INTERNATIONAL SOLAR ALLIANCE

Knowledge provider

EY

Building a better working world

Ernst & Young LLP

Ease of Doing Solar 2020

In ISA Member Countries

Contents

Foreword

With increased economic growth, there will be an exponential rise in demand for amenities owing to increased human consumption. This, in turn, would place an enormous demand on the resources of countries around the globe including that on the electricity or power sector. Therefore, the imperative is not just to meet the growing demand but meeting it in a sustained and efficient way.

The 2030 Agenda for Sustainable Development and the widely adopted Sustainable Development Goals (SDG) present a roadmap for sustainable, climate-conscious development for the ISA member countries. Among these, is the goal of a low-carbon future that necessitates resources with least or no carbon footprints quintessential in the energy mix. Solar, an abundant resource, holds the key here and is the most suitable alternative. However, large scale solar deployment would require vast scale investments across all solar rich countries and primarily a deep level of interest from the Investors worldwide.

Governments must navigate a complex maze of policy preparedness¸ technical feasibility and financial robustness to bring in the best solar technologies in the country. Investors, globally, would be attracted to a transparent and infrastructure ready regime supported by an investor friendly market. It is, therefore, essential for countries to assess their existing preparedness for solar investments and suitably adopt successful global learnings.

In 2019, the International Solar Alliance (ISA) felt the need of a publication that can address the areas of concern in the matter and decided to prepare the Ease of Doing Solar report as a demonstration pilot for consideration by the second General Assembly of the ISA. With a grand success of the first edition, the ISA decided to expand this initiative to cover the 80 member countries.

The ISA, with an assistance from Ernst & Young LLP (EY), has conceptualized a framework for evaluating countries on seven key indicators (macroeconomy, policy enablers, technical feasibility, market maturity, infrastructure, financing ecosystem and energy imperatives) and came up with a report that can be used by Governments and Investors to identify key challenges and drivers. The EoDS report is expected to serve as a ready reckoner for Governments to understand the policies, regulations and their effectiveness among the member countries and to build a robust and sustainable solar energy ecosystem in their home countries.

We hereby present this report to the Honourable members of Third Assembly of the ISA for consideration. My heartiest congratulation to the ISA Secretariat for bringing out this document.

Upendra Tripathy

Director General

International Solar Alliance

Glossary

Abbreviation	Full Form
BU	Billion Unit
1 BU	1 Terawatt-hour
Ckt km	Circuit Kilometer
COP	Conference of the Parties
CUF	Capacity Utilisation Factor
EoDS	Ease of Doing Solar
EU	European Union
FDI	Foreign Direct Investment
FY	Financial Year
GDP	Gross Domestic Product
GHG	Green house gases
GHI	Global Horizontal Irradiance
GW	Gigawatt
GWh	Gigawatt-hour
IPP	Independent Power Producer
km	Kilometer
kV	Kilo Volt
kW	Kilowatt
kWh	Kilowatt-hour
Mn.	Million
MU	Million Unit
1 MU	1 Gigawatt-hour
MVA	Million Volt Ampere
MW	Megawatt
MWh	Megawatt-hour
NPA	Non-performing asset
PV	Photovoltaic
RE	Renewable Energy
sq.	Square
SEIN	Sistema Eléctrico Interconectado Nacional
SHS	Solar Home Systems
TWh	Terawatt-hour
T&D	Transmission & Distribution
UNFCCC	United Nations Framework Convention on Climate Change
US$/ USD	United States Dollar
VAT	Value Added Tax
NFP	National Focal Points

Executive summary

1. Overview

The ISA aims to undertake joint efforts to reduce the cost of finance and the cost of technology and mobilize more than US$ 1,000 billion of investments by 2030 in the solar sector. The ISA's aim is to provide a dedicated platform for cooperation among solar-resource-rich countries through which the global community (including governments, bilateral and multilateral organizations, corporates, industry, and other stakeholders) can contribute to help achieve the common goal of increasing the use and improving the quality of solar energy in meeting energy needs in a safe, convenient, affordable, equitable and sustainable manner.

The Ease of Doing Solar 2020 Report, for the ISA members, is a continuation of the pilot study conducted for 4 member countries in 2019 and is now expanded to cover 80 ISA member countries with a refined evaluation framework. The report intends to provide a compendium, to the governments, on current progress and best practices for adoption across enabling parameters for solar across member nations. Further, it is expected to act as a reference to the Financial Institutions investing in solar. The ISA intends to publish this report on an annual basis by undertaking evaluation framework design, data collection, collation, analysis and the dissemination of the outcomes among member countries.

The assessment has been carried out, for each of the 80 member countries, across seven key drivers: macroeconomy, policy enablers, technological feasibility, power market maturity, infrastructure, financing, and energy imperatives. To study and quantify performance of the ISA member countries across these Drivers, various parameters and indicators have been selected under each driver to demonstrate Ease of Doing Solar. The seven key drivers form the bedrock of the EoDS evaluation model with weightages assigned to the drivers, parameters and indicators for a quantitative evaluation of the overall EoDS scores for the countries. Data for this study has been collected from primary and credible secondary sources. The countries have been grouped across four segments, as below, basis the quantification of the total scores across the drivers:.

Achiever	Countries with most favourable technical and commercial conditions for solar and perceived as most attractive for investments in solar.
Influencer	Countries with moderately favourable technical and commercial conditions for solar and perceived as moderately attractive for investments in solar.
Progressive	Countries which are at initial stages in development of a favourable ecosystem in terms of commercial feasibility and investments for solar.
Potential	Countries with untapped potential and at a nascent stage for development of favourable ecosystem.

2. Overview of the results

Owing to strong potential, robust sustainability targets, high solar irradiation and developing power infrastructure, India has emerged as a leading performer among the ISA member countries along with countries like Brazil, Saudi Arabia and United Arab Emirates. The 2020 report focuses on non-OECD member countries of the ISA. Countries have been classified in four categories based on the performance across seven drivers identified under the Ease of Doing Solar concept. The countries are arranged in alphabetical order under each classification.

Achiever

- Brazil
- India
- Saudi Arabia
- United Arab Emirates

Influencer

- Algeria
- Argentina
- Bolivia
- Botswana
- Burkina Faso
- Cape Verde
- Costa Rica
- Dominican Republic
- Egypt
- El Salvador
- Fiji
- Ghana
- Jamaica
- Maldives
- Mali
- Mauritius
- Namibia
- Nigeria
- Peru
- Rwanda
- Saint Kitts and Nevis
- Saint Vincent and the Grenadines
- Senegal
- Seychelles
- Sri Lanka
- Tanzania
- Trinidad and Tobago
- Tuvalu

Progressive

- Bangladesh
- Benin
- Cambodia
- Côte D'Ivoire
- Djibouti
- Dominica
- Ethiopia
- Gambia
- Grenada
- Kiribati
- Madagascar
- Malawi
- Mozambique
- Nauru
- Niger
- Palau
- Paraguay
- Samoa
- Saint Lucia
- Suriname
- Tonga
- Uganda
- Zambia
- Zimbabwe

Potential

- Burundi
- Cameroon
- Chad
- Comoros
- Cuba
- Democratic Republic of the Congo
- Equatorial Guinea
- Eritrea
- Gabon
- Guinea
- Guinea-Bissau
- Guyana
- Haiti
- Liberia
- Myanmar
- Papua New Guinea
- Sao Tome and Principe
- Somalia
- South Sudan
- Sudan
- Togo
- Vanuatu
- Venezuela
- Yemen

3. Regional highlights

Key insights from the assessment of the ISA member countries across 3 regions highlighting the strengths and areas of improvements in each region have been presented below.

Africa (42 Member countries)

- Africa region has 14 Influencer, 12 Progressive and 16 Potential countries in the EoDS 2020 report.
- Owing to higher levels of solar irradiations in the region, countries in Africa are bestowed with large solar potential and technological feasibility. Current low levels of access to electricity in some countries present a significant opportunity for off-grid solar technologies..
- Lead performers in the region have set high and long-term targets up to 2030 and have been undertaking activities towards theses goals.
- Most Progressive and Potential countries have had a reasonably better macroeconomic environment but need improvement in areas like infrastructure development and financing mechanisms.
- Aspects related to financing, policies and setting sustainability targets need more focus and offer scope for improvement to develop an effective solar ecosystem in the region.

Asia & Pacific (18 Member countries)

- Asia & Pacific region has 3 Achievers, 5 Influencer, 6 Progressive and 4 Potential countries in the EoDS 2020 report.
- Along with high levels of solar irradiation, enabling macroeconomic and financing aspects are driving the growth of Solar adoption in the region.
- Leading countries in the region have long-term visions related to infrastructure growth ably matching Solar growth and supportive investment ecosystem.
- Progressive and Potential countries of this region are still at initial stage of developing conducive policy environment and developing a robust power infrastructure to make solar more viable.

Latin America & Caribbean (20 Member countries)

- Latin America & Caribbean region has 1 Achiever, 10 Influencer, 5 Progressive and 4 Potential countries in the EoDS 2020 report.
- Similar to African region, Latin America & Caribbean region has also been bestowed with large Solar irradiation. Besides this, most countries of the region have performed well on aspects related to market maturity and macroeconomy.
- Leading performers in the region have set high and long-term solar targets up to 2050 and have been undertaking activities towards these goals. Leaders also encourage privatization and have long-term visions related to infrastructure growth and associated investment plans.
- For the Progressive and Potential countries, policy enablers and infrastructure development have been identified as key areas of improvement. Leaders in the region have implemented supportive policies like feed-in-tariff, net metering, etc. to encourage participation in the sector.

Note: Results from the assessment of countries across the drivers have been presented in the Appendix 1 of the document

4. Country assessment across drivers

Key insights from the assessment of member countries' across seven drivers drawn have been presented below:

Macroeconomy

- Robust GDP Growth rate and low country risks have been a key differentiators among countries evaluated on Macroeconomy.
- Other key differentiators include Investor protection initiatives and the extent of political stability in the individual countries.
- Most Influencer countries have initiated structural reforms to strengthen economic competitiveness and establishing more favourable environments to promote investments.
- Most Progressive countries have a strong FDI growth trend and with a rising GDP growth trend though the size of the GDP is comparatively lower.
- The Potential countries have low GDP size with the better ranked ones having a comparatively higher GDP growth rate.

Policy enablers

- Robust policy mechanisms to support renewables, sustainability targets and financial incentives are key scoring aspects on policy enablers.
- In addition, countries scoring high have created favourable downstream policy framework for renewable energy such as renewable purchase obligations (RPO), emission reduction targets and tax incentives for solar developers.
- Most Influencer countries may not have demonstrated significant actions on policy front but have mandated clear policies to promote clean energy primarily through private participation
- Progressive countries are in the initial phases of renewable specific policy formulation but have acknowledged the role of renewable energy in the country's developmental agenda.
- The Potential countries have been focussing on introducing favourable policies to promote renewable energy with limited on ground implementation.

Technological feasibility

- High levels of Global Horizontal Irradiance (GHI) and normative capacity utilisation factors are the key differentiators in Technological Feasibility across the four evaluation segments.
- Countries in Africa and Middle East are bestowed with naturally high levels of solar irradiation have scored higher in Technological Feasibility and hence have score comparatively higher.
- Existence of energy storage projects have also helped in improving technological feasibility scores for the leading countries.
- Another key differentiating criterion has been the extent of use of renewable to enhance electricity access in countries that are still not hundred percent electrified.

Note: Results from the assessment of countries across the drivers have been presented in the Appendix 2 of the document

Market maturity

- Countries with high levels of access to electricity, presence of a structured and mature power markets along with a robust share of operational solar projects have scored high in Market Maturity.
- Another key differentiating factor has been the adoption of competitive bidding process for awarding power projects by the countries.
- Most Influencer countries have already achieved a significant level of electricity access and have a strong focus on opening the power market through private participation.
- The Potential and the Progressive countries are differentiated, primarily, with the levels of electricity access and the extent of initiatives to transition towards a comparatively mature power market in future.

Infrastructure

- Looking into the intermittency and other operational challenges related to solar integration with the grid, the need for robust infrastructure is indispensable. The Achiever countries have taken a planned approach towards strengthening the national grid infrastructure with a focus on integrating solar.
- Leading countries have also encouraged private participation in not only solar infrastructure development but also in strengthening grid infrastructure privatisation to fast-track infrastructure development.
- Most Influencer countries have taken concrete steps towards developing a long-term infrastructure development plan with renewables at its core.
- Progressive and Potential countries are in different stages of building and operating a robust, high voltage integrated transmission grid to support better integration of solar in the long run.

Financing

- Low cost of financing, better accessibility to financial instruments and presence of quality banking system are the key reasons for countries which perform better on financing. Extent of private credit, by domestic banks, is also an enabling differentiator.
- Most Achievers have set up specialized institutions to develop targeted incentives for the industry, climate funds, tax incentives, grants, financial programs and cooperation plans to encourage capital flows in the sector.
- Most Influencer countries present a stable financial outlook and a strong financial ecosystem which is moving towards the levels of Achievers.
- The Potential countries are having certain levels of financial institutional setup especially for power sector financing thought it is primarily focusing on government financing or from Developmental Financing Institutions (DFIs).
- There is significant dependence on financing from DFIs in most Potential countries. The institutional mechanism for project financing is still in the evolution stage.

Note: Results from the assessment of countries across the drivers have been presented in the Appendix 2 of the document

Energy imperatives

- The existing per capital electricity consumption, historical growth in electricity demand and current solar installed capacities are the key differentiating parameters under energy imperatives. The Achiever countries have scored maximum on this criterion.
- Influencer countries have demonstrated growth in electrical demand and solar installed capacities. In addition to the high-income economies, a few developing countries have also performed relatively better in energy imperatives owing to their aggressive solar deployment in recent years mostly in off-grid solar primarily on account of rapid electrification
- The Progressive countries have a strong potential of off-grid as well as on-grid solar but the same is yet to be explored. Owing to low electrifications levels, the demand growth is not strong but is expected to grow once electrification starts even using off-grid solar plants.
- Most Potential countries have had a good demand growth but score low in solar deployment over the years.

5. Way forward

The 2020 edition of the EoDS report focuses on developing a robust and comprehensive framework for country evaluations. Future editions will aim towards further strengthening stakeholder consultations through regional and country level engagements which are quintessential in further reinforcing the EoDS framework. It will also enable seamless and more updated data collection for the upcoming editions of the EoDS report.

Going forward, greater emphasis will be given to online dashboards for better visualisation and user interaction which will enable the ISA in moving from a paper based report to interactive analysis. Transition towards online report is expected to further facilitate greater participation from member countries. It will also provide a more dynamic experience for member countries by adopting features such as real time data sharing by members to faster response on the draft analysis and reporting.

The online mode of the EoDS report will also ensure agility and adaptability to enable inclusion of new parameters and indicators in the framework as well as reducing the annual reporting frequency to half yearly or even quarterly reporting.

The 2020 report classifies countries in 4 broad categories, i.e. Achiever, Influencer, Progressive and Potential. As the EoDS framework matures, the future editions will evolve towards absolute rankings that would present a better country to country comparison framework leading to higher response from countries to work towards improving individual rankings.

Further, few additional features are planned in the future editions such as country profile matching to draw finer regional and county-level insights and developments where countries would be able to draw more objective and actionable insights from the practises adopted by high performers. The platform will aim to accommodate new opportunities listing and development review articles/ stories providing more visibility for the member countries. The EoDS concept also has the potential to evolve as a base case to plan Technical Assistance for the ISA member countries to further enhance their solar investment environment.

Note: Results from the assessment of countries across the drivers have been presented in the Appendix 2 of the document

Approach and methodology

1. Overview

1.1 Framework for Ease of Doing Solar 2020 report

A. Guiding principles & scoring methodology

How it is done?

- Review of past similar studies to assess various methodologies
- Parameters (KRA) and KPIs identification, selection and formulation of rationales
- Sources-based classification of KPIs
- Criticality assessment and assigning weights for quantitative analysis

Key outputs

- Drivers & KPIs
- Rationales and classification

B. Scoring model & data research

How it is done?

- Secondary data collection (based on credible data sources)
- Primary data collection (NFPs and country-focused research)
- Identify and address data gaps and key roadblocks for each country
- Determining weightages for drivers – learnings from similar studies

Key outputs

- Weights for the KRAs and KPIs
- Validated data set and scoring model for the analysis

C. Data sensitization and verification

How it is done?

- Consensus building with stakeholders
- Preparation of country specific reports
- Country specific consultations

Key output

- **Ease of Doing Solar 2020 report**

1.2 Classification based on overall scores

Achiever	Countries with most favourable technical and commercial conditions for solar and perceived as most attractive for investments in solar.
Influencer	Countries with moderately favourable technical and commercial conditions for solar and perceived as moderately attractive for investments in solar.
Progressive	Countries which are at initial stages in development of a favourable ecosystem in terms of commercial feasibility and investments for solar.
Potential	Countries with untapped potential and at a nascent stage for development of favourable ecosystem.

Ranking framework shall evolve from “Classification” to “Absolute ranking” over the years as the EoDS concept matures and used as a guiding tool for benchmarking by stakeholders

2. Guiding principles

2.1 Guiding principles for the EoDS 2020 report

The EoDS report has country-specific snapshots and analysis that assess a country's preparedness in attracting and sustaining investments in the solar space. The analysis has been planned to encompass multiple solar segments:

1) Grid connected solar

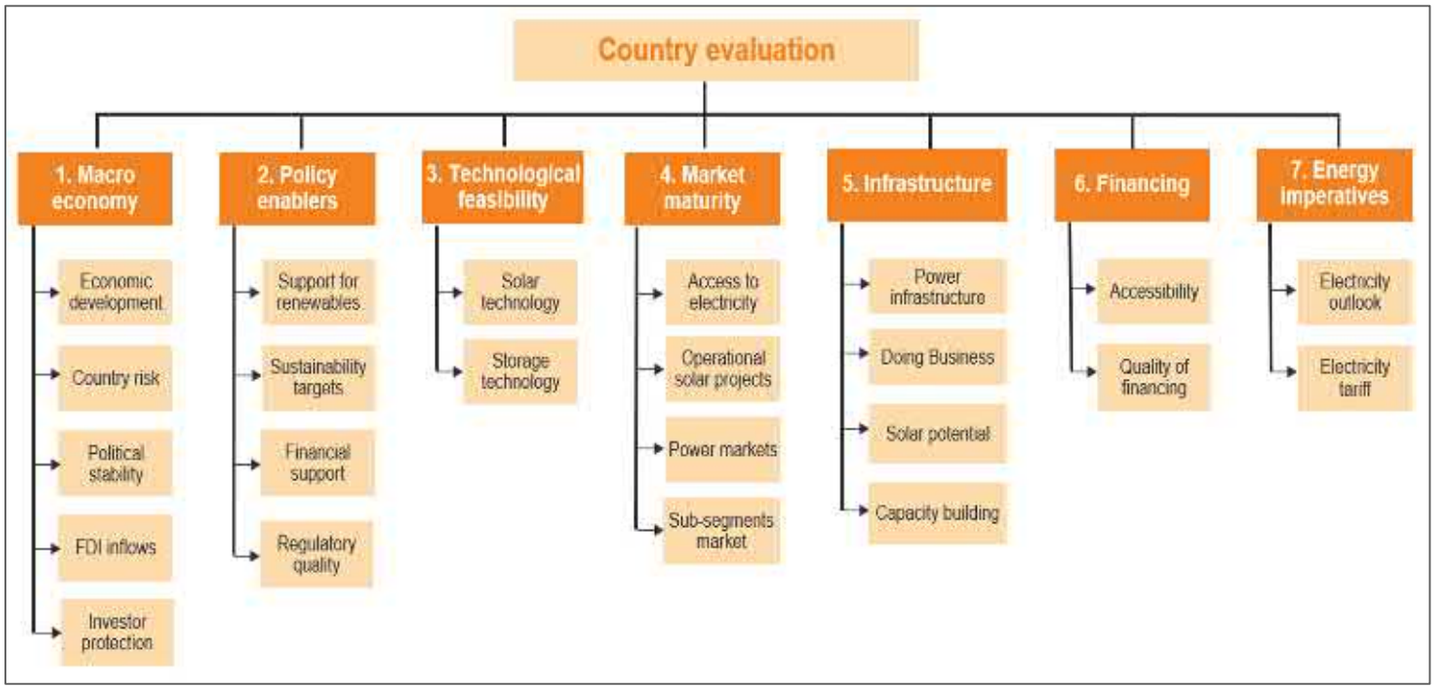
2) Solar mini-grids

3) Solar rooftop

4) Solar home systems

The assessment has been carried out for each of the member countries across seven key drivers: macroeconomy, policy enablers, technical feasibility, power market maturity, infrastructure, financing, and energy imperatives. Nearly 38 indicators have been used to develop the analysis of these parameters and drivers. Each of these parameters demonstrates the Ease of Doing Solar in the ISA member countries.

The guiding principles– drivers, parameters and indicators- have been developed based on the review of similar studies like 1). Ease of Doing Business by the World Bank; 2). State Investment Promotion Agency Framework by Invest India; 3). Global Investment Competitiveness Report by the World Bank; 4). Renewable Energy Country Attractiveness Index by EY; 5). Regulatory Indicators for Sustainable Energy (RISE) Study and the review of multiple reports and analysis from 1). International Energy Agency (IEA); 2). International Renewable Energy Agency (IRENA); 3). Lighting Global; 4). GOGLA; 5). World Bank and many others. The basic skeleton of the evaluation is similar to the pilot study conducted last year.



Guiding principles – drivers & evaluation parameters considered for EoDS 2020 analysis

3. Understanding the drivers

3.1 Understanding the drivers

The table below provides details of each of the seven drivers of the EoDS 2020 framework. Key parameters are also listed which were used to analyse the performance of the countries against the drivers.

Drivers	Description	Parameters
Macroeconomy	Macroeconomic parameters shall be evaluated to understand the economic strength, in terms of size of the economy, growth prospects and maturity. The macroeconomic driver also helps the stakeholders assess the market and associated risks at a macro-level. Strong macroeconomic indicators, for a country, signify business opportunities for the investors/ developers and also translates to an optimistic view of the future of solar sector in the country.	• Economic development • Country risk • Political stability • FDI inflow • Investor protection
Policy enablers	Effective policies and quality of regulatory ecosystem act as key enablers for growth in any sector. This is an important driver for the governments and investors to understand the road blocks limiting the growth of solar segment in the country. Government initiatives, such as fiscal incentives and subsidies for solar energy deployment, not only helps in attracting new investments in the sector but also minimises the risks associated with such projects.	• Support for renewables • Sustainability targets • Financial support mechanisms • Regulatory quality
Technological feasibility	Analysis of various technical aspects is of utmost importance in order to determine the feasibility and cost-effectiveness of a solar project. Indicators such as solar irradiation in the region and capacity utilisation factor impact the viability of solar Projects.	• Solar irradiation levels • Storage technology
Market maturity	Market maturity is a critical driver for the investors and project developers to have a better understanding of the overall electricity market in the country. A mature market ensures minimum risks and high certainty of returns to the investors, but also offers high degree of competition. On the other hand, a less mature market may offer huge opportunities for the new entrants, but with a higher risk quotient.	• Access to electricity • Operational solar projects • Power markets • Market for solar sub-segments

Drivers	Description	Parameters
Infrastructure	Adequate infrastructure is essential to support the development of solar projects. Availability of adequate transmission & distribution infrastructure/ network, efficiency of power utilities and capacity building activities are essential components of infrastructure that translates to the success of solar industry in the country.	• Power infrastructure • Ease of Doing Business • Solar potential • Capacity building
Financing	Analysis of domestic banking ecosystem is essential to understand business viability and risks in a country. Strong financial ecosystem and innovative financial products are important factors for large scale solar deployment. While availability of appropriate financing models is essential to attract private investments, low cost of financing is also critical for the commercial viability of the projects and off-grid products deployment.	• Accessibility to financing • Quality of banking ecosystem
Energy imperatives	This parameter evaluates the total electricity landscape in terms of consumption, tariffs and installed capacities. The current status of off-grid solar products is also analysed, which can help investors identify the country's potential for off-grid installations.	• Electricity sector outlook • Electricity tariffs

4. Determining weightages for drivers

4. Determining weightages for drivers

Assigning weights for drivers forms a critical part of the study. It captures relative importance of the drivers and helps in arriving at the overall classification of the countries. The weightages for the drivers in the EoDS 2020 report have been determined based on the learnings from similar studies and consultations with domain experts.

Learnings from similar studies

- Multiple similar studies and their mechanisms for weightage determination have been analysed to understand existing methodologies in the system.

Sample analysis:

- State Rooftop Solar Attractiveness (SARAL), 2019 Index covering 31 Indian states: Basis the importance/ ranks given by different stakeholders, the weightages to the parameters were decided.
- Ease of Doing Business, 2020 by the World Bank uses a direct method: Weighing all topics equally and giving equal weight to each component within each topic.

Ease of Doing Business

Parameters	Weightage
Starting a business	9.09%
Dealing with construction permits	9.09%
Getting electricity	9.09%
Registering property	9.09%
Getting credit	9.09%
Protecting minority investors	9.09%
Paying taxes	9.09%
Trading across borders	9.09%
Enforcing contracts	9.09%
Resolving insolvency	9.09%
Labour market regulation	9.09%
Total	100%

SARAL – State Rooftop Solar Attractiveness Index

Parameters	Weightage	Sub-parameters	Weightage
Robustness of Policy framework	20%	Level of policy support	33.3%
		Billing Mechanism	33.3%
		Covenants	33.3%
Effectiveness of policy support/ implementation	26.3%	Ease of application	60%
		Power offtake attractiveness	10%
		Impact of Policy	10%
		State of affair of DISCOMs	20%
Investment climate	16.8%	Driver for rooftop solar uptake	33.3%
		Maturity of the Market	33.3
		Ease of financing	33.3%
Consumer experience	26.3%	Pre-installation consideration	30%
		During installation	40%
		Post-installation experience/costs	30%
Business ecosystem	10.6%	Business enablers	37.5%
		Fiscal and Regulatory Environment	37.5
		Economic outlook	25.0%
Total	100%		100%

5. Data research

5.1 Data research – secondary

- Database-based research has been carried out for major set of Indicators. Competent databases from World Bank, IMF, UN Foundation, IEA, IRENA, etc. have been used.
- Country-focused research has been carried out to address data gaps for a small set of countries and to develop insights on member countries.

5.2 Data research – primary

A questionnaire was developed and circulated among the National Focal Points (NFPs) of the member countries. A part of the questionnaire is appended below:

S.No.	Key Indicators	Response	UoM	Source of Information (if applicable)	Year of Information	Remarks
1	**Does the country have Renewable Energy Targets?**		Yes/No			
2	**Are the following mechanisms available for Renewable Energy**					
	Accelerated Depreciation of Renewable Energy Assets		Yes/No			
	Subsidy provisions for Renewable Energy		Yes/No			
	Feed-in-Tariffs for Renewable Energy Supply to the Grid		Yes/No			
	Revenue Based Incentives		Yes/No			
	Presence of Net metering/ Gross metering policies and regulations		Yes/No			
3	**Is there a mandate for Renewable Purchase Obligations (RPO) for Distribution utilities/ Retailers/ DSOs?**		Yes/No			
4	**Are there specific policies/ schemes for the following Solar**					
	Solar Rooftop		Yes/No			
	Solar Mini Grids		Yes/No			
	Solar standalone systems		Yes/No			
	Utility scale Solar		Yes/No			
5	**Are following incentives available?**					
	Import duty waivers for Solar Developers		Yes/No			
	Tax waivers for manufacturers of raw materials (modules, off grid appliances, SHS, etc.)		Yes/No			
6	**Are there Government Trainings/ certifications/ academic programs focusing on Solar industry for people?**		Yes/No			
7	**Kindly provide the following information to understand the Institutional Structure in the Power sector.**					
	Have the Power sector operations been segregated into Generation, Transmission & Distribution?		Yes/No			
	Is the Power sector regulated?		Yes/No			
	Are there regional/ national Load dispatch centres for power grid operations?		Yes/No			
	Are there Technical Standards pertaining to Power equipments?		Yes/No			
	Does the country have a grid code that clearly specifies connection procedures for ensuring Grid operations?		Yes/No			
	Is there a dedicated Nodal agency for Renewable Energy?		Yes/No			
8	**Do the players in the Power industry have access to any Power exchange/ Power trading platform?**		Yes/No			

Procedure:

- Questionnaire was prepared in English, French and Spanish languages to facilitate prompt data collection from primary sources – NFPs.
- Responses were sought as qualitative information (eg.: Yes/ No) and data-based information for nearly 17 and 28 Indicators respectively.
- The research is based on data for the year 2019. However, in instances where data was not available for 2019, earlier years' data was used.

Country reports

What to look for in each section of the country report?

Country snapshot

This section primarily covers country's as-is scenario with respect to the power sector indicators such as annual electricity consumption, access to electricity, installed solar capacity, Ease of doing business score, and growth of solar installed capacity.

Power trends

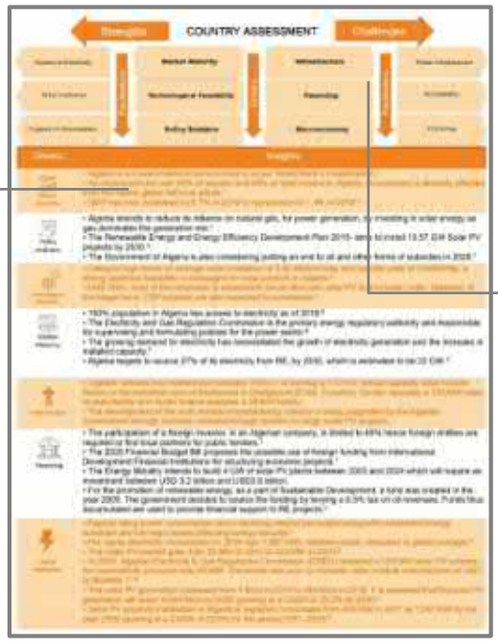
This section depicts overall power sector trends of the country through yearly trends in cumulative solar installed capacity, access to electricity, consumer mix and overall electricity consumption. Consumer mix is not shown for a few countries where data was not available.

Qualitative assessment

This section provides a crisp qualitative assessment of the country across seven drivers. References for the remarks under this section are provided in the Appendix of this report.

Page 1

Page 2



EoDS performance

This section indicate overall classification of the country (i.e. Achiever, Influencer, Progressive and Potential). It also shows countries performance across seven drivers as detailed out in the approach and methodology section of this report.

Installed capacity drill down

This section depicts electricity mix of the country (in capacity terms) along with the drill down on capacity of solar sub-segment such as solar mini-grid, solar home systems etc.

Performance in the sub-region

For the countries where installed capacity drill down was not available, EoDS classification of the neighbouring countries is depicted in this section.

Strengths & challenges

This section provides insights developed from the overall assessment of the member countries across seven drivers. Relative strengths(in orange) and challenges (in grey) have been identified for the country based on performance comparison within the country across sever drivers and various parameters within those drivers.

Note: Extensive list of sources are provided in the Appendix -3 of the report.

Algeria

Africa

Electricity Consumption in BU (2017)

56.4

Installed Solar Capacity in MW (2019)

423.0

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

423.0

World Bank's Ease of Doing Business Score (2020)

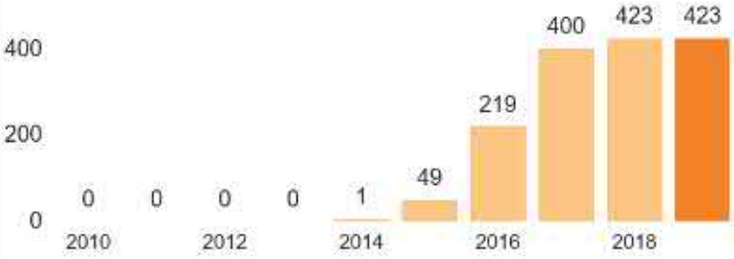
48.60

Solar installed capacity Growth rate (CAGR) for 2015-19

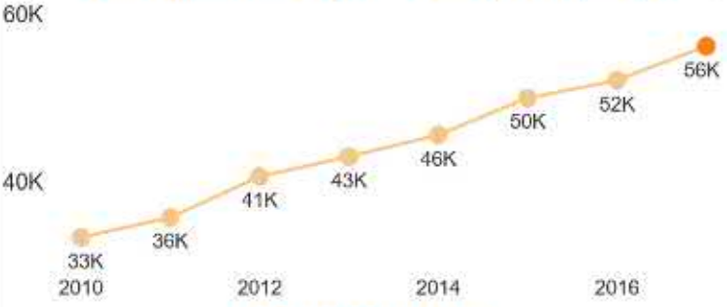
71%

Power Trends

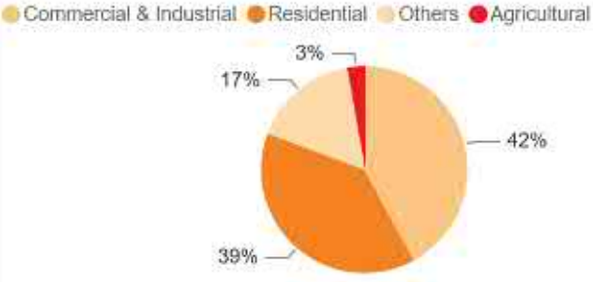
Cumulative Solar installed Capacity (MW)



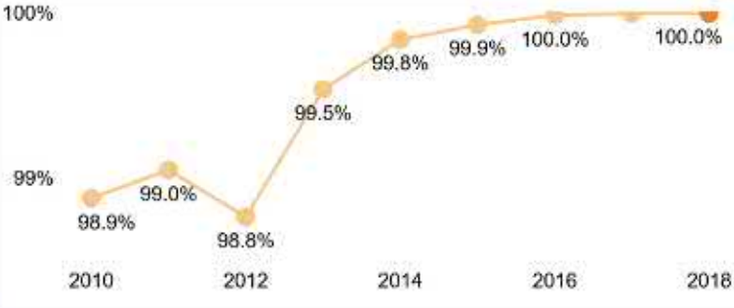
Overall Electricity Consumption (MU)



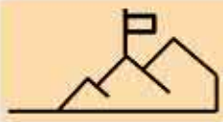
Consumer Mix



Access to Electricity

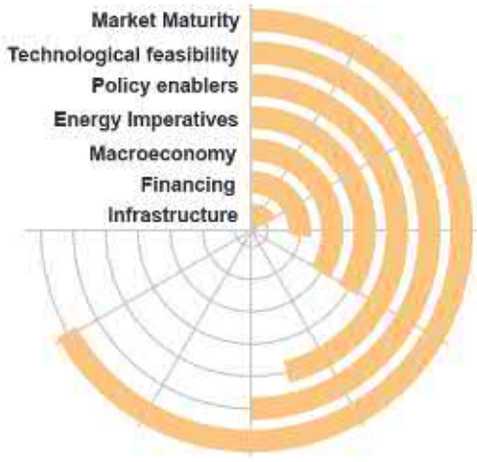


Ease of Doing Solar Classification

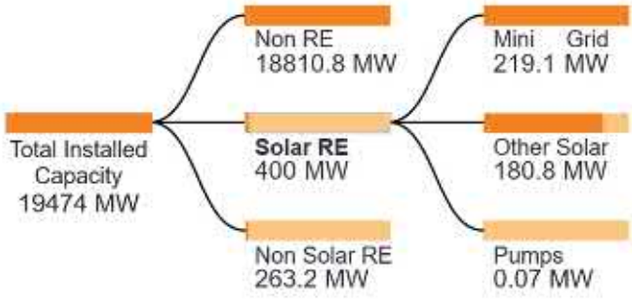


Influencer

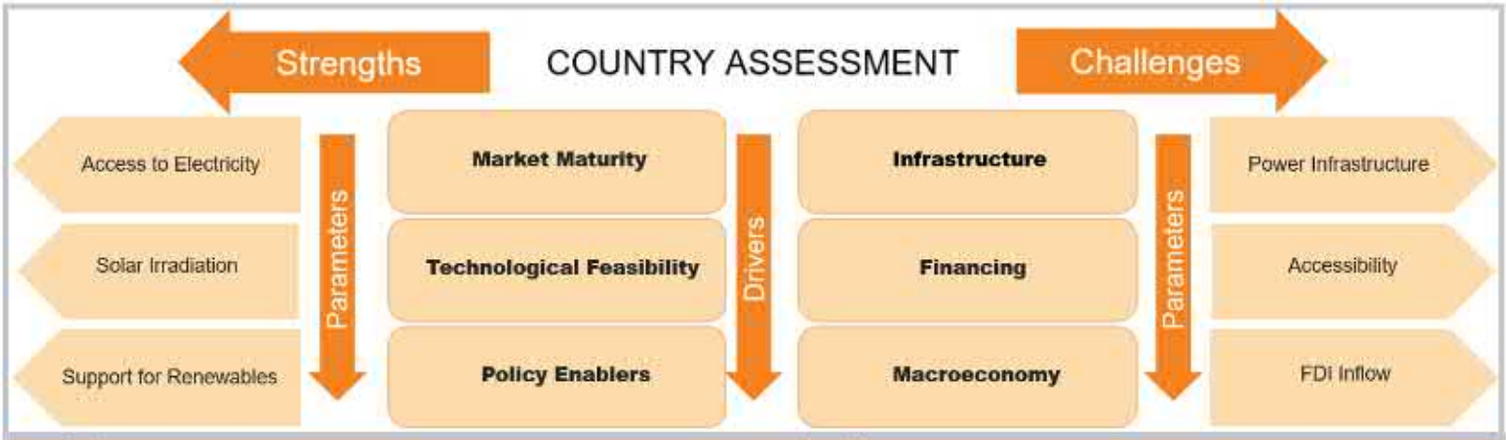
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Algeria is a Lower-middle-income economy as per World Bank's classification.[1] • As oil accounts for over 90% of exports and 60% of total income in Algeria, its economy is severely affected from the recent global fall in oil prices.[1] • GDP has only increased by 0.7% in 2019 in comparison to 1.4% in 2018.[2]
Policy enablers	• Algeria intends to reduce its reliance on natural gas, for power generation, by investing in solar energy as gas dominates the generation mix.[1] • The Renewable Energy and Energy Efficiency Development Plan 2015- aims to install 13.57 GW Solar PV projects by 2030.[3] • The Government of Algeria is also considering putting an end to oil and other forms of subsidies in 2020.[1]
Technological Feasibility	• Owing to high levels of average solar irradiation of 5.92 kWh/m^2/day and specific yield of 5. kWh/kWp, a strong technical feasibility is envisaged for solar projects in Algeria.[4] • Until 2020, most of the emphasis is expected to be on wind and solar PV due to lower costs. However, in the longer term, CSP projects are also expected to commence.[5]
Market Maturity	• 100% population in Algeria has access to electricity as of 2018.[8] • The Electricity and Gas Regulation Commission is the primary energy regulatory authority and responsible for supervising and formulating policies for the power sector.[6] • The growing demand for electricity has necessitated the growth of electricity generation and the increase in installed capacity.[7] • Algeria targets to source 27% of its electricity from RE, 2030, which is estimated to be 22 GW.[5]
Infrastructure	• Algerian telecom and renewables company Milltech is building a 100 MW annual capacity solar module factory in the industrial zone of Boukerana in Chelghoum El Aid. Currently, Condor operates a 130 MW solar module facility and Aurés Solaire operates a 30 MW facility. • The development of the solar module manufacturing industry is being supported by the Algerian Government through domestic demand through tenders for large scale PV projects.
Financing	• The participation of a foreign investor, in an Algerian company, is limited to 49% hence foreign entities are required to find local partners for public tenders.[1] • The 2020 Financial Budget Bill proposes the possible use of foreign funding from International Development Financial Institutions for structuring economic projects.[1] • The Energy Ministry intends to build 4 GW of solar PV plants between 2020 and 2024 which will require an investment between USD 3.2 billion and USD 3.6 billion. • For the promotion of renewable energy, as a part of Sustainable Development, a fund was created in the year 2009. The government decided to source the funding by levying a 0.5% tax on oil revenues. Funds thus accumulated are used to provide financial support to RE projects.[5]
Energy Imperatives	• Rapidly rising power consumption and a declining natural gas output along with substantial energy subsidies are the major issues affecting energy security.[8] • Per capita electricity consumption in 2019 was 1,887 kWh, relatively lower compared to global average.[6] • The Solar PV market grew from 25 MW in 2010 to 423 MW in 2019. • In 2019, Algerian Electricity & Gas Regulation Commission (CREG) tendered a 150 MW solar PV scheme, but successfully procured only 50 MW. The tender was won by domestic solar module manufacturer at USD 0.069 per kWh.11,14 The solar PV generation increased from 1 MUs in 2014 to 385 MUs in 2016. It is expected that the solar PV generation will reach 9,345 MUs by 2030 growing at a CAGR of 25.2% till 2030.[8] • Solar PV capacity installation in Algeria is expected to increase from 400 MW in 2017 to 7,267 MW by the year 2030 growing at a CAGR of 22.5% for the period 2017–2030.[8]

Argentina

Latin America & Caribbean

Electricity Consumption in BU (2017)

129.0

Installed Solar Capacity in MW (2019)

441.3

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

2.0

World Bank's Ease of Doing Business Score (2020)

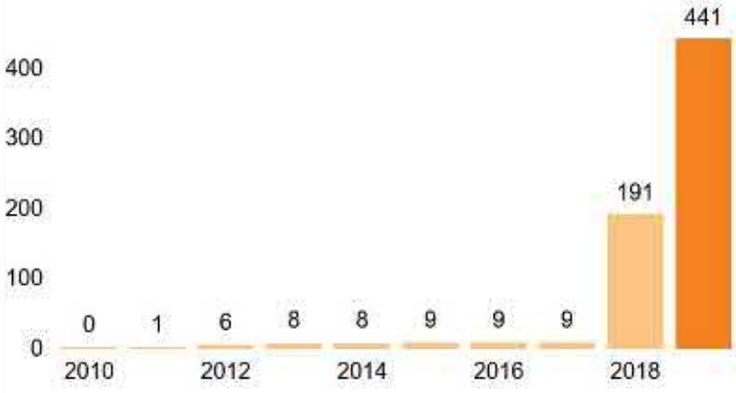
59.00

Solar installed capacity Growth rate (CAGR) for 2015-19

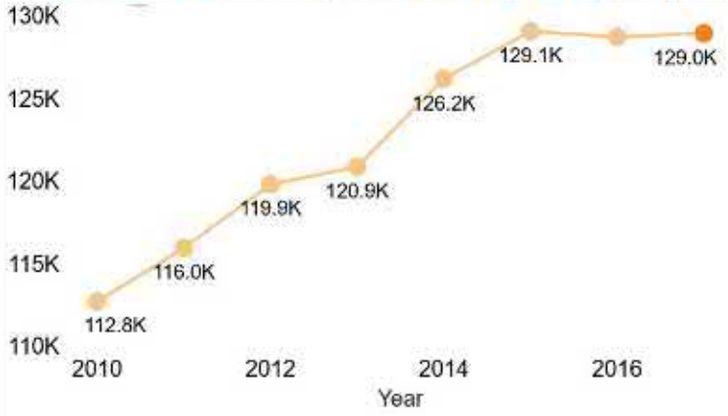
167%

Power Trends

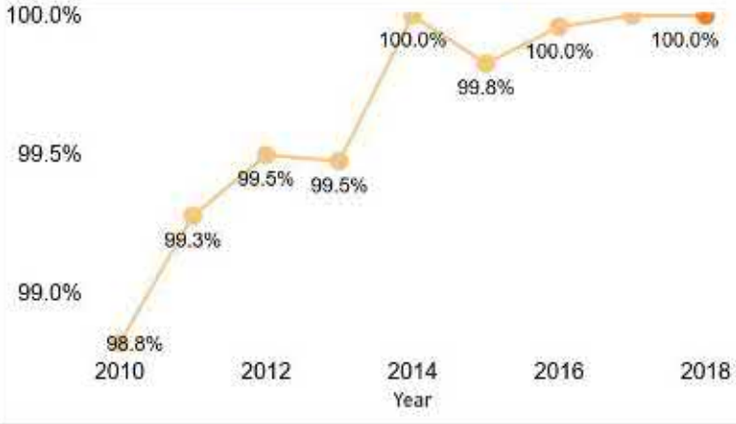
Cumulative Solar installed Capacity (MW)



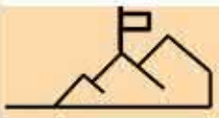
Overall Electricity Consumption (MU)



Access to Electricity

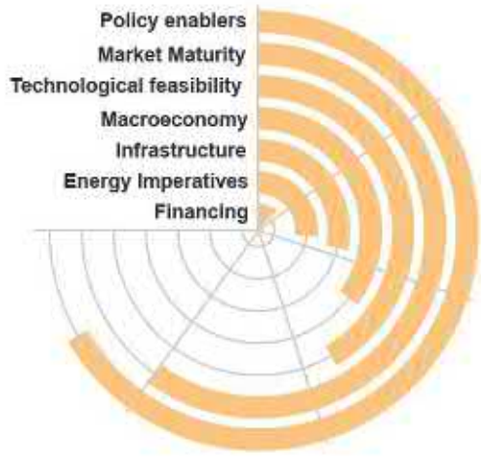


Ease of Doing Solar Classification



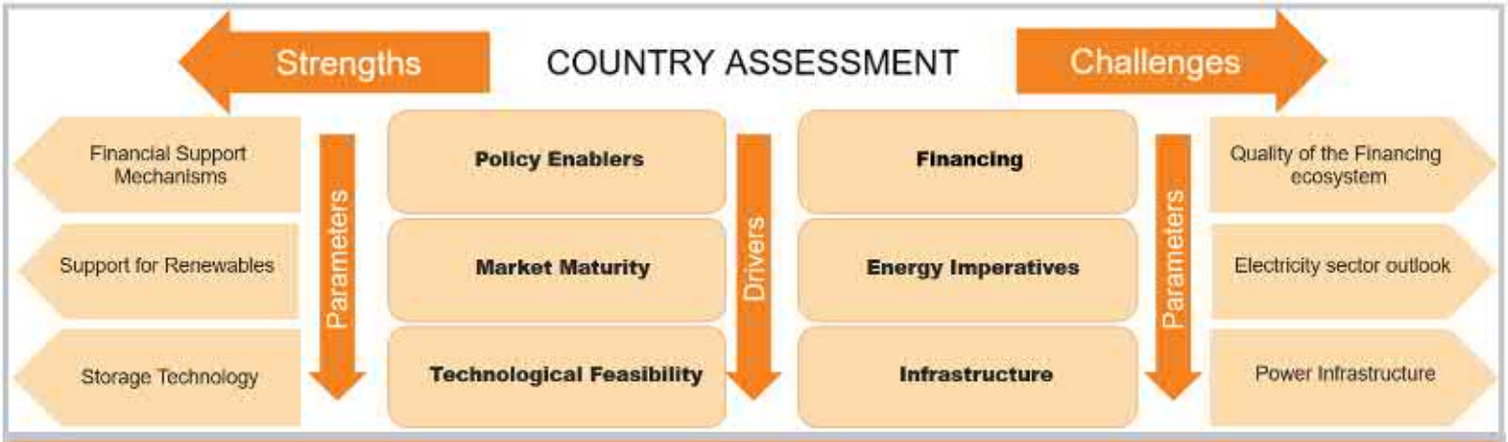
Influencer

Performance against 7 Drivers



Sub-regional standing

Neutral Beignner Progressive Influencer



Drivers	Insights
Macro-economy	• GDP (at current prices) was poised at USD 449.66 billion in 2019.[4] • GDP (Real) has contracted at an annual rate of 2.2% in 2019.[6,7] • Argentina also initiated structural reforms to strengthen the competitiveness of its economy and to create conditions for private sector-led growth, including reducing export taxes, easing import controls and implementing reforms to reduce the cost of doing business.[7]
Policy enablers	• Feed-in-Tariffs and other subsidies are being offered to encourage investments in renewable energy.[6] • The National Electricity Act established the National Electricity Fund which capitalized upon tax collected on power sales in the wholesale market. Under the law, 60% of these taxes are distributed to those provinces that adhere to federal schemes for distribution tariffs in order to subsidize consumers. The remaining 40% is allocated to the internal development of power sector.[6] • RenovAr (Argentina Renewable Energy Auctions) program conducted four rounds of bidding from 2016 to 2019 and allocated more than 36 solar projects with approximate capacity of 1500 MW.[6,9]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.12 kWh/m^2/day and specific yield of 4.66 kWh/kWp, strong technical feasibility is envisaged for solar projects in Argentina.[1] • The World Bank Country Partnership Framework (CPF), for 2019-2022, promotes the adoption of climate-smart practices through the Integrated Risk Management in Rural Agro-Industrial System.[8]
Market Maturity	• Installed renewable capacity was 1.7 GW in 2018, grown at a CAGR of 10.6% from 2000 and is expected to reach 16.4 GW by 2030.[6] • 100% of population has access to electricity as of 2018.[5] • Total power generation was 136.2 BUs in 2018 and is expected to reach 222.5 BUs by 2030.[6] • In 2018, renewable power generation was 4.1 BUs and is expected to grow at a CAGR of 18.6% between 2019-2030.[6]
Infrastructure	• In 2018, the total length of the transmission network was 35,563 ckm which is expected to increase to 44,886 ckm by 2025.[6] • In 2018, the total distribution network length was 434,428 ckm and is expected to reach 505,762 ckm by 2025.[6] • Power generation is one of the most competitive markets in which majority of capacity is owned by private and a small share is split between municipal, provincial, co-operative and national operators.[6]
Financing	• International financial flow in 2017 was USD 490.1 million (in PPP terms) to support clean and renewable energy.[5] • An annual deal value of USD 3.4 billion was achieved in 2018 from 27 deals in Argentina's power sector.[6] • Large consumers, with with a demand load equal to or larger than>300 kW, have been given the option of opting out of the tendered Power Purchase Agreements (PPA) and getting their supply directly from a distributor or from the wholesale market at a price ceiling of USD 113 per MWh or through self-consumption projects.[6] • The Term Market, from Renewable Energy Sources (MAT ER) regime, aims to set favourable conditions for large electricity users within the wholesale electricity market and large distribution companies to meet their demand supply obligation from renewable sources.[6]
Energy Imperatives	• Annual consumption increased to 129 BUs in 2017, at a CAGR of 3.3% from 2000 and is expected to reach 140.6 BUs by 2023.[6] • Per capita electricity consumption of 3,125 kWh, in 2019, is nearly at par with the global average.[2] • Renewable energy share, in total final energy consumption, was 11% as of 2017 and is targeted to reach 20% by 2025.[5,6] • The Renewable Energy Project in Rural Markets (PERMER) program aims to support rural populations by supplying renewable energy to schools and households.[6]

Bangladesh

Asia & Pacific

Electricity Consumption in BU (2017)

60.2

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

45.00

Installed Solar Capacity in MW (2019)

283.6

Installed Off-Grid Solar Capacity in MW (2019)

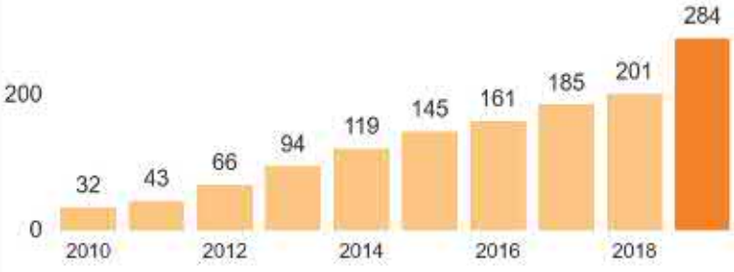
209.3

Solar installed capacity Growth rate (CAGR) for 2015-19

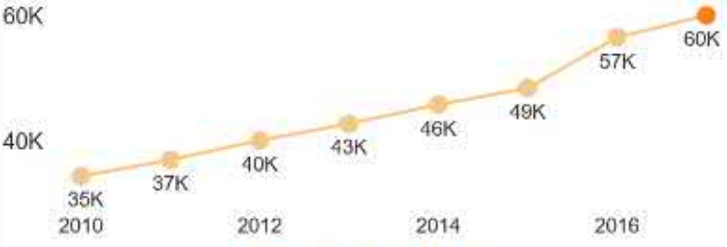
18%

Power Trends

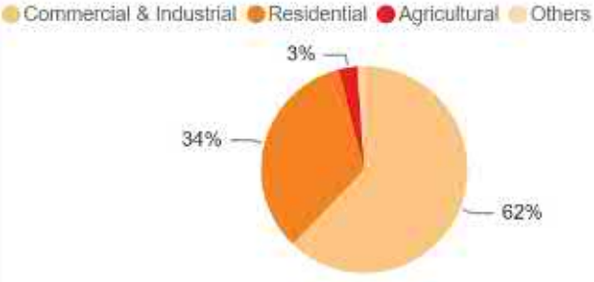
Cumulative Solar installed Capacity (MW)



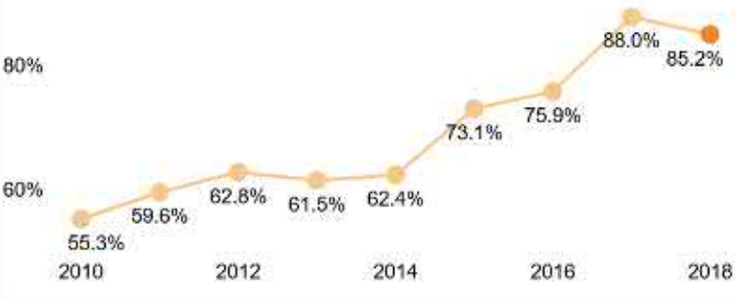
Overall Electricity Consumption (MU)



Consumer Mix

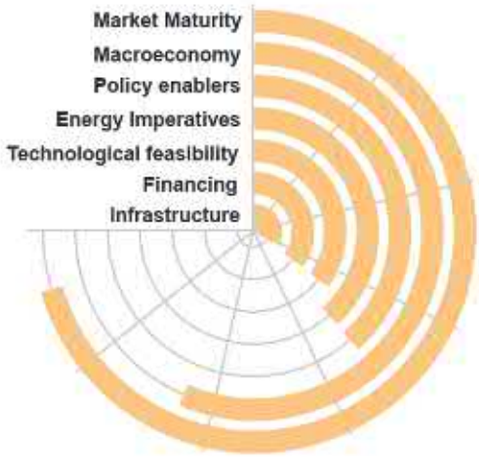


Access to Electricity

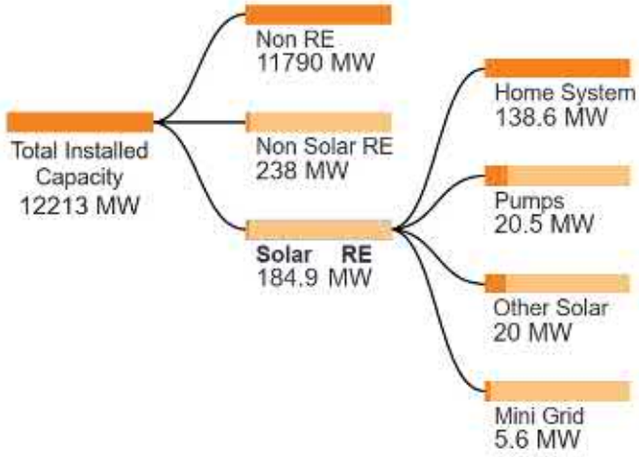


Ease of Doing Solar Classification

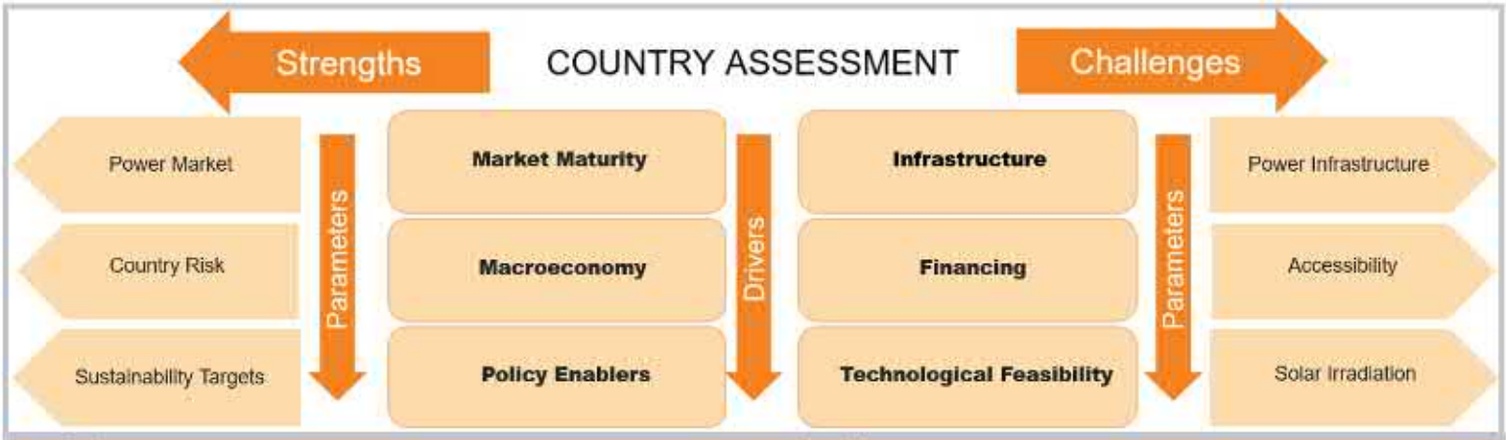
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Bangladesh is one of the fastest growing economy in the region with a stable economic performance that has helped reduce poverty and social inequalities. • GDP (Real) has grown at an annual rate of 7.9% in 2019.[1] • FDI inflows to Bangladesh fell by 56% to USD 1.6 billion in 2019 from USD 3.6 billion in 2018.[2] • In 2018, Bangladesh fulfilled all three eligibility criteria for graduation from the UN's Least Developed Countries (LDC) list for the first time and is on track for graduation in 2024.
Policy enablers	• Renewable Energy Policy aims to develop renewable energy projects to meet 10% of the total power demand by 2020 coming from renewables.[3] • The Solar Home System (SHS) program is one of the most successful green energy programs in the world providing nearly 20 million people with access to electricity.[4] • Bangladesh is considered to be a market leader in Solar Home Systems in the region.
Technological Feasibility	• The country receives 10.5 hours of sun on an average per day, of which 4 - 4.5 are peak sunlight hours and 300 clear sunny days per year. • Bangladesh receives relatively moderate levels of solar irradiation levels of 4.60 kWh/m^2/day and specific yield of 3.89 kWh/kWp. Moderate technical feasibility is envisaged for solar projects in Bangladesh.[5] • The power sector has a high dependence on fossil fuels as natural gas and coal are the dominating sources for power generation in the country. • Land availability, due to one of the highest population densities in the world, is a strong deterred to large scale solar power plants. • Floating solar is under consideration to utilize the large water resources of the country for harnessing solar power.
Market Maturity	• 85% population in Bangladesh has access to electricity as on 2018.[6] • Power sector is regulated by Bangladesh Energy Regulatory Commission (BERC). Power sector is unbundled into generation, transmission and distribution, largely managed by state owned utilities. Generation and distribution are managed by Bangladesh Power Development Board (BPDB) with some participation of IPPs whereas transmission is solely managed by Power Grid Company of Bangladesh Ltd. • Gas-based thermal power generation is the dominant technology in Bangladesh.[7] • Transmission system comprises of two voltage levels, 132 kV and 230 kV lines.[7]
Infrastructure	• Eight solar parks with a 100MW capacity each and a 200 MW capacity solar power project is under planning while two 200MW capacity solar parks are under construction. • Bangladesh Economic Zone Authority (BEZA) intends to develop a solar power zone that will add at least 1,000 MW PV capacity. The government agency has taken steps to acquire about 4,000 acres (1,619 ha) of land for this purpose. • Rooftop solar is getting significant traction with many state-owned entities considering the option to reduce the electricity cost and carbon footprints.
Financing	• Country has a stable financial outlook with a credit rating of Ba3 as of March 2020.[8] • Financial situation of the banking sector remains weak due to a large share of non-performing loans and an increase in restructured loans.[9] • Infrastructure Development Company Limited (IDCOL), Government owned financing agency, provides soft finance for Solar Home System, Solar Pumps, Roof-top systems and Solar Mini-grids /Micro-grids.[10]
Energy Imperatives	• Power demand in Bangladesh has been increasing rapidly, due to the growth of the domestic economy.[7] • Per capita electricity consumption in 2019 was 550 kWh, relatively low in comparison to the global average.[11] • The Solar PV installed capacity grew from 32 MW in 2010 to 284 MW in 2019.[12]

Benin

Africa

Electricity Consumption in BU (2017)

1.2

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

52.40

Installed Solar Capacity in MW (2019)

2.9

Installed Off-Grid Solar Capacity in MW (2019)

1.5

Solar installed capacity Growth rate (CAGR) for 2015-19

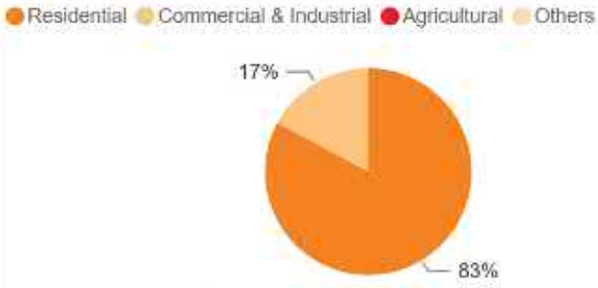
25%

Power Trends

Cumulative Solar installed Capacity (MW)

Overall Electricity Consumption (MU)

Consumer Mix



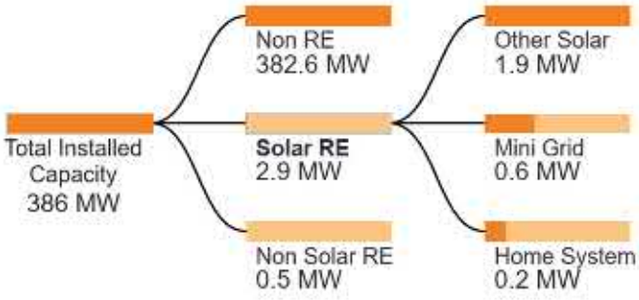
Access to Electricity

Ease of Doing Solar Classification

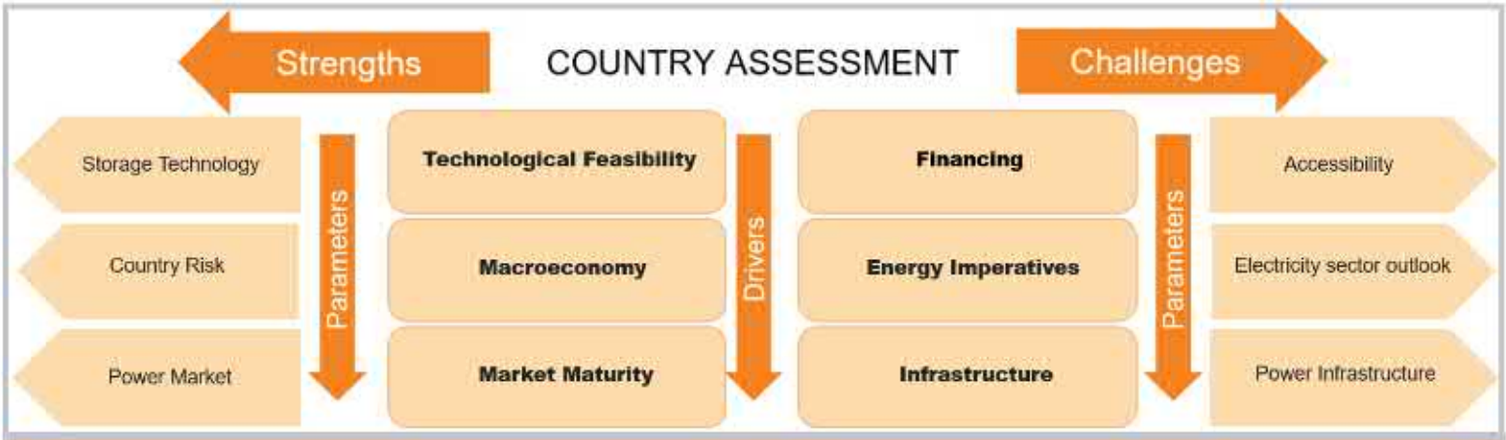
Progressive

Performance against 7 Drivers

Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Benin is a low-income economy as per World Bank's classification. GDP (Real) has grown at an annual rate of 6.4% in 2019.[1,2] • FDI inflows have increased from USD 194 million in 2018 to USD 230 million in 2019.[1] • The country's external energy dependency and rapid population growth are some of roadblocks hindering economic growth.[1]
Policy enablers	• The National Agency for the Development of Renewable Energies and Energy Efficiency (ANADER) was created in 2014 with a mission to facilitate promotion and adoption of renewable energies.[3] • Benin government has implemented new reforms to foster investment which include creating a unified regulatory framework for public-private partnerships, a single business registration desk as well as multiple tax incentives.[1] • With a target of 228 MW of RE capacity by 2030, National Renewable Energy Plan aims to implement solar PV including mini grids and Solar Home Lighting Systems to increase electricity access in rural areas.[4] • An independent electricity regulator has been established with the authority to regulate tariffs, pass laws encouraging public-private partnerships and approve a performance plan with targets for the national utility.[5]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation of 5.33 kWh/m^2/day and specific yield of 4.2 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Benin.[6] • Over the last decade, the power supply has relied mostly on imports representing 75-95% of the total electricity supply.[7] • Conventionally rural households, in the country, use DGs to meet their electricity needs. This system of power generation is highly fuel consuming, expensive and highly polluting.[7]
Market Maturity	• 42% population in Benin had access to electricity in 2018.[8] • Reliability of the electricity provided by the Beninese Electrical Power-Company (SBEE) remains low by wide variations in voltage and frequent power cuts.[9] • The country is highly dependent on biomass and import of energy from the neighbouring countries.[4] • The Government of Benin and MCA-Benin II signed a management services contract to entrust the national electricity utility to a private company for a period of four years beginning in November 2019.[11]
Infrastructure	• A new electricity code has been ratified by Benin's National Assembly. In addition to opening up the energy sector to private investors the Code paves the way for the development of the solar sector.[11] • Benin improved the reliability and transparency of the land administration system by publishing statistics on land transactions and land disputes for the previous year and committing to deliver a legal document within a specific time frame.[1] • In February 2020, a new electricity code has been ratified by the National Assembly. In addition to opening up the energy sector to private investors, the code paves the way for the development of solar sector.[11]
Financing	• The Millennium Challenge Corporation leads Power Africa's work in Benin through a USD 375 million grant agreement focused on strengthening the power sector. The Government of Benin is co-investing USD 28 million in the initiative.[13] • Benin is supported by international partners such as AFD, GIZ and Government of India for RE projects.[4] • GIZ is providing financial incentives with objectives of promotion of Entrepreneurship and small companies for production of solar components.[4]
Energy imperatives	• Per capita consumption, in 2019, was 100 kWh, relatively lower in comparison to the global average.[13] • The Solar PV market grew from 0.2 MW in 2014 to 3 MW in 2019. • The share of RE (hydroelectricity and solar power), in the energy mix, is still low at 1%. • High cost of solar projects is a key challenge for large scale deployment of Solar in the country.[4] • Isolated mini-grid, which are cheaper and quick to install, would be a suitable technology to supply power to rural communities in Benin.[7]

Bolivarian Republic of Venezuela

Latin America & Caribbean

Electricity Consumption in BU (2017)

81.2

Installed Solar Capacity in MW (2019)

5.3

Share of Population with Access to Electricity (2018)

0% 100% 100%

Installed Off-Grid Solar Capacity in MW (2019)

3.0

World Bank's Ease of Doing Business Score (2020)

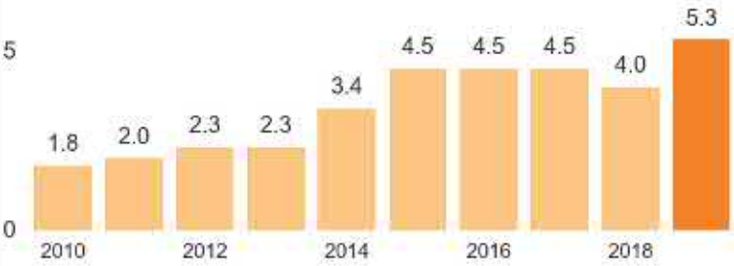
30.20

Solar installed capacity Growth rate (CAGR) for 2015-19

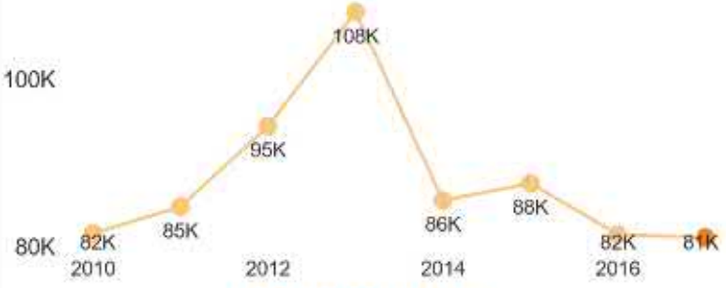
4%

Power Trends

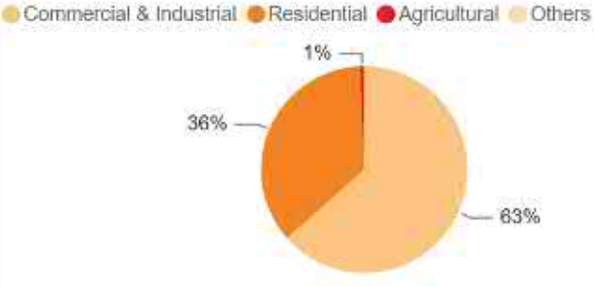
Cumulative Solar installed Capacity (MW)



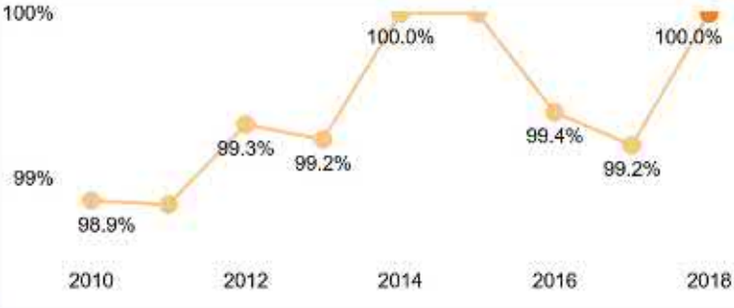
Overall Electricity Consumption (MU)



Consumer Mix



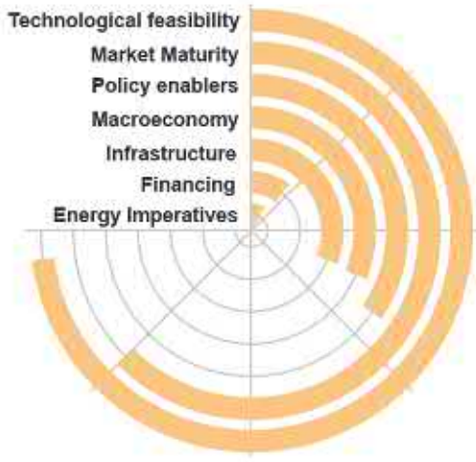
Access to Electricity



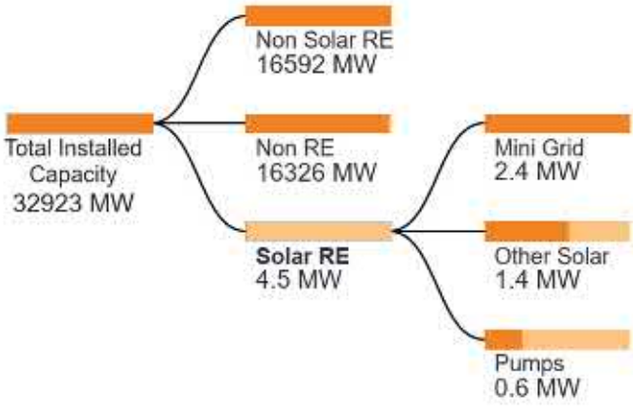
Ease of Doing Solar Classification

Potential

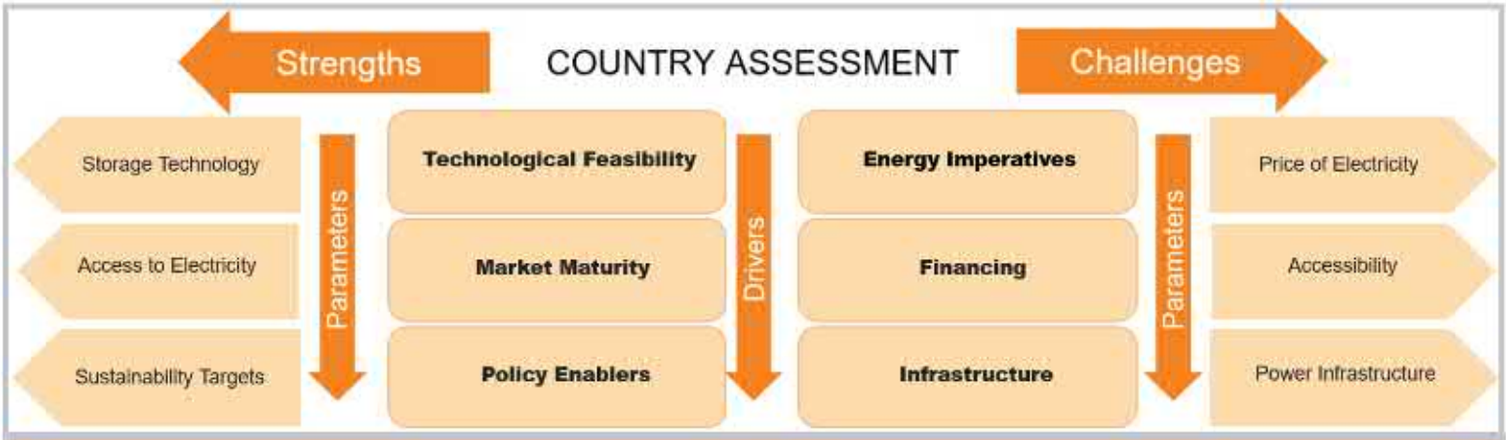
Performance against 7 Drivers



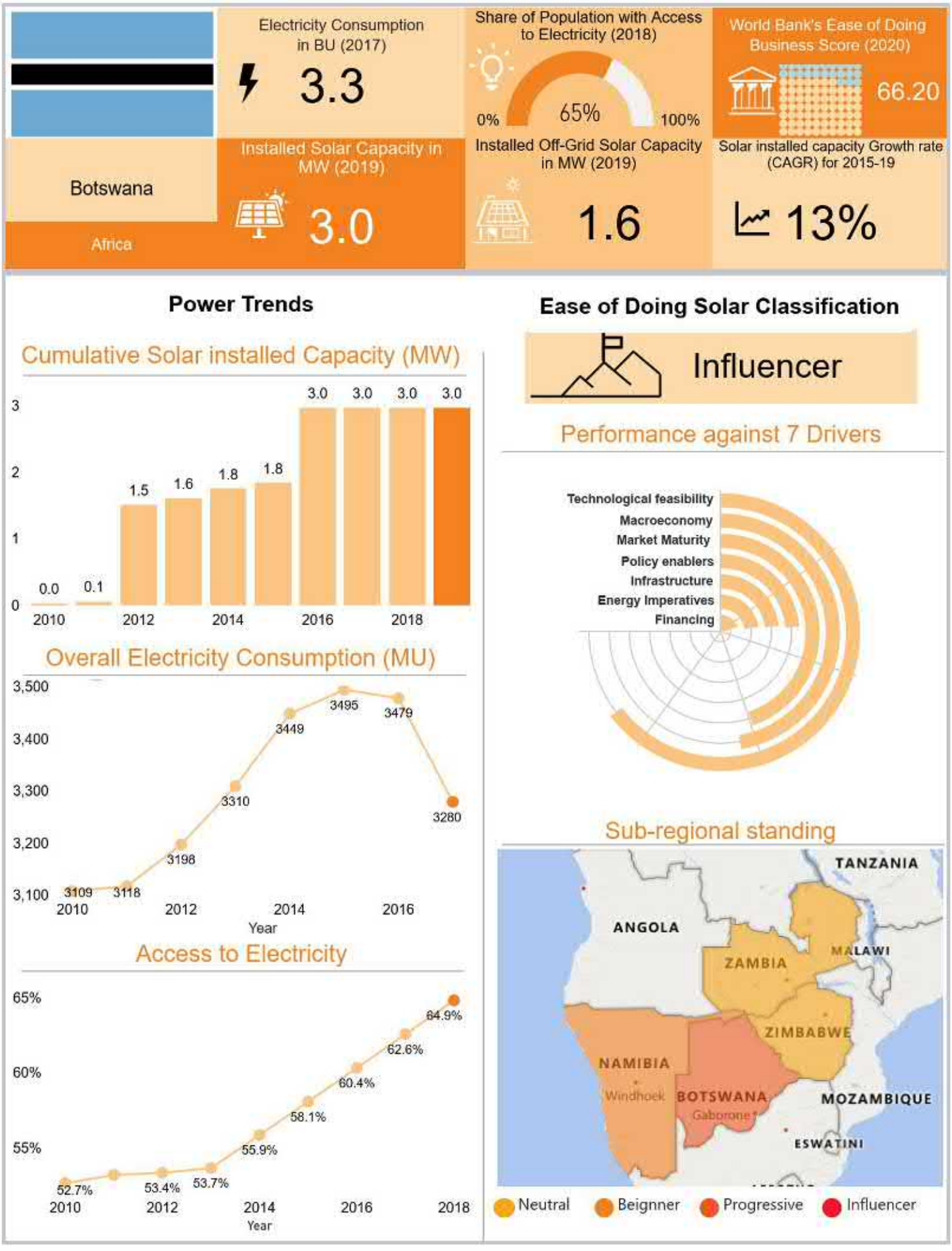
Installed Generation Capacity by Source

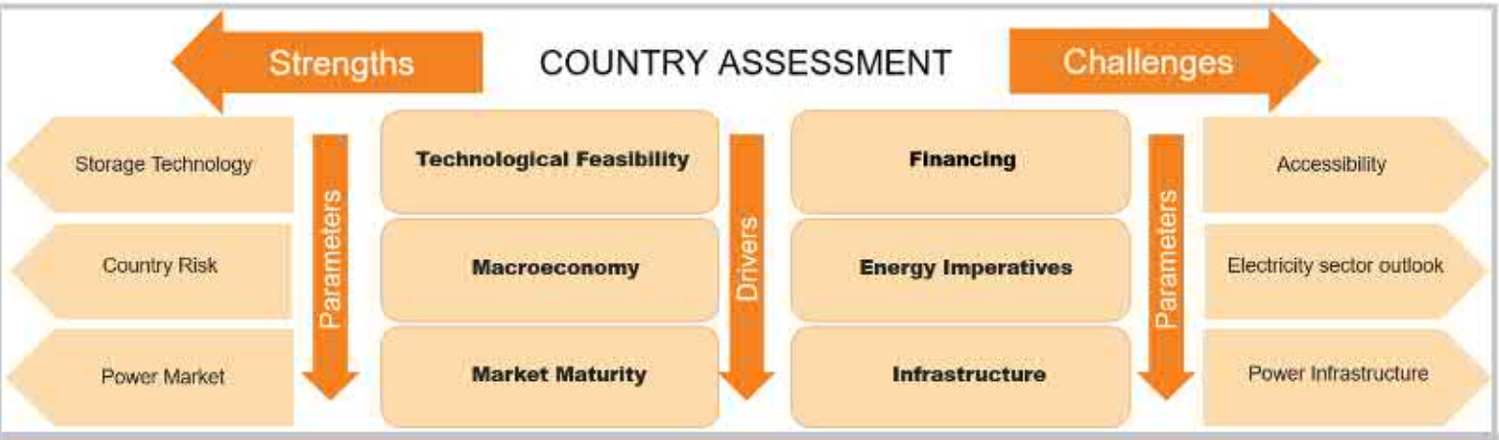


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) is estimated at USD 70 billion in 2019. GDP per capita (at current prices) is approximately USD 2,548 in 2019.[1] • During the 2018–2022 period, population is expected to grow at a CAGR of 1.2% to 33.4 million by 2022, implying growth in power consumption as the residential sector is one of the largest consumers of power.[4]
Policy enablers	• Venezuela's Development Plan, for the National Electric System, aims to electrify 2,512 off-grid communities through solar PV and hybrid with a combined capacity of 63 MW by 2019 and plans to extend target until 2033.[2] • Sowing Light Program, funded by the Public Foundation for Electric Development (FUNDELEC) in 2005, aims to spread renewable energy in remote and indigenous community areas through solar PV and hybrid systems.[2] • In 2013, Venezuela began the process to develop the Law for the Use of Alternative Energy. It also developed a draft Plan for the long-term development of renewable energy in the period 2019-2031.[8]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 5.35 kWh/m^2/day and specific yield of 4.35 kWh/kWp, strong technical feasibility is envisaged for solar projects in Venezuela.[5] • The Law of Rational and Efficient Use of Energy, 2011 promotes the use of renewable energy for thermal use such as hot water heating and cooling in new and existing buildings.[8]
Market Maturity	• The non-hydro renewable sources, such as wind and solar, contributed to 0.3% of total installed capacity as of 2017.[4] • 100% of population in Venezuela had access to electricity by 2018.[6] • The renewable energy sector is a promising area for development, and is expected to grow at a CAGR of 4.1% between 2018 and 2030.[4]
Infrastructure	• In 2017, the electric power transmission network comprised 32,480 circuit kilometres (ckm) of high-voltage transmission lines, which increased at a CAGR of 3% between 2007 and 2017.[4] • The country's electricity distribution network totalled approximately 143,375 ckm as of 2017. It increased at a CAGR of 3% between 2007 and 2017 and is expected to increase at a CAGR of 2% between 2018 and 2025 to approximately 171,900 ckm.[4]
Financing	• Foreign investments are encouraged in Venezuela and protected by a new legal framework especially through the dispositions stipulated in the Decree 2095.[9] • According to UNCTAD's World Investment Report 2020, the country experienced an increase in FDI inflows which reached USD 934 million in 2019 compared to USD 886 million in 2018.[9]
Energy Imperatives	• Total power Generation grew from 82.6 BUs to 119.4 BUs over the period 2000-2017 at a CAGR of 2.2%.[4] • Country's per capita electricity consumption is 2,976 kWh in 2019.[3] • Power consumption is expected to increase at a CAGR of 0.2% from 2018.[4]


Botswana
Africa
Electricity Consumption in BU (2017)
3.3
Installed Solar Capacity in MW (2019)
3.0
Share of Population with Access to Electricity (2018)
0%
65%
100%
Installed Off-Grid Solar Capacity in MW (2019)
1.6
World Bank's Ease of Doing Business Score (2020)
66.20
Solar installed capacity Growth rate (CAGR) for 2015-19
13%
Power Trends
Cumulative Solar installed Capacity (MW)
0.0
0.1
1.5
1.6
1.8
1.8
3.0
3.0
3.0
3.0
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
3109
3118
3198
3310
3449
3495
3479
3280
Year
Access to Electricity
52.7%
53.4%
53.7%
55.9%
58.1%
60.4%
62.6%
64.9%
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Technological feasibility
Macroeconomy
Market Maturity
Policy enablers
Infrastructure
Energy Imperatives
Financing
Sub-regional standing
TANZANIA
ANGOLA
ZAMBIA
MALAWI
ZIMBABWE
NAMIBIA
Windhoek
BOTSWANA
Gaborone
MOZAMBIQUE
ESWATINI
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• Botswana is an upper-middle-income economy which has witnessed one of the world's highest growth rates in the last 10 years; A major reason for this is the appropriate utilization of its diamond mines.[1] • International trade accounted for 77.1% of the country's GDP in 2018. Diamonds represent almost 90% of the country's total exports.[1] • FDI inflows in Botswana decreased from USD 286 million in 2018 to USD 261 million in 2019.[1] • Botswana's GDP (Real) growth has reduced to 3% in 2019 against 4.5% in 2018 (IMF).[1,2]
Policy enablers	• Government has set national electricity access targets of 82% by 2016 and 100% by 2030.[3] • Government funded Rural Electrification Programme is set to ensure rural areas get complete access to electricity.[4]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation of 6.07 kWh/m^2/day and specific yield of 5.16 kWh/kWp, strong technical feasibility is envisaged for solar projects in Botswana.[5] • Around 59% of Botswana's current power demand is met by fossil fuel powered generation.[6]
Market Maturity	• 65% population has access to electricity in the country.[7] • Botswana Power Corporation (BPC), established in 1970, is the state-owned company for electrical power generation, transmission, and distribution.[4]
Infrastructure	• Botswana hosts vast swathes of low-cost land that records direct normal irradiance (DNI) of over 2,200 kWh per year, indicating a good opportunity for Solar infrastructure.[8] • Under a 20-year resource plan, approved in Aug 2019, procurement is also underway for a 100 MW solar PV plant due in 2022.[9] • The government will launch a call for tenders at the beginning of next year for the establishment of a 200 MW solar power plant which should be completed by 2026.[9]
Financing	• Botswana has a negative financial outlook with a credit rating of A2.[10] • The Government has opened a Renewable Energy Fund Account with a 7.9 million Pula (bwp) grant from the Global Environment Fund as seed money. The Fund is aimed at subsidizing renewable energy technologies for off-grid solutions especially for applications including solar water heating and water pumping.[11]
Energy Imperatives	• Per capita electricity consumption in 2019 was 1,240 kWh, relatively low in comparison to the global average.[12] • Total installed capacity in the country was 920 MW in 2019. Share of renewables in country's installed capacity is just 0.3% in 2019.[13] • Installed Solar capacity has grown from 0.1 MW in 2011 to 3 MW in 2019.[13] • The Botswana Energy Regulatory Authority is responsible for providing an efficient energy regulatory framework for Electricity, Gas, Coal, Petroleum products, solar and all forms of renewable energy with the primary mandate of providing the economic regulation of the sectors.[14]

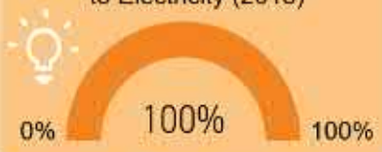
Brazil

Latin America & Caribbean

Electricity Consumption in BU (2017)

498.0

Share of Population with Access to Electricity (2018)



World Bank's Ease of Doing Business Score (2020)

59.10

Installed Solar Capacity in MW (2019)

4465.1

Installed Off-Grid Solar Capacity in MW (2019)

7.2

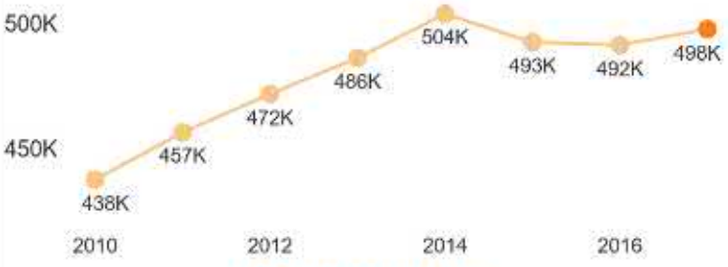
Solar installed capacity Growth rate (CAGR) for 2015-19

259%

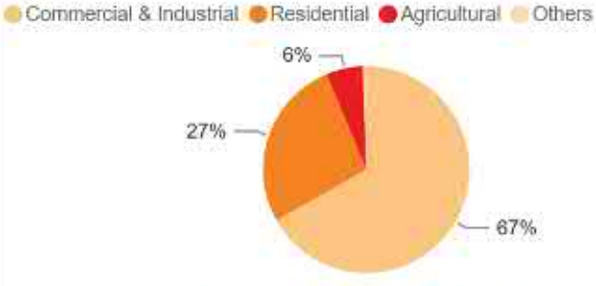
Power Trends

Cumulative Solar installed Capacity (MW)

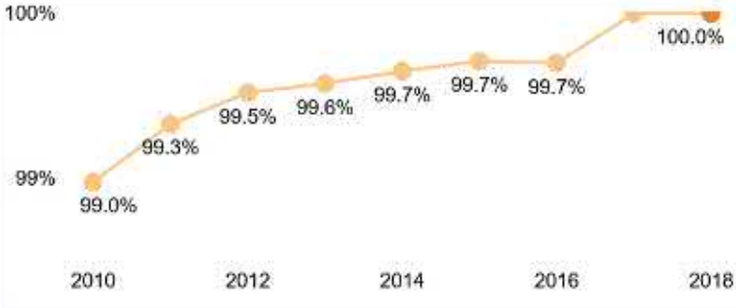
Overall Electricity Consumption (MU)



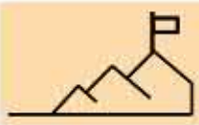
Consumer Mix



Access to Electricity

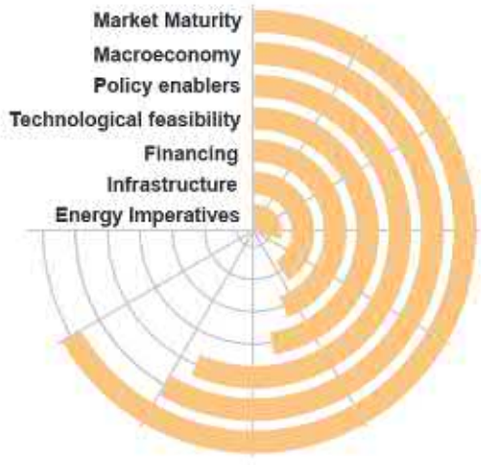


Ease of Doing Solar Classification

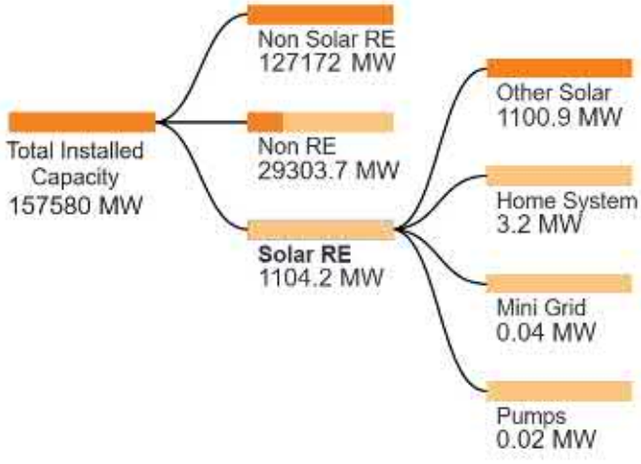


Achiever

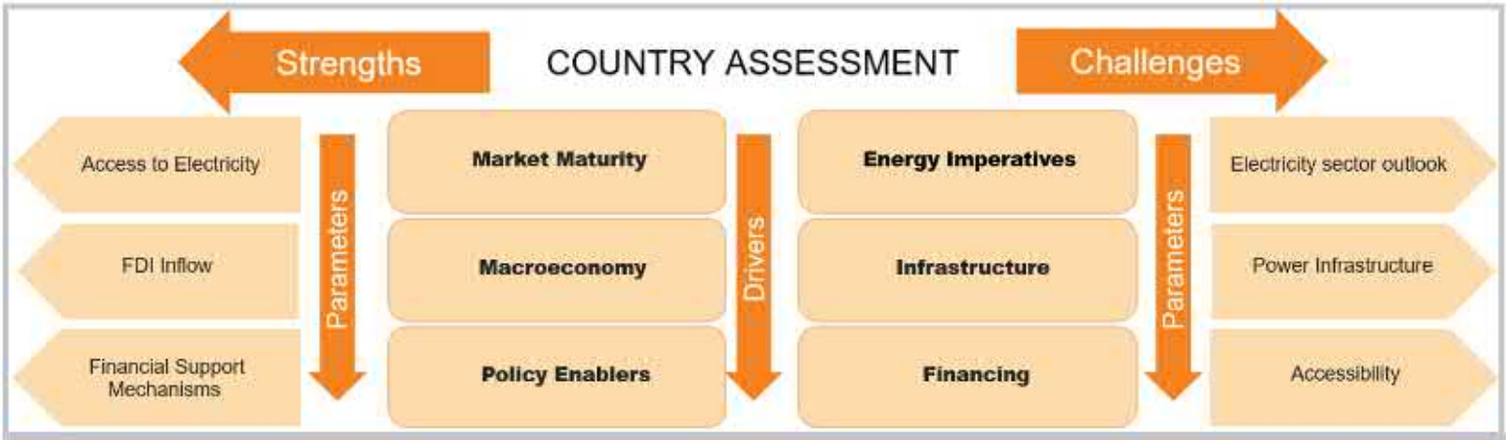
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) is estimated at USD 1.84 trillion in 2019; it has grown at an annual rate of 1.1% in 2019.[3,4] • Brazilian economy has experienced a steady growth with a 2.2% rise in Gross Domestic Product (GDP), at constant rates, from 2000 to 2019.[6]
Policy enablers	• In 2015, Brazilian Electricity Regulatory Authority (ANEEL) amended the Net metering policy allowing up to 5 MW of renewable energy plants to be qualified under Net metering.[8] • Through the enactment of a Federal Law, Brazil, started a program of exemption of State value added tax (ICMS) and Social Integration/Social Security Contribution taxes (PIS/COFINS) to solar power generators on net electricity fed back to the grid. • Following the publishing, in 2007, of the the National Energy Plan 2030 (PNE2030), Brazil's Energy Research Office has published in 2020, the National Energy Plan 2050 (PNE2059), and is currently under public consultation.
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.28 kWh/m^2/day and specific yield of 4.27 kWh/kWp/DAY, strong technical feasibility is envisaged for solar projects in Brazil.[2] • The Financing Instruments for Energy Efficiency Cities in Brazil project is supported by USD 200 million by International Bank for Reconstruction and Development through Green Climate Fund to improve urban energy efficiency and enhance technical quality.[7] • Brazil Inova Energia Program financed by BNDES, FINEP (Financiadora de Estudos e Projetos) and ANEEL aims to enhance cooperation and knowledge sharing between companies and technology institutes in the fields of smart grid technology, renewable energy and hybrid and energy-efficient vehicles.[6]
Market Maturity	• Currently, there are two on-going projects to achieve 100% energy access in Brazil: "Light for All" and "More Light for the Amazon". The second one was formalized by decree in February 2020. • Solar PV accounts for 2.6% of installed capacity in 2019 and is expected to grow at CAGR 17.9% during 2020-2030 period.[6] • Power generation increased to 597.5 BUs in 2019 at a CAGR of 2.9% from 2000.[6]
Infrastructure	• Grid access policies, for renewable energy in Brazil, offer transmission and distribution tariff with at least 50% discount.[8] • In 2019, Brazil's electric power transmission network consisted of 154,419 ckm of high-voltage transmission line growing at a CAGR of 4.9% from 2008.[6] • In 2019, the total length of distribution network lines amounted to 3.7 million ckm and is expected to reach 4.2 million ckm by 2025.[6]
Financing	• International financial flow, in 2017, was USD 560.0 million (in PPP terms) to support clean and renewable energy.[5] • An annual deal value of USD 13.3 billion was achieved in 2019 with 72 deals in the power sector.[6] • The Brazilian Development Bank (BNDES) initiated a financing programme FINEM (Financiamento a empreendimentos) and funds the credit lines such as FINEM-renewable energy, FINEM- energy efficiency and climate fund.[11]
Energy Imperatives	• Annual power consumption is 537.4 BUs in 2019 and is expected to grow at CAGR 1.1% during 2019-2030.[6] • Per capita electricity consumption of Brazil is 2964 kWh in 2019 which is relatively lower in comparison to the global average.[1] • in 2019, Renewables were responsible for 80% of primary electricity generation in Brazil. • Solar PV capacity is expected to grow at a CAGR of 17.9% during 2020 - 2030 period.[6] • Brazil's intended Nationally Determined Contribution (NDC), under Paris agreement, contains an intended contribution to reduce the GHG emissions by 37% below 2005 levels in 2025 and by 43% in 2030.

Burkina Faso

Africa

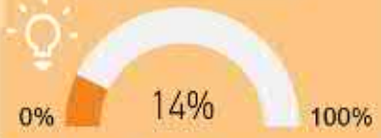
Electricity Consumption in BU (2017)

1.5

Installed Solar Capacity in MW (2019)

62.4

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

27.0

World Bank's Ease of Doing Business Score (2020)

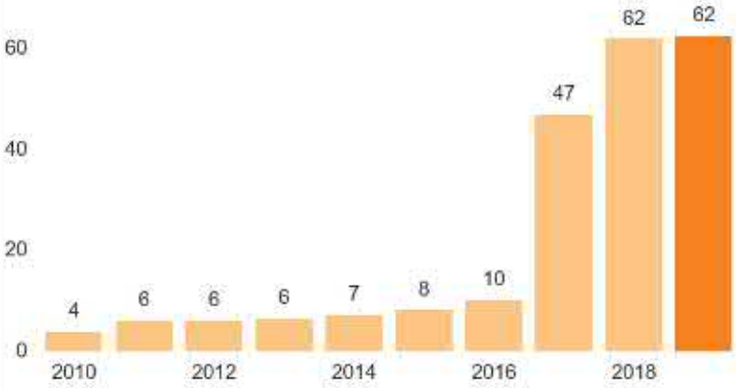
51.40

Solar installed capacity Growth rate (CAGR) for 2015-19

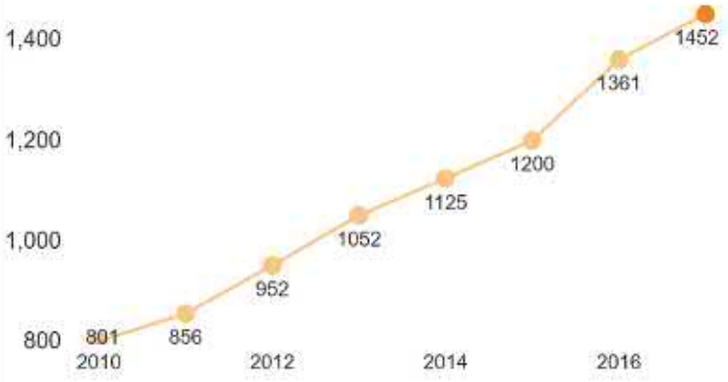
67%

Power Trends

Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)

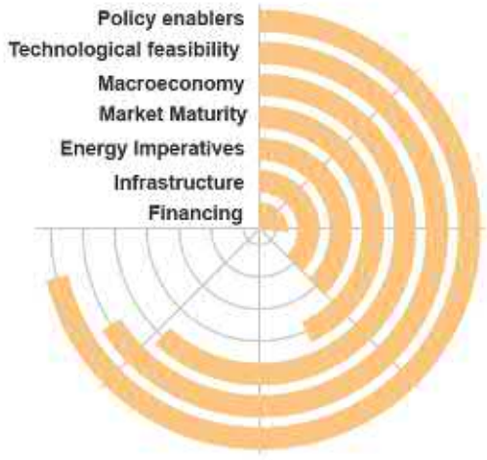


Access to Electricity

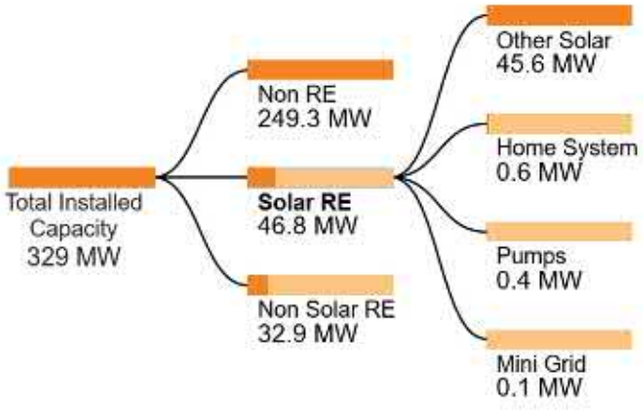
Ease of Doing Solar Classification

Influencer

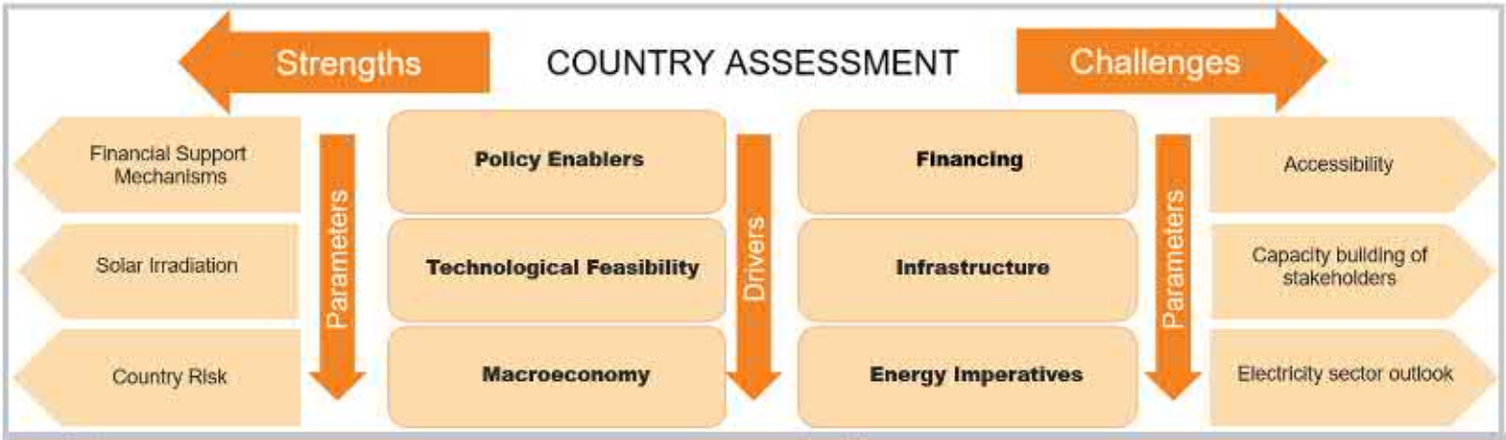
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Burkina Faso is a low-income country (as per World Bank's classification) with limited natural resources. Its economy is largely based on agriculture which employs close to 80% of the working population although gold exports have increased in recent years.[16] • GDP (at current prices) is USD 15.746 billion with an annual growth rate of 5.7% in 2019.[3,4] • A trade surplus of approximately 1.5% of GDP on average is expected during 2020-22 period. Three main factors are expected to contribute to the surplus- the increase in gold exports, the decline in oil imports and the consolidation of the Government budget which is expected to contribute to lower demand for imports.[16]
Policy enablers	• Burkina Faso is a member of Sahel Alliance, an initiative launched in 2017. It aims to develop effective response for challenges such as climate change, poverty, domestic security. In 2020 the alliance announced the enactment of these goals through implementation of over 800 projects by 2022, with global funding Euro 11.6 million.[7] • Despite sustained robust economic growth over past two decades, the country's private investment is relatively low at 13% of GDP. The Country Private Sector Diagnostic (CPSD) investigates and proposes the opportunities to boost the private sector investment to contribute more substantially to Burkina Faso's development.[9] • Burkina Faso is part of the CIPRES (Inter-African Conference on Social Security) zone which is an inspection and technical support body for African Social Security Funds.[8]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.81 kWh/m^2/day and specific yield of 4.57 kWh/kWp, strong technical feasibility is envisaged for solar projects in Burkina Faso.[2] • Lighting Africa is currently supporting improved access to off-grid solar products in Burkina Faso through two World Bank Projects: Projet d'Accès au Secteur de l'Electricité (PASEL, Access to Electricity Project) and through the Regional Off-Grid Electrification Project (ROGEP).[12]
Market Maturity	• Only 14% of population has access to electricity as of 2018.[5] • Energy Sector Policy goal is to reach a 100% access rate in areas and 40% in rural areas by 2025.[15] • Renewable energy share in total consumption is 70% as of 2017.[5] • The Government also set a target of 50% RE in the electric mix by 2030 (excluding biomass).[13] • Solar contributes 64% in renewable capacity installed and 16% in the total capacity as of 2019.[14]
Infrastructure	• In 2017, the U.S. Trade and Development Agency (USTDA) awarded a grant to Société de Production d'Energie Solaire de Kodéni SAS for a feasibility study for two 17 MW solar PV plants.[11] • Project Zagtouli of 33 MW PV has reached financial closure with public financing from EU, EIB and AFD and started construction in 2018.[15]
Financing	• International financial flows, to support and renewable energy, were USD 20.4 million (in PPP terms) in 2017.[5] • Burkina Faso's domestic financial system includes 13 commercial banks, 3 banking-like financial institutions, 16 insurance and reinsurance companies and 153 licensed microfinance entities.[8] • A national financial inclusion strategy has been developed with the assistance of the United Nations Capital Development Fund (UNCDF).[8] • In March 2020, the International Development Association started financing roughly 30 development projects. 20 of these are national and 8 regional, representing a total commitment of USD 2.5 billion.[10] • IFC 's long term finance commitments grew from USD 11 million to USD 135 million between FY2013 and FY2018. Burkina Faso is among IFC's 20 largest exposure in Sub-Saharan Africa.[10]
Energy Imperatives	• The Per capita electricity consumption of 57 kWh in 2019 is lower in comparison to the global average.[1] • Burkina Faso is a member of the West African Economic Monetary Union (UEMOA) whose objective is to achieve a target of approximately 82% share of renewables in the electricity mix by 2030.[17]

Burundi

Africa

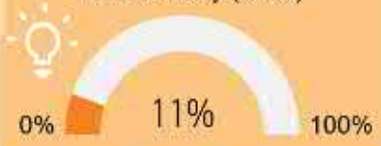
Electricity Consumption in MU (2017)

225.0

Installed Solar Capacity in MW (2019)

5.1

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

4.7

World Bank's Ease of Doing Business Score (2020)

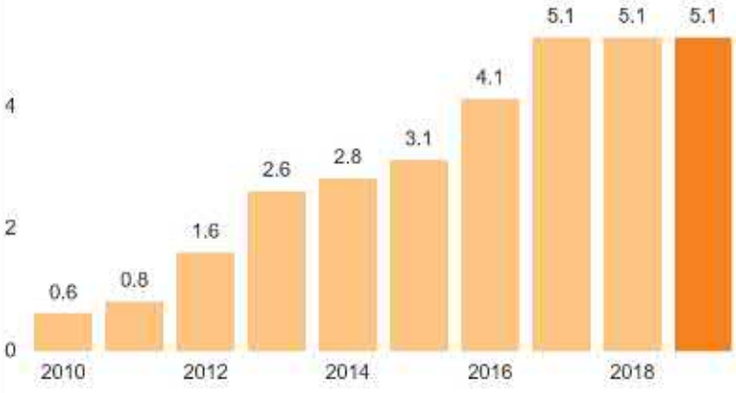
46.80

Solar installed capacity Growth rate (CAGR) for 2015-19

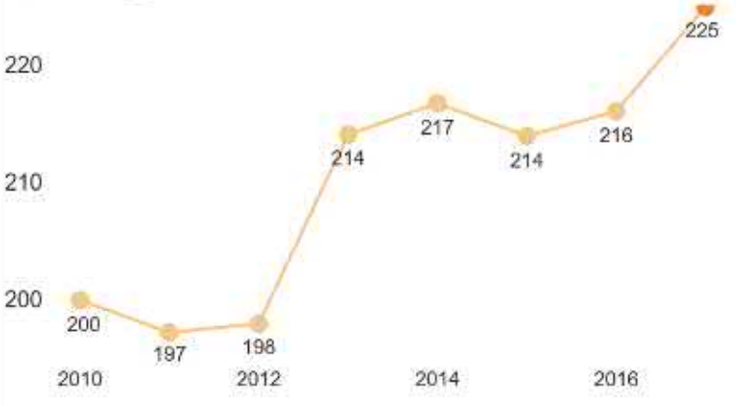
13%

Power Trends

Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)

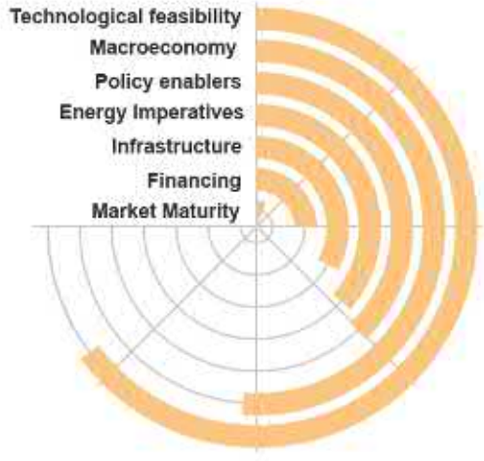


Access to Electricity

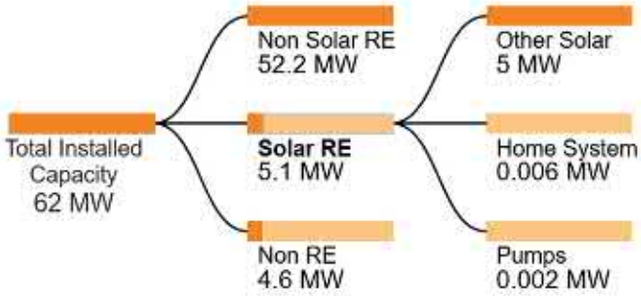
Ease of Doing Solar Classification

Potential

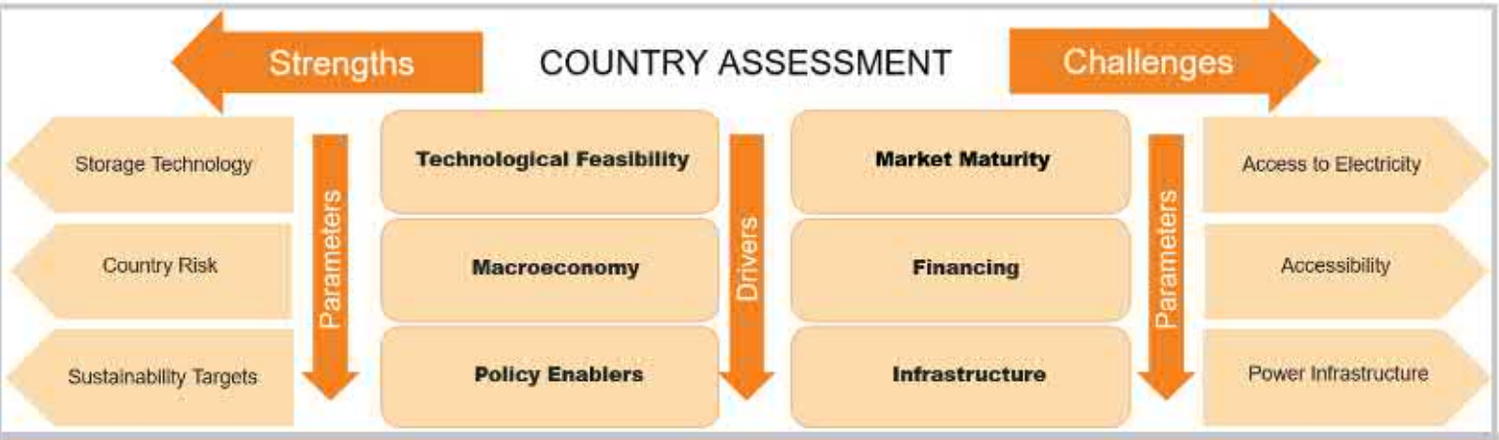
Performance against 7 Drivers



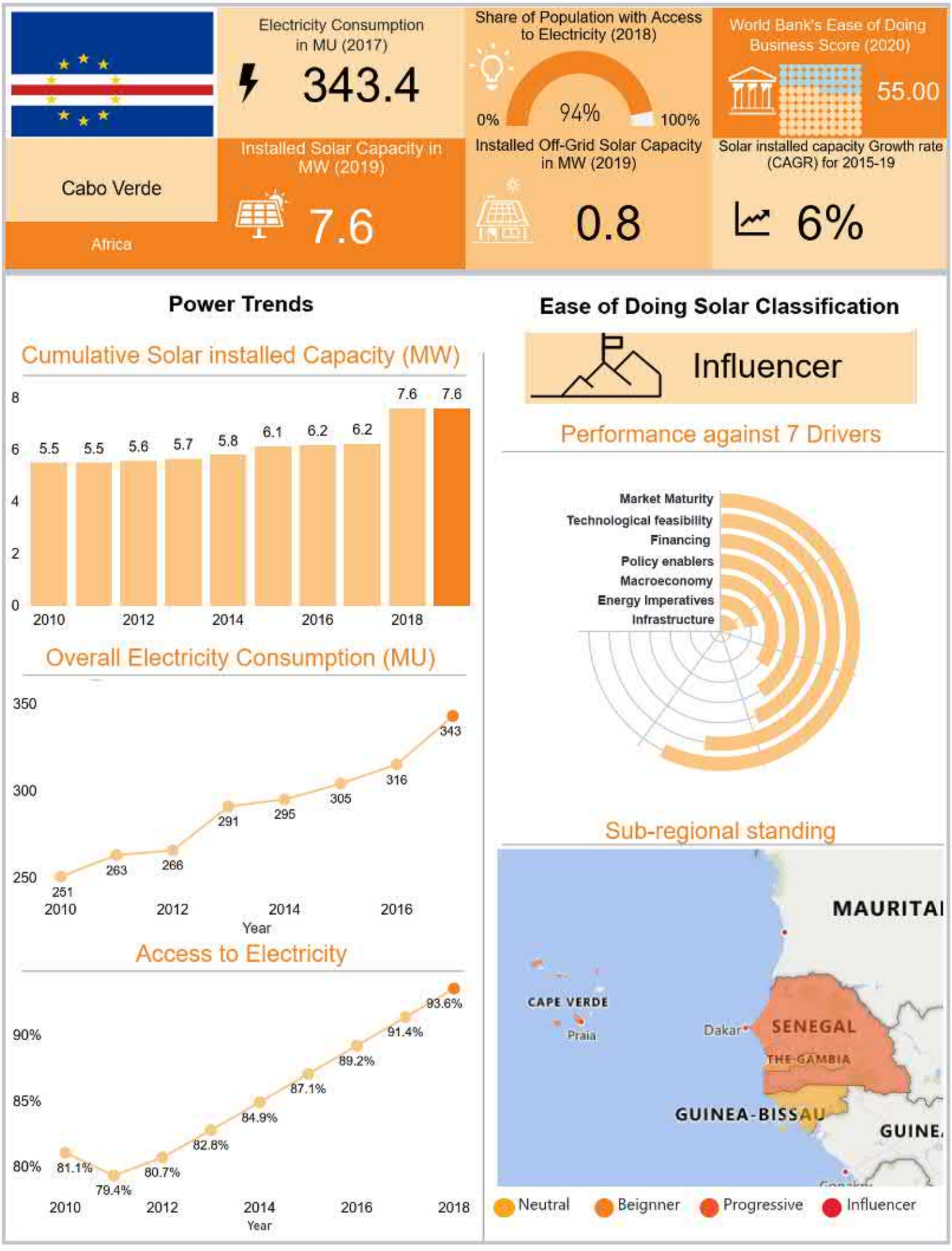
Installed Generation Capacity by Source

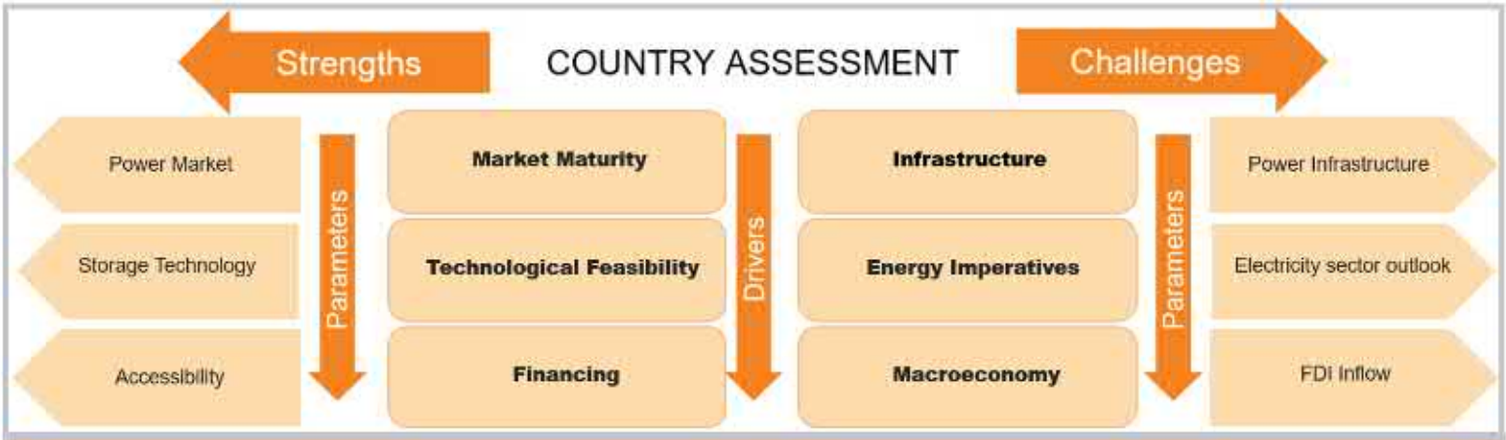


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) poised at USD 3.012 billion with an annual growth rate of 1.8% in 2019.[5,6] • The fiscal deficit in 2018 is 3.3% of GDP which increased to 4.2% in 2019 and is expected to further increase to 4.9% in 2020 and 5.2% in 2021.[1]
Policy enablers	• The Government has initiated the Energy Strategy and Action Plan in 2011 for renewable energy development in Burundi.[8] • According to Production Master Plan, which was financed by African Development Bank, Burundi is expected to increase the solar PV installation to 204 MW by 2040.[9]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.19 kWh/m^2/day and specific yield 4.16 kWh/kWp, strong technical feasibility is envisaged for solar projects in Burundi.[4] • Vision Burundi 2025 was launched in 2011 with a goal of increasing renewable technologies for household heating and cooking. This will provide better quality of energy and minimize health hazards in the country.[8]
Market Maturity	• As of 2018, 11% of total population has access to electricity; in rural areas this number is 3%.[7] • As per Distribution Master Plan, it is expected to achieve 30% access to electricity by 2030. The plan is financed by the Sustainable Energy for All Technical Assistance Program(S-TAP) Burundi.[9] • The country has observed 80% reduction in emissions due to RE in 2017.[3]
Infrastructure	• A grant from Public Private Infrastructure Advisory Facility (PPIAF) was received in July 2018 to create a regulatory framework for RE auctions enabling private sector investment in generation infrastructure particularly in solar.[9] • The GoB validated least cost power sector master plan in June 2018 to identify priority grid infrastructure investments needed to reinforce and extend the existing network.[9]
Financing	• The current account deficit inched lower to 10% in 2019, financed primarily by government borrowing from the banking sector through the issuance of treasury bills.[1] • Despite having a relatively developing financial sector, Burundi has over 75% of total economy assets through banking.[2]
Energy Imperatives	• As of 2017, 88% of electricity is generated through renewable energy sources.[3] • Solar contributes 8% of total capacity utilised in 2017. • The Decentralized Rural Electrification (DRE) Strategy was implemented in 2015 to bring benefits of modern energy technologies to rural population.[8]


Cabo Verde
Africa
Electricity Consumption in MU (2017)
343.4
Installed Solar Capacity in MW (2019)
7.6
Share of Population with Access to Electricity (2018)
0%
94%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.8
World Bank's Ease of Doing Business Score (2020)
55.00
Solar installed capacity Growth rate (CAGR) for 2015-19
6%
Power Trends
Cumulative Solar installed Capacity (MW)
8
6
4
2
0
5.5
5.5
5.6
5.7
5.8
6.1
6.2
6.2
7.6
7.6
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
350
300
250
251
263
266
291
295
305
316
343
2010
2012
2014
2016
Year
Access to Electricity
90%
85%
80%
81.1%
79.4%
80.7%
82.8%
84.9%
87.1%
89.2%
91.4%
93.6%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Market Maturity
Technological feasibility
Financing
Policy enablers
Macroeconomy
Energy Imperatives
Infrastructure
Sub-regional standing
MAURITA
CAPE VERDE
Praia
Dakar
SENEGAL
THE GAMBIA
GUINEA-BISSAU
GUINE
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• Cabo Verde is a Middle-income economy as per World Bank's classification.[1] • In 2019, GDP (Real) has grown at 5.5%, against 5.1% in 2018.[2] • FDI inflows in 2019 totalled USD 104 million, a slight decrease compared to 2018 (USD 105 million).[1]
Policy enablers	• The government expects to generate 30% of its electricity from renewables in 2025 and 50% in 2030. • The Government plans to attract private sector investment for larger renewable energy projects (5 MW and above) through tenders for Independent Power Producers (IPPs).[3] • Currently, the Government is supporting distributed generation projects by providing subsidy (50%) to private banks to reduce the cost of loans to micro-generators.[3]
Technological Feasibility	• Cabo Verde's tropical location has good potential for solar photovoltaic (PV) electricity. • Owing to relatively high average solar irradiation levels of 5.64 kWh/m^2/day and specific yield of 4.66 kWh/kWp, strong technical feasibility is envisaged for solar projects in Cabo Verde.[4] • Historically, electricity demand growth in Cape Verde has been met exclusively by generation from imported petroleum products (80%).[3]
Market Maturity	• 94% population had access to electricity in 2018.[5] • Cabo Verde's electricity sector is dominated by ELECTRA, the vertically integrated public utility company responsible for electricity generation, transmission, and distribution.[3] • There are significant losses in the distribution grids and electricity costs are extremely high.[3] • The World Bank is assisting the government with privatization studies, particularly plans for the privatization of ELECTRA.[3]
Infrastructure	• The Government anticipates that Cape Verde will install 160 MWp of new solar projects and more than 91 MW of new wind farms.[3] • The Ministry of Industry, Trade and Energy had issued an expression of interest to pre-qualify developers for two 5 MW solar projects in Jan'2020. • To plan for the necessary infrastructure and related investments to meet the energy goals under the National Program for Energy Sustainability (PNSE), the Government has prepared a Master Plan for the Power Sector (2018-2030).[3]
Financing	• Cabo Verde has a recent history of attracting private participation/ investment in its renewable energy sector. Two wind IPPs have been operating successfully in the country since 2011.[3] • Public funds are planned be used to finance small-scale RE generation that may not attract private developers.[3] • Under World Bank Renewable Energy Development Project (REDP), USD 11 million will be invested to support the construction of small-scale solar power plants as well as grid expansion/ reinforcement and installation of energy storage facilities to support RE integration.
Energy Imperatives	• Per capita electricity consumption in 2019 was 843 kWh, relatively low in comparison to the global average.[6] • Solar PV capacity grew from 5.5 MW in 2010 to 7.6 MW in 2019.[7] • The centralised grid model of electricity has been effective although technological advancements are making community-based "micro-grids" increasingly attractive. • Electricity prices in Cabo Verde are amongst the highest in Africa; residential tariffs have averaged US$ 0.28 per kWh over the past four years but have fluctuated as high as USD0.36 per kWh in March 2019 for higher consuming (> 60kWh/month) residential users.[3]

Cambodia

Asia & Pacific

Electricity Consumption in BU (2017)

6.8

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

53.80

Installed Solar Capacity in MW (2019)

98.6

Installed Off-Grid Solar Capacity in MW (2019)

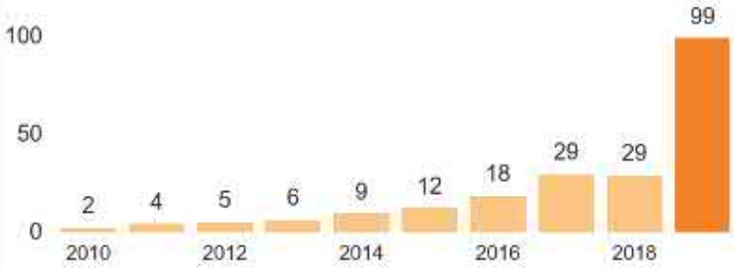
1.3

Solar installed capacity Growth rate (CAGR) for 2015-19

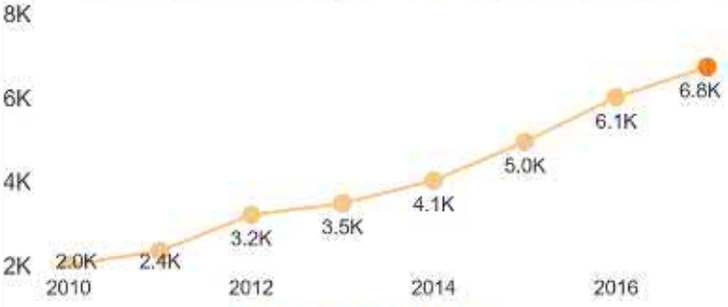
69%

Power Trends

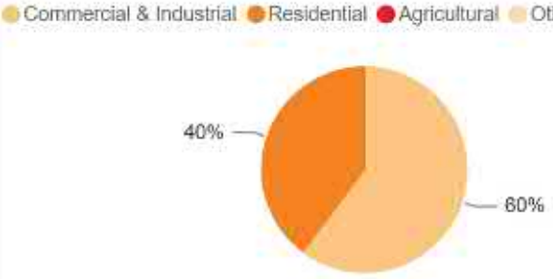
Cumulative Solar installed Capacity (MW)



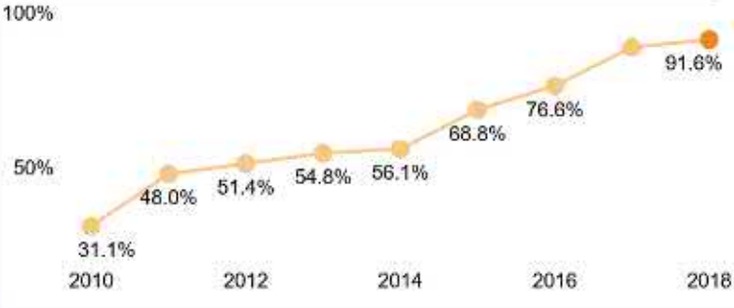
Overall Electricity Consumption (MU)



Consumer Mix



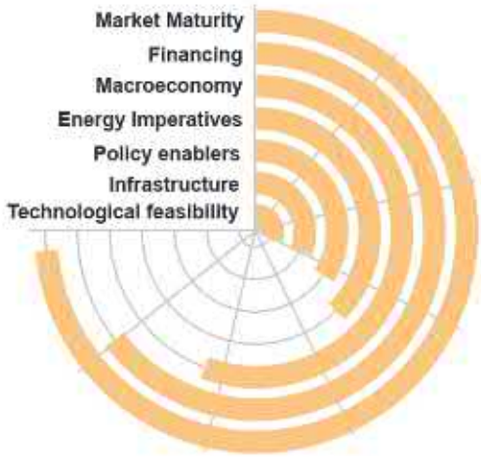
Access to Electricity



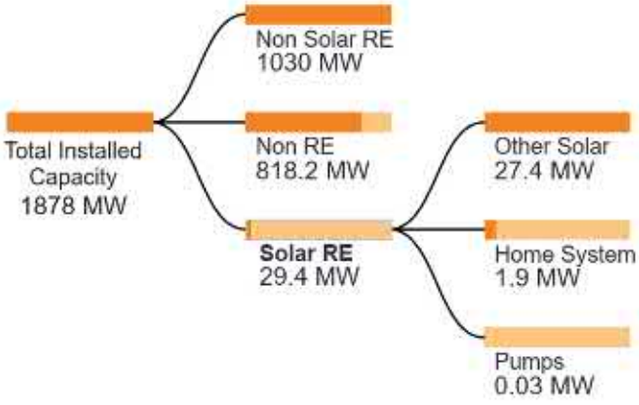
Ease of Doing Solar Classification

Progressive

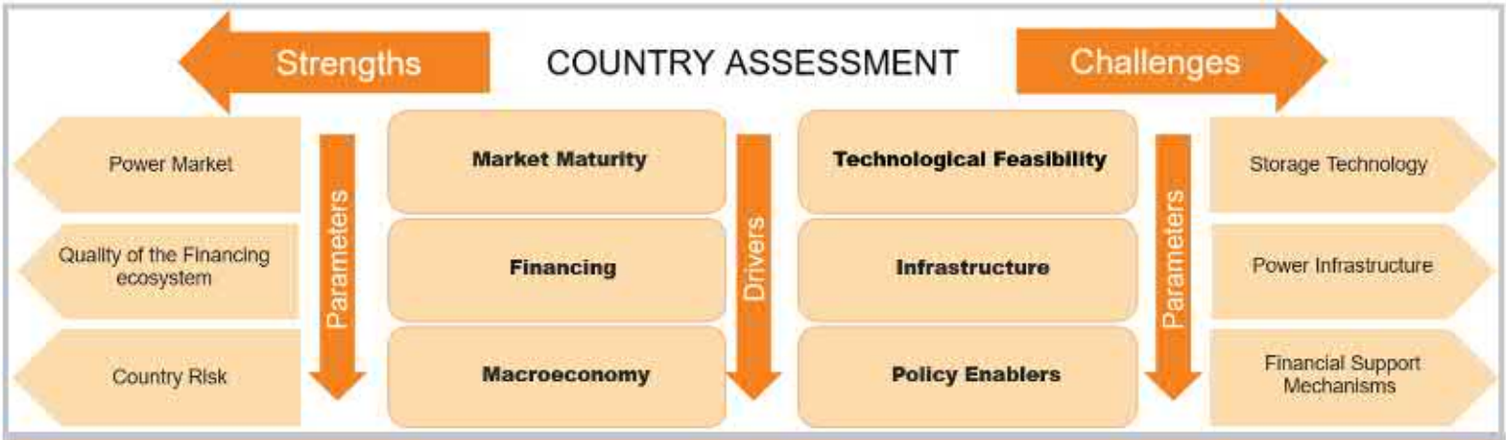
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Cambodia is among Asia's fastest growing economies with an average growth rate of 7.6% over the past decade, much higher than the regional average of 5.1%.[1] • GDP (Real) has grown at an annual rate of 7% in 2019.[2] • Cambodia's economy continues to show signs of robust growth, supported by solid export performance and strong domestic demand.[3] • In recent years foreign investment from China has surged- mainly directed towards construction (infrastructure, commercial and residential real estate), tourism and to a lesser extent in manufacturing and agriculture sectors.[3]
Policy enablers	• The Royal Government of Cambodia's priorities for electricity includes ensuring sufficient supply, increasing electrification and accessibility, reliability and a reduction of tariffs with minimal impact to the environment.[4] • Under Cambodia's National Strategic Development Plan three solar projects with a combined capacity of approximately 140 MW were approved in 2019.
Technological Feasibility	• Owing to an average solar irradiation levels (GHI) of 5.09 kWh/m^2/day and specific yield of 4.09 kWh/kWp, a moderate technical feasibility is envisaged for solar projects in Cambodia.[5] • The country has significant external dependence for electricity supply i.e. imported fossil fuels for generation and imported electricity thereby making it vulnerable to external forces.[1]
Market Maturity	• The country's per capita consumption in 2019 was 458 kWh which is relatively low in comparison to the global average.[6] • As of June 2018, 97.6% of Cambodian households have access to the electricity, 71.5% on grid and 26.1% off-grid (primarily through solar home systems and rechargeable batteries).[7] • Affordability of electricity is an issue for rural, lower income, and female-led households. It is aggravated by low availability and poor reliability of electricity. Only 0.3% of urban and 0.8% rural grid-connected households allocate an additional monthly spending to backup sources of lighting.[7]
Infrastructure	• High cost of electricity coupled with an unreliable power supply owing to the absence of an integrated high-voltage transmission system and costly diesel used in power generation are key areas of concern.[1] • Owing to the lower cost and easy deployment, Cambodian households and businesses are also increasingly investing in behind-the-meter (BTM) solar energy systems.
Financing	• Country has a stable financial outlook with a credit rating of B2.[8] • Cambodia is taking a public-private partnership approach to raise capital needed to carry out its latest strategic development plan. • The approved foreign direct investment (FDI) commitments have slowed in the first half of 2019 as compared to 2018.[3] • Bank credit growth accelerated to 28.3% (y-o-y) by mid-2019, up from 24.2% in December 2018.[11] • The Asian Development Bank's (ADB) has financed a USD 11 million loan and a USD 3 million grant from the World Bank administered Strategic Climate Fund for development of 100 MW Solar Park.
Energy Imperatives	• Electricity demand grew at a compound annual growth rate of 15.64% between 2010-2018.[13] • The Solar PV installed capacity grew from 2 MW in 2010 to 99 MW in 2019. • In rural areas, off-grid solutions offer a large potential. Innovative models such as PayGo may be explored.[7]

Cameroon

Africa

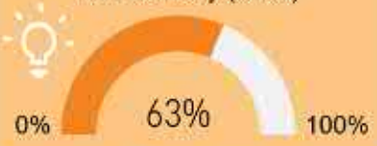
Electricity Consumption in BU (2017)

6.3

Installed Solar Capacity in MW (2019)

14.2

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

14.2

World Bank's Ease of Doing Business Score (2020)

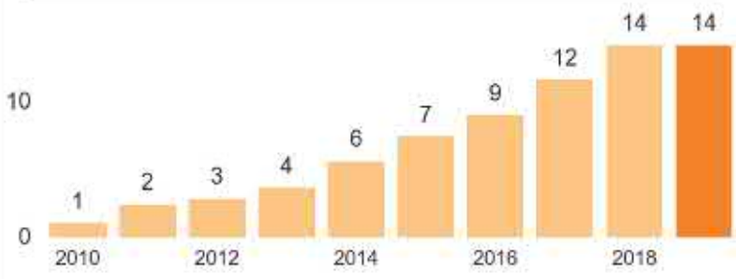
46.10

Solar installed capacity Growth rate (CAGR) for 2015-19

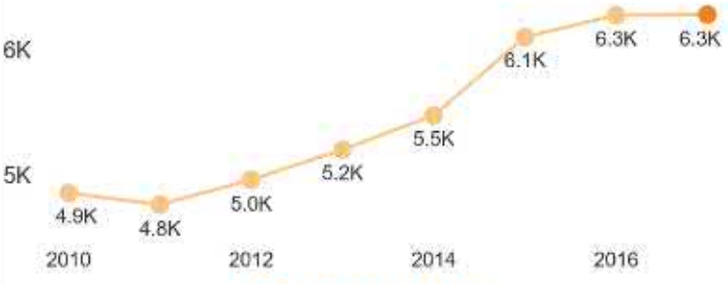
18%

Power Trends

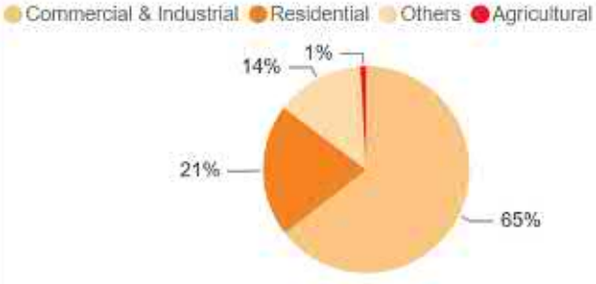
Cumulative Solar installed Capacity (MW)



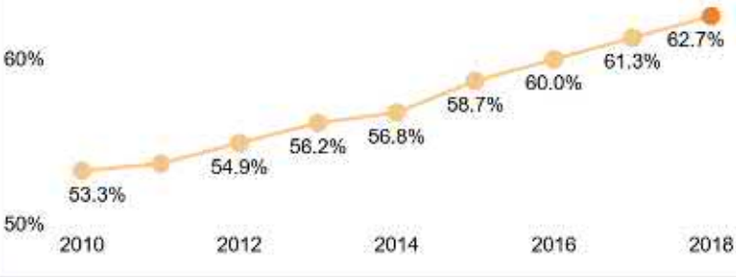
Overall Electricity Consumption (MU)



Consumer Mix



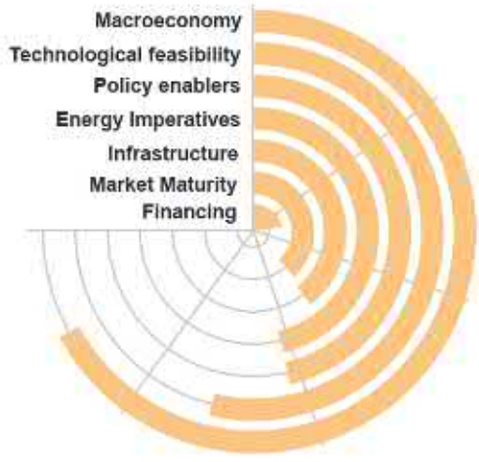
Access to Electricity



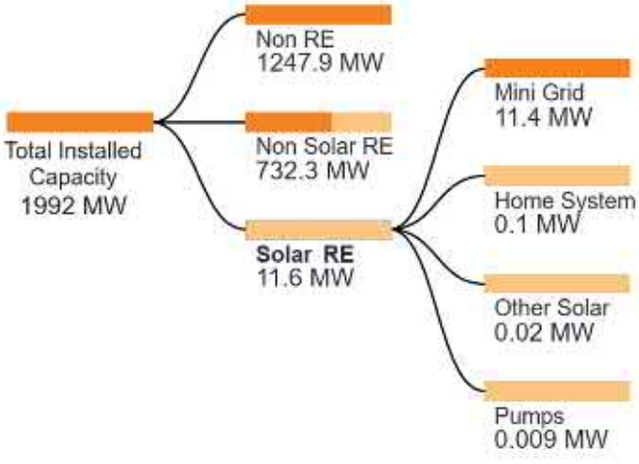
Ease of Doing Solar Classification

Potential

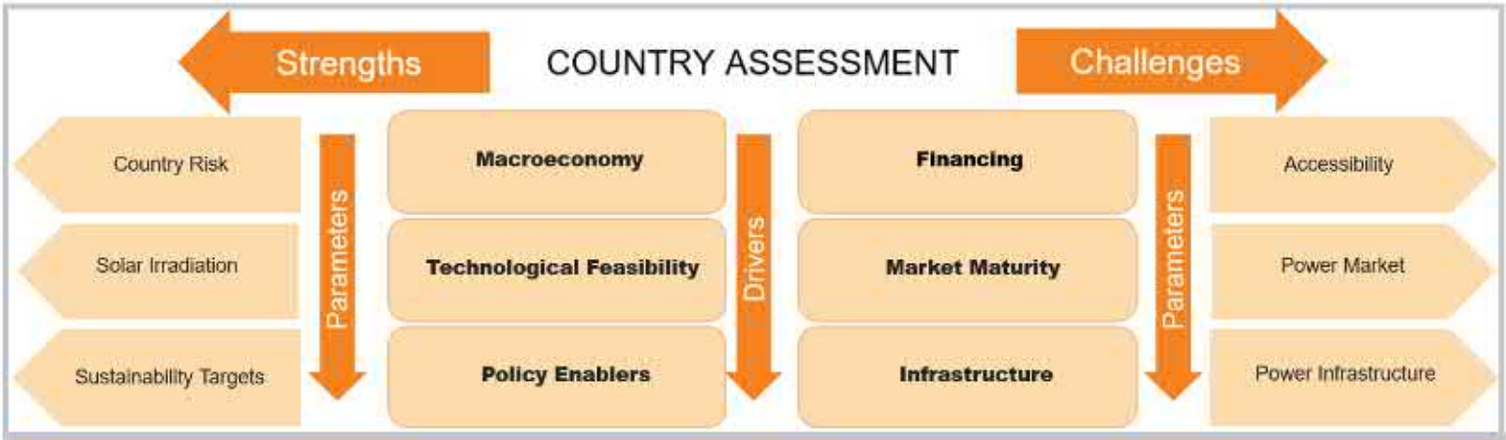
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Cameroon is a Lower-middle-income economy as per World Banks classification. Country's economy primarily relies on agriculture and petroleum.[1] • Cameroon's GDP (Real) has grown at 3.7% in 2019.[2]
Policy enablers	• Government intends to increase share of renewable energy in the energy mix to 25% by 2030 out of which 6% is planned to be from solar PV.[3] • RE projects can qualify for a VAT reduction for 5 years and various tax exemptions for up to 10 years and reduced taxes and customs duties for renewable energy equipment.[4] • Solar products are subject to a 10% import tax but no VAT.[4]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation of 5.3 kWh/m^2/day and specific yield of 4.2 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Cameroon.[5] • The Northern regions of Cameroon are endowed with a huge solar potential that can be exploited to help improve the electricity deficits in Cameroon.[6] • To meet electricity demand fossil fuels are used in remote areas of the country where access to electricity is very low.[6]
Market Maturity	• 63% of the population in Cameroon had access to electricity as of 2018.[7] • Grid power has been unreliable as erratic rainfall and droughts hit the county's hydropower dams that supply most of its electricity. • Power sector reforms started in the late 1990s. The state-owned utility was privatised in 2001 which is now called Eneo Cameroon. In 2011, the generation, transmission and distribution were un-bundled in to separate utilities.
Infrastructure	• The Rural Electrification Master Plan targets electrification in 660 localities through various approaches including solar powered electrification technologies as well as the development of a regional grid to interconnect the stand alone grid.[4] • In 2019. Eneo signed an MoU with a consortium led by Scatec Solar (a Norwegian solar developer) for the construction of two PV plants with a total installed generation capacity of 25 MW.
Financing	• The Rural Electrification Agency (Agence d'Electrification Rurale, AER), a legal public entity with financial autonomy, is focused on promoting and implementing rural electrification in Cameroon and manages the Rural Energy Fund.[4] • In June 2019, GDS Orion Solar signed an agreement with the Investment Promotion Agency to invest nearly EUR 23 million in a project to build a 20 MW solar power project.[13]
Energy Imperatives	• Per capita electricity consumption in 2019 was 330 kWh, relatively lower in comparison to the global average.[6] • Total installed capacity of Solar PV at the end of 2018 was 14 MW primarily consisting of distributed generation projects.[8] • Most people in semi-urban and remote communities rely on Lead-acid batteries for lighting and to power their appliances.[9]

Chad

Africa

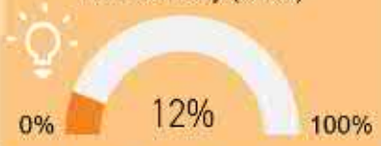
Electricity Consumption in MU (2017)

218.0

Installed Solar Capacity in MW (2019)

0.2

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

0.2

World Bank's Ease of Doing Business Score (2020)

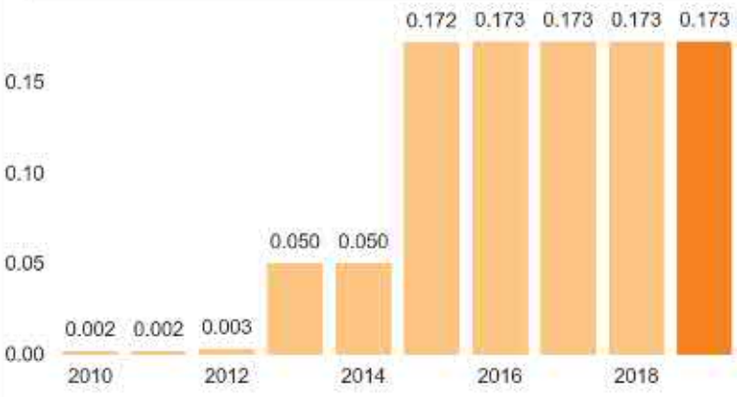
36.90

Solar installed capacity Growth rate (CAGR) for 2015-19

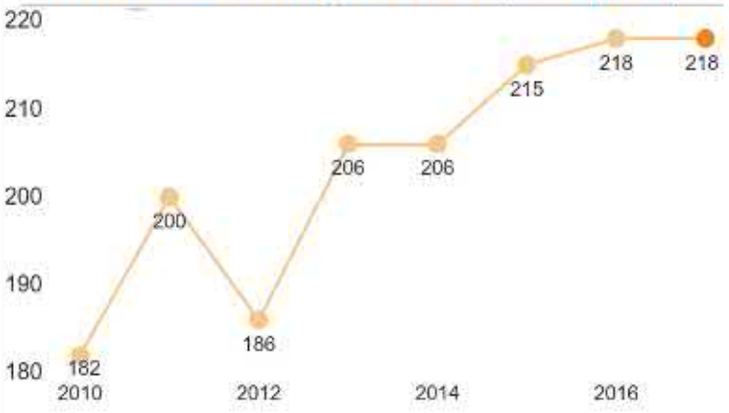
0%

Power Trends

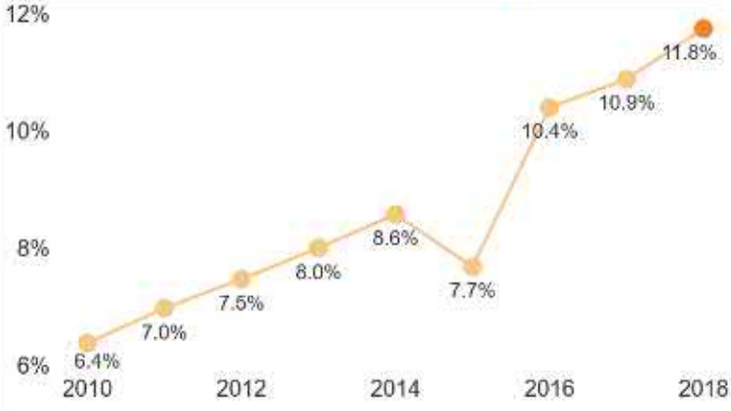
Cumulative Solar installed Capacity (MW)



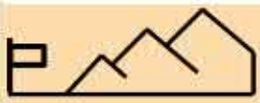
Overall Electricity Consumption (MU)



Access to Electricity

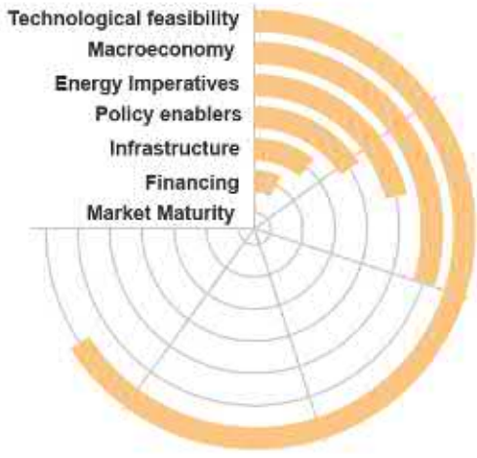


Ease of Doing Solar Classification

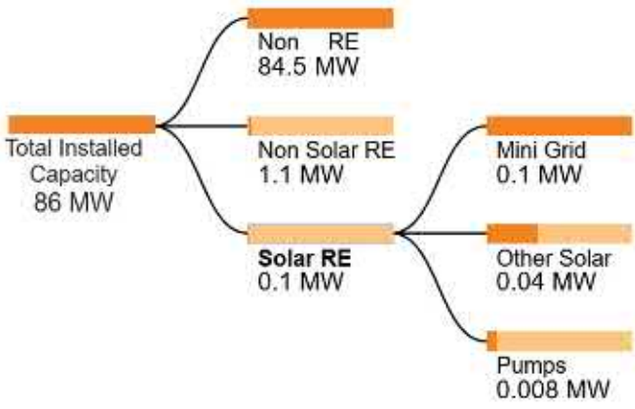


Potential

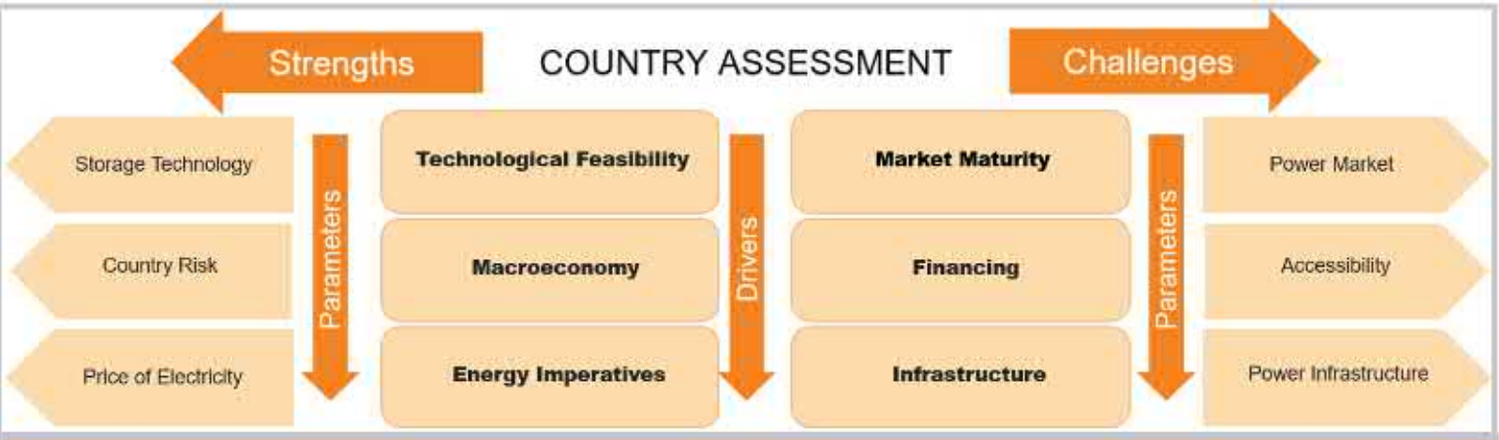
Performance against 7 Drivers



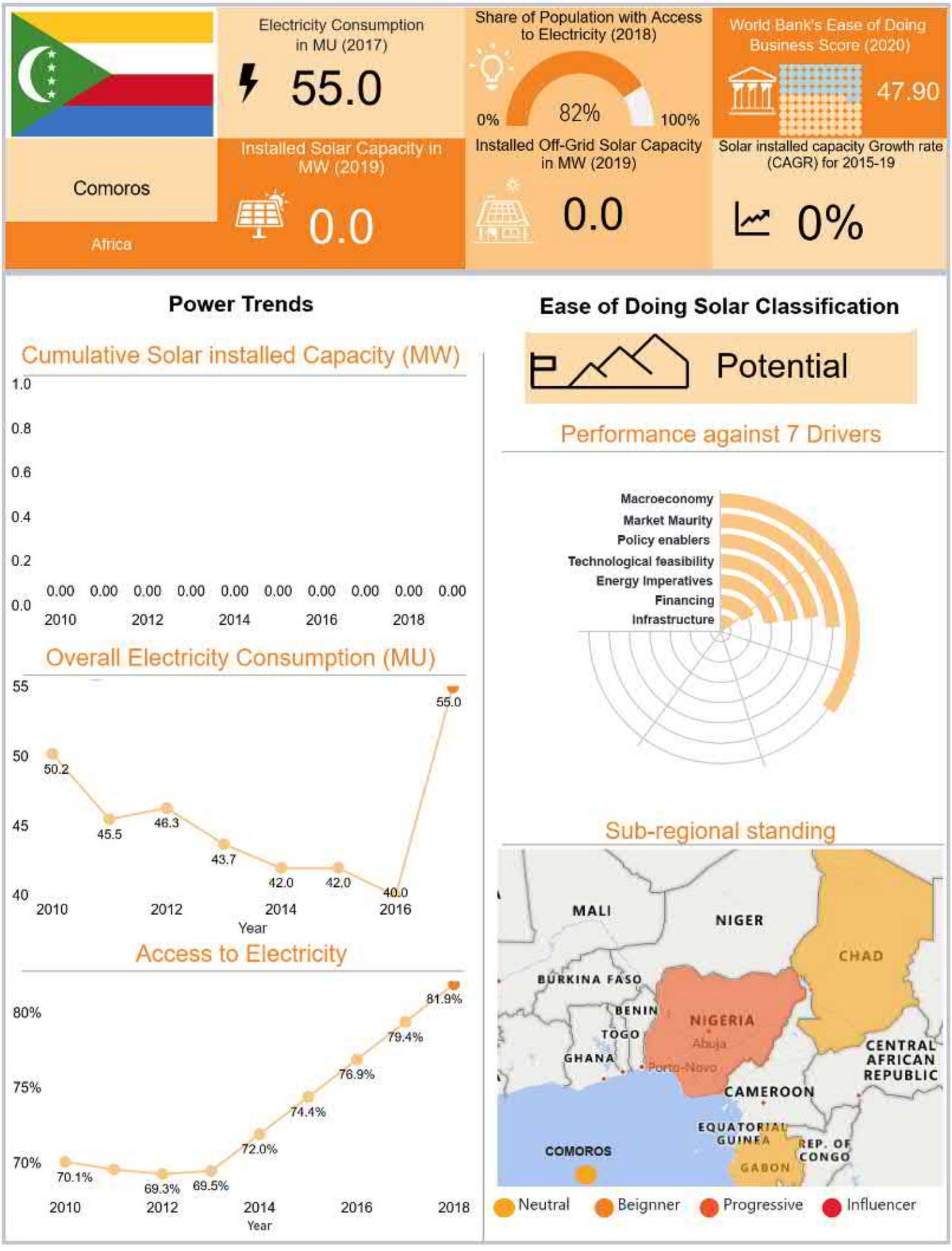
Installed Generation Capacity by Source

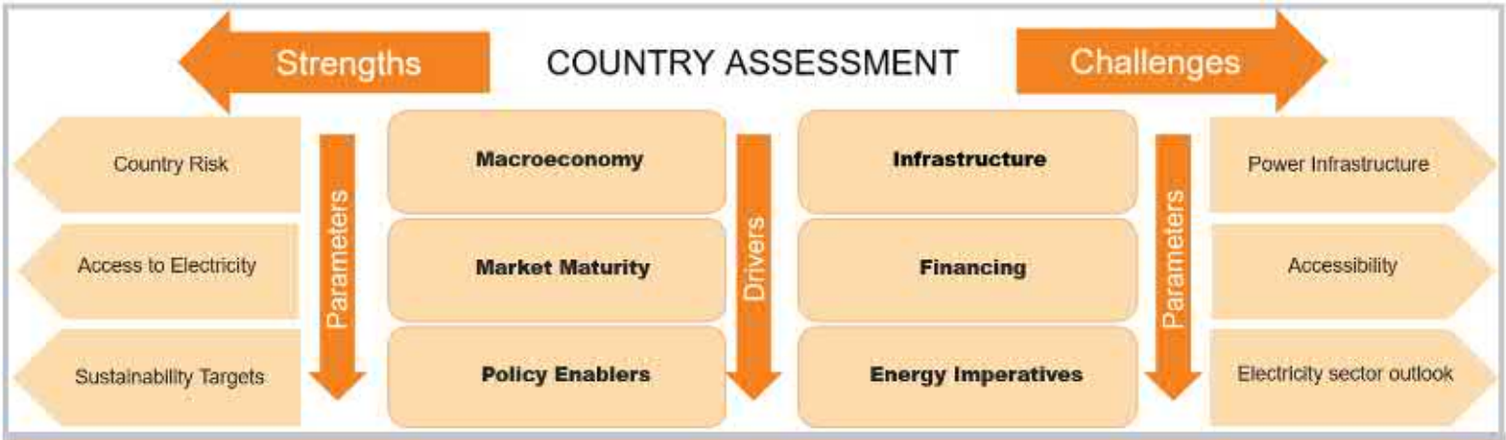


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



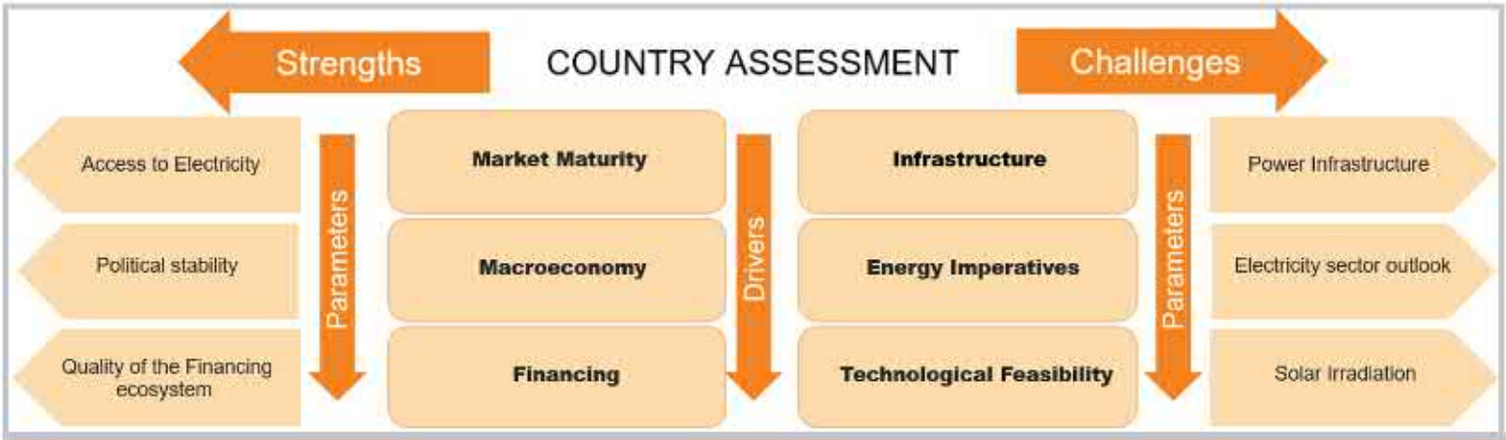
Drivers	Insights
Macro-economy	• Chad is a Lower-middle-income economy as per World Bank's classification.[1] • GDP (Real) grew at a rate of 3% in 2019 showing a slight improvement from the previous year (2.3%).[2] • FDI inflows increased to USD 567 million in 2019 from USD 461 million in 2018.[1]
Policy enablers	• The Government has formed the Agency for the Development of Renewable Energy (ADER), within the Ministry of Petroleum and Energy, with a responsibility of renewables based electrification.[3] • The Government has not set any national target regarding renewable energy deployment so far.[3] • Under the updated Finance Law, 2019, any equipment relevant to the generation and promotion of renewable energy is to be exempted from import duties and value-added tax.[3]
Technological Feasibility	• Owing to high levels of average irradiation of 6.26 kWh/m^2/day and specific yield of 5.01 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Chad. • Most of its existing generation capacity is dependent on diesel (LDO) and HFO generation.[5]
Market Maturity	• With only 12% population having access to electricity in 2018, Chad has one of the lowest electrification rates in the world.[6] • The electricity network covers only 0.3% of the country's total area. Over 80% of the electricity output is consumed in the capital. • The national utility is facing challenges due to inadequacy of its transmission and distribution network, commercial performance and financial equilibrium. • The state utility SNE is unable to recover its costs due to the mandated price subsidies.[3]
Infrastructure	• In 2019, The government of Chad has signed a Memorandum of Understanding (MoU) with UAE-based AMEA Power to develop a 120MW solar photovoltaic (PV) in the country.[7] • The AfDB has approved a EUR 18 million loan and a Partial Risk Guarantee (PRG) to support the 32 MWp Djermaya solar-plus-storage project in Chad. • AfDB finance also includes funds for improving the interconnection network between Chad and Cameroon and the rehabilitation of the generation assets of the country's power utility, National Electricity Company (SNE).
Financing	• Domestic clean energy investments, in Chad are very limited, with all finance exclusively coming from outside the country and disbursed at concessional rates.[3] • Although Chad is open to investments, the lack of diversification of the economy adds to the challenges for starting new businesses. Complicated tax procedures are also seen as major constraints.[1] • There are fewer active financial institutions in Chad than in neighbouring countries. The main players in this area are the European Union, the World Bank and the Islamic Development Bank.[3] • As part of its 2015-2020 Assistance Strategy for Chad, the African Development Bank plans to support Government's efforts to build diversified energy production infrastructure in the country.
Energy imperatives	• Per capita electricity consumption in 2019 was 15 kWh, significantly lower in comparison to the global average.[9] • The electricity tariffs in Chad are higher than in most neighbouring countries.[3] • There is no solar PV installed capacity as of 2019.[8] • The Overseas Private Investment Corporation (OPIC) has committed USD 10 million to support the introduction of off-grid solar kits and appliances in Chad.[10]


Comoros
Africa
Electricity Consumption in MU (2017)
55.0
Installed Solar Capacity in MW (2019)
0.0
Share of Population with Access to Electricity (2018)
0%
82%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.0
World Bank's Ease of Doing Business Score (2020)
47.90
Solar installed capacity Growth rate (CAGR) for 2015-19
0%
Power Trends
Cumulative Solar installed Capacity (MW)
1.0
0.8
0.6
0.4
0.2
0.0
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
55
50
45
40
50.2
45.5
46.3
43.7
42.0
42.0
40.0
55.0
2010
2012
2014
2016
Year
Access to Electricity
80%
75%
70%
70.1%
69.3%
69.5%
72.0%
74.4%
76.9%
79.4%
81.9%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Potential
Performance against 7 Drivers
Macroeconomy
Market Maurity
Policy enablers
Technological feasibility
Energy Imperatives
Financing
Infrastructure
Sub-regional standing
MALI
NIGER
CHAD
BURKINA FASO
BENIN
NIGERIA
Abuja
TOGO
GHANA
Porto-Novo
CAMEROON
CENTRAL AFRICAN REPUBLIC
EQUATORIAL GUINEA
REP. OF CONGO
COMOROS
GABON
Neutral
Beignner
Progressive
Influencer

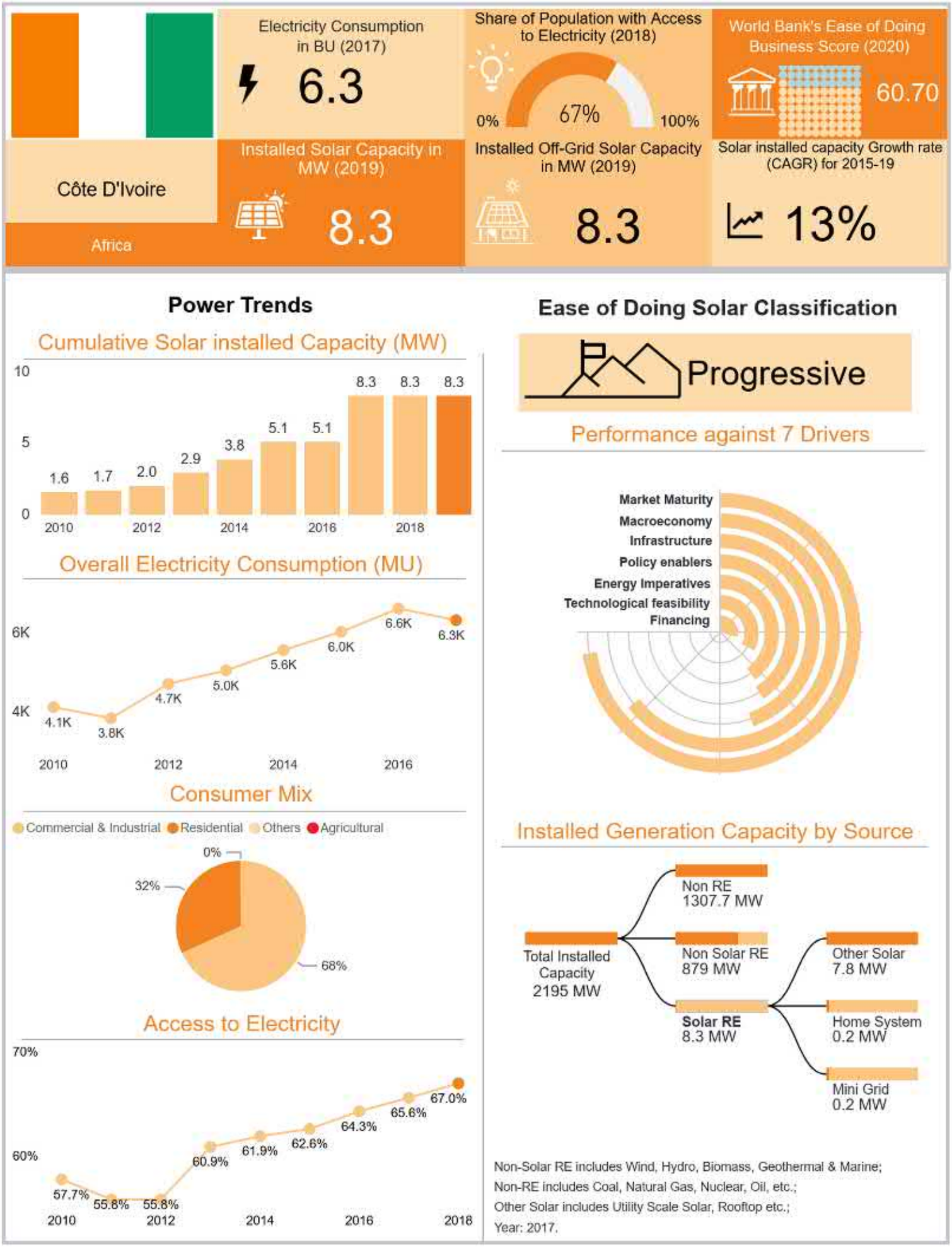


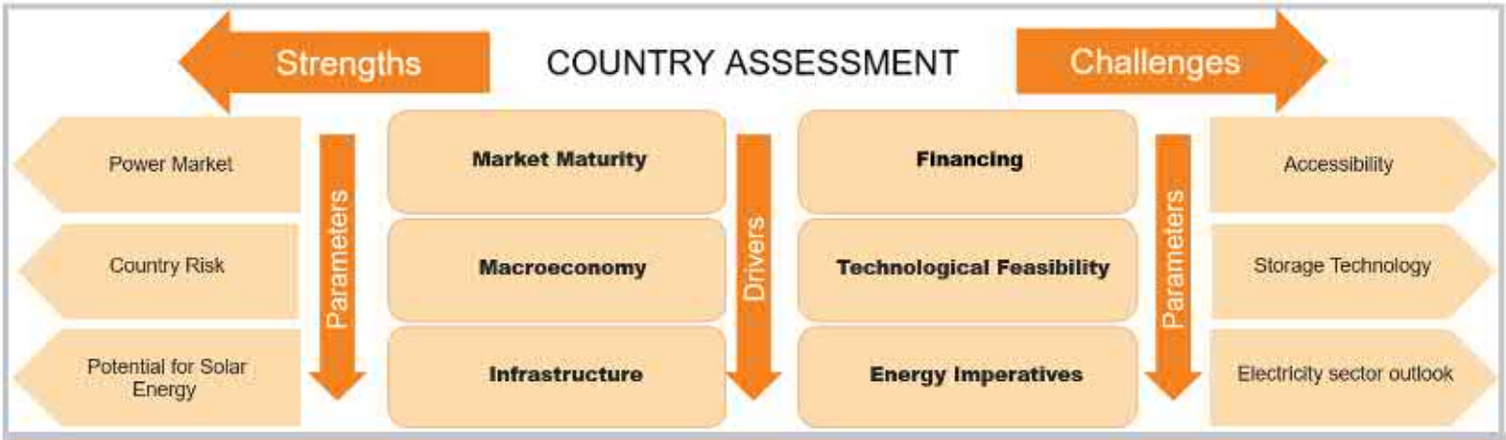
Drivers	Insights
Macro-economy	• Real GDP Growth has slowed down from 3.6% in 2018 to 1.9% in 2019 in Comoros.[1] • Significant remittance inflows (accounting for ~15% of GDP) have rendered support external stability and have boosted living standards.[1] • Trade and tourism are key industries that are driving the economy in Comoros.[2]
Policy enablers	• The country has set a target to achieve 100% share of renewable energy in the generation mix by 2050.[5] • A number of power sector reforms are being implemented in the country with the support of the AfDB. These reforms include institutional and legislative reforms aiming to improve sector planning and promote renewable energy. • Several sectoral reforms are being implemented including the finalization and adoption of a Power Sector Master Plan, the country's first grid code and the adoption of standard power purchase agreements.[4]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.054 kWh/m^2/day and specific yield of 4.286 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Comoros.[8] • Comoros is exposed to 8 hours per day of sunlight (~2,880 hours /year) indicating a favourable environment for solar based generation.[3]
Market Maturity	• Access to electricity rates vary by island with highest access rate in Grande Comore (80.2%) and relatively lower access rates on Mohéli (52.9%) and Anjouan (43.7%). Despite this disparity between islands, all islands have access rates higher than the Sub-Saharan regional average of 40%.[4] • Although having higher access to electricity than most of the sub-Saharan nations, Intermittent and relatively lower quality of supply results in a lower per capita electricity consumption.[4] • Few private sector-led projects have started – including Green Energy's 5 MW Lingoni mini-grid project and Innovent's 3 MW plant at Dahu
Infrastructure	• The public electricity provider faces financial stress on account of government-set tariffs which cover only one third of its cost.[1] • Due to the lack of proper maintenance of the generation equipment, the available capacity regularly dips below installed values and is inadequate to consistently satisfy demand across the three islands.[4]
Financing	• As per IMF, growth of credit to the economy has remained relatively feeble as the banking sector faces less favourable operating environment in the country.[1] • Asset quality remains lower with gross non-performing loans at 24% of the total loans as of 2019.[1] • There are twelve financial institutions, including four banks and four micro-finance deposit-taking institutions. Concentration is pronounced with two institutions holding 45% of the system's assets and deposits. Banking penetration remains relatively lower.[1]
Energy Imperatives	• Comoros imports about 90% of its commercial energy derived in the form of fossil fuels.[6] • In 2018, electricity generation in the Comoros consisted of small-scale diesel generators adding up to a total installed capacity of 31.5 MW.[4] • Total primary energy consumption is 0.2 tons of oil equivalent per capita, one of the lowest in the world and commercial energy consumption is also lower at 0.06 tons of oil equivalent per capita.[4] • With a relatively high cost of electricity at USD 0.33 per kWh, Comoros' electricity tariffs are reported to be the among the highest in Africa.[4]


Costa Rica
Latin America & Caribbean
Electricity Consumption in BU (2017)
9.9
Installed Solar Capacity in MW (2019)
47.5
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.6
World Bank's Ease of Doing Business Score (2020)
69.20
Solar installed capacity Growth rate (CAGR) for 2015-19
21%
Power Trends
Cumulative Solar installed Capacity (MW)
50
40
30
20
10
0
12
14
10
13
17
22
24
28
28
47
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
10,500
10,000
9,500
9,000
8,500
8565
8673
9019
9102
9207
9428
9785
9901
2010
2012
2014
2016
Year
Access to Electricity
99.8%
99.6%
99.4%
99.2%
99.1%
99.5%
99.7%
99.7%
99.4%
99.4%
99.5%
99.7%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Market Maturity
Macroeconomy
Financing
Policy enablers
Technological feasibility
Energy Imperatives
Infrastructure
Sub-regional standing
JAMAICA
BELIZE
HONDURAS
EL SALVADOR
NICARAGUA
COSTA RICA
PANAMA
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• Costa Rica is an upper-middle-income economy as per World Bank's classification.[14] • Costa Rica's GDP (Real) has grown at an annual rate of 2.1% in 2019, slightly less than the previous year (2.7%).[1] • FDI flows totalled to USD 2.5 billion in 2019 with a slight increase compared to previous year when inflows reached to USD 2.2 million.[2]
Policy enablers	• The 7th National Energy Plan 2015–2030 aims toward energy sustainability of the country with low emission levels and it supports the continuation of renewable energy development, energy efficiency, and low-carbon emission transport.[3] • In 2019, Costa Rica adopted National Decarbonisation Plan 2018-2050 which aims at transitioning to a completely Renewable Energy based economy.[3]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation of 4.89 kWh/m^2/day and specific yield of 3.96 kWh/kWp, moderate technical feasibility is envisaged for solar projects in Costa Rica.[4]
Market Maturity	• 99.7% population in Costa Rica has access to electricity as of 2018. • Based on the data from Energy Planning Secretariat (SEPSE), between 2010 and 2018, the average growth rate in electricity consumption reduced to 1.9% from 4.9% between 2001 to 2008. • As per SEPSE, the productive sector accounts for 61.5% of annual electricity consumption while the residential sector accounts for remaining 38.5% as of 2019. • The Costa Rican Institute of Electricity (Instituto Costarricense de Electricidad- ICE) controls 65% of electricity generation, 100% of transmission and 78% of distribution.
Infrastructure	• Cooperative Solar Park, a 4.4 MW solar energy project in Costa Rica, was completed in 2019. The financial investment to bring this project to completion was of approximately US$ 6.3 million. • A new solar plus storage micro grid will provide resilient power and cost savings for an international component assembly and manufacturing company.
Financing	• The International Finance Corporation (IFC) is providing longer-term funding beyond what is currently available in the domestic financial markets and intends to play the role of an anchor investor and mobilizing resources upon green bond issuance on commercial terms from institutional and private investors.[6] • IFC has signed a loan of USD $35 million to support and incentivize the issuance of a green bond by Davivienda Costa Rica, the third largest private bank in Costa Rica.[6]
Energy Imperatives	• According to National Energy Balance 2019 and INEC, per capita electricity consumption in 2019 was 2,008 kWh, relatively low in comparison to the global average. • Solar PV capacity grew from 10 MW in 2012 to 47 MW in 2019. • Costa Rica is one of very few countries in the world generating more than 99.2% of its electricity from RE source (including hydro), however only 0.49% of electricity is generated by solar PV (SEPSE).


Côte D'Ivoire
Africa
Electricity Consumption in BU (2017)
6.3
Installed Solar Capacity in MW (2019)
8.3
Share of Population with Access to Electricity (2018)
0%
67%
100%
Installed Off-Grid Solar Capacity in MW (2019)
8.3
World Bank's Ease of Doing Business Score (2020)
60.70
Solar installed capacity Growth rate (CAGR) for 2015-19
13%
Power Trends
Cumulative Solar installed Capacity (MW)
10
5
0
1.6
1.7
2.0
2.9
3.8
5.1
5.1
8.3
8.3
8.3
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
6K
4K
4.1K
3.8K
4.7K
5.0K
5.6K
6.0K
6.6K
6.3K
2010
2012
2014
2016
Consumer Mix
Commercial & Industrial
Residential
Others
Agricultural
0%
32%
68%
Access to Electricity
70%
60%
57.7%
55.8%
55.8%
60.9%
61.9%
62.6%
64.3%
65.6%
67.0%
2010
2012
2014
2016
2018
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Market Maturity
Macroeconomy
Infrastructure
Policy enablers
Energy Imperatives
Technological feasibility
Financing
Installed Generation Capacity by Source
Total Installed Capacity 2195 MW
Non RE 1307.7 MW
Non Solar RE 879 MW
Solar RE 8.3 MW
Other Solar 7.8 MW
Home System 0.2 MW
Mini Grid 0.2 MW
Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Cote d'Ivoire is a Lower-middle-income economy as per World Bank's classification.[1] • GDP (Real) has grown at an annual rate of 6.9% in 2019.[2] • FDI inflows increased to USD 1,009 million in 2019 from USD 620 million in 2018.[1] • Cote d'Ivoire's economic growth has been driven by commodity-based exports, which is expected to remain key to growth in medium term.[3]
Policy enablers	• Through the country's NDC (National Determined Contributions) released in 2016, a target has been set to reduce its greenhouse-gas emissions by 28% by 2030 including a target to generate 42% of its electricity from renewable energy by 2030.[3] • The Strategic Action Plan for the Electricity Sector 2030 include plans to retrofit existing rural diesel grids with Solar PV.[4] • Costs for solar PV based electricity is rapidly decreasing and, in some settings, is less expensive than fossil fuel-based power.[5]
Technological Feasibility	• Côte d'Ivoire has a fair potential for solar power electricity production with an average of 6 hours of sunshine a day.[3] • Owing to relatively high levels of irradiation of 5.05 kWh/m^2/day and specific yield of 4.00 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Cote d'Ivoire.[6] • The Electricity Code,2014 has paved way to harness the existing private sector interest and push innovative projects such as small-scale grid-connected solar photovoltaic (PV) and biomass projects beyond proposals into implementation.[7]
Market Maturity	• 67% population had access to electricity in 2018.[8] • The country is a net exporter of electricity with grid connections with Benin, Burkina Faso, Ghana, Guinea and Togo.[3] • Private operators in Côte d'Ivoire are currently responsible for 70% of energy production and 100% of its distribution. • Nearly 73% of the nation's electricity is generated from Gas based power plants and 27% from hydropower plants.[3]
Infrastructure	• The Master Plan for Rural Electrification indicates that all electrified villages in Côte d'Ivoire are located less than 20 km from the grid and hence will be connected to the national grid. • IFC is supporting the development of two public-private partnerships to generate 60 MW of solar energy. • Utility scale PV projects, under development in Côte d'Ivoire, include 66 MW and 25 MW facilities in Korhogo, in the northern Poro region and a 37.5 MW project in Boundiali department in the northwest. • KfW is preparing to support the rehabilitation of transmission lines in a "Green Corridor" as a prerequisite to connecting solar power plants in the north of Côte d'Ivoire.[3]
Financing	• Côte d'Ivoire's energy sector is growing but there is a need to restore and improve its financial sustainability and strengthen the private sector's willingness to invest.[3] • Côte d'Ivoire's 2016-2020 National Development Program aims to attract USD 32 million in private investment in renewable energy.[3]
Energy Imperatives	• Cote d'Ivoire's energy demand is expected to grow at 8% annually, reaching about 9,500 MUs by 2020.9 • Per capita electricity consumption, in 2019, was 397 kWh which is relatively low in comparison to the global average.[10] • With an installed generation capacity of 2,199 MW, Côte d'Ivoire's electrical system is the third largest in West Africa, after Nigeria and Ghana. Generation capacity is dominated by Gas fired plants (1,320 MW) and hydro power (879 MW).[3] • Solar PV capacity has grown from 2 MW in 2010 to 8 MW in of 2019.[11]

Cuba

Latin America & Caribbean

Electricity Consumption in BU (2017)

15.5

Installed Solar Capacity in MW (2019)

159.3

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

7.0

World Bank's Ease of Doing Business Score (2020)

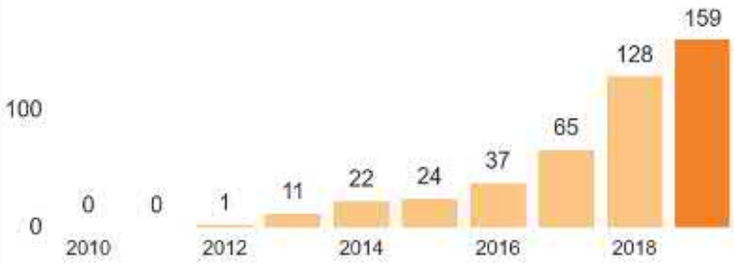
-

Solar installed capacity Growth rate (CAGR) for 2015-19

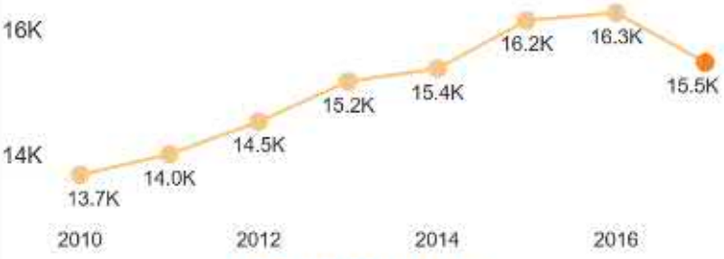
61%

Power Trends

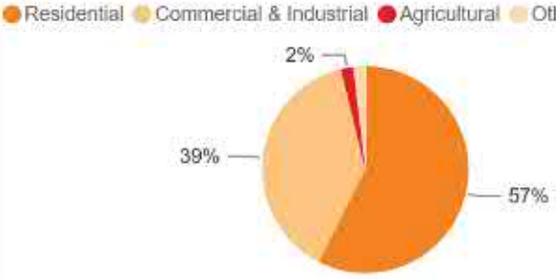
Cumulative Solar installed Capacity (MW)



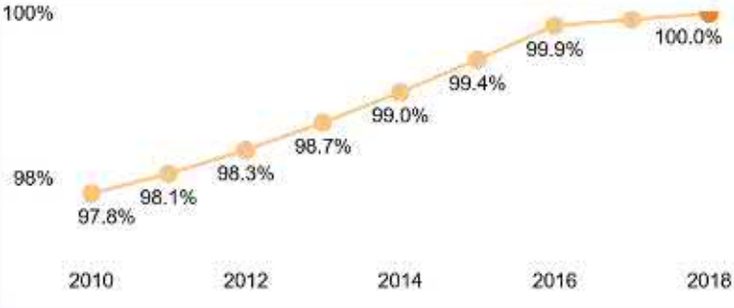
Overall Electricity Consumption (MU)



Consumer Mix



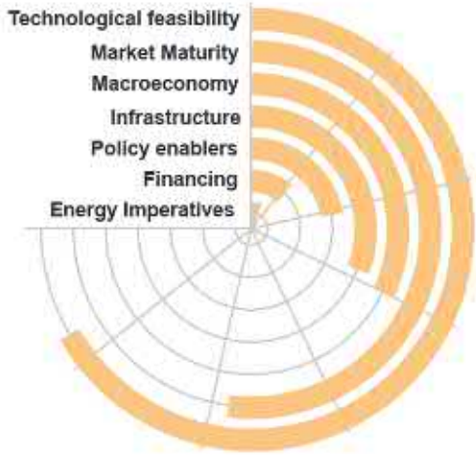
Access to Electricity



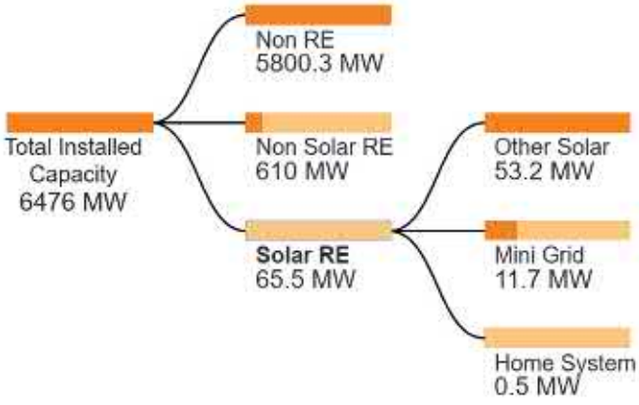
Ease of Doing Solar Classification

Potential

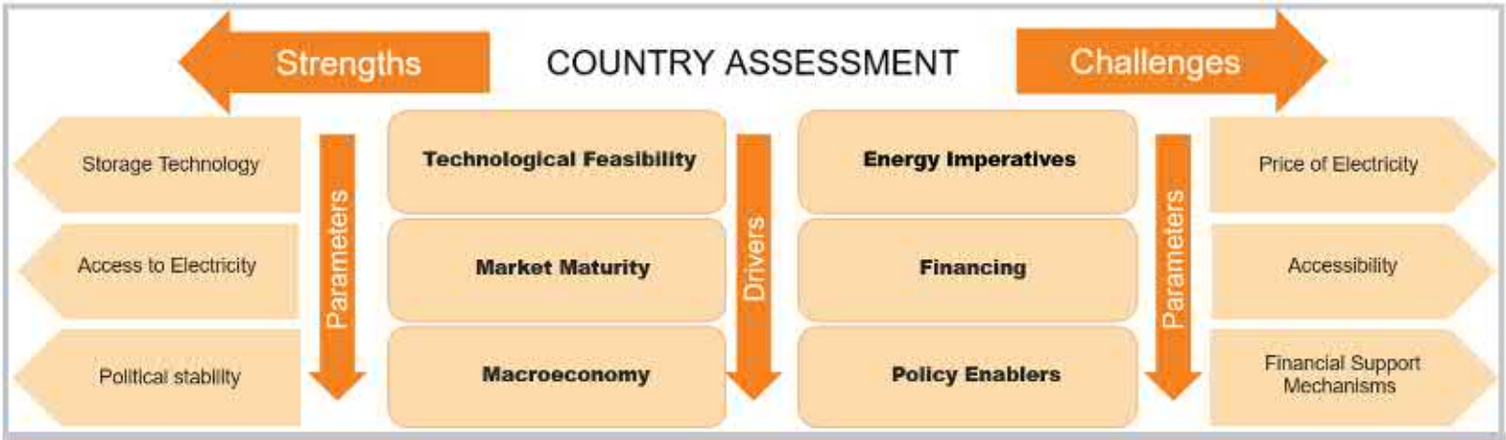
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Cuba is an upper-middle-income country as per World Bank's classification.[1] • GDP (Real) annual growth rate was estimated at 2.2% in 2018.[2] • Agriculture is one of the main contributors to Cuba's economy.[3]
Policy enablers	• Cuba aims to increase the share of renewable energy to 24%, in the consumption mix, by 2030 from approximately 4.5% in 2018. The Renewable Energy program aims to install 700 MW solar PV capacity in the country.[4] • Cuba has developed an ambitious Renewable Energy program considering it to be as one of the topmost priorities within the Cuban economic development policy.[4]
Technological Feasibility	• Owing to relatively high levels of irradiation of 5.41 kWh/m^2/day and specific yield of 4.52 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Cuba.[5] • Cuba has a high dependency on fossil fuels of which 52% is imported and 48% produced within the national territory. Renewable energy offers a good alternative to reduce this dependence on imported fuel and enhance energy security of the country.[4]
Market Maturity	• 100% population had access to electricity in 2018.[6] • Although the National Electricity System has made significant improvements in the last years, power cuts due to weather conditions are still common.[4]
Infrastructure	• 22 solar PV parks are in operation with a total capacity of 37 MW as of 2017.[7] • Cuba has one solar panel manufacturing plant with an annual production capacity of approximately 14 MWp. The country also produces supports/tables to install PV panels.[4] • Abu Dhabi Fund for Development (ADFD) had sanctioned a loan of USD 20 million in 2020 to install 8.5 MW of solar PV capacity supported with 2 MW of energy storage.[8]
Financing	• The Cuban Government aims to attract renewable energy investments of USD 3.5 billion in order to reach its goal of generating 24% of its power from renewable energy by 2030.[9] • Given Cuba's renewable energy financing constraints, IRENA has recommended a state-owned 10 MW solar PV project to its partner, the ADFD, for an award of USD 15 million in co-funding.[10] • The European Union, together with the Cuban authorities, developed a Support Program to Cuba's Energy Policy. The program consists of a budget of Euro 18 million and includes an objective to facilitate foreign investment in the renewable energy space.[4]
Energy Imperatives	• Per capita electricity consumption, in 2019, was 1,718 kWh which is relatively low in comparison to the global average.[5] • Solar PV capacity has grown from 1 MW, in 2012, to 159 MW in 2019.[6] • The Cuban Renewable Energy Program aims to develop wind, solar, bioelectricity and hydro power projects. The different projects are expected to add 2,284 MW of installed capacity with an investment potential of USD 4 billion.[12]

Democratic Republic of the Congo

Africa

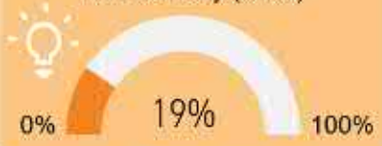
Electricity Consumption in BU (2017)

7.2

Installed Solar Capacity in MW (2019)

18.9

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

18.9

World Bank's Ease of Doing Business Score (2020)

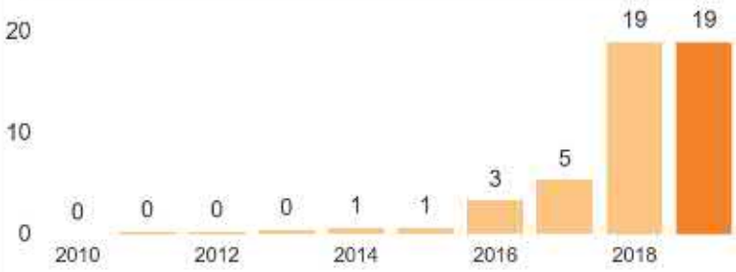
36.20

Solar installed capacity Growth rate (CAGR) for 2015-19

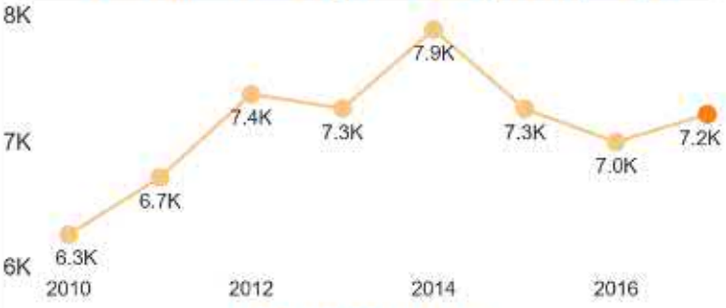
130%

Power Trends

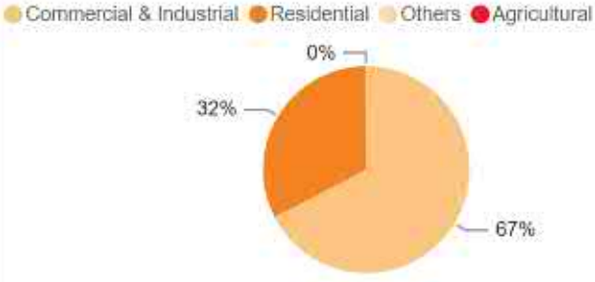
Cumulative Solar installed Capacity (MW)



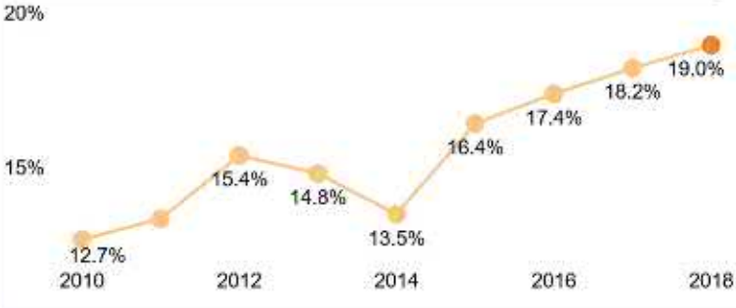
Overall Electricity Consumption (MU)



Consumer Mix



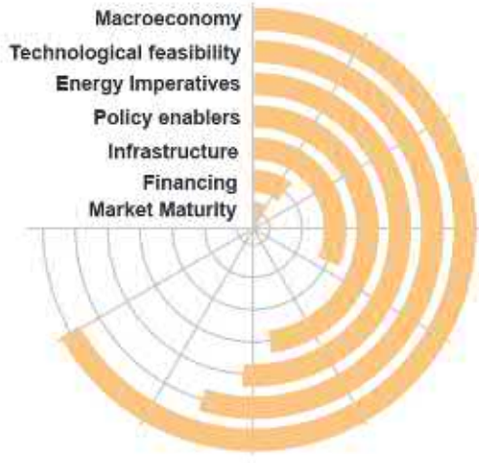
Access to Electricity



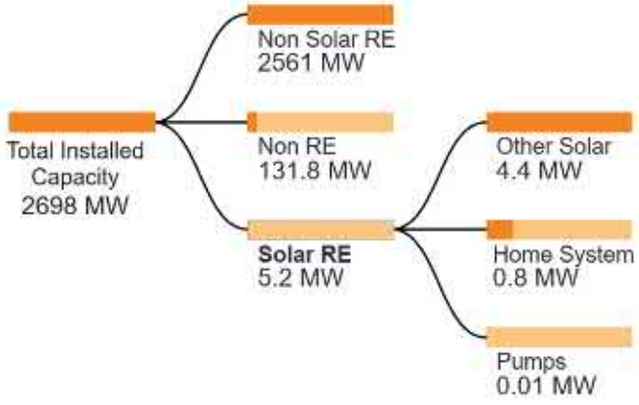
Ease of Doing Solar Classification

Potential

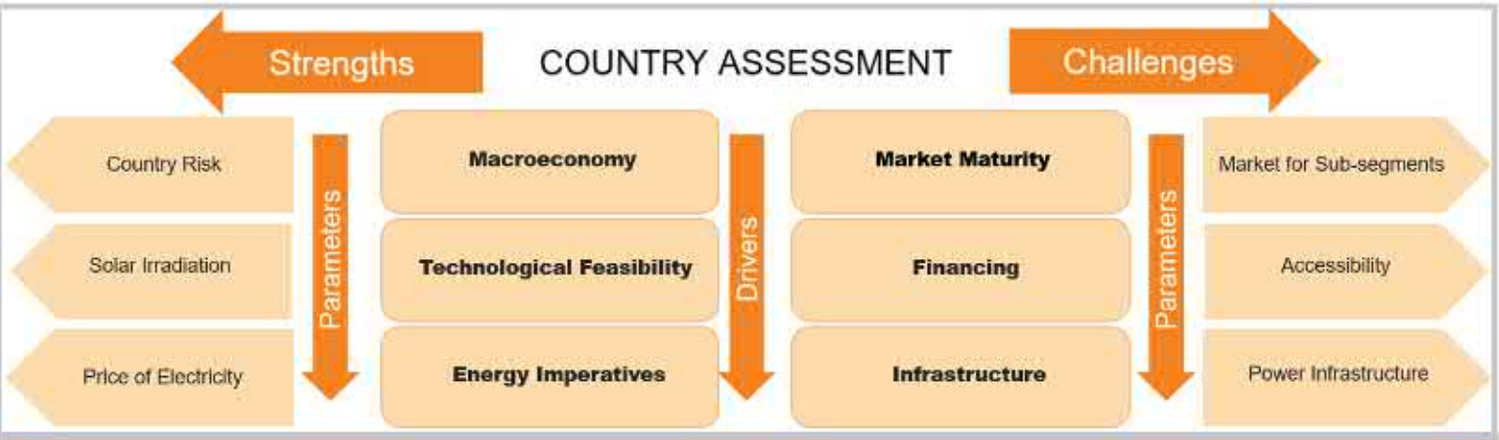
Performance against 7 Drivers



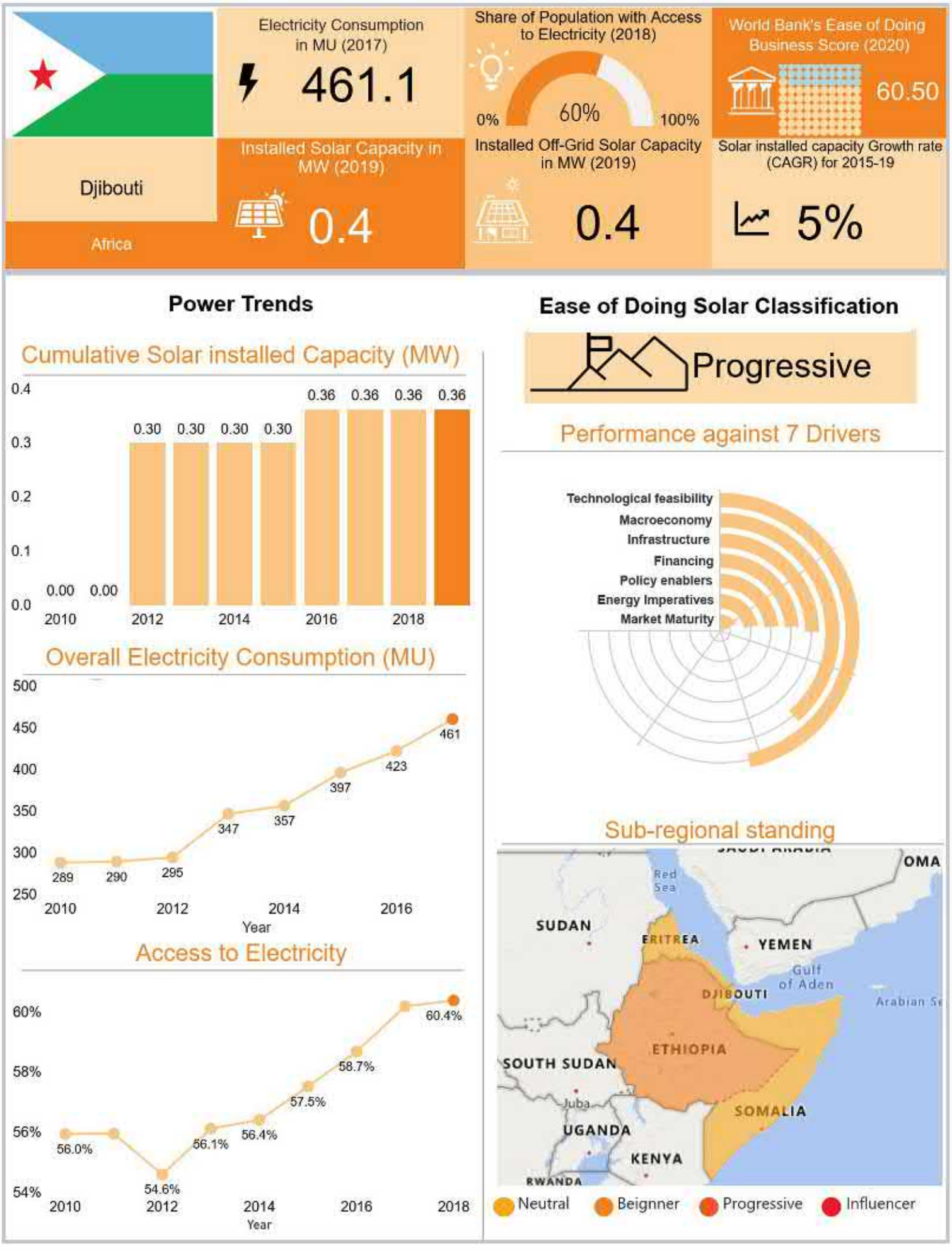
Installed Generation Capacity by Source

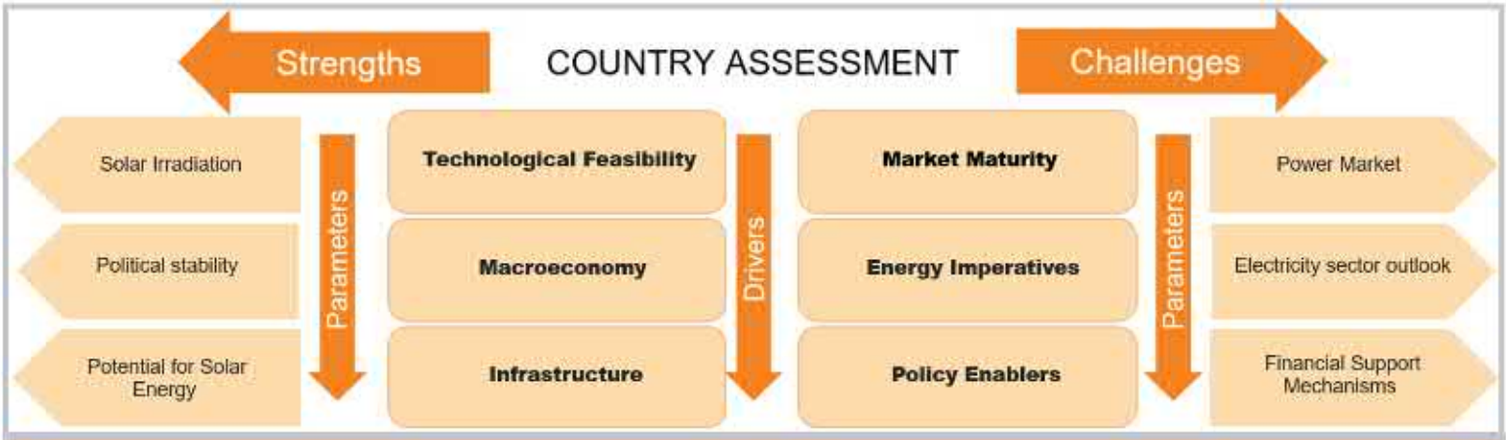


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



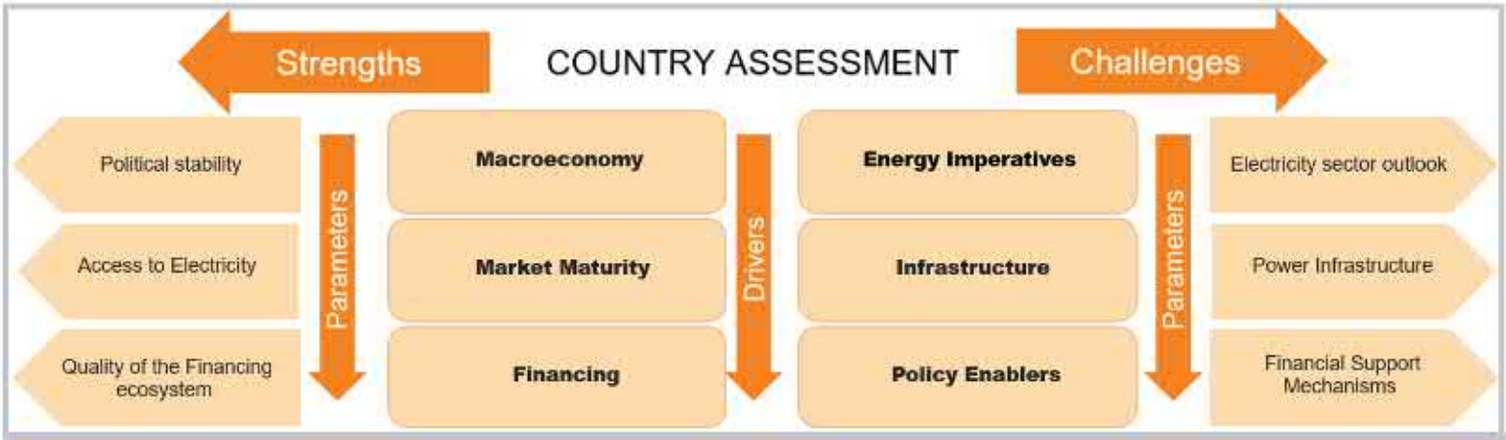
Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 4.4% in 2019.[2] • The Democratic Republic of the Congo has made reasonable economic growth with GDP (at current prices) rising from USD 37.918 billion in 2015 to 47.32 billion in 2019.[3] • It is a member of the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of Central African States (ECCAS) and the Southern African Development Community (SADC).[12]
Policy enablers	• Electricity is prioritized under Investments Code Law that has set up National Agency for Investment Promotion (ANAPI) as a One-Stop-Shop for all investment including renewable energy investments.[14] • The National Electrification Agency (AGENA) and National Electrification Fund (FONEL) were created to increase access to energy in rural areas and secondary cities.[14] • The National Electrification Fund is a financial mechanism that funds private operators, small businesses, NGOs and rural cooperatives that are involved in decentralized systems using renewable energies.[14]
Technological Feasibility	• Owing to the relatively high levels of average solar irradiation (GHI) of 5.19 kWh/m^2/day and specific yield of 4.12 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Congo.[4] • The Congo National Committee aims to promote sustainable energy development in the Democratic Republic of Congo, as a part of the World Energy Council's energy vision.[13]
Market Maturity	• As of 2018, 19% of the population had access to electricity. The country has set a target to achieve universal access by 2030.[5,6] • The country is endowed with abundant energy potential and resources. While these resources are yet to be harnessed fully, the conservation and sustainable management of these resources are major challenges for the Congolese government.[13]
Infrastructure	• The Government of DRC, with support of Lighting Africa, developed a USD 1.5 million Domestic Power Markets Development Project (PMEDE) for off-grid lighting with an aim to increase awareness, access, and understanding of quality-verified solar products.[6] • 20,000 solar lanterns are being provided to social institutions in selected off-grid districts. In addition, 5,000 basic plug-and-play Systems are being distributed to town halls, schools and healthcare facilities.[6] • Government of Uganda and Government of Congo announced project financing for the development of a 350 km power transmission line connecting the countries. The financing will be provided by African Development Bank. The total cost of the project is approximately USD 150 million.[10] • The Government has launched the construction of a 600 MW PV plant in Menkao.[11]
Financing	• Sovereign rating of Caa1 with stable financial outlook reflects on the country's credit view.[7] • Capital inflows and other financial flows in 2019, including foreign direct investments (FDI), have helped protect official reserves, limit the depreciation of the Congolese franc and curb inflation.[9] • The Electricity Access and Service Expansion (EASE) Project is approved in 2017, with USD 145 million commitment, to expand access to electricity in target areas and promote private sector expansion.[15]
Energy Imperatives	• Per capita electricity consumption in 2019 was 111 kWh which is significantly lower in comparison to the global average.[1] • The country has one of the lowest electrification rates in the world at just over 9%, with 1% in rural areas and 19% in urban areas.[3] • The Congo River basin remains the world's largest untapped source of renewable hydroelectric energy and has a potential to install up to 100 GW of hydropower capacity.[6,8] • Three Gorges Corporation and Sinohydro have announced project financing of USD 73 million for the construction and development of Grand Inga Mega Hydroelectric Project in Congo. The financing was provided by African Development Bank. The total installed capacity of the project will be 11,000 MW.[10]


Djibouti
Africa
Electricity Consumption in MU (2017)
461.1
Installed Solar Capacity in MW (2019)
0.4
Share of Population with Access to Electricity (2018)
0%
60%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.4
World Bank's Ease of Doing Business Score (2020)
60.50
Solar installed capacity Growth rate (CAGR) for 2015-19
5%
Power Trends
Cumulative Solar installed Capacity (MW)
0.4
0.3
0.2
0.1
0.0
0.00 0.00 0.30 0.30 0.30 0.30 0.36 0.36 0.36 0.36
2010 2012 2014 2016 2018
Overall Electricity Consumption (MU)
500
450
400
350
300
250
289 290 295 347 357 397 423 461
2010 2012 2014 2016
Year
Access to Electricity
60%
58%
56%
54%
56.0% 54.6% 56.1% 56.4% 57.5% 58.7% 60.4%
2010 2012 2014 2016 2018
Year
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Technological feasibility
Macroeconomy
Infrastructure
Financing
Policy enablers
Energy Imperatives
Market Maturity
Sub-regional standing
Red Sea
SUDAN
ERITREA
YEMEN
Gulf of Aden
DJIBOUTI
ETHIOPIA
SOUTH SUDAN
Juba
SOMALIA
UGANDA
KENYA
RWANDA
Neutral
Beignner
Progressive
Influencer

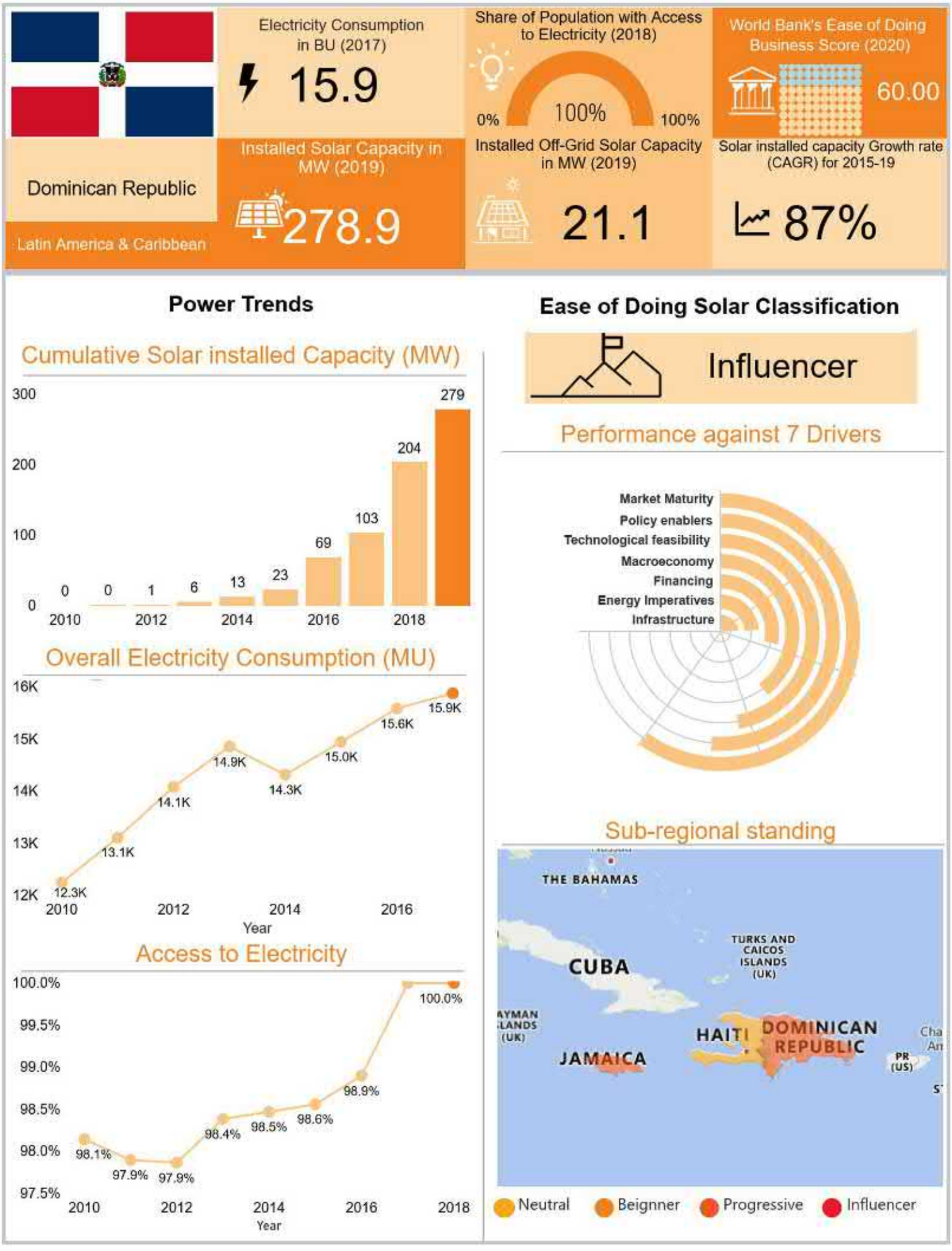


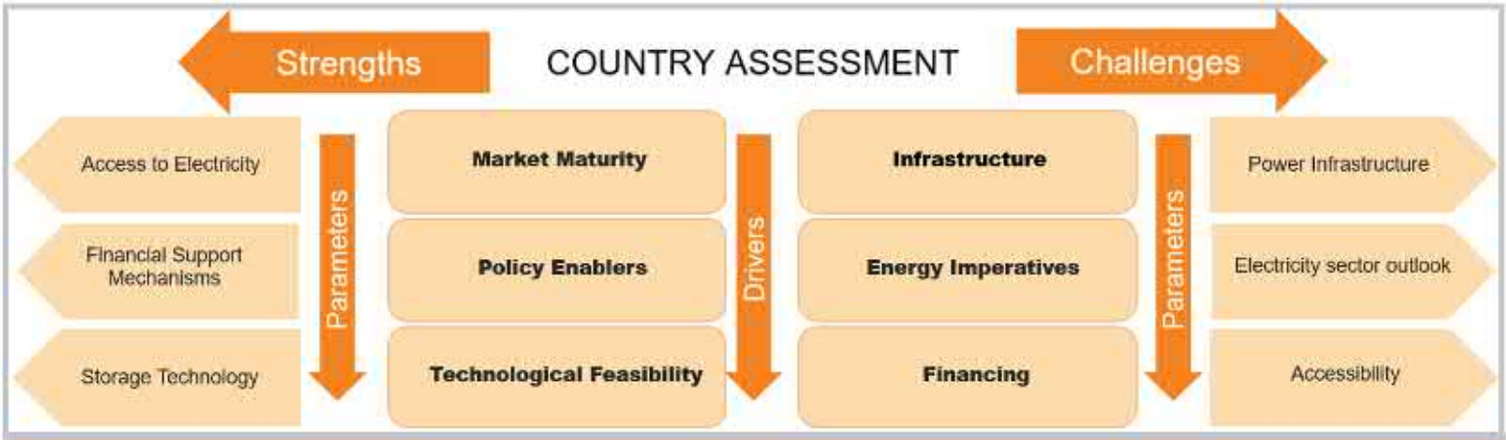
Drivers	Insights
Macro-economy	• Djibouti is a Lower-middle-income economy as per World Bank's classification.[1] • GDP (Real) has grown at an annual rate of 7.5% in 2019.[2] • FDI flows to Djibouti amounted to USD 182 million in 2019, up from USD 170 million in 2018.[1] • Continued dependence on imported fuel for generating electricity is impacting the economy in Djibouti.[3]
Policy enablers	• Djibouti's government aims to achieve 100% share of renewable energy in its generation mix by 2035.[4] • Djibouti provides a tax exemption for all renewable energy equipment to facilitate investments in the RE sector.[3]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation of 6.06 kWh/m^2/day and specific yield of 4.80 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Djibouti.[5] • According to the Centre des Etudes et la Recherche de Djibouti (CERD), the South-West region enjoys the highest irradiation levels, particularly in Dikhil.[6]
Market Maturity	• 60% population had access to electricity as of 2018.[7] • The country remains heavily dependent on imported fossil fuels and power exposing it to fluctuating oil prices and external service disruptions.[8] • The Ministry of Energy and Natural Resources oversee the energy sector and is also the sector regulator. The Électricité de Djibouti (EDD) is the sole generator, transmitter and distributor of electricity in the country.[9]
Infrastructure	• The Multilateral Investment Guarantee Agency (MIGA) recently announced it has insured investments in 58.9 MW of wind power project which is also country's first IPP.[10] • Government of Djibouti has signed a Memorandum of Understanding (MoU) with French-based energy group, Engie, to build a 30-MW solar power plant.[11]
Financing	• In 2020, Africa Finance Corporation (AFC), announced a US$ 63 million strategic investment to construct and operate a 60MW wind project in in Djibouti.[12] • The CREC Renewable Energy Park will be the first U.S. infrastructure project in Djibouti built by the U.S. private sector.[13]
Energy Imperatives	• Djibouti's electricity demand is expected to considerably increase due to various large-scale infrastructure projects including ports, free trade zones and railways that the government has undertaken.[12] • Per capita electricity consumption in 2019 was 391 kWh, relatively low in comparison to the global average.[14] • Solar PV capacity has remained nil out of total installed capacity of 123 MW as of 2019.


Dominica
Latin America & Caribbean
Electricity Consumption in MU (2017)
120.8
Installed Solar Capacity in MW (2019)
0.3
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.0
World Bank's Ease of Doing Business Score (2020)
60.50
Solar installed capacity Growth rate (CAGR) for 2015-19
8%
Power Trends
Cumulative Solar installed Capacity (MW)
0.6
0.4
0.2
0.0
0.22 0.22 0.23 0.23 0.23 0.23 0.63 0.63 0.32 0.32
2010 2012 2014 2016 2018
Overall Electricity Consumption (MU)
145
140
135
130
125
120
134.8 139.7 138.7 132.4 136.0 138.9 143.2 120.8
2010 2012 2014 2016
Year
Access to Electricity
100%
98%
96%
94%
94.0% 95.4% 96.8% 98.2% 99.7% 99.8% 100.0% 100.0%
2010 2012 2014 2016 2018
Year
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Macroeconomy
Market Maturity
Financing
Technological feasibility
Policy enablers
Infrastructure
Energy Imperatives
Sub-regional standing
Fajardo
(UK)
ANGUILLA (UK)
ST KITTS AND NEVIS
Plymouth
FRENCH-GUADELOUPE (FR)
DOMINICA
Roseau
FRENCH-MARTINIQUE (FR)
SAINT LUCIA
ST VINCENT AND THE GRENADINES
BARBADOS
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• GDP (at current prices) has grown at an annual rate of 9.2% in 2019.[3,4] • The country's economy is largely depended on tourism and agricultural sectors.[10] • Despite the natural disaster in 2017, the country is committed to build back and maintain stable financial sector. The country is also focused on implementing climate resilience and recovery plan.[10,11]
Policy enablers	• National Energy Policy (NEP) aims to promote use of sustainable and indigenous resources to make electricity generation self-sufficient by 2020.[6] • The Government's commitment to create a saving fund for natural disasters is commendable, topped up with higher risk coverage under the Caribbean Catastrophe Risk Insurance Facility (CCRIF).[8]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation of 4.94 kWh/m^2/day and average specific yield of 4.09 kWh/kWp, moderate technical feasibility is envisaged for solar projects in Dominica.[1] • In April 2018, an agreement was signed with the Clinton Climate Initiative (CCI) to manage Sustainable and Resilient Energy Plan (S-REP) to identify a cost-effective, reliable and climate resilient electricity system for Dominica.
Market Maturity	• 100% of population has access to electricity in 2018.[5] • Dominica is an active participant in the Caribbean Renewable Energy Development Programme (CREDP) to remove the barriers to use renewable energy.[7] • As of 2018, cumulative installed capacity of Dominica was 41.9 MW of which 1.5% was from solar PV.[6]
Infrastructure	• The grid network comprises of 403 kms of 11 kV and 922 kms of 230/400 V overhead lines.[6] • Post blackouts caused by Hurricane Maria, in 2017, solar panels and battery storage systems were installed in 6 critical health facilities in the country.[12]
Financing	• International financial flows, to Dominica, in support of clean and renewable energy was US$ 13 million in 2017 in PPP terms.[5] • In July 2019, European union (EU) signed a financing agreement of US$ 2.83 million in support of renewable energy and energy efficiency projects in the country.[6] • As on date, 21 projects have been approved of total commitment amount of US$ 235.26 million by the World Bank Group (in the form of Loan, credit or grant).[9]
Energy Imperatives	• By 2017, renewable energy share has reached 10% of total electricity consumption.[5] • The country has approximately 392 MW potential of renewable energy with 45 MW of solar power potential.[14] • The electricity generation mix consists of 0.5% solar as of 2018.[6] • The national average electricity consumption per capita is 1,066 kWh as of 2019.[2]


Dominican Republic
Latin America & Caribbean
Electricity Consumption in BU (2017)
15.9
Installed Solar Capacity in MW (2019)
278.9
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
21.1
World Bank's Ease of Doing Business Score (2020)
60.00
Solar installed capacity Growth rate (CAGR) for 2015-19
87%
Power Trends
Cumulative Solar installed Capacity (MW)
300
200
100
0
0
0
1
6
13
23
69
103
204
279
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
16K
15K
14K
13K
12K
12.3K
13.1K
14.1K
14.9K
14.3K
15.0K
15.6K
15.9K
2010
2012
2014
2016
Year
Access to Electricity
100.0%
99.5%
99.0%
98.5%
98.0%
97.5%
98.1%
97.9%
97.9%
98.4%
98.5%
98.6%
98.9%
100.0%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Market Maturity
Policy enablers
Technological feasibility
Macroeconomy
Financing
Energy Imperatives
Infrastructure
Sub-regional standing
THE BAHAMAS
CUBA
TURKS AND CAICOS ISLANDS (UK)
AYMAN LANDS (UK)
HAITI
DOMINICAN REPUBLIC
JAMAICA
PR (US)
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• Despite economic crisis in 2009, the country witnessed an average GDP growth rate of 5% during 2000-2018 period.[3] • GDP growth rate, in 2019, is at 5%. GDP is expected to grow at a CAGR of 5.1% between 2019 and 2023.[2,3] • GDP per capita (at current prices) is USD 8,282 in 2019.[1] • The government has drafted the 2016-2020 plan at the start of its second term on long-term National Development Strategy (Vision 2030).[4]
Policy enablers	• Available fiscal incentives include exemption of sales tax, tax on imports on RE components and grants up to 50% of investment costs for a maximum 5MW production capacity.[3] • Fixed feed-in tariff and reduced transmission fees for RE projects.[3] • Net metering legislation, in 2011 for residential solar installations (<25 kW) and commercial installations (<1 MW), resulted in stimulating 519 customers to connect to grid by 2014.[3]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.42 kWh/m^2/day and specific yield 4.56 kWh/kWp, strong technical feasibility is envisaged for solar projects in Dominican Republic.[5] • Technical potential, for solar PV, is estimated to be 1.9 GW by 2030.[3] • In 2017, the country launched RE project support plan which includes 3 solar projects with an investment of 250 million USD (132.96 MW).[3]
Market Maturity	• The country's solar PV capacity reached 204 MW in 2018 from 0.01 MW in 2011.[3] • As of 2018, solar constituted 4.1% of total installed capacity which is expected to grow at a CAGR of 12.7% during 2019-2030.[3] • 100% of population had access to electricity in 2018.[6] • In generation sector, 86-88% share of installed capacity is owned by private companies and remaining is owned by the Government.[3]
Infrastructure	• With 2.06% annual rate of urbanization (2015-20 Est), 82.5% of total population will be urbanized by 2020.8 • As of 2014, power transmission and distribution losses stand at 12.1% of output, indicating a considerably better network.[9] • The transmission network belongs to a single state-owned company which transports 87% of all the electricity consumed in the country.[10] • The distribution sector is under responsibility of three public sector companies which control 78% of electricity distribution market.[10]
Financing	• Country has a stable financial outlook with a credit rating of Ba3.[7] • The utility-scale market is in an upswing, with successful financing and construction for a few large-scale wind and solar projects.[3] • Lack of effective financing options to support small-scale renewable energy projects, though, is a challenge.[3]
Energy Imperatives	• Annual power generation has increased from 14,053 MUs in 2006 to 19,587 MUs in 2018 at a CAGR of 2.8%.[3] • Net electricity consumption is 16,409 MUs in 2018 has grown at a CAGR of 2.7% during 2006-2018.[3] • The country has set a target of increasing the share of renewable energy sources to 25%, in power generation mix, by 2025 and to save more than USD 25 billion in energy sector spending through 2030.[3] • In 2018, around 35.3% of country's power consumed was by industrial segment, 31.5% by residential segment and 26.2% by commercial segment.[3]

Egypt

Africa

Electricity Consumption in BU (2017)

151.6

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

60.10

Installed Solar Capacity in MW (2019)

1647.0

Installed Off-Grid Solar Capacity in MW (2019)

50.0

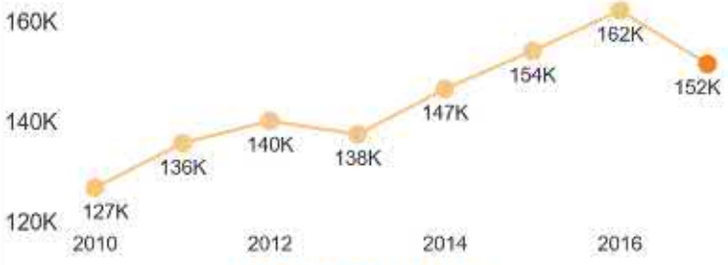
Solar installed capacity Growth rate (CAGR) for 2015-19

185%

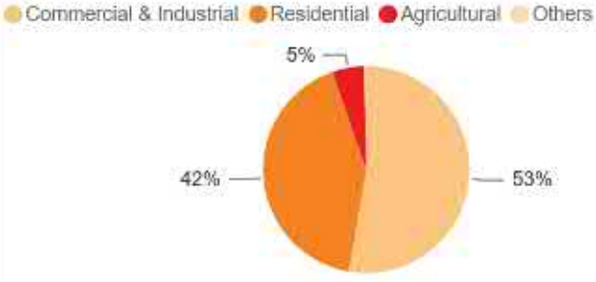
Power Trends

Cumulative Solar installed Capacity (MW)

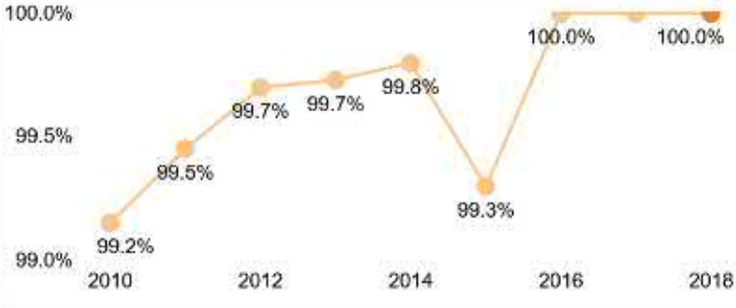
Overall Electricity Consumption (MU)



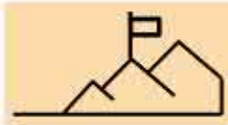
Consumer Mix



Access to Electricity

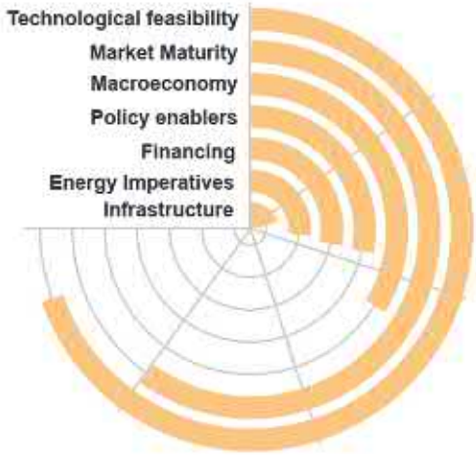


Ease of Doing Solar Classification

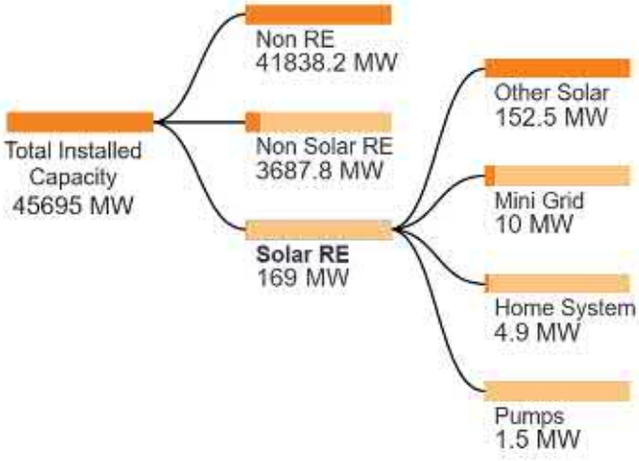


Influencer

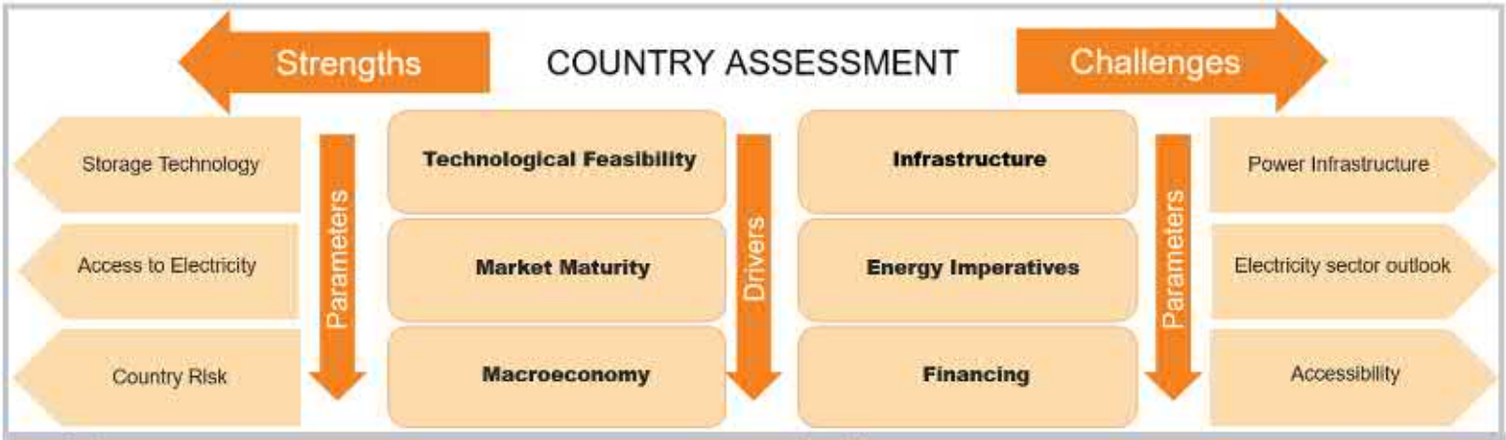
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) is poised at USD 303.175 billion and has grown at an annual rate of 5.6% in 2019.[2,3] • Egypt's economy largely depends on tourism, oil and gas fields. Economic growth is expected to further strengthen to 6% in 2021.[7] • The debt-to-GDP ratio fell from 103% in 2017 to 89.5% in 2019, partly as a result of fast-growing nominal GDP.[7]
Policy enablers	• The Egyptian Government has implemented an Integrated Sustainable Energy Strategy (ISES) with a renewable energy target of 42% of electricity mix by 2035.[8] • By amending its investment law to increase the renewable energy investment, the country has reduced the custom tax by 2% for renewable energy equipment. Additionally, VAT was reduced to 5% from earlier levels of 14% and sales tax was reduced to 5% from earlier levels of 10%.[8]
Technological Feasibility	• Owing to relatively high levels of solar irradiation levels of 6.319 kWh/m^2/day and specific yield of 5.412 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Egypt.[5] • Share of renewable energy in the consumption mix was 6% in 2017 and is expected to reach 20% by 2022 (of which 12% would be from solar) through public investments under the New and Renewable Energy Authority (NREA).[8,6] • Currently renewable energy is a diverse mix of technologies that includes sizeable generation from solar PV, Concentrated Solar Power (CSP) and wind.[11]
Market Maturity	• 100% of the population has access to electricity as of 2018.[6] • International financial flow, to support clean and renewable energy, was at USD 1828.2 million in 2017 (in PPP terms).[6] • According to Cabinet of Ministers, 30 solar PV systems, of total capacity 840 kW each at a capital cost USD 0.521 million, is implemented by Egyptian Electrical Holding Company (EEHC) and its affiliated subsidiaries.[10]
Infrastructure	• The Egyptian Electrical Holding Company (EEHC) is the state-owned utility responsible for total electricity value chain covering generation, transmission and distribution.[8] • Egypt's electric power transmission network consisted of 47,724 ckm in 2018 and is expected to increase to 55,897 ckm by 2025.[8] • The total length of the distribution lines grew at a CAGR of 2.78% between 2000-2018 to 502,477 ckm and is expected to grow at CAGR of 3.29% by 2025.[8] • Country has developed the Strategy of Sustainable Development 2030 to make the electricity sector of country a central hub for energy.[8] • The country is a part of 8 country interconnection project including Iraq, Jordan, Libya, Lebanon, Palestine, Syria, Turkey (EIJLLPST).[8]
Financing	• The Government of Egypt has been affirmed the long term foreign and local currency issuer rating at B2 with stable outlook.[4] • In 2018, Egypt power market has reached a total deal value of USD 177 million from 13 deals.[8] • The USD 500 million Upper Egypt Local Development Program- "For Results" was implemented to improve the business environment for private sector development.[9] • The Asian Infrastructure Investment Bank (AIIB) announced up to USD 210 million in debt to finance renewable power projects and help the country to meet its commitments under the Paris Climate Agreement.[10]
Energy Imperatives	• Total electricity consumption has increased to 157.6 BUs in 2018 at a CAGR of 5.5% from 2000-2018.[8] • As of 2019, per capita electricity consumption of Egypt is 1998 kWh, relatively lower in comparison to the global average.[1] • Solar PV accounts for 1.3% of total installed capacity in 2018.[8]

El Salvador

Latin America & Caribbean

Electricity Consumption in BU (2017)

6.2

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

65.30

Installed Solar Capacity in MW (2019)

391.4

Installed Off-Grid Solar Capacity in MW (2019)

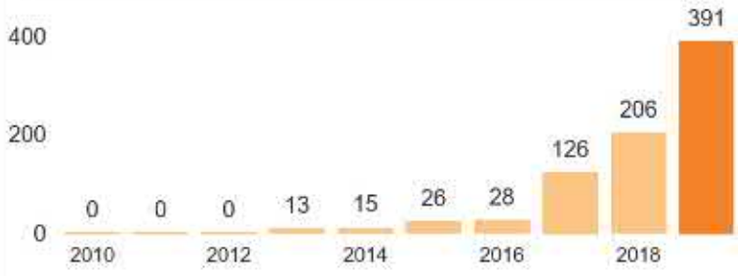
4.0

Solar installed capacity Growth rate (CAGR) for 2015-19

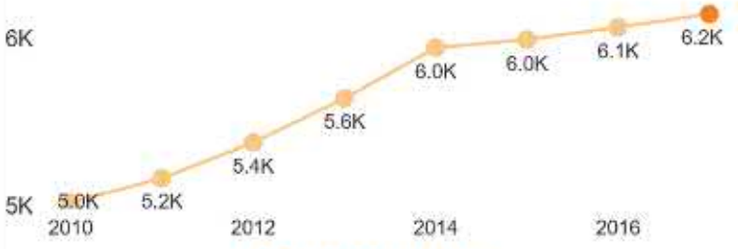
97%

Power Trends

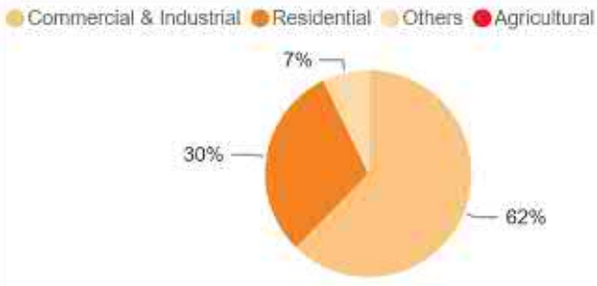
Cumulative Solar installed Capacity (MW)



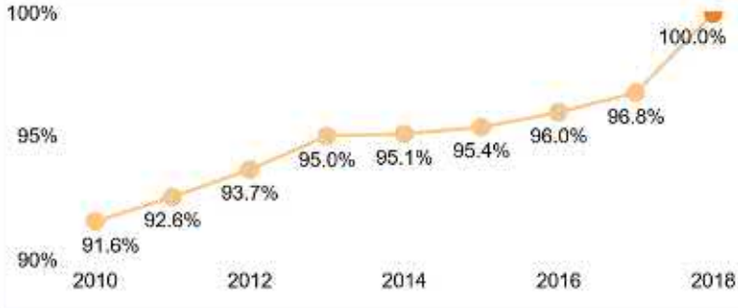
Overall Electricity Consumption (MU)



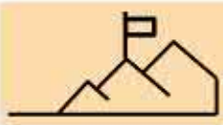
Consumer Mix



Access to Electricity



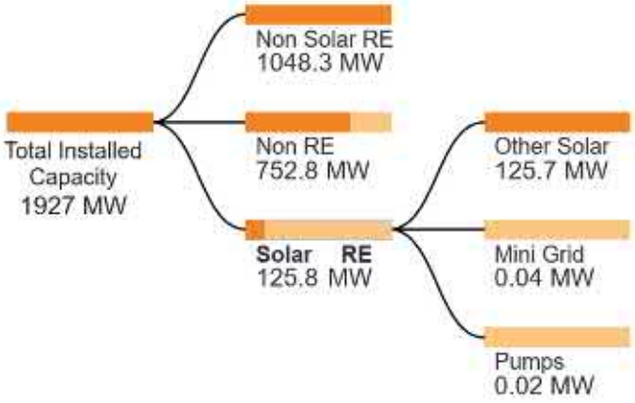
Ease of Doing Solar Classification



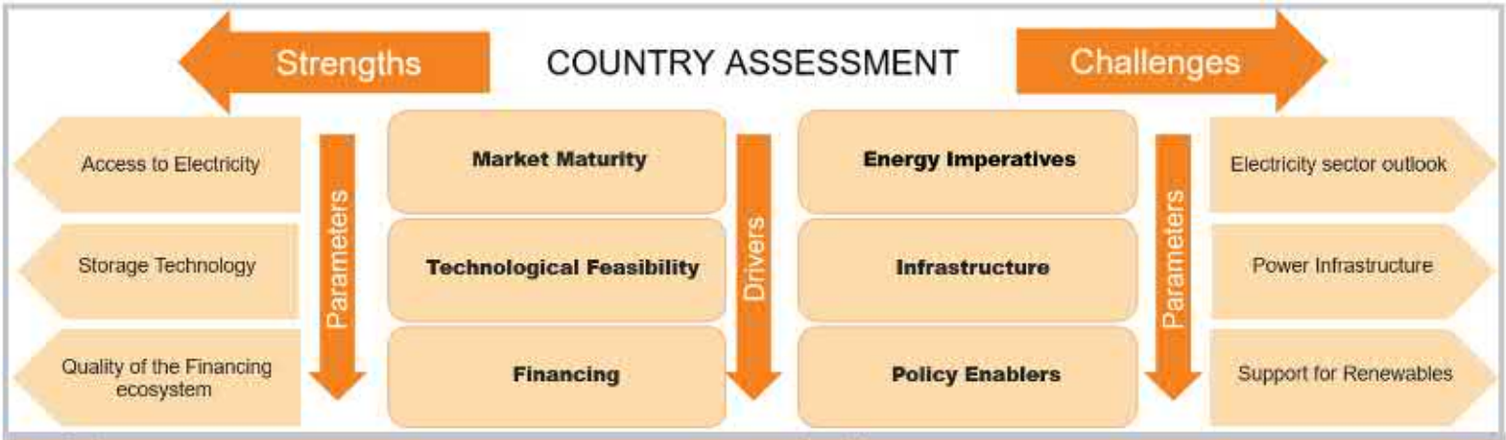
Influencer

Performance against 7 Drivers

Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 2.4% in 2019.[9] • El Salvador is a lower-middle-income developed country with a GDP per capita of USD 4,187 in 2019.[3,10] • Ongoing smooth political transition, strengthened policy frameworks and structural reforms have led to sustained economic growth in the recent years.[17] • The GDP (current) is recorded at USD 27.02 billion in 2019.[11]
Policy enablers	• As per Decree No. 80, from 2012, mandatory dispatch is considered for all grid connected renewable energy generators.[12] • In 2015, Decree No. 462 was amended which offers income tax benefits for all sources of renewable energy. Also, it offers income tax benefits for the sale of Certified Emission Reductions under the Clean Development Mechanism.[13] • El Salvador has launched renewable energy tenders for renewable energy projects in 2013. Renewable energy projects, with total capacity of 313 MW, have been tendered till now.[14,15] • The Master Plan for Renewable Energy Development 2012-2026 aims to add an ambitious 660 MW of renewable energy between 2012 and 2026.[16]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.92 kWh/m^2/day and specific yield of 4.80 kWh/kWp, strong technical feasibility is envisaged for solar projects in El Salvador.[2]
Market Maturity	• 100% of the population has access to electricity in 2018.[3] • Despite having significant potential, solar contributed to 7% in the total generation of 5,883 MUs in 2019.[4] • The price of solar power has fallen from USD 181.79 per MWh in the first auction held in 2014 to USD 8.45 per MWh in the auction held in 2019.[15,18] • El Salvador imports 25% of its total electricity from its neighbouring countries making it the biggest electricity importer in Central America.[20]
Infrastructure	• As of 2014, Transmission and distribution losses stood at 11.3% of output indicating a considerably efficient network.[21] • Challenging topography, such as mountainous regions, could be a deterrent for the installation of large utility scale solar projects.[1] • To meet the increasing demand, total installed capacity is expected to grow from 2,124 MW in 2019 to 3,258 MW in 2030 at a CAGR of 4.0%. Solar PV is expected to have the largest consumption over the years with capacity reaching to 751 MW by 2030.[19]
Financing	• El Salvador has a credit rating of B3 with a stable outlook in 2020.[7] • According to UNCTAD's World Investment Report 2020, El Salvador has recorded FDI inflows of USD 662 million in 2019.[1] • El Salvador has recorded a total public debt of 70% of GDP, fiscal surplus of 1% and 1.1% inflation in 2018.[17] • The banking sector remains strong and well capitalized as of 2018. The credit to private sector has increased from 51.5% in 2017 to 52.4% of GDP in 2018.[17]
Energy Imperatives	• Per capita consumption of 1,100 kWh is relatively low in comparison to the global average.[5] • The generation mix is diversified with oil having largest share of 28% and with hydro and geothermal contributing 25.9% and 25% respectively.[4] • Country's total installed capacity was 2,231 MW in 2019 with a 66% (1,474 MW) share of renewables.[22] • Out of total installed renewable energy capacity of 1,474 MW, solar installed capacity is 391 MW.[22] • With economic and population growth, the annual electricity consumption is expected to reach 6,589 BUs by 2023 from 6,099 BUs in 2019, growing at a CAGR of 2%.[6]

Equatorial Guinea

Africa

Electricity Consumption in MU (2017)

719.0

Installed Solar Capacity in MW (2019)

0.0

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

0.0

World Bank's Ease of Doing Business Score (2020)

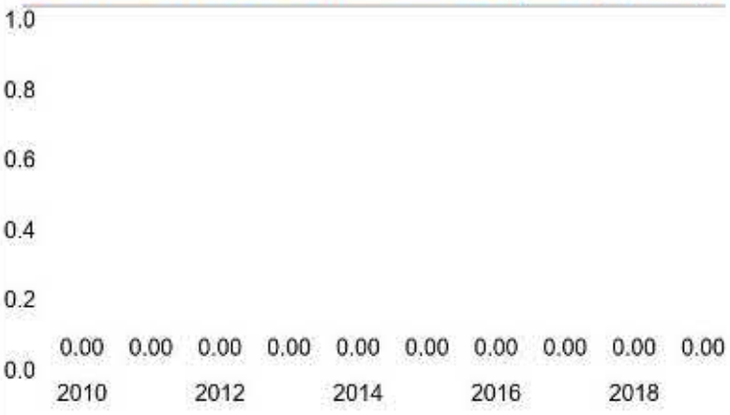
41.10

Solar installed capacity Growth rate (CAGR) for 2015-19

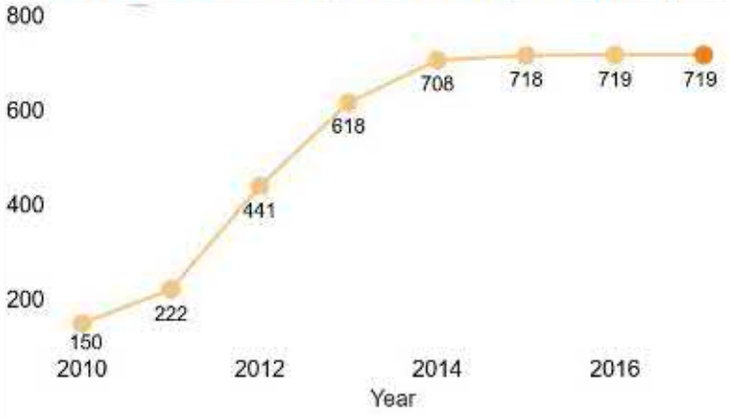
0%

Power Trends

Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)

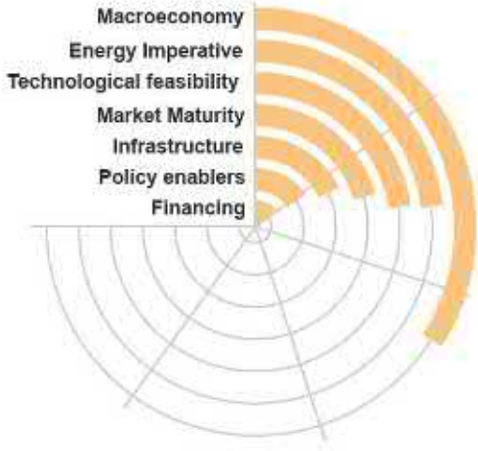


Access to Electricity

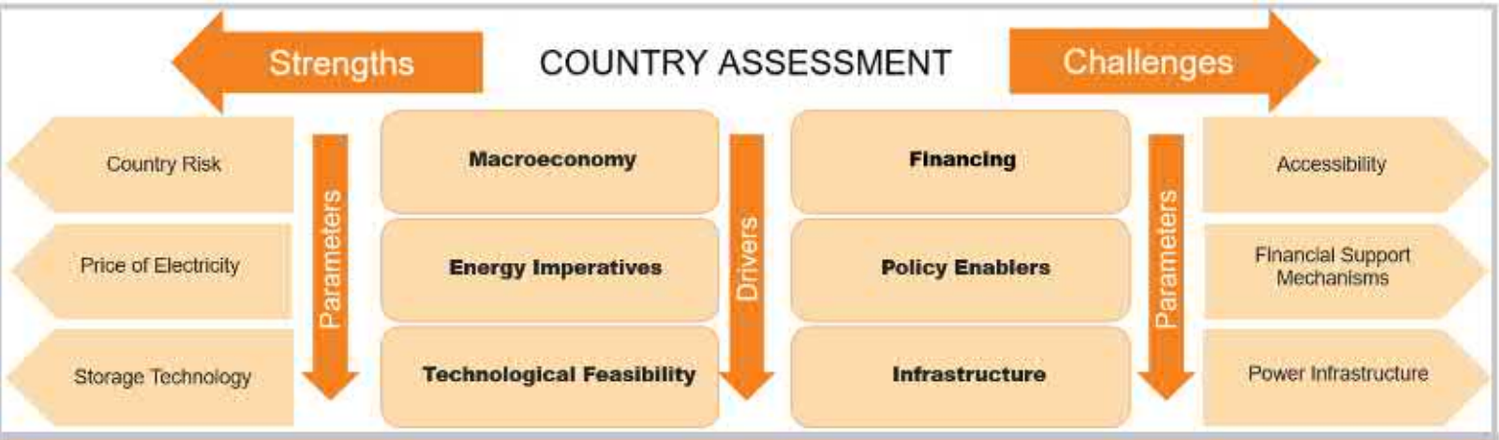
Ease of Doing Solar Classification

Potential

Performance against 7 Drivers



Sub-regional standing



Drivers	Insights
Macro-economy	• Equatorial Guinea is an Upper-middle-income economy. The economy depends heavily on mining industries.[1,8] • GDP (Real) has contracted at an annual rate of 6.1% between 2018 and 2019.[2] • FDI inflows increased from USD 396 million to USD 452 million between 2018 and 2019.[1] • After the discovery of large oil reserves in the 1990s, Equatorial Guinea became the third-largest producer of oil in Sub-Saharan Africa, after Nigeria and Angola. More recently, substantial gas reserves have also been discovered.[3]
Policy enablers	• The Action Plan for 2020 commits to providing the country and its population with basic needs for development. The country's "Electricity for All" initiative aims to establish an efficient and reliable electricity system.[4]
Technological Feasibility	• Owing to relatively moderate levels of solar irradiation levels of 4.6 kWh/m^2/day and specific yield of 3.66 kWh/kWp, a moderate technical feasibility is envisaged for solar projects in Equatorial Guinea.[5]
Market Maturity	• 67% population had access to electricity as of 2018.[11] • Although electricity demand is growing in Equatorial Guinea, access to electricity and reliability of supply are low as a result of the country's inadequate infrastructure and management of the national grid.[7] • The Ministry of Mines, Industry and Energy oversees the energy sector whereas the Electricity Energy Regulatory Agency regulates the power market. • The Electricity sector is managed by Sociedad de Electricidad de Guinea Ecuatorial (SEGESA) through its subsidiaries- SEGESA Generation, SEGESA Transmission and SEGESA Commercial (Distribution).[12]
Infrastructure	• Under the national Economic Development Plan Horizon 2020 of the Government of Equatorial Guinea, a 5 MW microgrid was developed in the Annobon Island.
Financing	• Despite liberalization of the banking system, corporate financing is limited. Fund grants to small and medium-sized enterprises are also limited, although, this is a common funding instrument that is available to countries in the region.[9]
Energy Imperatives	• Per capita electricity consumption in 2019 was 1,293 kWh, which is relatively lower in comparison to the global average.[6] • Total installed capacity in the country was 401 MW in 2019 which includes 127 MW of hydro.[10] • Country is yet to develop a Solar PV capacity as of 2019.[10]

Eritrea

Africa

Electricity Consumption in MU (2017)

327.0

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

21.60

Installed Solar Capacity in MW (2019)

12.5

Installed Off-Grid Solar Capacity in MW (2019)

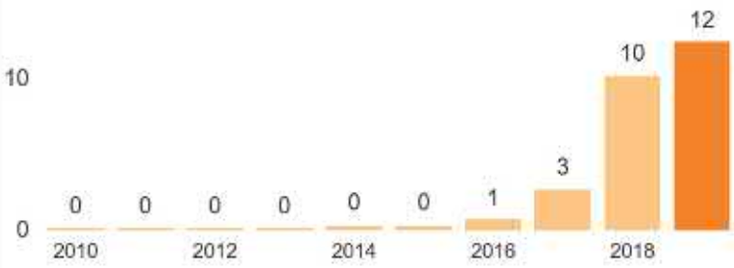
12.5

Solar installed capacity Growth rate (CAGR) for 2015-19

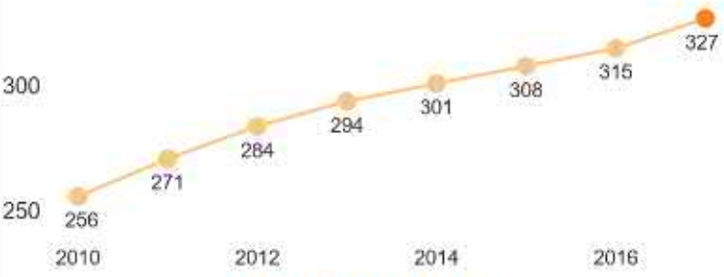
151%

Power Trends

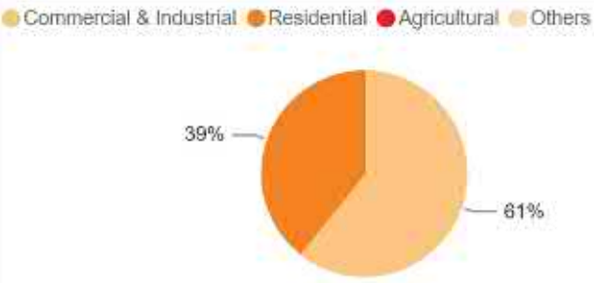
Cumulative Solar installed Capacity (MW)



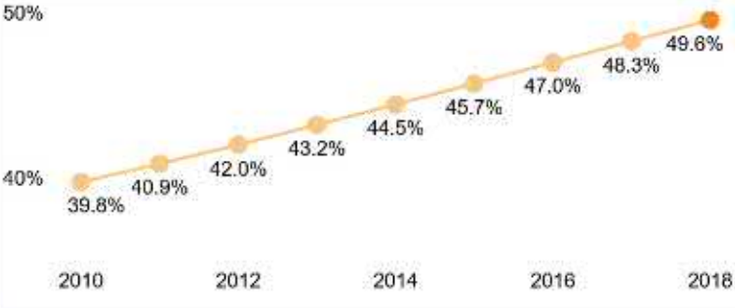
Overall Electricity Consumption (MU)



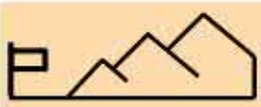
Consumer Mix



Access to Electricity



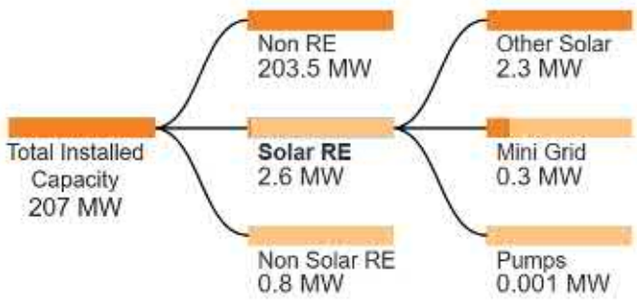
Ease of Doing Solar Classification



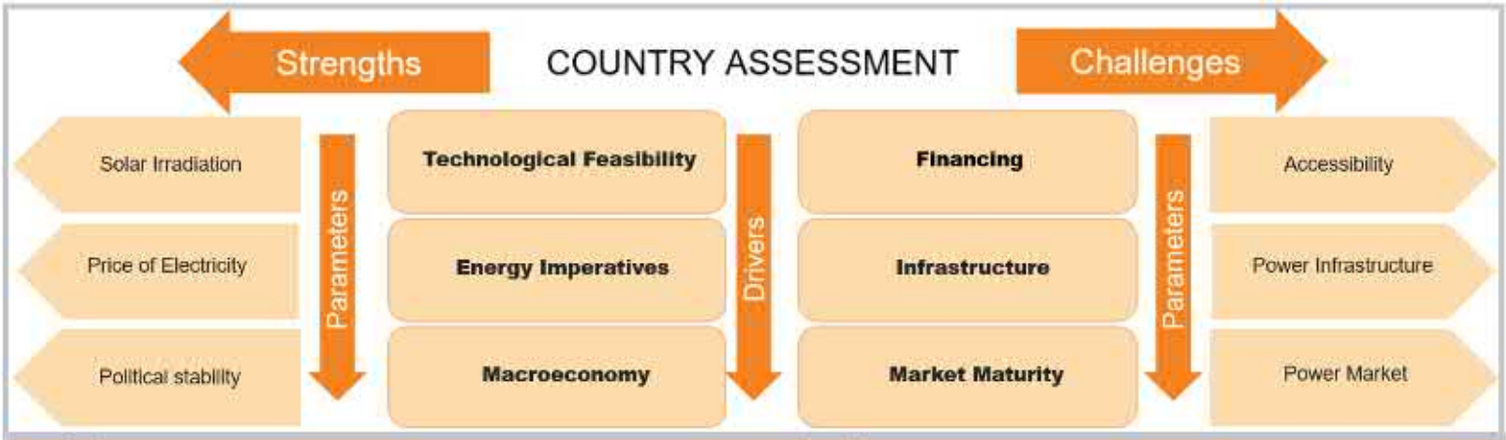
Potential

Performance against 7 Drivers

Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 3.8% in 2019.[1] • Eritrea is a low-income developing country with a GDP of USD 6.5 billion as of 2019.[3,4] • Mining, Tourism and Agriculture are the major contributors to the economy.[2] • Owing to recent improvements in geopolitical stability in the region, the economy is expected to grow and attract private sector investments in the coming years.[2] • Eritrea's economy is vulnerable to externalities and climate changes owing to significant dependence on exports of gold, zinc and agricultural raw materials.[2]
Policy enablers	• The "Enhancing Energy Access and Energy Security in Eritrea 2014" aims to achieve 100% access to electricity by 2030.[13] • Under the "Renewable energy Policy and Development Framework 2010", the government has set a target to increase the share of renewable energy to 50% in the generation mix by 2030.[13] • The government of Eritrea is targeting to achieve the technical and non-technical losses under 10% by the end of 2020.[13]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 6.07 kWh/m^2/day and specific yield of approximately 4.88 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Eriteria.[5]
Market Maturity	• As of 2018, 50% of the population has access to electricity in Eritrea.[4] • Despite having a significant potential, solar contributed to 8.69% in the total generation of 496 MUs in 2018.[6] • The power sector in Eritrea is regulated by the Department of Energy. The generation, transmission and distribution sectors are unbundled but managed by a sole holding company, Eritrean Electricity Corporation (EEC).[15] • Eritrea is expected to join the Eastern African Power Pool in the coming years. This will enable the country to import renewable energy power from the neighbouring countries.[7]
Infrastructure	• Through the funding received from the government, a solar company installed solar-diesel hybrid power system of net capacity 2.25 MW. This project will provide 24/7 clean electricity to 40,000 people in rural areas. • As of 2014, Electricity system losses stand at 12.8% of output, indicating a considerably better power network.[14] • In 2016, Eritrea signed a national energy plan with the European Development fund and received a funding of USD 200 million for strengthening the national grid and build solar PV and wind power supply systems in rural areas. • Under the Development Cooperation Strategy for 2019-20, the European Commission will invest EURO 125 million for the development of the infrastructure and energy sector.[19]
Financing	• According to UNCTAD's World Investment Report 2020, FDI inflows has increased from USD 61 million in 2018 to USD 67 million in 2019.[9] • Eritrea has an Ease of Doing score of 21.6 (out of 100) and ranks at 189th position among 190 countries in 2020. A few areas where businesses need support are getting credit, construction permits, enforcing contracts, access to electricity, paying taxes and trading across borders.[12]
Energy Imperatives	• Per capita consumption of 100 kWh is relatively low in comparison to the global average.[6,10] • Oil-based thermal power production contributes approximately 91% of the generation mix in 2018.[6] • Approximately 59% of the population resides in the rural areas of which 65% of the population doesn't have access to electricity. Off-grid solar systems can be a viable solution.[4,8] • As of 2018, the residential sector constitutes 39% of the total electricity demand.[6]

Ethiopia

Africa

Electricity Consumption in BU (2017)

9.5

Share of Population with Access to Electricity (2018)

0% 45% 100%

World Bank's Ease of Doing Business Score (2020)

48.00

Installed Solar Capacity in MW (2019)

11.0

Installed Off-Grid Solar Capacity in MW (2019)

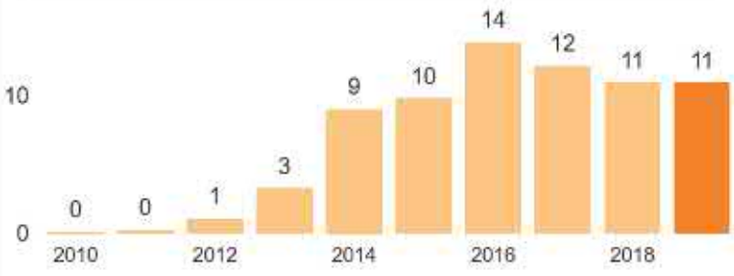
11.0

Solar installed capacity Growth rate (CAGR) for 2015-19

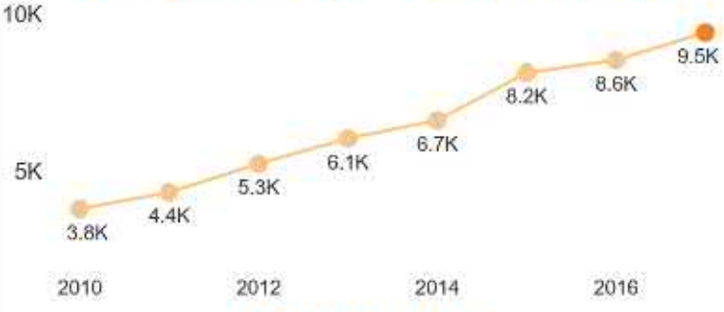
3%

Power Trends

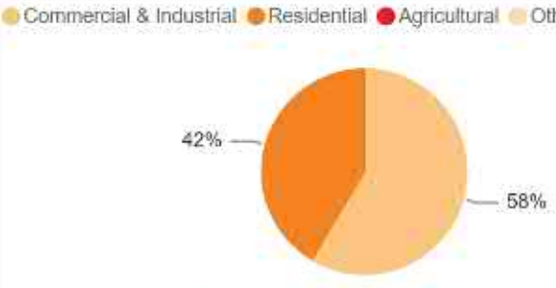
Cumulative Solar installed Capacity (MW)



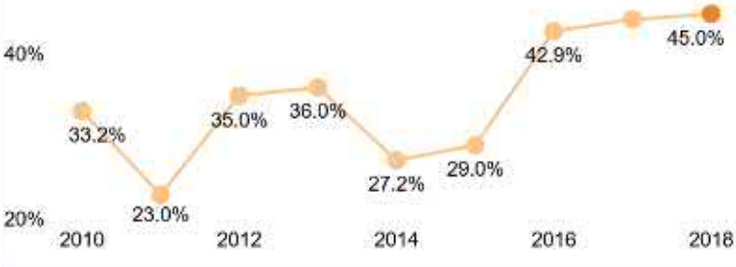
Overall Electricity Consumption (MU)



Consumer Mix



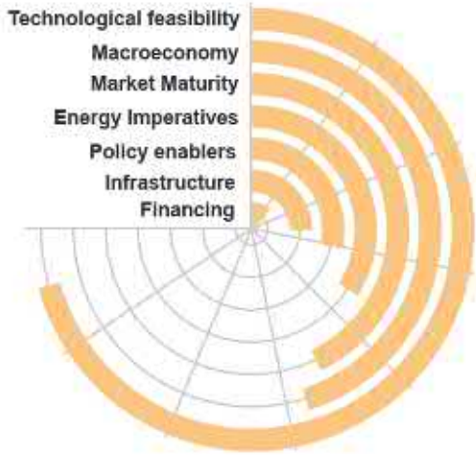
Access to Electricity



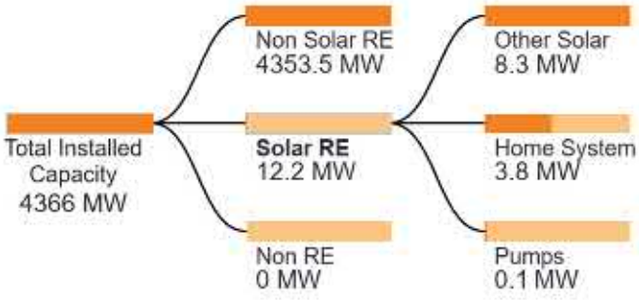
Ease of Doing Solar Classification

Progressive

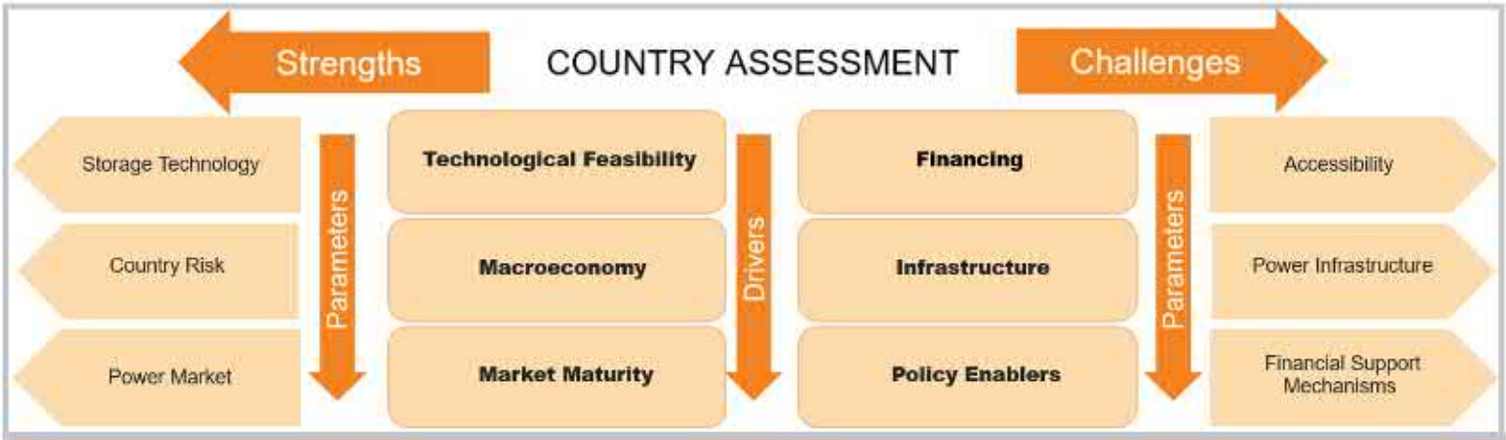
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) is estimated at USD 96.1 billion in 2019 with annual growth rate of 9%.[3,4] • In 2019, industry and services continued to lead the economic growth on supply side.[7] • Private consumption and domestic investment were primary growth drivers on demand side but domestic investment slowed reflecting fiscal consolidation to stabilize the public debt.[7]
Policy enablers	• Ethiopia is a member of the Common Market of Eastern and Southern Africa (COMESA) which adopted competition law regime and a joint competition commission to promote economic integration.[8] • Ethiopia offers tax free import privileges for the equipment related to off-grid solar technologies.[10] • Ethiopia aims to achieve carbon neutral middle-income status by 2025 through the Climate Resilience and Green Economy strategy (CRGE) and Growth and Transformation Plan (GTP).[13]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.85 kWh/m^2/day and specific yield of 4.68 kWh/kWp, strong technical feasibility is envisaged for solar projects in Ethiopia.[1] • The Ethiopian Rural Energy Development and Promotion Centre (EREDPC), an executive arm of Rural Electrification Fund (REF), is to carry out the technology research and development which includes solar and wind as potential sources for rural electrification.[13]
Market Maturity	• 45% of population has access to electricity as of 2018.[5] • The National Electrification Program launched in 2017 aims to achieve 100% electrification by 2025 (35% through off-grid and 65% through grid) and to reach 96% grid by 2030.[12] • Solar contributes 18 MUs of electricity generation in 2018.[11]
Infrastructure	• Ethiopia's public–private partnership framework is expected to diversify the country's development of finance sources, improve debt sustainability and sustain growth-generating infrastructure investments and enhance domestic resource mobilization.[7] • Scaling-up Renewable Energy Program for Ethiopia was launched in 2012 in coordination with African Development Bank and The World Bank to maximize renewable energy installations.[13]
Financing	• International financial flow, in 2017, was USD 392.5 million (in PPP terms) to support clean and renewable energy.[5] • The private sector is expected to be a key contributor to Ethiopia's future development. World Bank's Country Partnership Framework envisages prominent roles for the International Finance Corporation (IFC) and Multilateral Investment Guarantee Agency (MIGA).[6] • A solar PV project of USD 120 million, expected to be operational by 2021 will sell power to Ethiopian Electric Power (EEP) under a 20-year Power purchasing agreement (PPA).[14]
Energy Imperatives	• Per capita electricity consumption of 133 kWh is significantly low in comparison to the global average.[2] • 33% of rural population has access to electricity as of 2018.[9] • Renewable electricity capacity is 98% as of 2019 of which 84% is Hydro.[11] • Currently Ethiopia is significantly reliant on hydropower and expected to increase solar PV, geothermal to almost 45% of power mix by 2040, estimates Ethiopia Energy Outlook by IEA.[12]

Fiji

Asia & Pacific

Electricity Consumption in MU (2017)

902.4

Installed Solar Capacity in MW (2019)

9.5

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

4.4

World Bank's Ease of Doing Business Score (2020)

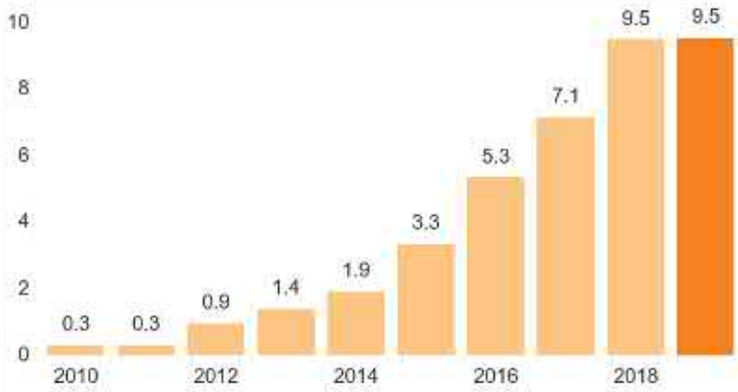
61.50

Solar installed capacity Growth rate (CAGR) for 2015-19

30%

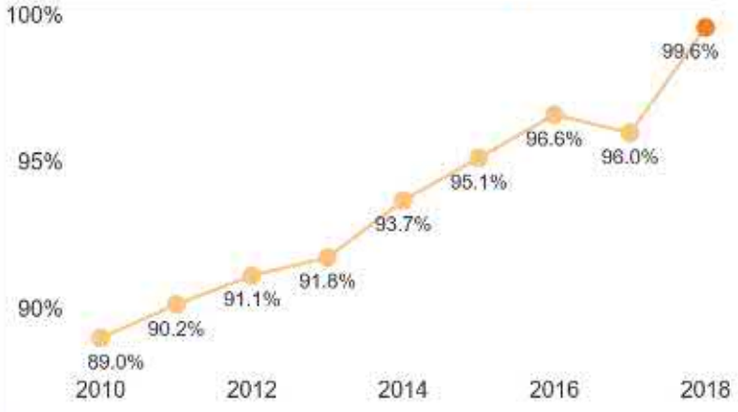
Power Trends

Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)

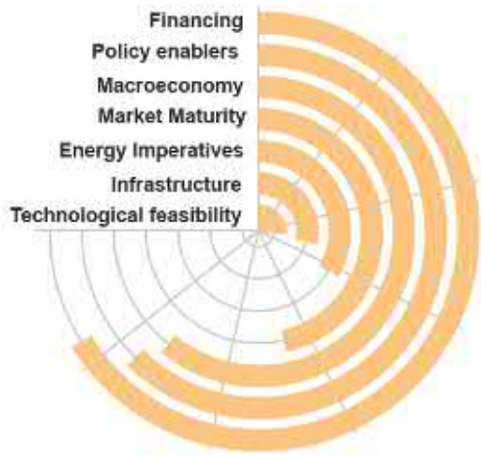
Access to Electricity



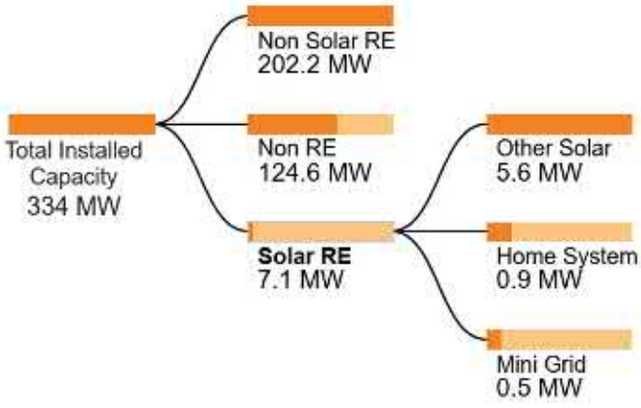
Ease of Doing Solar Classification

Influencer

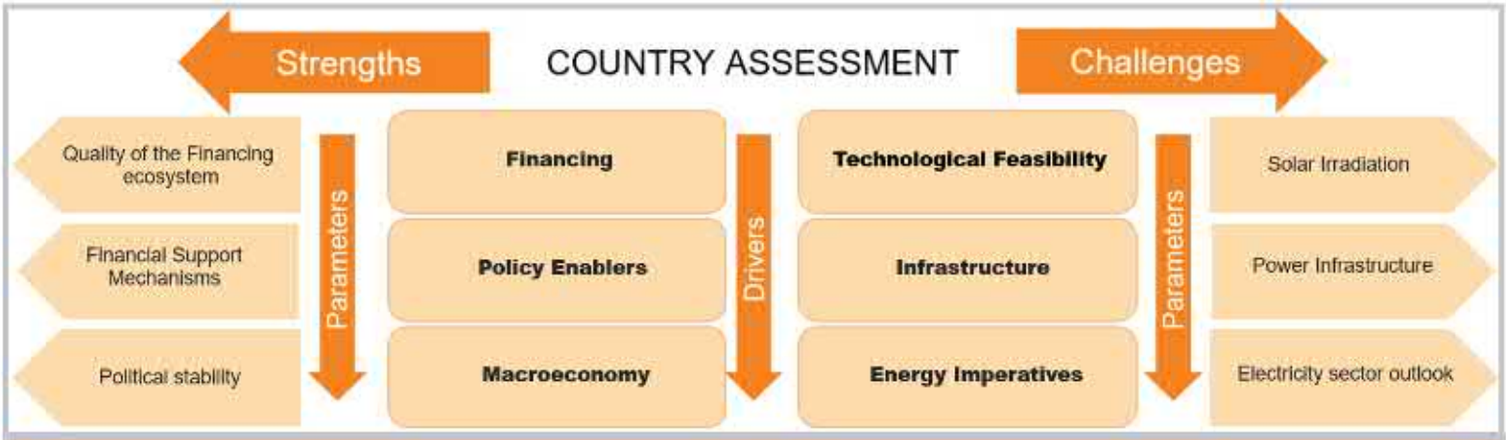
Performance against 7 Drivers



Installed Generation Capacity by Source

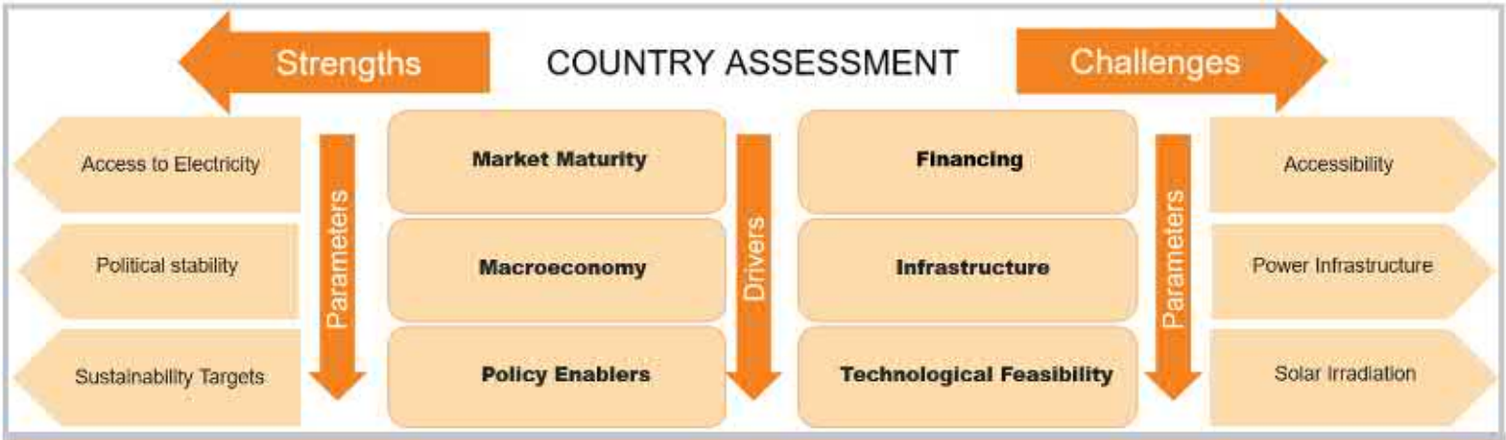


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) is poised at USD 5.53 billion with an annual growth rate of 0.5% in 2019.[4] • Fiji has one of the most developed economies in the Pacific region with tourism and foreign direct investment as its main driver of economic activity.[1] • The agricultural sector accounts for 10.7% of GDP while industry & services represent 15.6% and 68.9%.[2] • The country has also seen a shift in exports from agricultural commodities to manufactured goods.[1] • The average current account deficit, during 2008-17, was 5.3% of GDP and was fully financed by average FDI inflows of 7.8% of GDP.[9]
Policy enablers	• The intended Nationally determined contributions (NDC) to UNFCCC includes the target to achieve a renewable energy share in electricity to be around 99% by 2030.[6] • The National Energy Policy states that Fiji could achieve 100% renewable electricity by 2030 which would require investments in new energy technologies.[8] • Delays in project approvals remains a concern with foreign investors facing costly bureaucratic delays.[3] • To reduce the financial risks for IPPs tariff policy, payment conditions and collection efficiency need to be improved by the Utilities.[6]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation level (GHI) of 4.32 kWh/m^2/day and specific yield 3.56 kWh/ kWp, a moderate technical feasibility is envisaged for solar projects in Fiji.[5] • Because of radiation reflection by surrounding ocean, the satellite data yields higher values of insulation.[10] • The theoretical potential of solar PV power generation was found to be around 170 MUs per year which would result in around 150,000 metric tonnes of carbon dioxide avoided emissions.[7]
Market Maturity	• Foreign investors are increasingly participating in public-private sector partnership arrangements in the energy, health and maritime port sectors.[3] • The government is actively seeking partners in the energy sector which will help increase renewable energy capacity as well as development in the state's Transmission & Distribution (T&D) infrastructure.[8] • Fiji Electricity Authority (FEA) currently uses the tariffs published by the Fiji Commerce Commission (FCC) as the basis of negotiation for the power purchase agreements.[6] • Even in areas with grid connection, high costs and inequalities within communities, prevent some parts from achieving reliable access to electricity.[8] • The limited capacity of skilled local manpower for technology operation, within the communities adds further to the challenges.[6]
Infrastructure	• The land ownership rules are complex. The Land Sales Act restricts ownership of freehold land inside city or town council boundaries to Fijian citizens.[3] • For the private sector stakeholders, a major challenge is the scarcity of licensed technicians.[6] • There are no fully private Independent Power Producers in Fiji that currently supply power to the grid.[6]
Financing	• The government is encouraging the banks, to utilize 3% of their lending on renewable generation.[6] • However, access to financing for grid connected RE power generation projects continues to be a major barrier. Domestic banks have little or no capacity for the financing of RE power generation projects.[6] • Pockets of vulnerability lie in Non-Bank Financial Institutions (NBFIs); Credit unions and financial cooperatives are not suitably regulated.[9]
Energy Imperatives	• In 2014, 55% of Fiji's electricity was generated using renewable energy resources, making it the Pacific island state with the lowest oil dependency.[8] • Most operating RE projects are mainly off-grid projects located at remote project sites in multiple islands.6 • Solar PV and battery storage hybrid systems could be used to improve the stability of the many existing mini grids in the country.[8] • On the smaller islands Solar Home Systems (SHS) are used to provide access to electricity for the inhabitants.[8]


Gabon
Africa
Electricity Consumption in BU (2017)
2.1
Installed Solar Capacity in MW (2019)
1.4
Share of Population with Access to Electricity (2018)
0%
93%
100%
Installed Off-Grid Solar Capacity in MW (2019)
1.4
World Bank's Ease of Doing Business Score (2020)
45.00
Solar installed capacity Growth rate (CAGR) for 2015-19
0%
Power Trends
Cumulative Solar installed Capacity (MW)
1.5
1.0
0.5
0.0
1.40 1.40 1.40 1.40 1.40 1.40 1.40 1.40 1.40 1.40
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
2,000
1,800
1,600
1,400
1454
1537
1628
1719
1795
1852
2016
2026
2010
2012
2014
2016
Year
Access to Electricity
94%
92%
90%
88%
86%
92.2%
90.5%
89.3%
86.4%
88.5%
89.6%
90.8%
91.9%
93.0%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Potential
Performance against 7 Drivers
Market Maturity
Macroeconomy
Policy enablers
Energy Imperatives
Technological feasibility
Infrastructure
Financing
Sub-regional standing
MALI
NIGER
CHAD
BURKINA FASO
BENIN
TOGO
GHANA
NIGERIA
Abuja
Porto-Novo
CAMEROON
CENTRAL AFRICAN REPUBLIC
EQUATORIAL GUINEA
REP. OF CONGO
GABON
CONGO (DRC)
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• Gabon is an upper-middle-income country as per World Bank's classification. • It is the fifth largest oil producer in Africa. Its strong economic growth over the past decade was driven by its production of oil and manganese. The oil sector has accounted for 80% of exports, 45% of GDP and 60% of fiscal revenue on average over the past five years.[12] • GDP (at current prices) is USD 16.658 billion in 2019 that grew at an annual rate of 3.4%.[4,5] • Real GDP growth in Gabon is expected to rise to 3.9% in 2021 due to a brighter outlook for the oil sector.[7] • Gabon has also launched a broad public investment programme (PSGE) in order to become one of the fastest-growing economies by 2025.[8]
Policy enablers	• Gabon established Law on environmental protection in 2014 to minimize Greenhouse Gas emissions, promote sustainable use of natural resources and follow the climate action plan.[9] • In 2019, a law was enforced to regulate the sector of hydrocarbons in Gabon that talks about the activities to be carried out with the principles and rules relating to sustainable development and environment.[11]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 4.54 kWh/m^2/day and specific yield of 3.6 kWh/kWp, strong technical feasibility is envisaged for solar projects in Gabon.[1] • Gabon is sparsely populated and has 22 million hectares of forest, one million hectares of arable agricultural land and over 800 km of coastline limiting the land availability for utility scale solar projects (mostly covered with forests).[8]
Market Maturity	• Renewable capacity is 53% of total installed capacity in 2019.[10] • 93% of population had access to electricity as of 2018 with a target to achieve universal access by 2035.[3] • Renewable energy share, in total energy consumption, is 81% as of 2017.[3]
Infrastructure	• The local infrastructure project is a USD 100 million-funded project that seeks to increase access to basic urban services.[12] • Gabon signed a partnership agreement with French entity Engie's subsidiary Ausar Energy for development of eight solar power plants of capacity 2.8 MW in 2019.[14]
Financing	• International financial flow in 2017 was USD 0.1 million (in PPP terms) to support clean and renewable energy.[5] • The country has a sovereign rating of Caa1 with positive financial outlook.[6] • The World Bank is financing eight development projects in Gabon representing a net commitment of USD 626.70 million in 2019.[12]
Energy Imperatives	• Gabon's Per capita electricity consumption of 1,031 kWh, as of 2019, is relatively low in comparison to the global average.[2] • Total installed capacity in the country was 629 MW in 2019. Renewable capacity comprised of 53% of the total capacity at 333 MW (330 MW hydro and 1 MW solar).[10] • 63% of rural population had access to electricity in 2018 and targeted to achieve 85% of rural population by 2025.[3] • As of 2018, 54% of total electricity generation is by renewables.[10]

Ghana

Africa

Electricity Consumption in BU (2017)

12.2

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

60.00

Installed Solar Capacity in MW (2019)

63.3

Installed Off-Grid Solar Capacity in MW (2019)

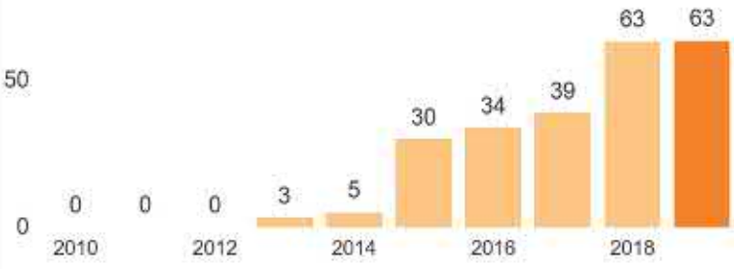
8.0

Solar installed capacity Growth rate (CAGR) for 2015-19

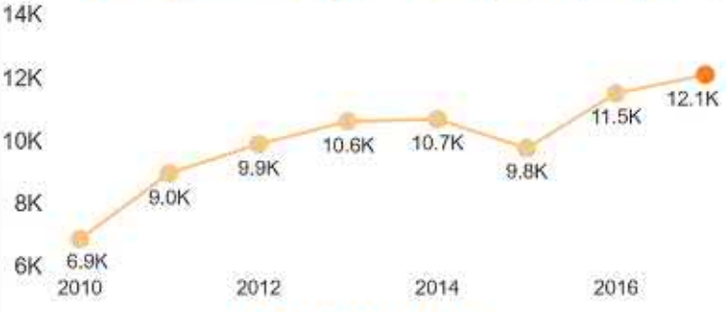
21%

Power Trends

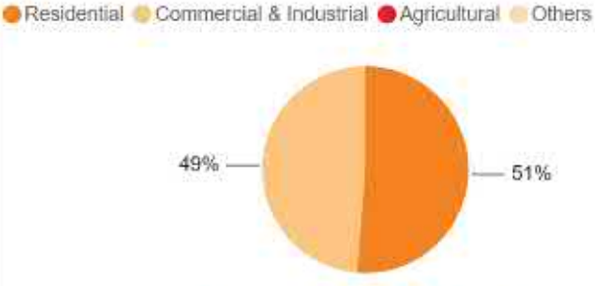
Cumulative Solar installed Capacity (MW)



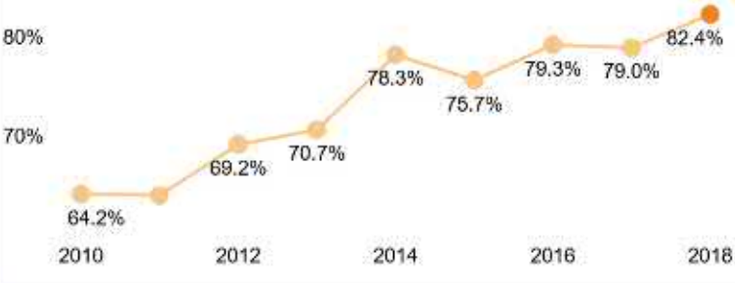
Overall Electricity Consumption (MU)



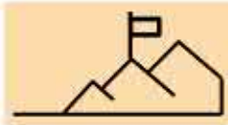
Consumer Mix



Access to Electricity



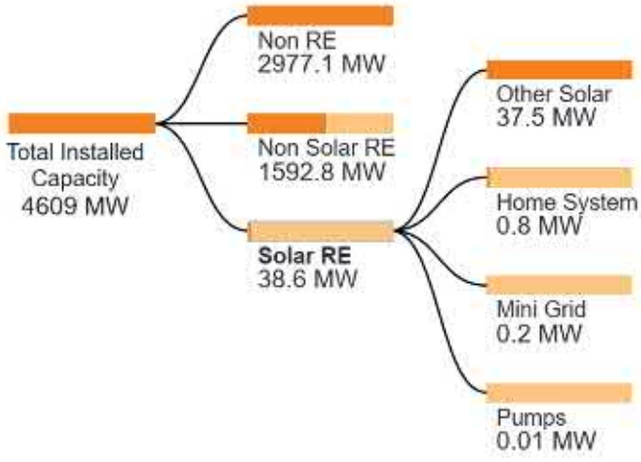
Ease of Doing Solar Classification



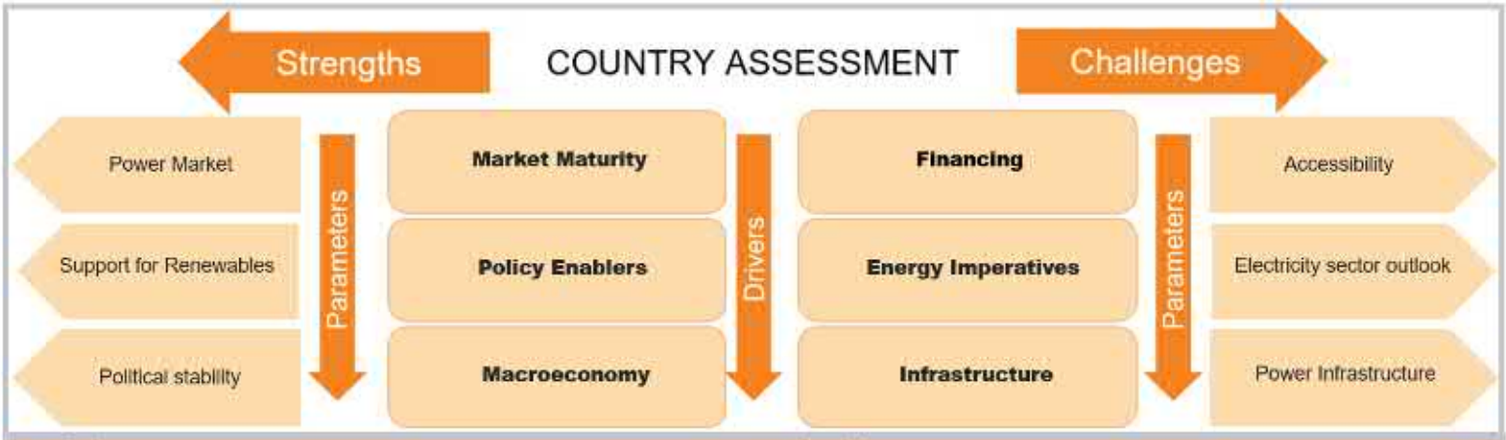
Influencer

Performance against 7 Drivers

Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• The economy continued to expand in 2019, with GDP (Real) growth estimated at 6.1%. High growth momentum since 2017 has consistently placed Ghana among Africa's 10 fastest-growing economies.[9] • Macroeconomic improvements were accompanied by expansion in domestic private consumption.[1] • Mounting energy sector liabilities due to excess installed capacity from take-or-pay contracts with independent power producers and the ongoing financial sector clean-up are likely to lift the debt-to-GDP ratio above the current 60.6%.[1]
Policy enablers	• Ghana has developed its SE4ALL Country Action Plan based on the three objectives: i) ensuring universal access to modern energy services; ii) doubling the rate of improvements in energy efficiency, and iii) doubling the share of renewable energy in the global energy mix.[10] • In May 2019, an Energy Sector Recovery Program (ESRP) was approved to provide an action plan to improve the financial balance of the energy sector over the next 5 years.[3] • The country offers Feed-in-Tariff scheme with 10 years guaranteed rates, mandatory connection policy to evacuate RE electricity and mandatory renewable purchase policy for distribution utilities.[10]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 5.10 kWh/m^2/day and specific yield 4.02 kWh/kWp, strong technical feasibility is envisaged for solar projects in Ghana.[4] • The highest irradiation levels occur in the northern half of the country where the Government is piloting few initiatives on solar energy system deployment.[10]
Market Maturity	• The access to electricity rate is 82%, the second-highest in Sub-Saharan Africa. The government aims to achieve universal access by the end of 2020. • Low collection efficiency and oversupply has resulted in the government paying for unused power which leads to contract renegotiations and payment problems for the IPPs, undermining investor confidence.[11] • According to the Renewable Energy Policy Review by the Energy Commission and UNDP, the willingness-to-pay ,for energy services from solar home systems in remote and rural areas of Ghana, is relatively high.[10] • In H2 2019, out of the total sales of 17,000 off-grid appliances, 10,000 units were solar on cash whereas remaining 7,000 were sold through PayGo model.[7]
Infrastructure	• The T&D system (consisting of 5,900 kms of transmission lines and 64 bulk supply points) has not been significantly upgraded since construction which has caused several system collapses in recent years.[5,11] • Electricity tariffs are not cost-reflective; as a result, the utilities are not able to pay transmission and generation companies and also limiting funds available for investments.[5] • According to the Energy Commission, transmission loss increased from 3.8% in 2009 to 4.4% in 2018.[11]
Financing	• A financial sector clean-up, that started in 2017, placed a temporary drag on the growth of services.[1] • Country's USD 5.6 billion Renewable Energy Master Plan involves more than 80% of investments coming from the private sector. The plan will be implemented over a 12-year time-space, from 2019 to 2030.[6] • Private sector credits are supported largely by the well-capitalized banking sector.[3]
Energy Imperatives	• A drive to develop the electricity infrastructure has raised generation capacity to 4,780 MW as of 2019.11 • While current capacity is sufficient, a 2.2% population growth rate and increasing urbanisation levels mean that demand for electrification and reliable power will continue to grow.[11] • The grid-connected RE capacity increased from 2.5 MW in 2013 to 42.6 MW in 2019.[8] • In 2019, the residential share, of the total electricity consumed, increased to 45.6% followed by the industrial sector with a share of 30.4%.[8] • The USD 220 million Ghana Energy and Development Access Project (GEDAP), providing mini-grids for isolated communities, has reached approximately 10,000 beneficiaries for the first time.[2]

Grenada

Latin America & Caribbean

Electricity Consumption in MU (2017)

196.1

Installed Solar Capacity in MW (2019)

3.2

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

-

World Bank's Ease of Doing Business Score (2020)

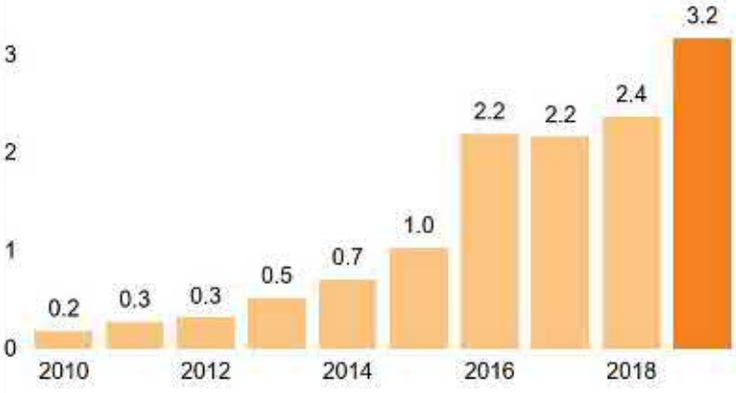
53.40

Solar installed capacity Growth rate (CAGR) for 2015-19

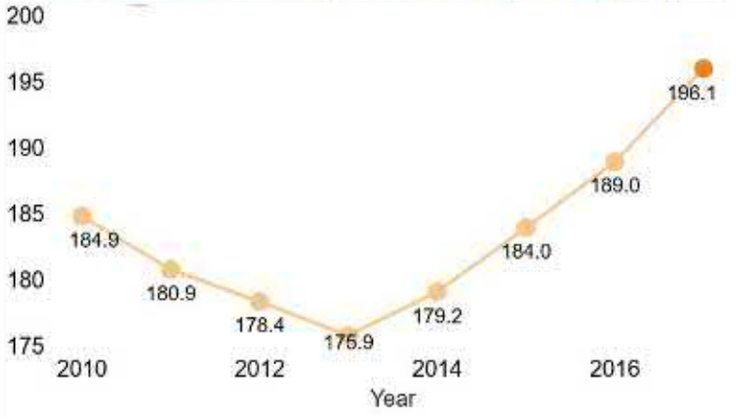
33%

Power Trends

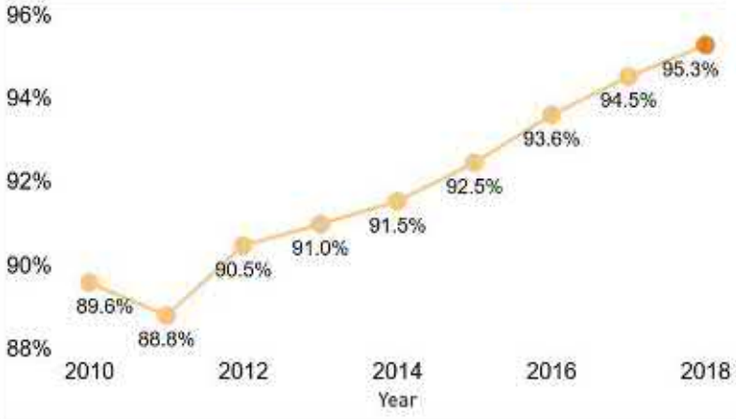
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



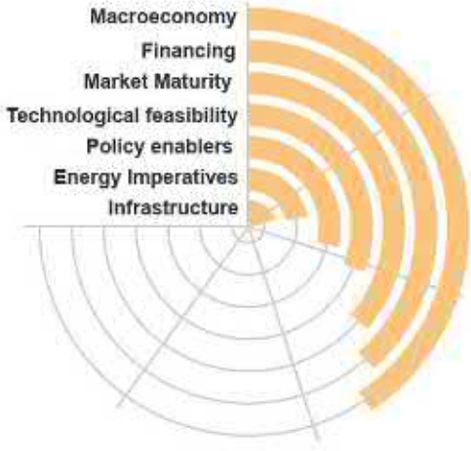
Access to Electricity



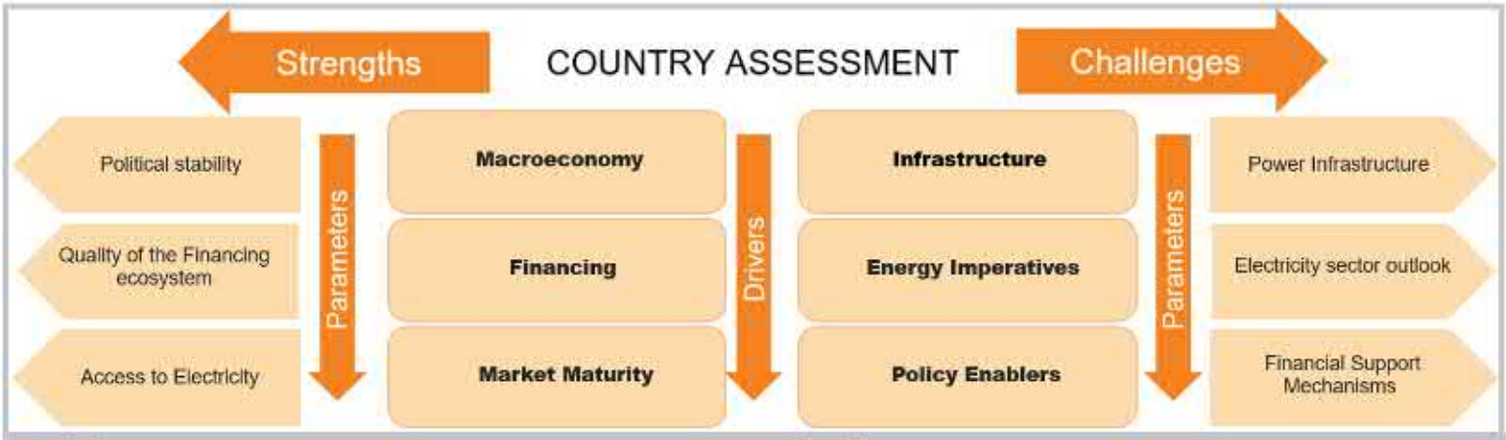
Ease of Doing Solar Classification

Progressive

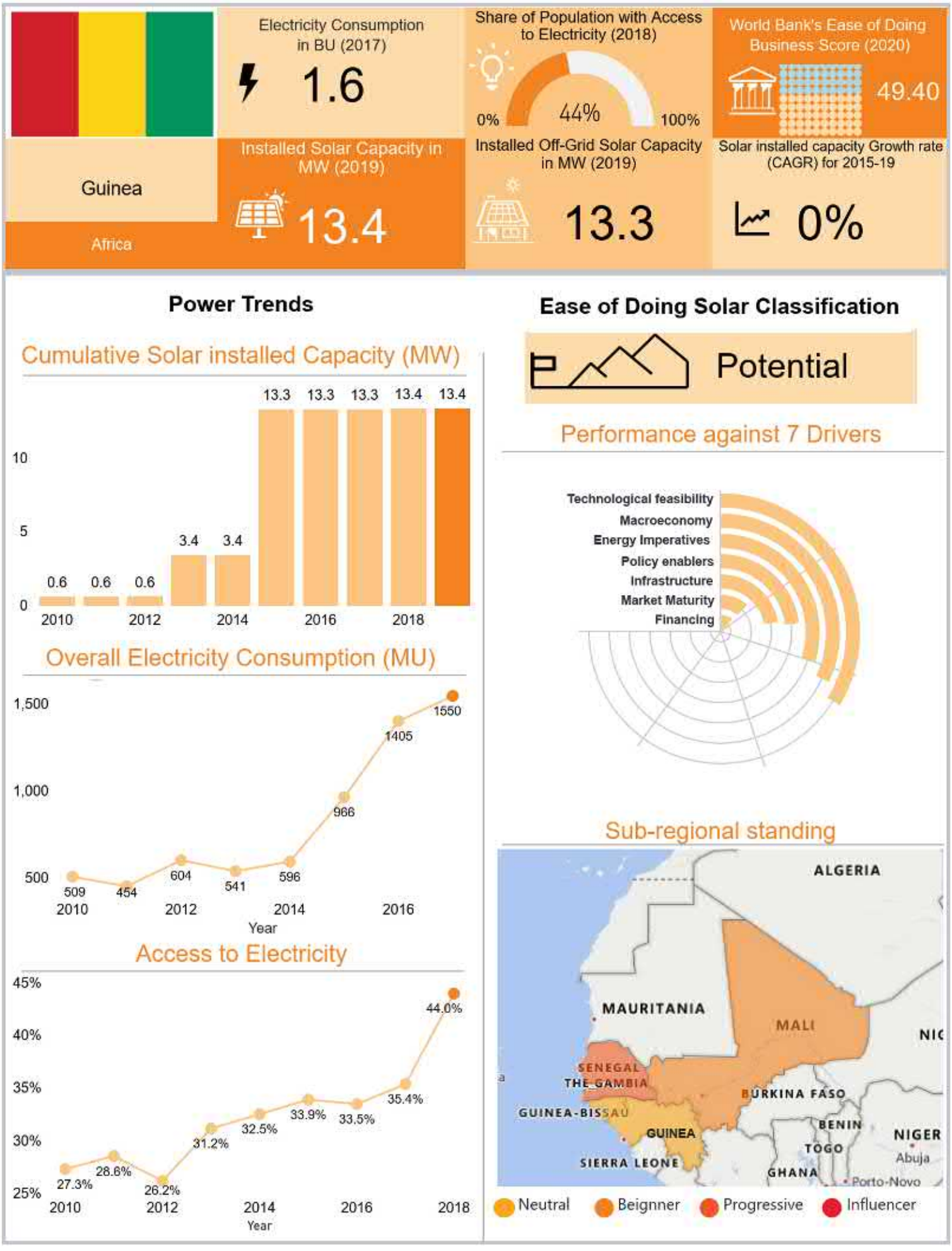
Performance against 7 Drivers

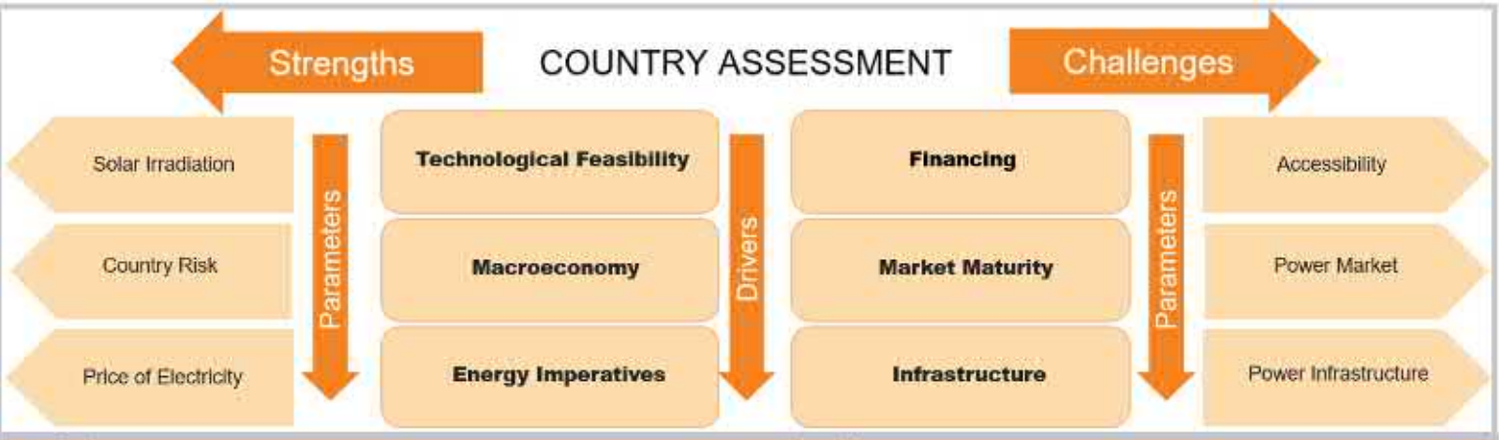


Sub-regional standing

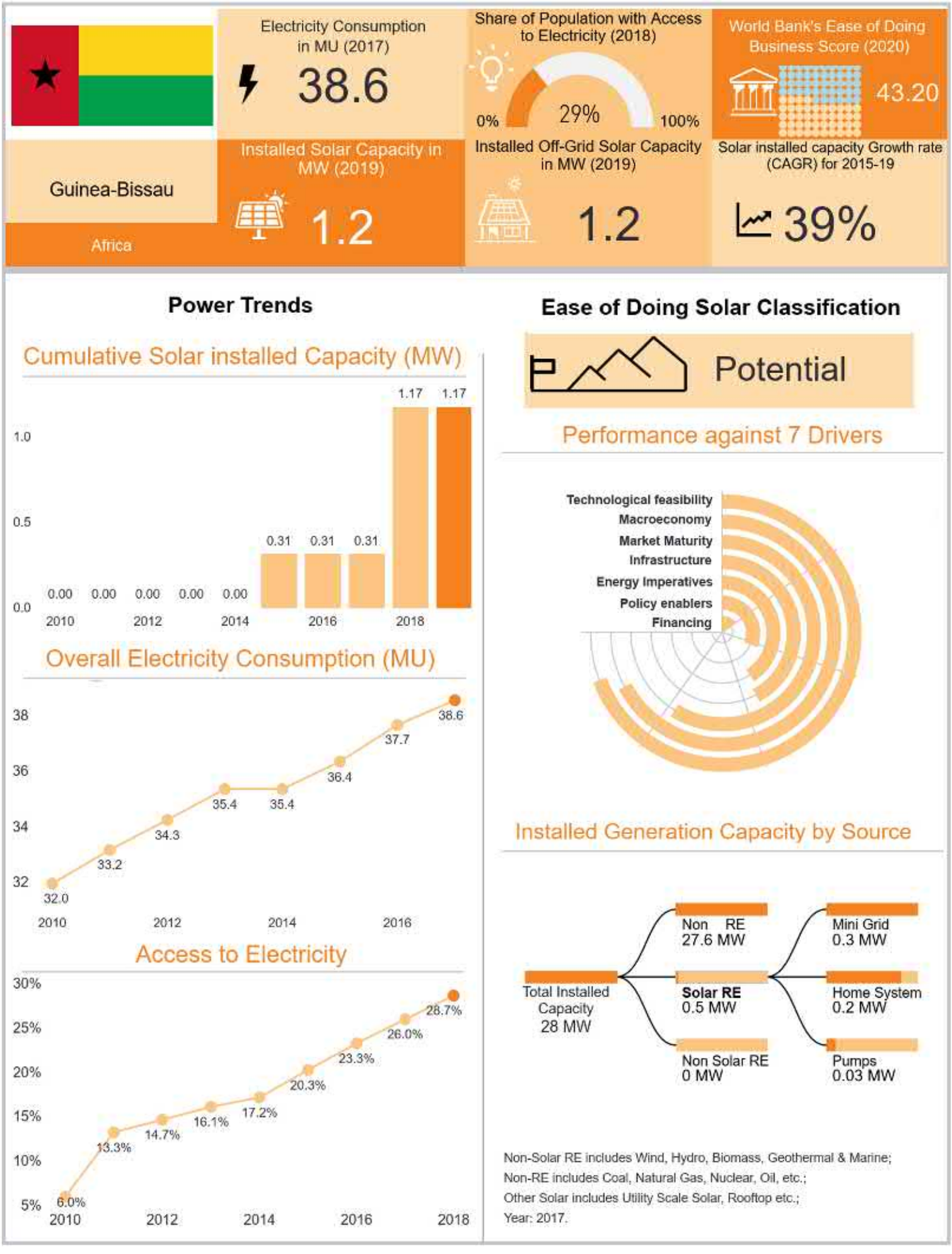


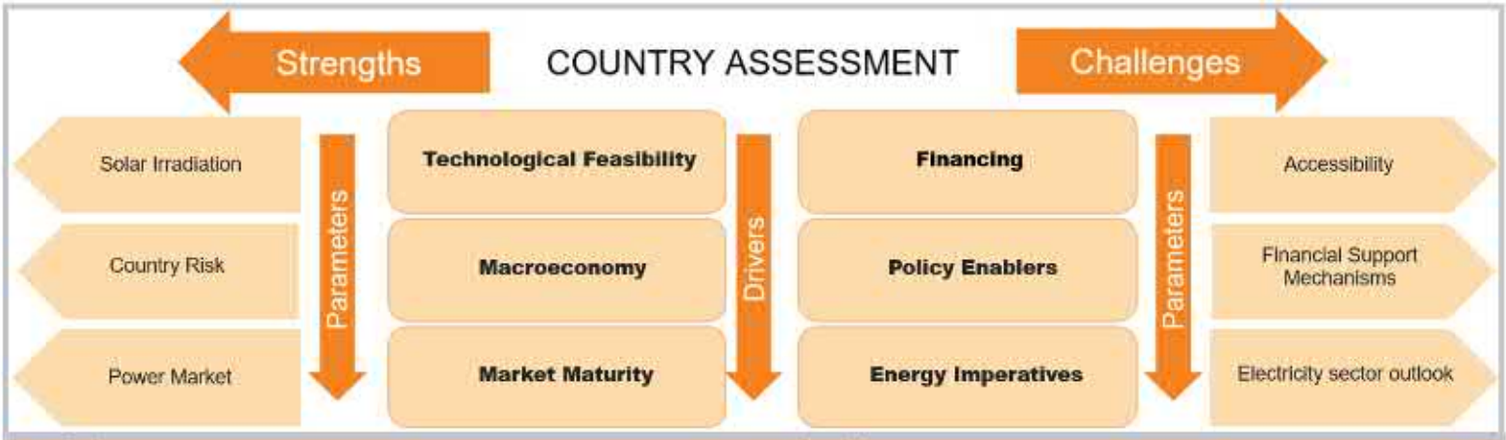
Drivers	Insights
Macro-economy	• The Grenadian economy continues to grow robustly. GDP expanded by 3.1% in 2019, driven by strong activity in construction and tourism.[5,7] • Availability of tax incentives, equitable treatment of national and international investors and political stability provides a healthy investment climate.[1] • The World Bank's Doing Business overall ranking for Grenada tracked downward, slipping from 138 in 2016 to 147 in 2019.[1] • Impressive economic performance, over the past five years, is marked by a cycle of high growth and falling debt.[5]
Policy enablers	• The country targets to increase Renewable Energy share in total consumption to 100% by 2030, from 5.38% in 2018.[3] • Grenada Electricity Services' (GRENLEC) interest in utility-scale renewable power, under its exclusive license to generate electricity, is yet to progress at a pace to meet Grenada's goals.[4] • Tax reduction incentive are being provided for use of solar panels, solar water heaters and installation of energy efficient light bulbs in government buildings.[6]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.57 kWh/m^2/day and specific yield 4.437 kWh/kWp, strong technical feasibility is envisaged for solar projects in Grenada.[8] • According to National Renewable Energy Laboratory (NREL), Grenada has a Solar PV potential of 25-50 MW.[4]
Market Maturity	• In 2016, parliament repealed the 1994 Electricity Supply Act and opened the market to potential investors who will transition to alternative sources of power, decreasing costs, reducing dependence on imported fossil fuels and improve energy efficiency.[1] • The 2016 Electricity Supply Act allows a new government-run regulatory body to grant multiple licenses to energy generators.[1] • The Electricity Supply Act has not been updated to address self-generation and distributed renewable energy.[4]
Infrastructure	• Market entry of independent energy producers has been limited so far due to the existing legal structure and the lack of regulatory framework. Major reasons for this include the monopolistic structures in electricity sector.[2] • Grenada has recently re-established the National Climate Change Committee which provides overall guidance and support to climate change activities.[6] • Grenada has also began improving its institutional capacity by selecting climate change focal points in all line ministries and conducting trainings in climate change risk analysis.[6]
Financing	• Robust FDI flows, including the citizenship-by-investment (CBI) program, are financing the external deficit while supporting economic growth.[5] • Low execution of grant financing and institutional bottlenecks in project execution kept capital outlays subdued at 2.75% of GDP in 2018.[5] • Banks have strong capital buffers while the Non-Performing Loans ratio fell below 2.5% in 2018.[5] • Grenada's INDC will cost ~USD 161.4 million to implement through 2025. Grenada anticipates meeting these costs through access to multilateral and bilateral support including Green Climate Fund and arrangements with development partners.[6]
Energy Imperatives	• Electricity is currently produced almost entirely from fossil fuels, primarily diesel based.[2] • Electricity prices on the island state of Grenada are among the highest in the world mainly because of the island's dependence on fossil fuels and high import costs.[2] • Electricity production from solar has already surpassed 2% and is increasing as more consumers are taking advantage of the incentives provided for solar technologies.[6]


Guinea
Africa
Electricity Consumption in BU (2017)
1.6
Installed Solar Capacity in MW (2019)
13.4
Share of Population with Access to Electricity (2018)
0%
44%
100%
Installed Off-Grid Solar Capacity in MW (2019)
13.3
World Bank's Ease of Doing Business Score (2020)
49.40
Solar installed capacity Growth rate (CAGR) for 2015-19
0%
Power Trends
Cumulative Solar installed Capacity (MW)
0.6
0.6
0.6
3.4
3.4
13.3
13.3
13.3
13.4
13.4
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
509
454
604
541
596
966
1405
1550
Year
Access to Electricity
27.3%
28.6%
26.2%
31.2%
32.5%
33.9%
33.5%
35.4%
44.0%
Year
Ease of Doing Solar Classification
Potential
Performance against 7 Drivers
Technological feasibility
Macroeconomy
Energy Imperatives
Policy enablers
Infrastructure
Market Maturity
Financing
Sub-regional standing
ALGERIA
MAURITANIA
MALI
SENEGAL
THE GAMBIA
BURKINA FASO
GUINEA-BISSAU
GUINEA
BENIN
TOGO
NIGER
SIERRA LEONE
GHANA
Abuja
Porto-Novo
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• Guinea's economic growth has remained steady on account of reforms to improve the business environment. GDP (at current prices) has grown at an annual rate of 5.6% in 2019.[5,6] • Public debt represented 36.7% of GDP in 2018 and is expected to remain below 45% until 2021.[1] • Growth is driven by mining and construction sectors and scaled-up electricity production.[3]
Policy enablers	• The Ministry of Energy and Hydraulics (MEH) is in charge of the supervision, control and regulation of the sector. The Electricity Sector Regulatory Body was created in September 2005. However, policies are still under improvement.[2] • The higher tax structure, by the government, needs to be reviewed and be made more conducive for investors to encourage private players in the country.[2] • Guinea has a strong Investment Code for solar projects and a Code for Public Contracts that includes a law on PPP to attract investors.[2]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.573 kWh/m^2/day and specific yield 4.437 kWh/kWp, strong technical feasibility is envisaged for solar projects in Guinea.[4] • Green mini grids has the potential to improve access in rural areas in an economic manner.
Market Maturity	• Advancing the multi-year tariff regime is a key reform to reduce untargeted electricity subsidies and free up resources for priority spending. Multi-year strategy, prepared with the support of the World Bank, aims to gradually increase tariffs to cost recovery levels by 2025.[3] • The Government has fixed target of electrifying 85% of the country by 2035.[2] • For industries such as health, rooftop solutions with storage may be considered to mitigate frequent power cuts.[2] • Increasing share of customers with mobile money account, from 1% to 14% between 2015 and 2017, indicates an strong potential for PayGo models for off-grid solar in the country.[5]
Infrastructure	• National Master Plan for Infrastructure is in place to develop several projects in medium and long term (2018-2035). Finalised in 2018, the Master Plan identifies sites for solar plants in the country.[2] • Guinea has access to suitable land, raw material and skilled manpower to have a manufacturing base for solar panels.[2] • The irrigation potential, with more than six million hectares of arable land, could create economic revolution through the use of solar agriculture pumps preferably manufactured locally.[2] • The key hurdles in the industry are higher tax structure which includes custom duty, VAT, lack of financing and limited number of players in the industry.[2]
Financing	• The banking sector remains stable. Private sector credit growth was at 24% (Y-o-Y), at the end of 2019, supported by banks' liquidity.[3] • In parallel, banks' net lending to the government increased by 27% in 2019.[3] • Strengthening banking supervision and regulation is expected to bring further financial stability. The frameworks are in line with the recommendations of 2019 Financial Sector Stability Review.[3]
Energy Imperatives	• Hydro energy contributes to 65% of the total installed capacity followed by thermal i.e. 33% and remaining 2% is from solar.[2] • The country's hydroelectric potential, tapped less than 6% so far, is estimated at 6,000 MW with potential to generate 19,300 MUs a year.[1] • Electricity tariffs will be doubled over 2019-25 (on a cumulative basis); Estimated to increase by 9% for households and 10% for industrial and professional users in 2020.[3] • Country intends to initiate process of setting up battery manufacturing base in the country.[2] • The Ministry of Hydraulics is planning to install 20,000 solar pumps for supply of drinking water in next 10 years.[2]


Guinea-Bissau
Africa
Electricity Consumption in MU (2017)
38.6
Share of Population with Access to Electricity (2018)
0%
29%
100%
World Bank's Ease of Doing Business Score (2020)
43.20
Installed Solar Capacity in MW (2019)
1.2
Installed Off-Grid Solar Capacity in MW (2019)
1.2
Solar installed capacity Growth rate (CAGR) for 2015-19
39%
Power Trends
Cumulative Solar installed Capacity (MW)
1.0
0.5
0.0
0.00 0.00 0.00 0.00 0.00 0.31 0.31 0.31 1.17 1.17
2010 2012 2014 2016 2018
Overall Electricity Consumption (MU)
38
36
34
32
32.0 33.2 34.3 35.4 35.4 36.4 37.7 38.6
2010 2012 2014 2016
Access to Electricity
30%
25%
20%
15%
10%
5%
6.0% 13.3% 14.7% 16.1% 17.2% 20.3% 23.3% 26.0% 28.7%
2010 2012 2014 2016 2018
Ease of Doing Solar Classification
Potential
Performance against 7 Drivers
Technological feasibility
Macroeconomy
Market Maturity
Infrastructure
Energy Imperatives
Policy enablers
Financing
Installed Generation Capacity by Source
Total Installed Capacity 28 MW
Non RE 27.6 MW
Solar RE 0.5 MW
Non Solar RE 0 MW
Mini Grid 0.3 MW
Home System 0.2 MW
Pumps 0.03 MW
Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Guinea Bissau consists of a continental part and an insular part that includes the Bijagós Archipelago comprising of about 90 islands and islets, of which only 17 are inhabited.[5] • GDP (Real) grew by an annual rate of 4.6% in 2019 driven primarily by private consumption and exports.[1,8]
Policy enablers	• Key aspects of its energy Intended Nationally Determined Contributions (INDCs) are to attain 80% RE in the national energy mix by 2030, to improve energy efficiency by reducing energy losses up to 10% by 2030 and to reach 80% of universal access to electricity by 2030.[4] • Guinea Bissau aims to decisively transform the energy sector in the decade 2015-2025.[2]
Technological Feasibility	• Owing to relatively high levels of solar irradiation (GHI) of 5.60 kWh/m^2/day and specific yield 4.46 kWh/kWp, strong technical feasibility is envisaged for solar projects in Guinea-Bissau.[6] • At present, solar energy use is limited despite the country receiving high solar radiation of about 3,000 sunshine hours per annum.[4]
Market Maturity	• Efforts to attract private investments include creating an Investment and Export Promotion Agency and signing the Lusophone Country- specific Compact.[1] • Only 29% of the population has access to electricity, as of 2018, with a marked imbalance between Urban (53%) and the Rural (10%).[7] • The foreign trade balance is negative, although it has shown a positive trend in recent years. The country is significantly dependent on international aid.[5] • The absence of metering, at consumer premises, is seen as a key bottleneck in limiting the revenues of distribution utilities.[7]
Infrastructure	• The nation has one of the lowest electricity access rates in Africa, as well as the one of the highest electricity prices on the continent. • The Guinea Bissau Sustainable Energy Investment Plan demands USD 700 million investments to bring in energy transformations by 2030.[8] • Rural electrification has reached multiple communities through expansion of mini-grids and projected construction of the national grid.[5] • Very few institutions specialise in the electricity sector indicating a need for capacity building of the stakeholders involved.[5] • According to the Investment Code of Guinea Bissau, the State guarantees the protection of assets resulting from private sector investment.[5]
Financing	• The local banking sector is not sufficiently capitalized to facilitate financing of RE projects with longer pay-back and substantial risks. • Improving financial support and incentive frameworks may facilitate the sector to play its full role.[7]
Energy Imperatives	• As of 2018, the electricity infrastructure, with an operating capacity estimated at around 41 MW satisfies only 9% of the demand.[5] • The energy supply is primarily based on biomass (85%) and complemented by imported petroleum products (15%).[5] • Guinea-Bissau generated 39 MUs of electricity in 2016 (covering 108% of its annual consumption needs) with 4 MUs (~10%) from RE.[9] • The implementation of new solar projects, both off-grid and grid-connected, with a total capacity exceeding 30 MW has been planned.[5] • The country is currently operating and installing the biggest renewable energy hybrid mini-grid projects in the ECOWAS region.[8]

Guyana

Latin America & Caribbean

Electricity Consumption in MU (2017)

859.5

Installed Solar Capacity in MW (2019)

8.0

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

1.9

World Bank's Ease of Doing Business Score (2020)

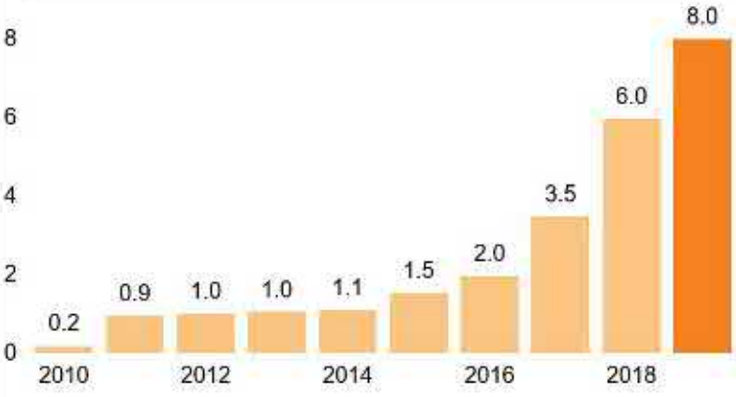
55.50

Solar installed capacity Growth rate (CAGR) for 2015-19

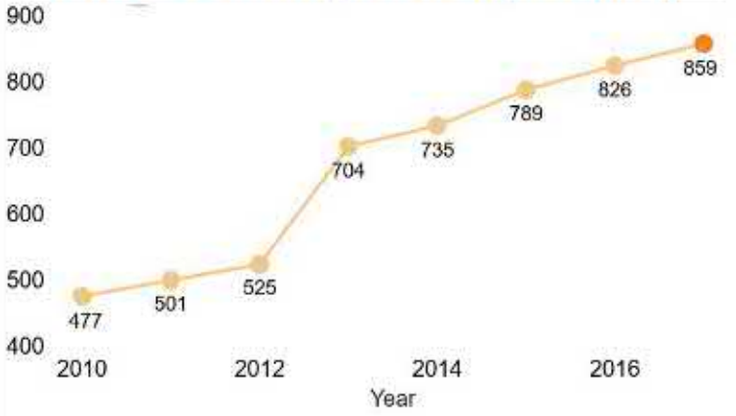
51%

Power Trends

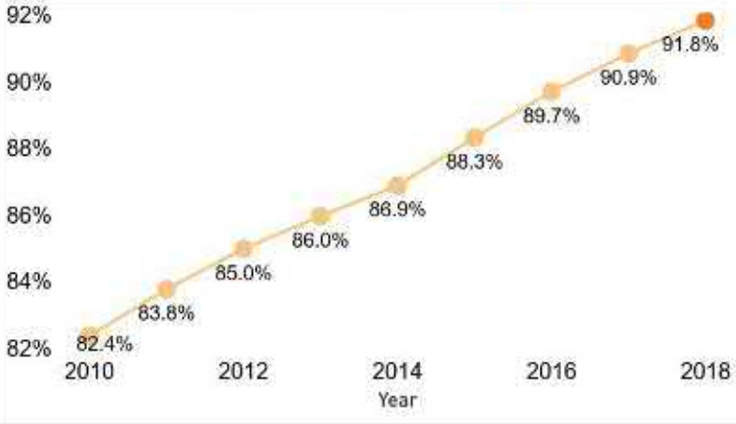
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



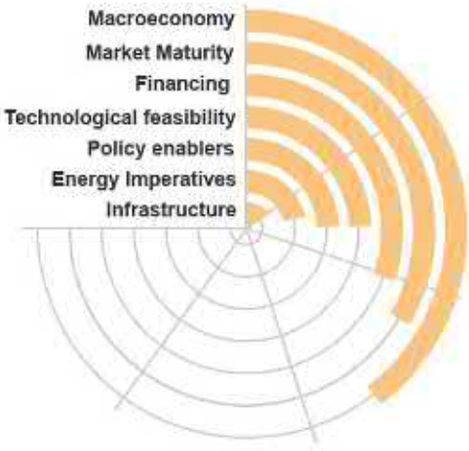
Access to Electricity



Ease of Doing Solar Classification

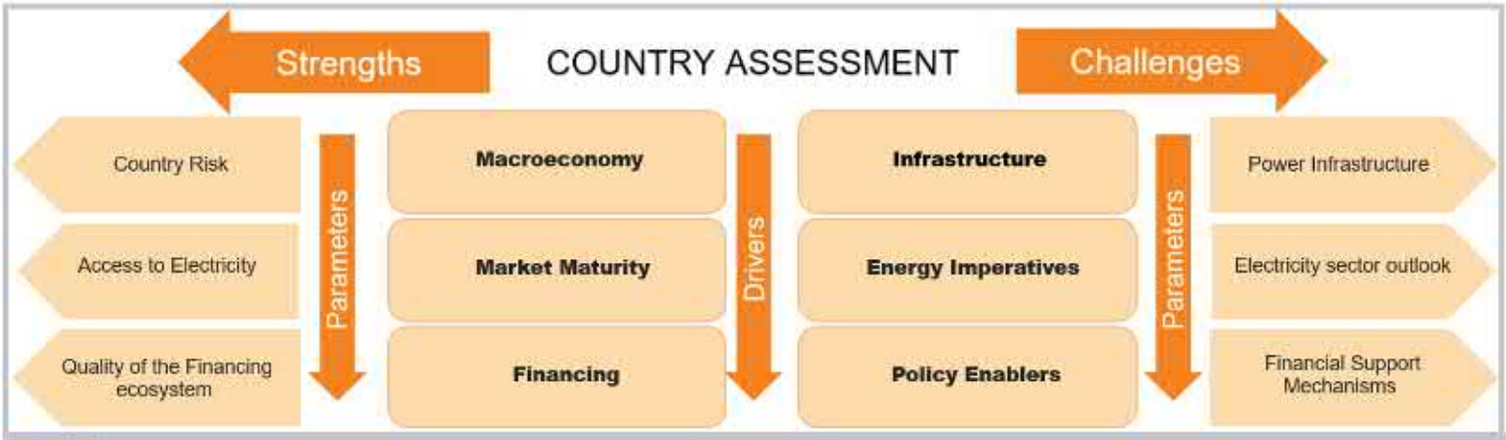
Potential

Performance against 7 Drivers



Sub-regional standing

Neutral Beignner Progressive Influencer



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 4.7% in 2019.[1,6] • Guyana's per capita GDP reached approximately USD 4,181 in 2018, up from around USD 2,360 in 2009. The annual inflation rate was 2% in 2018.[1] • Guyana's economy primarily relies on agriculture and mining.[2]
Policy enablers	• In 2016, Guyana's Green State Development Strategy (GSDS) was launched to bring in economic transition towards renewable, clean, and cheaper sources of energy.[1] • Government has provided fiscal incentives for Solar like VAT and import duty exemptions for equipment and appliances (solar water heaters, solar cook stoves etc.) and one-off tax holiday, for two years, for corporate tax to importers of items for solar investments.[3]
Technological Feasibility	• Owing to relatively high levels of solar irradiation (GHI) of 5.212 kWh/m^2/day and specific yield of 4.13 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Guyana.[7] • Most locations, across Guyana, have excellent solar insolation levels and are ideal for solar PV generation.[3]
Market Maturity	• 92% of the population has access to electricity as of 2018. • To stimulate business enterprises, the country is targeting to reduce the cost of electricity by 50% through a mix of Renewable sources. • In addition to establishing a National Grid Code, Guyana Power and Light Inc. (GPL) is working on a Code for the Integration of Distributed Generation, establishing the commercial and technical frameworks for grid connected renewable energy systems and streamlining the procedures for feed-in mechanisms.[3] • GPL is planning 3 utility-scale solar farms totalling 30 MW.[3]
Infrastructure	• GPL is investing USD 18.06 million to construct 83 km of single circuit 69 kV lines with 47 km completed in 2019. On distribution side, the company will be upgrading 92 km of medium voltage and low voltage distribution networks with an investment of USD 22.4 million.[4] • An additional 322 km of 230 kV transmission lines are planned between 2020 and 2025 and 395 km of 500 kV by 2025 to support the cross-border electricity trade to Suriname and Brazil.[4] • In 2016, GPL had high technical and commercial losses at 30.6% and 28.6% respectively, which is an area of great concern for the utility.[4] • As per Green State Development Strategy document, about 19% of the population rely on off-grid solutions for intermittent power. Approximately 20,000 individual solar units are installed about half of which remain non-functional as a result of the batteries becoming inoperable.[4]
Financing	• Credit to the private sector grew by 4.0% in 2018, faster than that in 2017 i.e. 2.1%. This was mostly driven by the commercial sector in the country.[5] • The banking sector's non-performing loans (NPLs) to total loans ratio, though still higher, has fallen slightly to 11.9% as of 2018 from 12.2% a year before.[5] • A private credit bureau, CreditInfo, was established, in July 2013, to enable exchange of credit information. In January 2016, the Credit Reporting Act was amended to mandate information sharing by both credit institutions and public utilities.[5]
Energy Imperatives	• Historically Guyana is the most fuel import-reliant economy in the Caribbean region with about 92% of its energy needs met through imports in 2017.[4] • As of 2018, the total installed capacity for Solar is 6 MW with an estimated annual generation of 7.2 MU.[3] • New government is aiming to add 400 MW of new generation capacity over the next five years. • Under the Hinterland Electrification Programme, about 19,000 solar systems had been installed in nearly 200 communities by 2018.[3] • During 2017 & 2018, the Government under its Green Public Sector programme implemented solar PV systems with a combined capacity of 3.02 MW on the rooftops of 175 public or government buildings.[3]

Haiti

Latin America & Caribbean

Electricity Consumption in MU (2017)

422.0

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

40.70

Installed Solar Capacity in MW (2019)

2.6

Installed Off-Grid Solar Capacity in MW (2019)

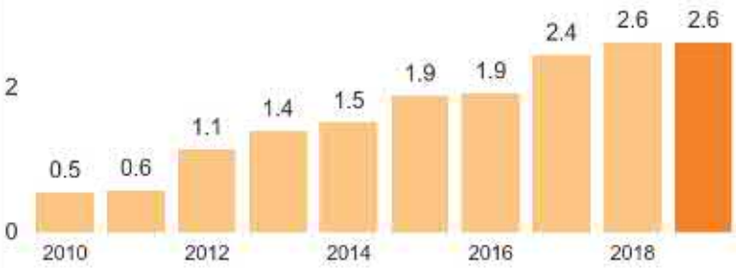
1.4

Solar installed capacity Growth rate (CAGR) for 2015-19

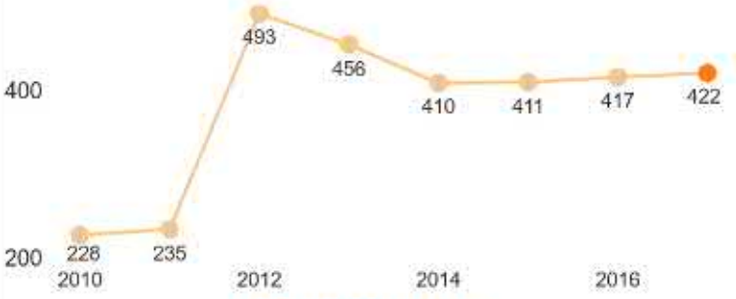
9%

Power Trends

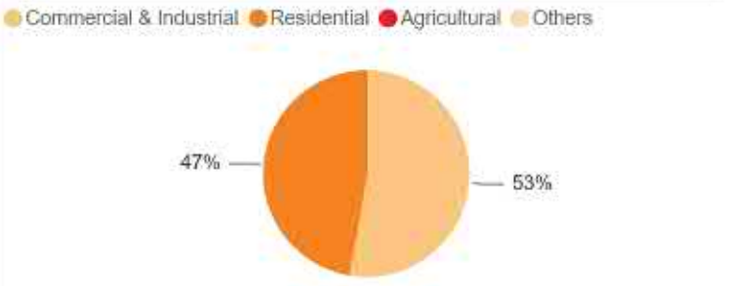
Cumulative Solar installed Capacity (MW)



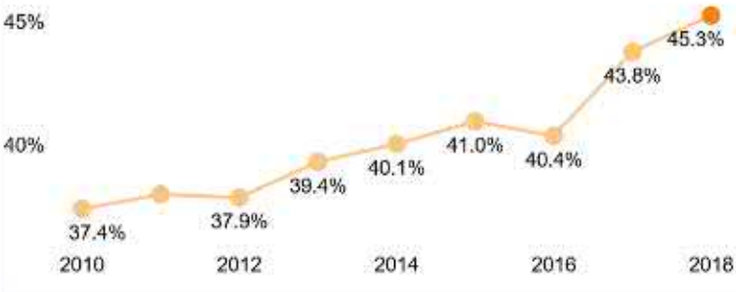
Overall Electricity Consumption (MU)



Consumer Mix



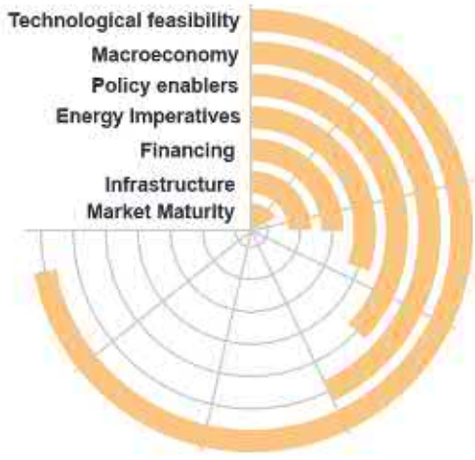
Access to Electricity



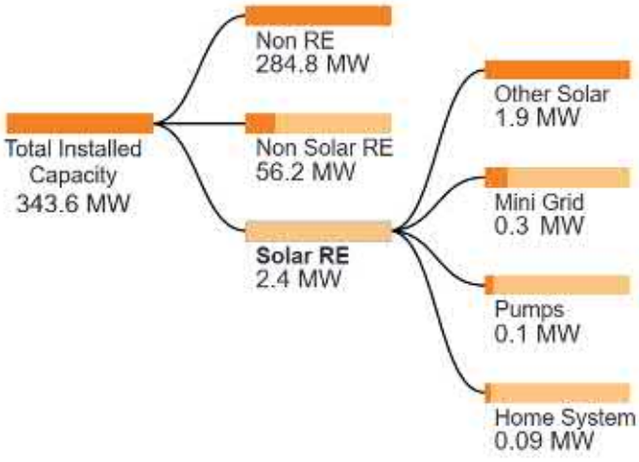
Ease of Doing Solar Classification

Potential

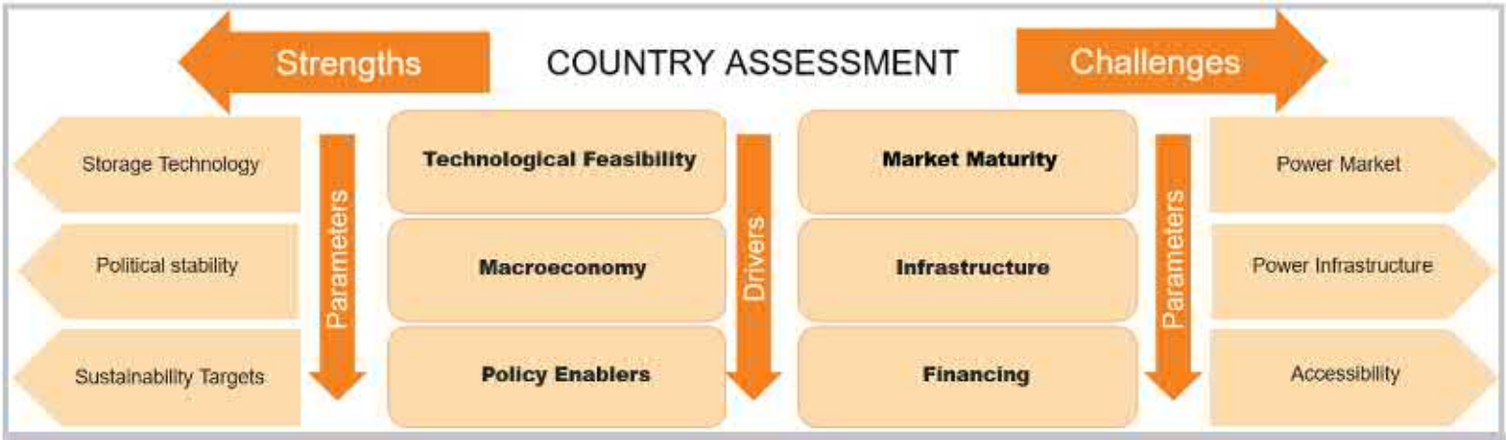
Performance against 7 Drivers



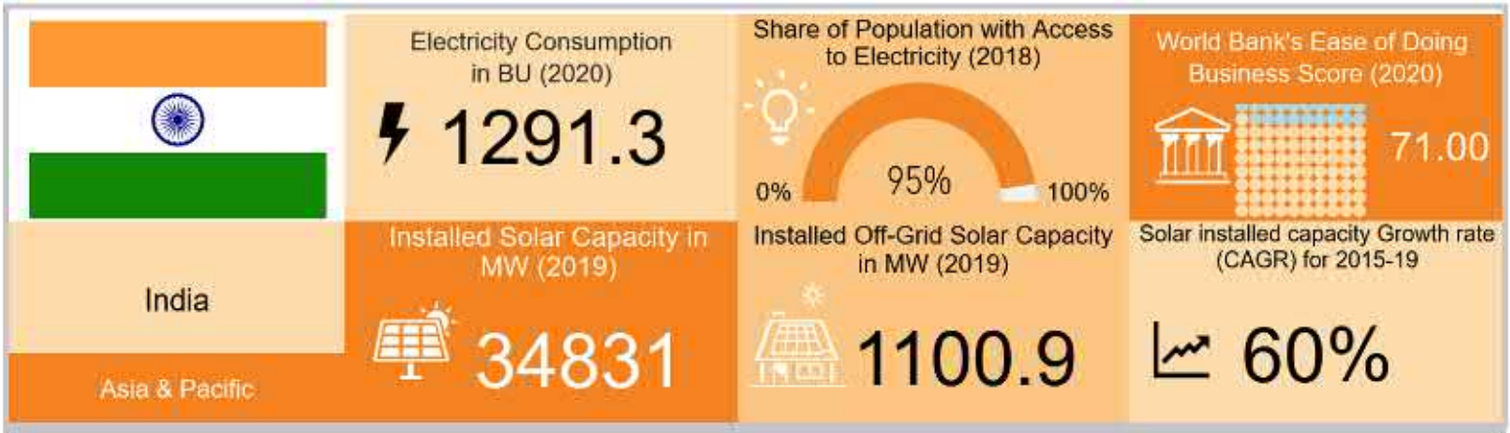
Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.

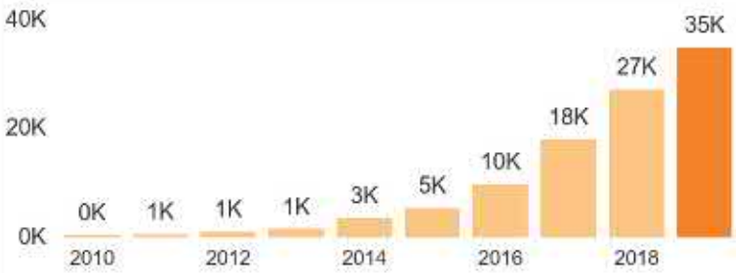


Drivers	Insights
Macro-economy	• Annual GDP (Real) has contracted by 1.2% in 2019 and averaged 1.4% from FY2015 through FY2018.[1,5] • Over 58% of the population live below the national poverty line (USD 2.41 per day) and real per capita income has stagnated since 2015 at around USD 870 (2018).[1]
Policy enablers	• Haiti has committed to cut GHG emissions by 2026, below the business as usual scenario, by 2030 compared to 2000 levels subject to international support and investments of USD 25.4 billion. This represents a total emission reduction of 35.24 metric tons CO2 by 2030.[2] • The country targets to increase the share of renewable energy to 47% (24.5% from hydro, 9.4%, from wind, 7.5% from solar and 5.6% from biomass) by 2030.[2] • Being an island country and vulnerable to climate change and natural disasters, Haiti would benefit from a Climate Change Policy Assessment which would help identify relevant adaptation, financing, and risk management strategies.[1]
Technological Feasibility	• Owing to relatively high levels of solar irradiation level (GHI) of 5.536 kWh/m^2/day and specific yield 4.677 kWh/kWp, strong technical feasibility is envisaged for solar projects in Haiti.[6] • With its tropical climate and good number of sunlight days, Haiti offers favourable conditions for Solar.
Market Maturity	• Only 45% of Haitians have access to electricity.[1] • More than half of the population relies on diesel or charcoal-powered self-generation.[1] • A major breakthrough came in February 2016 with the adoption of a new legal and regulatory framework that ended the public utility's monopoly on producing, selling, and distributing electricity opening the doors to private investment.[4] • Country has developed a short-term plan to provide solar home systems for the most isolated parts of the country that generate enough electricity to power lights and charge phones. So far, a pilot project serving about 10,000 households has been implemented. The service is being planned to be structured under a "pay-as-you-go (PayGo)" model.[4]
Infrastructure	• Haiti also intends to offer concessions to private companies to expand and strengthen eight regional grids and add generation capacity including small-scale solar PV.[4] • In the year 2019, Haiti and the World Bank established the Off-Grid Electricity Fund with an initial USD 17 million funding from the "Global Clean Technology Fund and the Scaling up Renewable Energy Program" to support access to electricity in remote areas.[4]
Financing	• The estimated funds needed to meet the conditional INDC target is USD 25.4 billion. Haiti plans to use international carbon market mechanisms to finance part of its conditional contribution activities.[2] • The ratio of private sector credit to GDP (in both gourdes and dollars) has stabilized at around 19.7%.[1] • Credit to the private sector represents about 19% of GDP; only 33% of the adult population has an account at a formal financial institution and 75% of bank lending goes to only 20 borrowers.[1] • Non-performing loans (NPLs) rose rapidly, in 2019, suggesting the need for a cautious assessment of banking sector stability risks.[1]
Energy imperatives	• Though the residential tariffs in Haiti are relatively low as compared with other fossil-fuel-dependent countries in the region, commercial and industrial tariffs are amongst the highest.[3] • Most of the industrial consumers prefer off grid relying on their own power generation since Haiti Electric Utility regional grids are perceived as less reliable. • The Energy Regulatory Authority, which grants licenses and concessions in the energy sector, expects to have 51 micro grids in place over the next two years.[4]

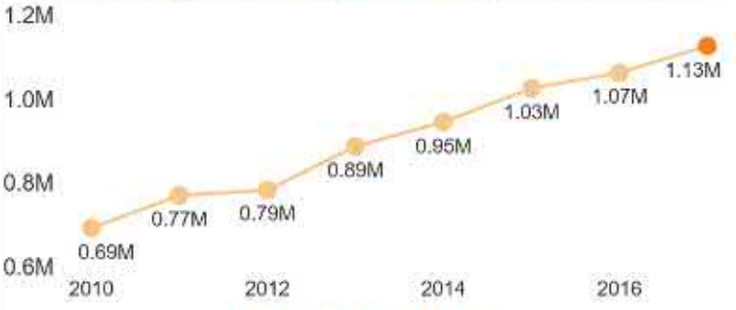


Power Trends

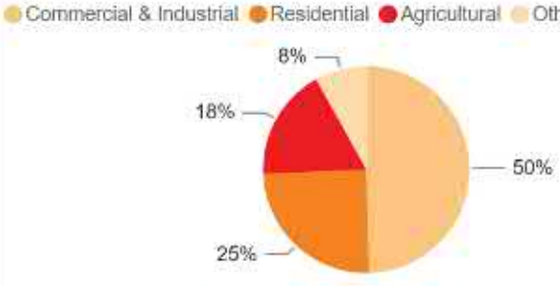
Cumulative Solar installed Capacity (MW)



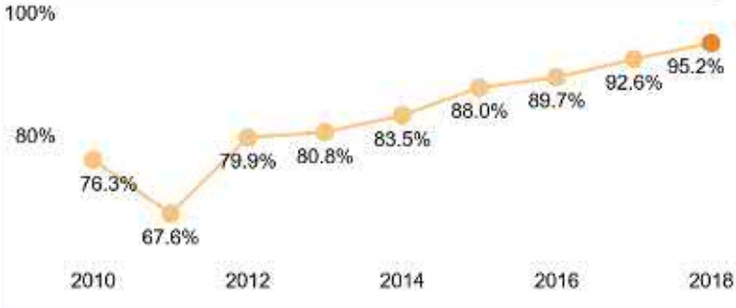
Overall Electricity Consumption (MU)



Consumer Mix



Access to Electricity

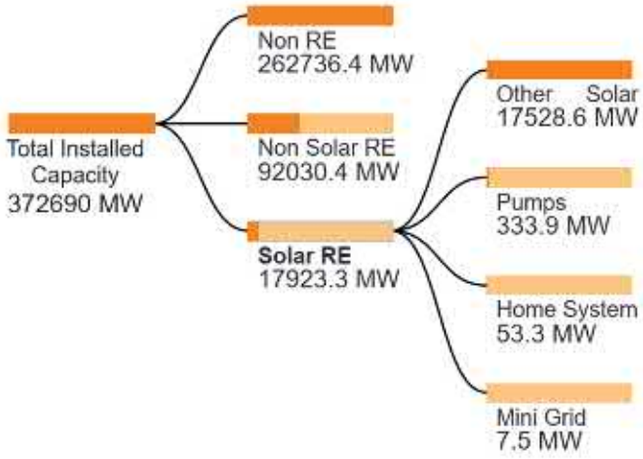


Ease of Doing Solar Classification

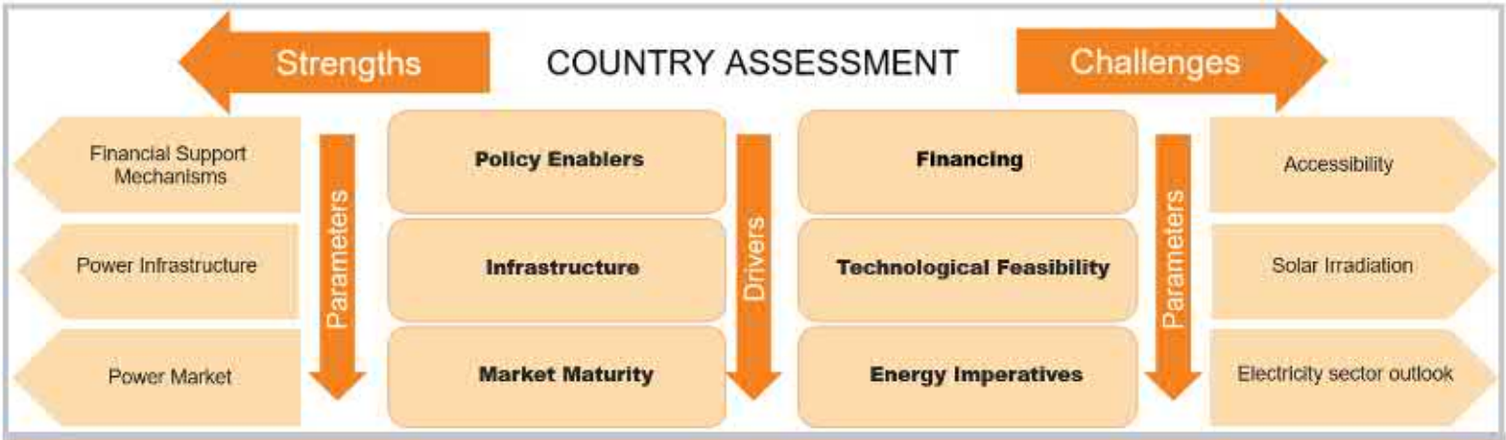
Achiever

Performance against 7 Drivers

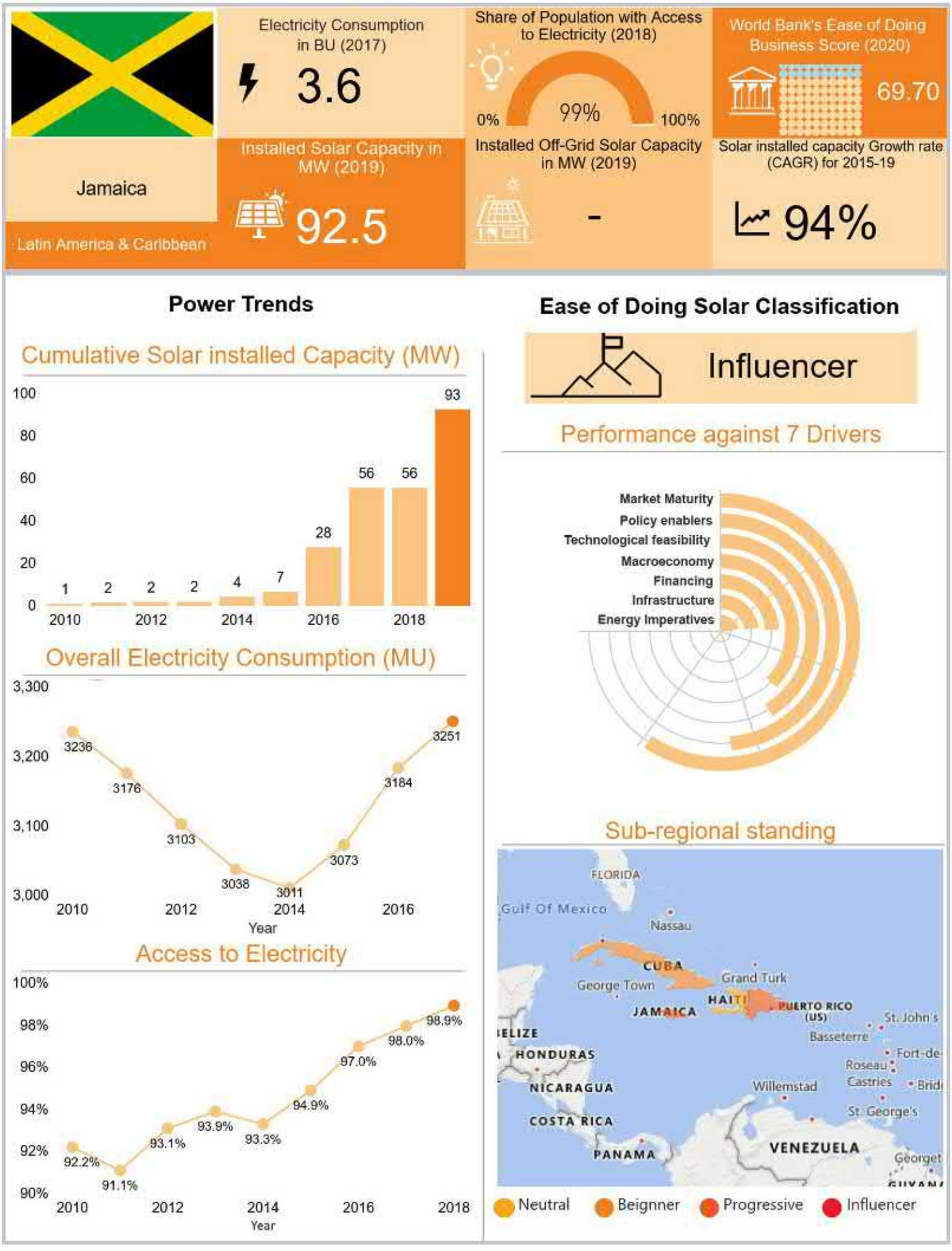
Installed Generation Capacity by Source

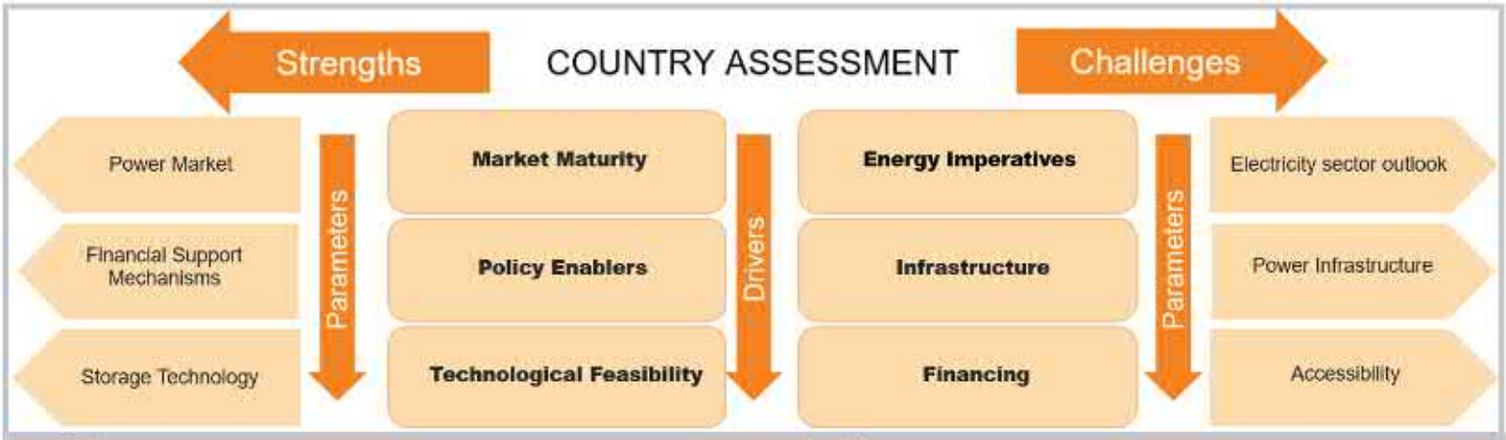


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.

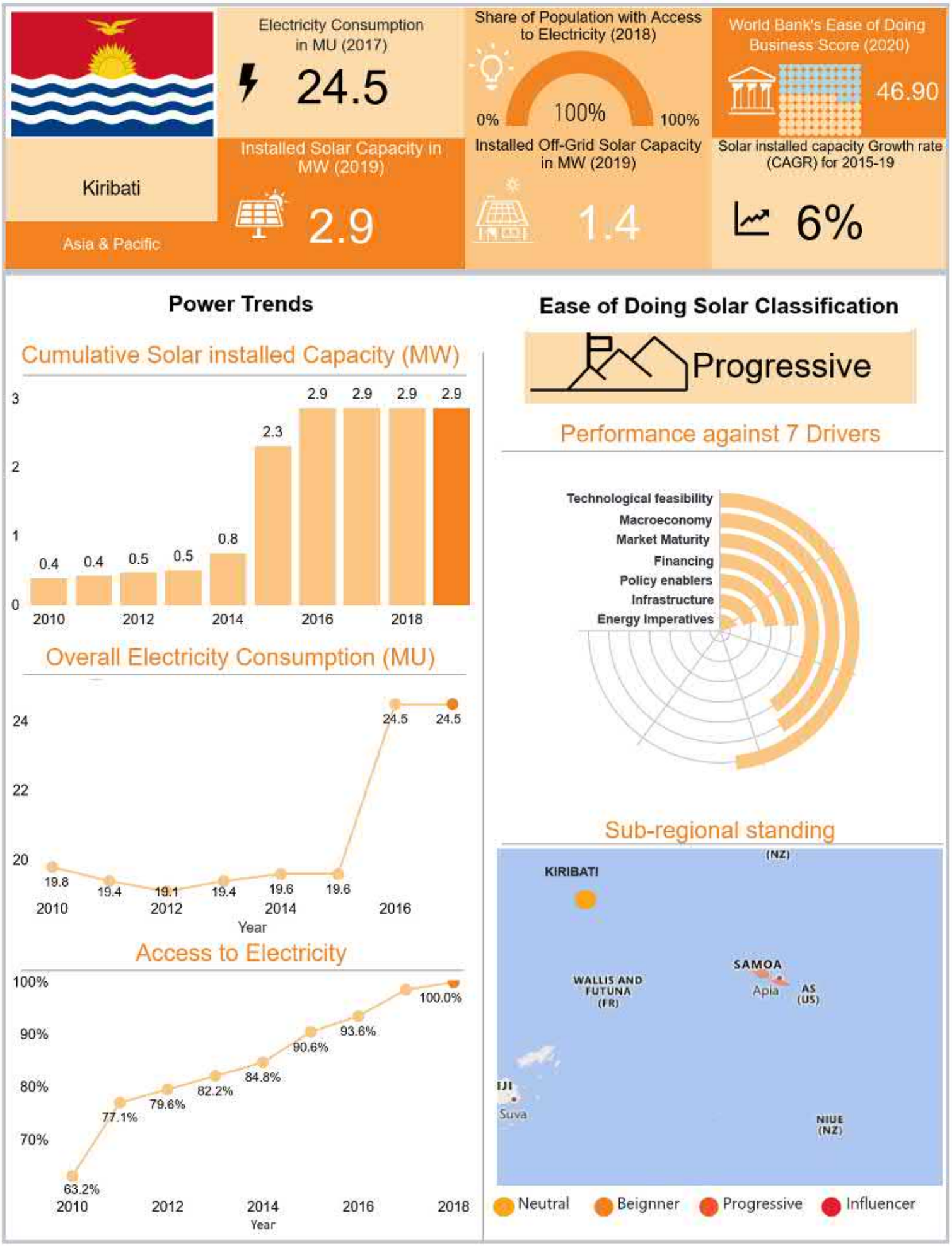


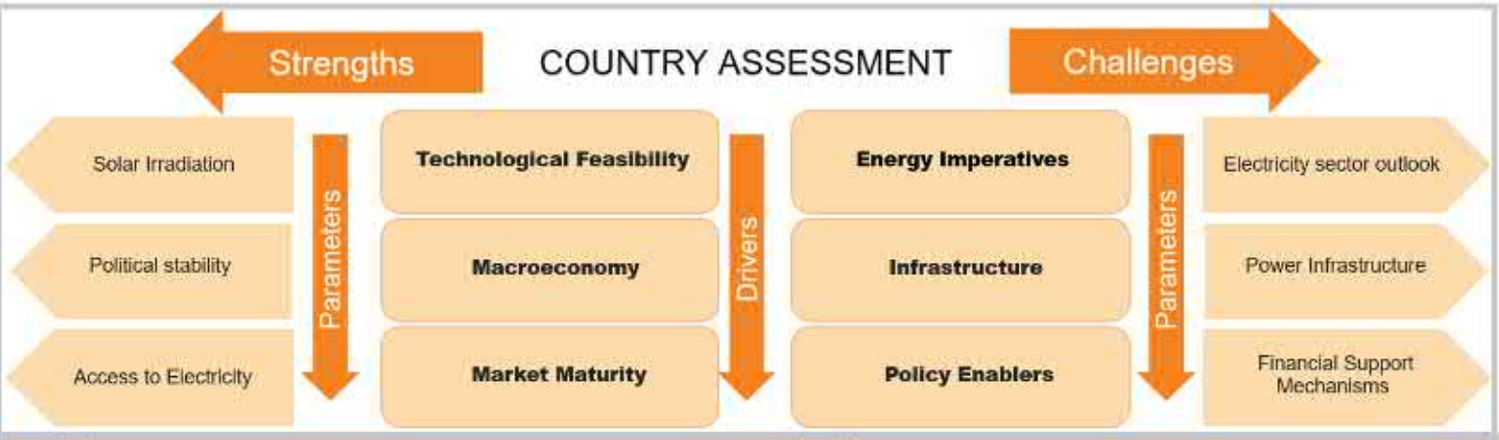
Drivers	Insights
Macro-economy	• India has been among the fastest-growing economies in the world over the past few years.[5] • The country recorded 4.2% real GDP growth in 2019.[14] • The Country observed USD 9.6 billion FDI Inflows in the Non-conventional Energy sector during April 2000 to June 2020 period.[6]
Policy enablers	• The country has set an ambitious target of 450 GW of renewable power by 2030 with 175 GW deployment by 2022. This is the world's largest expansion plan in the case of renewable energy.[6] • The National Tariff Policy was amended in 2011 to prescribe solar-specific Renewable Purchase Obligations (RPO). These obligations have increased from 0.25% in 2012 to 3% by 2022.[8] • The Central and State Regulatory Commissions have issued regulations and frameworks around Renewable Energy Certificates, Feed-In-Tariff mechanisms, grid connectivity, forecasting etc. for promoting solar. Most states have launched their own Solar Policies as well.[8] • Up to 100% FDI is allowed under the automatic route for renewable energy generation and distribution projects subject to provisions of The Electricity Act, 2003.[6]
Technological Feasibility	• Owing to relatively high levels of solar irradiation (GHI) of 5.098 kWh/m^2/day and specific yield of 4.322 kWh/ kWp, a strong technical feasibility is envisaged for solar projects in India.[2] • In most parts of India, clear sunny weather is experienced for 250 to 300 days a year; it is comparable with radiation received in the tropical and sub-tropical regions.[8]
Market Maturity	• India has nearly 372.69 GW of Installed capacity out of which 47% is owned by Private sector.[7] • By April 2018, all villages in the country were electrified. A village is considered electrified if 10% of its households and public places are connected to the grid.[13] • Under the National Solar Mission, a target of 2,000 MWp was kept for off-grid solar PV applications out of which 913 MWp has been sanctioned before 2017.[12] • India is the third largest market for Solar appliances with over 40,000 units sale as a result of increased participation in the country during Jul-Dec 2019.[3] • India registered the highest PAYGo units sold in H2 2018 at 1.2 million units.[4]
Infrastructure	• 42 solar parks of aggregate capacity 23,499 MW have been approved in 17 states up to March 2019.[6] • 60 solar cities have been approved with USD 1.3 billion for setting up 50 solar parks of 40 GW by 2020.[6] • India has around 3 GW/year Solar PV cells manufacturing capacity and around 10 GW per year Solar PV Modules manufacturing capacities.[11] • The Suryamitra Skill Development Programme is designed to develop employable workforce catering to the needs of Solar PV industries; 31,092 people have been trained up to 31st March, 2019.[10]
Financing	• There has been growing lender interest in renewable energy. 60 RE projects drew in financing of over USD 2.5 billion in 2017, nearly 60% of which came from non-banking financial institutions.[13] • India's renewable energy financing structure may further need reforms to boost the flow of capital into the sector in order to achieve the ambitious 2022 and 2030 targets.[13] • Access to bottom of pyramid consumers and provision of consumer credit has been significantly achieved through partnership with micro-finance institutions (MFIs).[4]
Energy Imperatives	• The total electricity consumptions stood around 1,158 BUs during 2018-19 with Industrial sector being the major contributor, consuming approximately 42%. The electricity consumption has been growing at a CAGR of 6.6% (2009-2019).[1] • With around 81 GW (Aug 2019), Renewable Energy contributed to 22% of Installed Capacity in India.[6] • With 35 GW of installed capacity in solar as of Apr'20, India has the 5th largest installed capacity of solar power in the world.[6] • Solar capacity has increased by more than 13 times in the last 6 years from 2.6 GW to 35 GW in Apr'20.[6]


Jamaica
Latin America & Caribbean
Electricity Consumption in BU (2017)
3.6
Installed Solar Capacity in MW (2019)
92.5
Share of Population with Access to Electricity (2018)
0%
99%
100%
Installed Off-Grid Solar Capacity in MW (2019)
-
World Bank's Ease of Doing Business Score (2020)
69.70
Solar installed capacity Growth rate (CAGR) for 2015-19
94%
Power Trends
Cumulative Solar installed Capacity (MW)
100
80
60
40
20
0
1
2
2
2
4
7
28
56
56
93
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
3,300
3,200
3,100
3,000
3236
3176
3103
3038
3011
3073
3184
3251
2010
2012
2014
2016
Year
Access to Electricity
100%
98%
96%
94%
92%
90%
92.2%
91.1%
93.1%
93.9%
93.3%
94.9%
97.0%
98.0%
98.9%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Market Maturity
Policy enablers
Technological feasibility
Macroeconomy
Financing
Infrastructure
Energy Imperatives
Sub-regional standing
FLORIDA
Gulf Of Mexico
Nassau
CUBA
George Town
Grand Turk
HAITI
JAMAICA
PUERTO RICO (US)
St. John's
Basseterre
ELIZE
HONDURAS
Fort-de
Roseau
Castries
NICARAGUA
Willemstad
COSTA RICA
St. George's
PANAMA
VENEZUELA
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• GDP (real) is estimated at USD 16.4 billion in 2019 and is growing at an annual rate of 1%.[11] • Public debt fell below 100% of GDP in 2018-19 and is expected to decline below 60% by 2025-26, in line with the provisions of the Fiscal Responsibility Law. The rate of unemployment also fell to a historic low of 7.2% in October 2019, which is almost half the rate at the start of the reform program.[8] • Income inequality in Jamaica is lower than in most countries in the Latin America and Caribbean region, but poverty at 19%, in 2017, is still significant.[8] • Poverty is expected to decline further with rising per-capita GDP and lower unemployment.[8]
Policy enablers	• The Jamaica Energy Security and Efficiency Enhancement Project has supported the development of regulations and policies for renewable energy and natural gas, contributing to an increase of generation capacity from 9% at the start of the project, to 12% in 2017, and is expected to reach over 20% in 2030.[8] • Government approved National Energy Policy has set a target of 50% of all energy through renewables by 2030.[1] • General Consumption Tax (GCT) exemptions were implemented through the GCT Act in early 2012 and are applied across energy efficiency and solar technologies.[10]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.21 kWh/m^2/day and specific yield of 4.39 kWh/kWp, strong technical feasibility is envisaged for solar projects in Jamaica.[2] • Oil dependency in the country decreased from 95% in 2010 to 71% in 2017, and it is expected to fall further, to approximately 50%, by the end of 2019.
Market Maturity	• Power sector is regulated by Office of Utilities Regulation (OUR) in Jamaica. Jamaica Public Service Company Limited (JPS) is the sole electric distribution utility in Jamaica, providing power to customers from its own generation fleet and through purchases from the island's independent power producers (IPPs). JPS also owns transmission and distribution networks within the country. [13] • Installed solar PV capacity is expected to reach approximately 246 MW, by 2030, from 93 MW in 2019.[1] • 98.9% of the population has access to electricity as of 2018.[3] • Public sector modernization programme to enhance the government's capacity and effectiveness.[8]
Infrastructure	• Jamaica Public Service Company (JPS) owns about 14,000 kms of transmission and distribution lines that make up the national electricity grid with a total capacity of 798 MVA. However, T&D network in the country needs further strengthening.[12] • JPS has a 20-year contract (up to 2027) for electricity transmission and distribution in the country.[10] • Challenges associated with renewable energy variability can be minimized by upgrading the grid infrastructure with higher-voltage transmission lines and better operations and forecasting.[10] • The Jamaica Integrated Community Development Project has improved community infrastructure through deployment of solar street lighting.[8]
Financing	• The Development Bank of Jamaica (DBJ) manages several credit lines with the aim of enabling private banks to offer loans for renewable energy projects.[1] • Loans, through DBJ, cover up to 90% of renewable energy project costs for small and medium-sized enterprises and up to 70% for large companies.[1] • As per the World Bank projections, public debt is expected to fall below 60% of GDP, by 2025, in line with the provisions of the Responsibility Law.[7,8]
Energy Imperatives	• Per capital electricity consumption is 1,440 kWh.[4] • Power Consumption is expected to reach approximately 3,667 MUs in 2030.[1] • Renewable energy contributes 12% of total electricity consumption as of 2017.[9] • Solar contributes 5% of total Installed Capacity as of 2018 and is expected to increase to 15.2% by 2030.[1] • In 2016, Office of Utilities Regulation received 17 bids from 10 entities to set up renewable power generation projects.[1]


Kiribati
Asia & Pacific
Electricity Consumption in MU (2017)
24.5
Installed Solar Capacity in MW (2019)
2.9
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
1.4
World Bank's Ease of Doing Business Score (2020)
46.90
Solar installed capacity Growth rate (CAGR) for 2015-19
6%
Power Trends
Cumulative Solar installed Capacity (MW)
0.4
0.4
0.5
0.5
0.8
2.3
2.9
2.9
2.9
2.9
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
19.8
19.4
19.1
19.4
19.6
19.6
24.5
24.5
Year
Access to Electricity
63.2%
77.1%
79.6%
82.2%
84.8%
90.6%
93.6%
100.0%
Year
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Technological feasibility
Macroeconomy
Market Maturity
Financing
Policy enablers
Infrastructure
Energy Imperatives
Sub-regional standing
KIRIBATI
(NZ)
SAMOA
Apia
AS (US)
WALLIS AND FUTUNA (FR)
FJI
Suva
NIUE (NZ)
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• The GDP (Real) grew at an average annual rate of 2.3% in 2018-19, compared to 5.25% in 2015–17.[1,2] • Kiribati is one of the remotest countries in the world. The population of about 112,000 lives on 21 islands spread over an ocean area of 3.5 million square kms.[1]
Policy enablers	• As per the Kiribati Integrated Energy Roadmap (KIER),the 2025 goals for Tarawa is a 45% reduction in fossil fuel use (23% through deployment of renewable energy); for Kiritimati it is 60% reduction in fossil fuels (40% through deployment of renewable energy); for the outer Islands, it is a 60% reduction in fossil fuel use in all rural public infrastructure. For other rural public and private institutions, the goal is to meet 100% electricity demand with renewable energy.[5] • New Zealand Ministry of Foreign Affairs and Trade (MFAT) is in the process of developing a Least Cost Plan to assist Kiribati in reducing reliance on fossil fuels by 45% by 2025. • The government has an ambitious 20 year development agenda, the Kiribati Vision 20 (KV20) initiated in 2016. Public spending is driven primarily by the infrastructure gap and significant climate adaptation costs.[1]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 6.13 kWh/m^2/day and specific yield of 4.85 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Kiribati.[6] • Variability, from worst to best month, is less than 20% for South Tarawa and 15% for Kiritimati, not surprising for equatorial sites.[4] • Fixed PV flat panel technology is ideally suited to the atolls, where both direct and diffused radiation can be captured without any moving parts.[4]
Market Maturity	• Land registration is a long-running challenge given the customary land system.[1] • Electricity represents one of the highest expenditures taken up by the Government.[4] • The least-cost future solution for Kiribati presents the highest share of renewable energy exceeding 55% in the larger and 80% in the smaller zones, with a combination of PV, battery and wind power.[4] • There are numerous standards and guidelines for both on and off-grid system installation and design.[4]
Infrastructure	• Establishment of the Climate Finance Division whose mission is to coordinate climate-change-related ex-penditures (funded through the budget or by donors) is an encouraging step forward.[1] • Some of the installed PV systems have been fitted with controls that allow automatic curtailment to avoid problems with over-frequency in cases of excess of generation.[4] • The population is dispersed making centralised management of outer island energy systems difficult.[3] • There is a lack of trained personnel for management and maintenance of equipment.[3]
Financing	• Kiribati is primarily reliant on external grants from major development partners.[1] • A cash management policy is adopted to ensure that the reserves are managed as efficiently as possible while meeting the liquidity needs of the government and the banking system.[1]
Energy Imperatives	• There are two primary energy sources: imported petroleum products and indigenous energy sources which are mainly bioenergy and solar.[4] • In 2014, renewables sources accounted for 37%, comprised of bioenergy used for cooking (485,865 GJ) and solar energy (7,756 GJ).[4] • The Kiribati Integrated Energy Roadmap (2017-2025) business-as-usual scenario estimates that total energy demand will likely remain stable through 2025.[4] • Solar is an important source of electricity in outer islands; The Kiribati Solar Energy Company (KSEC) has been installing solar systems since 1984.[3] • The outer islands have an ongoing successful solar home systems (SHS) program - approximately 9,200 systems had been supplied as of 2015.[4]

Liberia

Africa

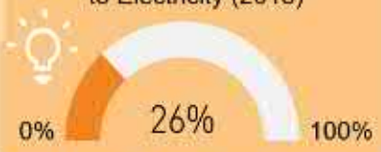
Electricity Consumption in MU (2017)

285.0

Installed Solar Capacity in MW (2019)

2.6

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

2.6

World Bank's Ease of Doing Business Score (2020)

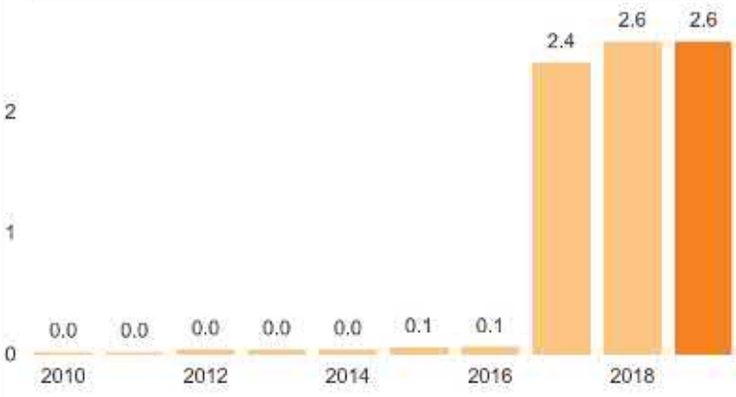
43.20

Solar installed capacity Growth rate (CAGR) for 2015-19

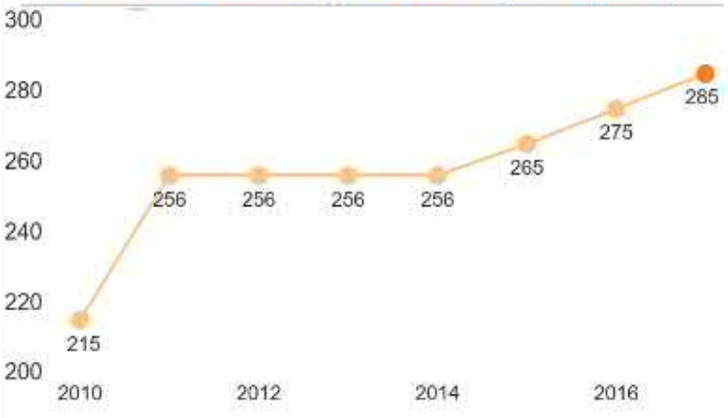
159%

Power Trends

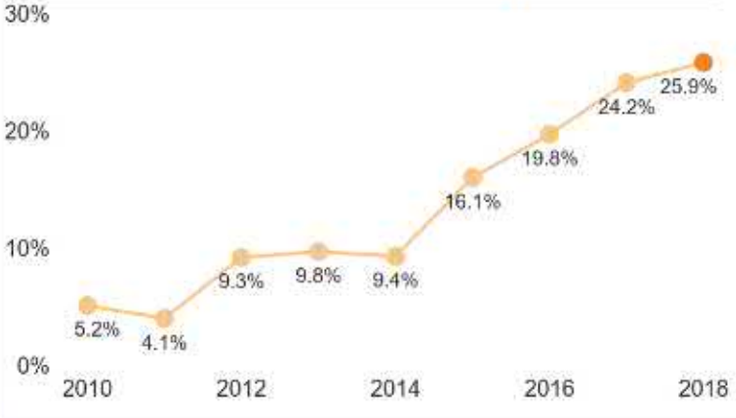
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



Access to Electricity

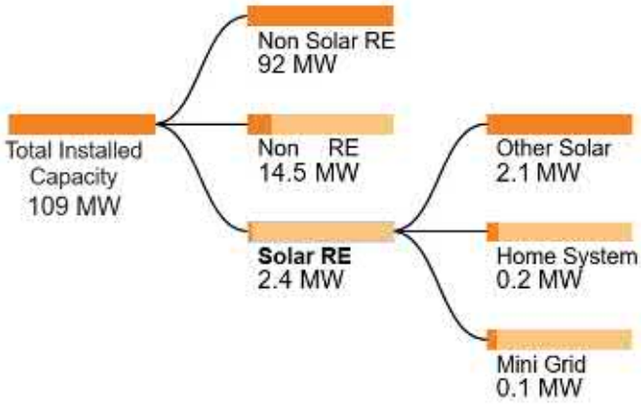


Ease of Doing Solar Classification

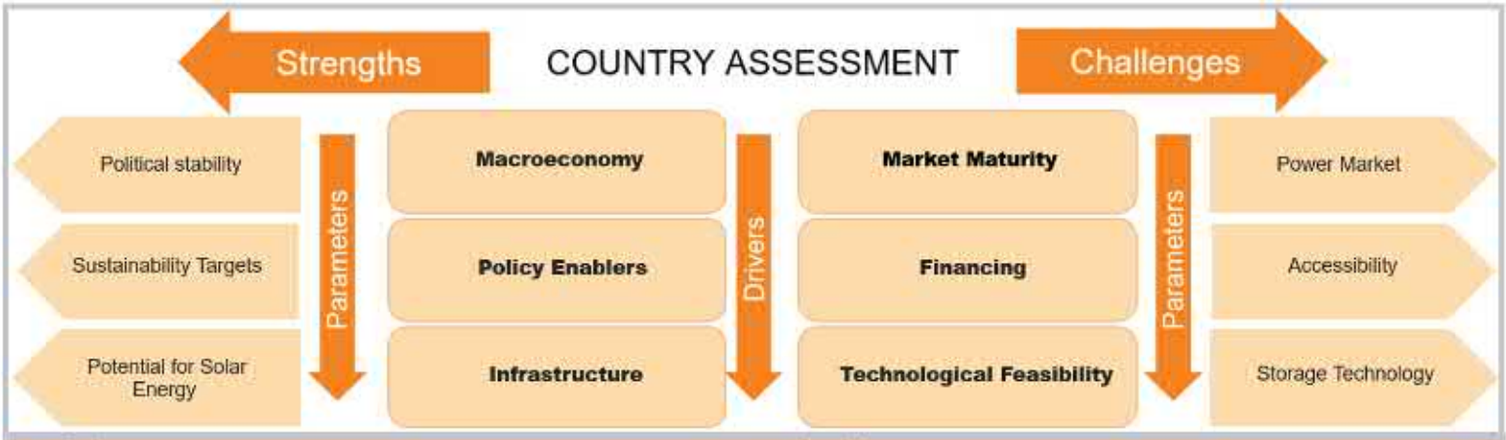
Potential

Performance against 7 Drivers

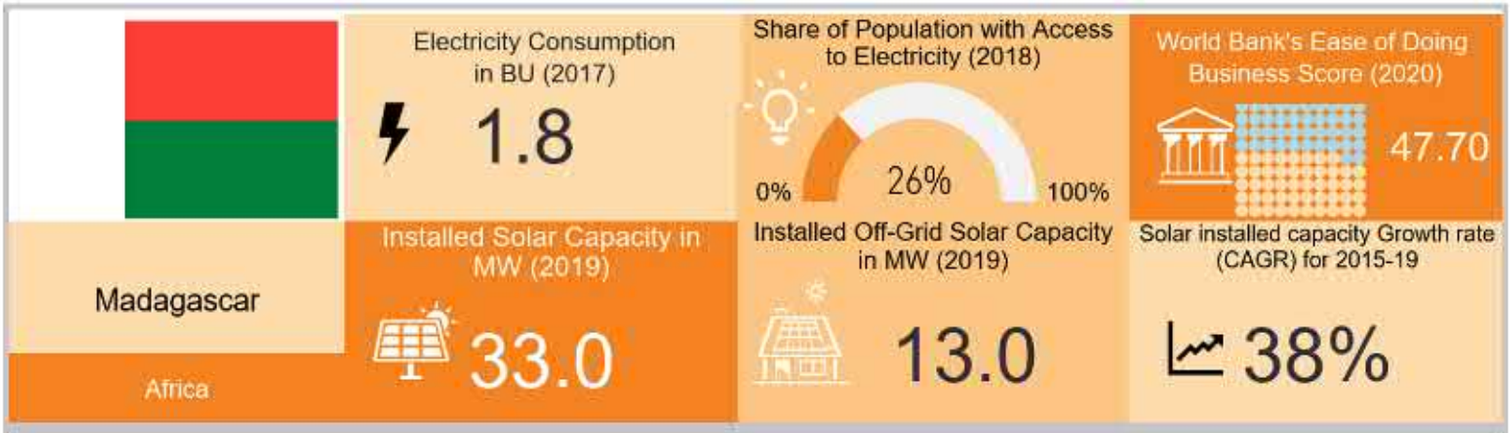
Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.

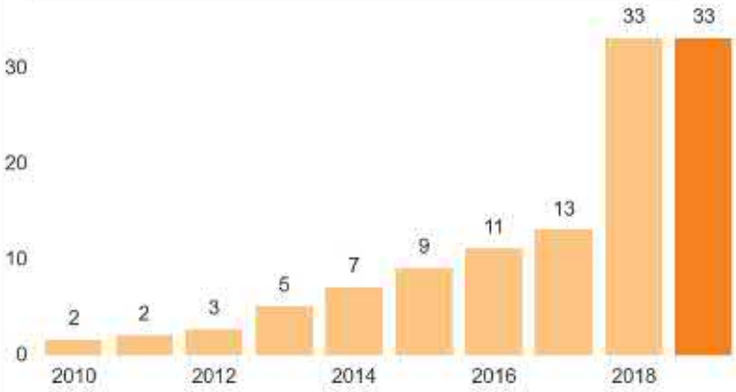


Drivers	Insights
Macro-economy	• The Liberian economy faced challenges in the past two years due to declining mining exports and rising inflation and currency depreciation.[1] • Real GDP contracted by 2.5% in 2019 and is expected to recover in 2020 supported by mining, forestry, and agriculture.[1,8] • Liberia's medium-term agenda focuses on regional integration, attracting private investments, and trade with the Mano River Union countries.[1]
Policy enablers	• The Rural Renewable Energy Agency (RREA) and the Liberia Electricity Law of 2015 provide a foundation to modernize the electricity sector and a framework for private sector participation.[10] • The country has set a target for the total share of RE in the electricity mix (excluding large hydro) of 10% in 2020 and 19% in 2030.[13] • Rural Electrification Program involves 5 key programs including Growing the National Grid (GTG) Program, Decentralized Grids (DG) and Beyond the Grid (Off-Grid solutions) which are composed of 92 projects.[12] • Investments in the energy sector greater than USD 1 million (for foreign-owned businesses) qualify for special tax incentives. The threshold is USD 300,000 for domestic businesses.[7]
Technological Feasibility	• Owing to relatively moderate levels of solar irradiation (GHI) of 4.88 kWh/m^2/day and specific yield 3.89 kWh/ kWp, a moderate technical feasibility is envisaged for solar projects in Liberia.[5] • Both hydro and solar have great potential in the country. Since the weather alters drastically between the dry and rainy seasons, the two sources of energy have their peaks at different times of the year.[11]
Market Maturity	• The Power sector is unbundled with the provision for the private sector to license all the sector activities except system operations.[4] • According to a 2014 household survey, only about 4.5% of Liberians use Liberia Electricity Corporation (LEC) power, 4.9% use a community generator, 4.4% have their own generator, 3.9% use vehicle batteries and 0.8% use other sources of electricity and remaining 81.3% have no access to electricity.[2] • Liberia targets Electrification rate of of10% in 2020, 20% in 2025, and 35% in 2030 for the population outside of Monrovia.[5] • Liberia recorded around 10,000 units Solar Home system sales during Jul-Dec 2018.[9]
Infrastructure	• The grid infrastructure in the country needs strengthening as currently it is unable to meet demand from the consumers in terms of affordability and reliability. • In order to address pressing needs, the government launched its Pro-Poor Agenda for Prosperity and Development, focusing on institutional, and human capacity to transform natural resources into wealth.[1,3] • Expansion of the T&D network, strengthening public utility, and improving the Off-Grid Sector are seen as some areas of focus towards development.[10]
Financing	• The fiscal deficit widened from 4.8% of GDP in FY 2017 to 5.5% in FY 2018, largely due to underperformance of revenue and decline in grants.[14] • External assistance to Liberia is down from USD 624 million (19.3% of GDP) at its peak in FY 2016 to USD 461 million (14.3% of GDP) in FY 2019.[14] • IMF's Financial soundness indicators for Dec 2018 suggest that the banking sector appears adequately capitalized but lending has slowed and risks are emerging.[14]
Energy Imperatives	• The electricity production is projected to expand to nearly 10 times to reach 5,000 MUs by 2030.[15] • 26% of population have access to electricity as on 2018.The Liberia National Investment Commission sees a peak total solar power production of 1400-1700 kWh as a realistic, untapped potential.[6,11] • By 2030, the Government aims to meet an anticipated peak demand of 300 MW serving 1 Million customers.[10] • Liberian SEforALL Action Agenda envisages 68% of the population to be served by around 150 mini-grids in addition to the isolated systems.[15]

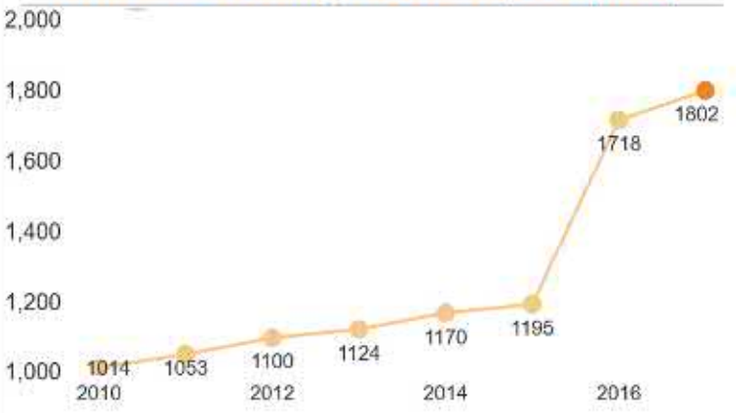


Power Trends

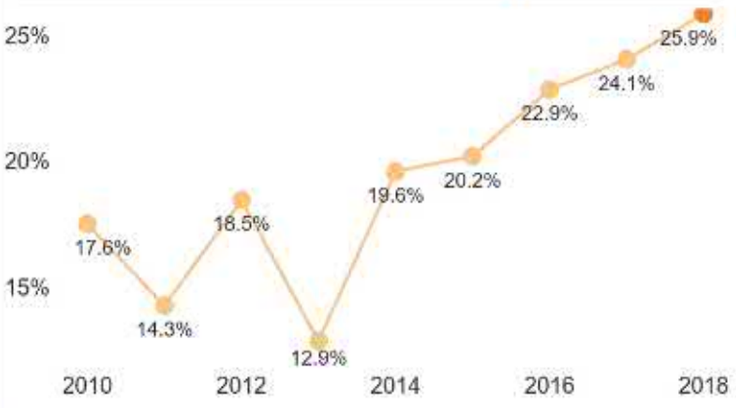
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)

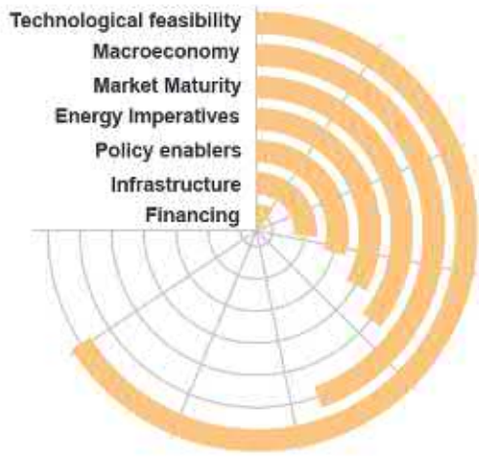


Access to Electricity

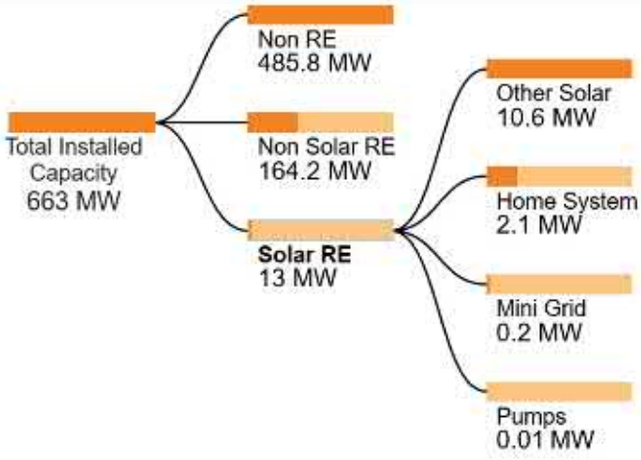


Ease of Doing Solar Classification

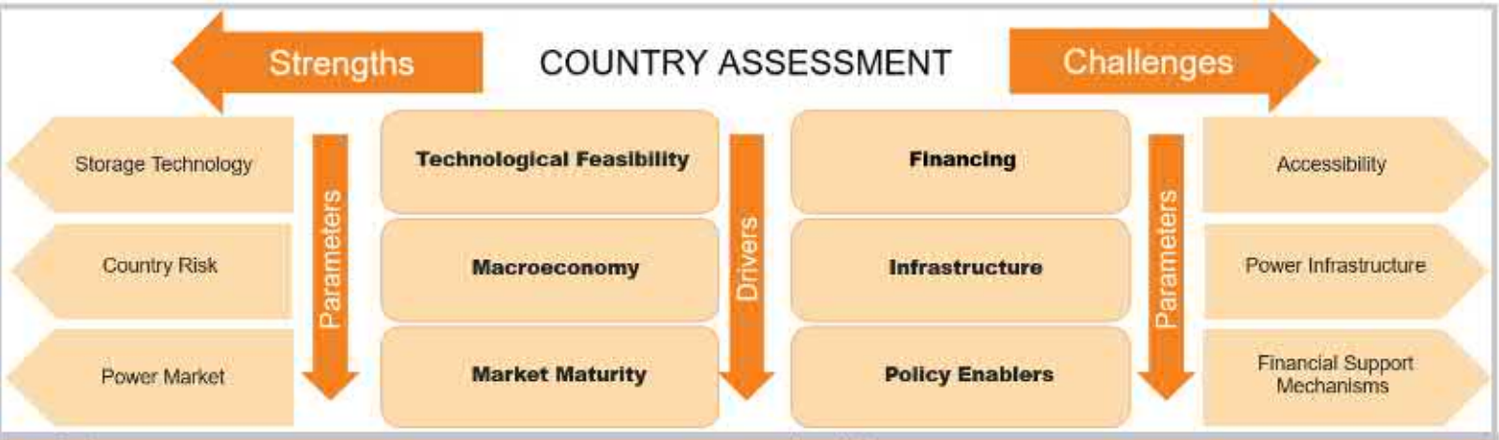
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• The country recorded 4.8% real GDP growth in 2019.[7] • The macroeconomic outlook continues to be favourable. The Plan Emergence Madagascar (PEM) assumes a gradual increase in real GDP growth from 5.5% in 2020 to 7% in 2023.[2] • The country ranked 161st among 190 countries in World Bank's 2019 Doing Business. Madagascar has made noteworthy progress in terms of transparency.[2]
Policy enablers	• The 2015-2030 Energy Policy provides an overview of the country's 2030 energy strategy. In regard to the RE, the Government foresees 85% of generation from clean energy by 2030 (75% hydro power, 5% wind power and 5% solar power).[3] • Doubling the electricity production is one of the key strategies of the country to attain the Sustainable Development Goals (SDG) goals by 2030.[2] • Self-generated excess power can be sold to the grid as long as 60% is consumed on-site with volume of retail not exceeding 40% of annual generation.[3]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.625 kWh/m^2/day and specific yield of 4.76 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Madagascar.[10] • The country enjoys over 2,800 hours of sunlight per year.[9]
Market Maturity	• The 2017 Electricity Code defines the overarching legal framework of the energy sector including tariffs, the role of renewable energy and the mandates of the responsible authorities.[3] • In cases of grid congestion, renewable energy receives priority access to the grid. The Electricity code also allows for tenders in the generation, transmission and distribution sectors.[3] • Though the off-grid solar market is already robust, a vast majority of products sold are not quality-verified.[8]
Infrastructure	• 26% of the population has access to electricity as of 2018.[5] • Close to 80% of the population live in rural areas where absolute poverty is almost twice as high compared to urban areas and only a very small minority of the rural population has access to electricity.[2] • The Government has an ambitious agenda, developed in its Plan Emergence Madagascar, to address developmental issues by increasing economic growth through increased public and private investment, strengthening human capital and improving governance.[2] • New grid connections are expected to reach an additional 600,000 households by 2030 (increasing grid access by 2.4%).[8]
Financing	• Efforts to improve financial inclusion have been recently stepped up in line with the 2018-22 National Strategy for Financial Inclusion. This strategy has three main objectives-financial education and consumer protection, access and use of financial services and strengthening of the legal, regulatory and institutional frameworks.[2] • Banks remain profitable, adequately capitalized well above the 8% capital adequacy ratio and with ample liquidity buffers.[2] • Efforts are ongoing to improve foreign exchange market operations and gradually phase out the surrender requirement on export proceeds.[2]
Energy Imperatives	• Diesel is used prominently for electricity generation resulting in electricity tariffs as high as USD 0.70-0.80 per kWh.[1] • The country has a total installed Solar capacity of 33 MW as of 2019.[4] • Madagascar saw a new surge in Solar products sales during Jul-Dec 2019 reaching over 30,000 units sold. Over half of the volumes sold fall in the multi-light systems category. Anecdotally, companies have reported successful duty- and tax-free imports which may have caused the surge.[6] • The mini-grid sector currently provides access to less than 1% of households and is expected to have a modest impact in the near future.[8]

Malawi

Africa

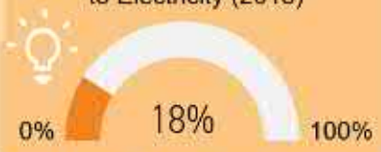
Electricity Consumption in BU (2017)

1.4

Installed Solar Capacity in MW (2019)

22.7

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

18.4

World Bank's Ease of Doing Business Score (2020)

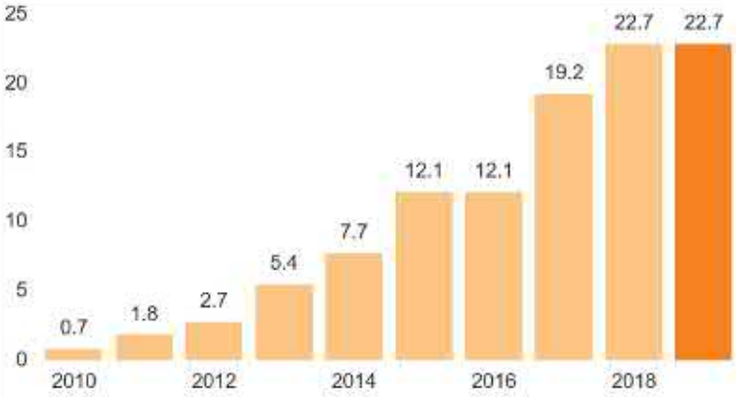
60.90

Solar installed capacity Growth rate (CAGR) for 2015-19

17%

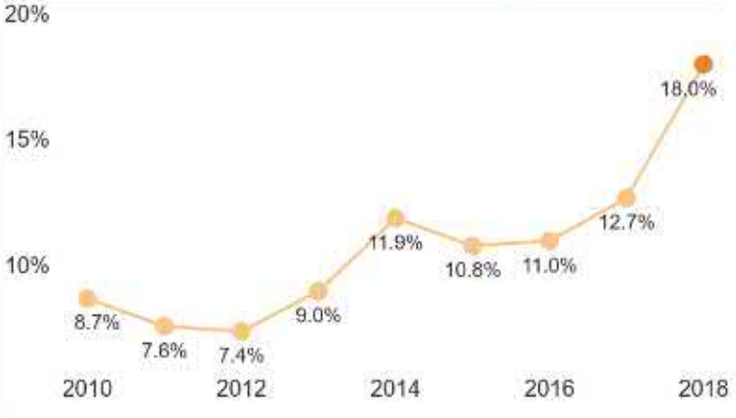
Power Trends

Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)

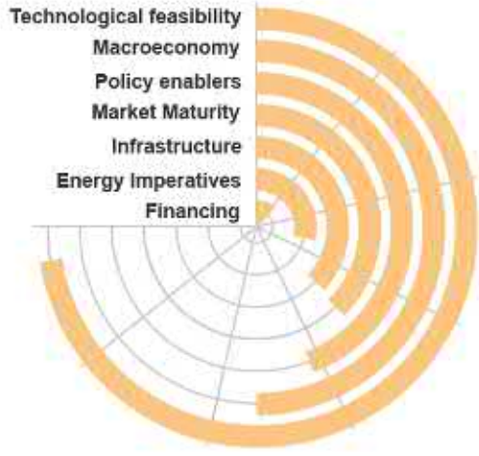
Access to Electricity



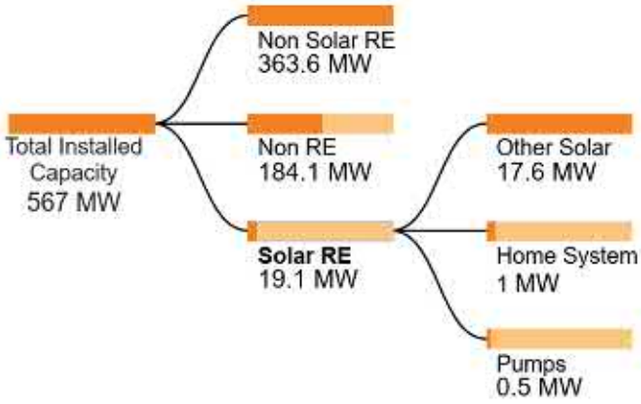
Ease of Doing Solar Classification

Progressive

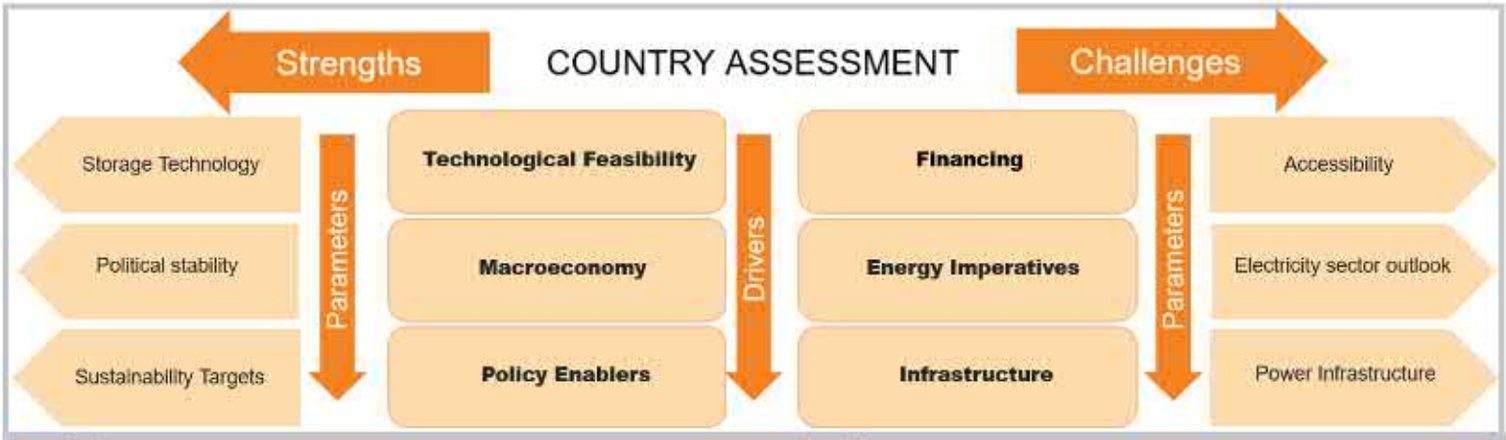
Performance against 7 Drivers



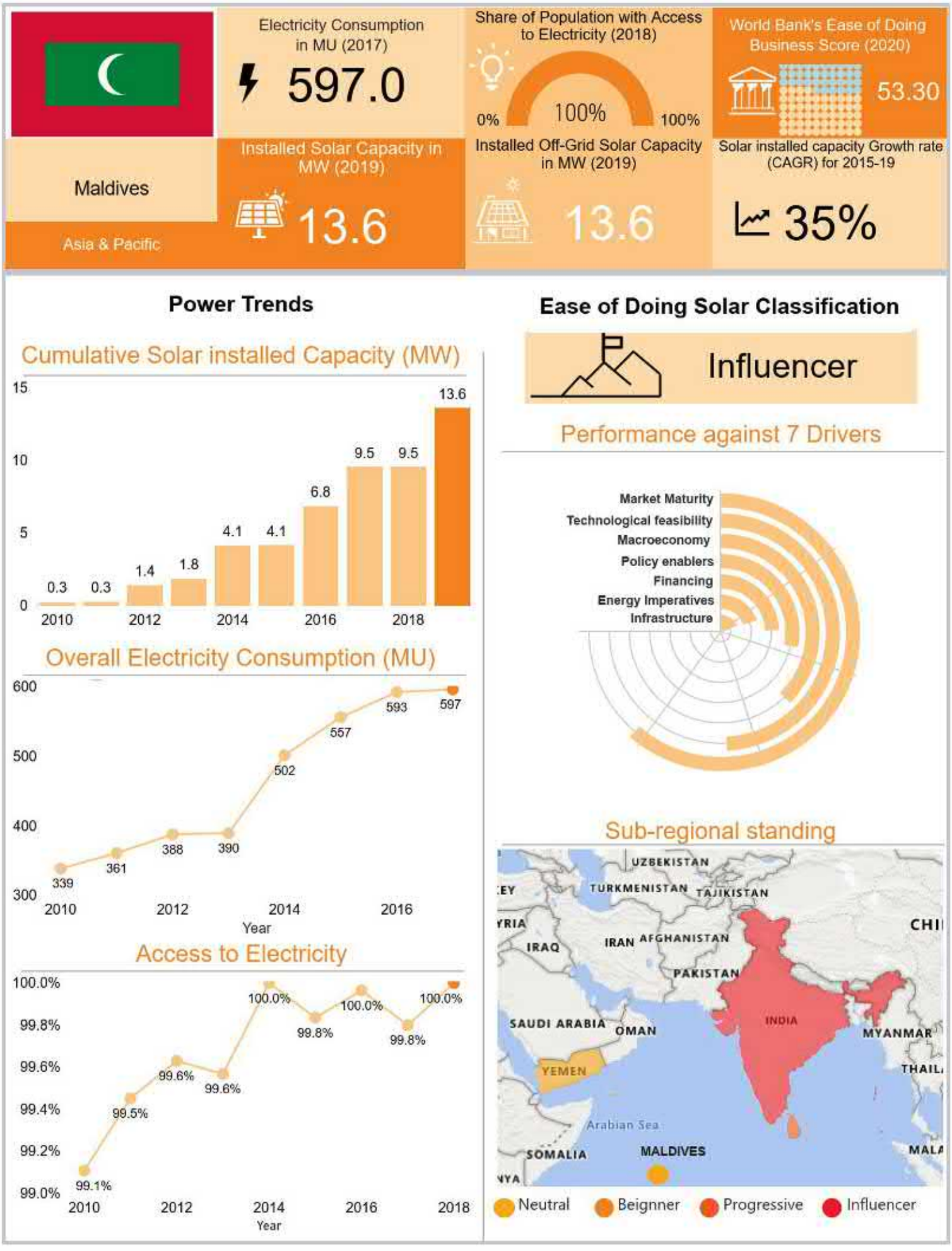
Installed Generation Capacity by Source

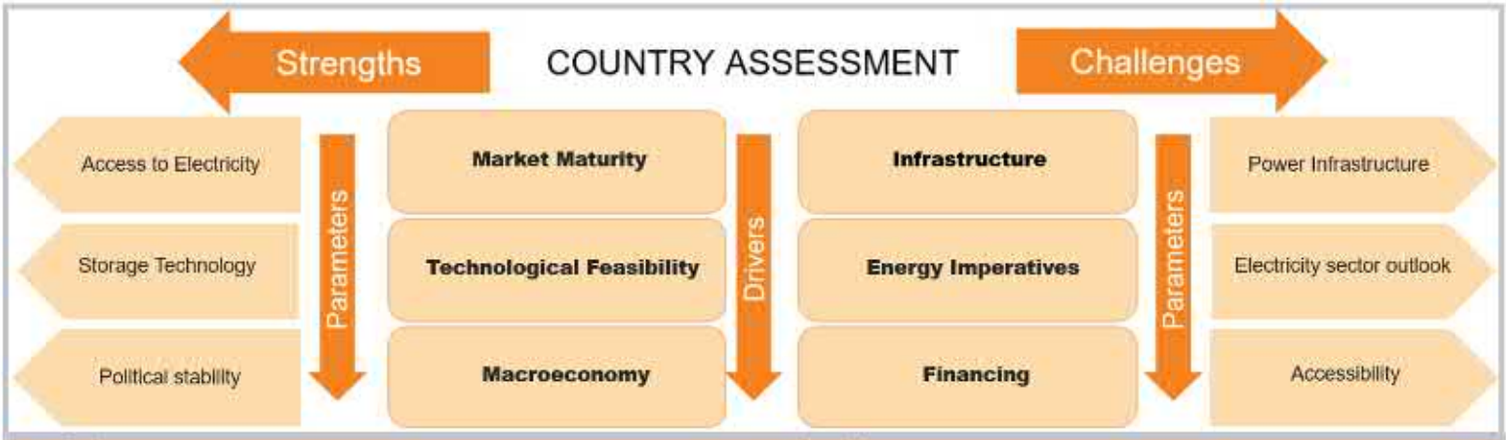


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 4.5% in 2019.[6] • Country's economy grew from 3.2% in 2018 to 4.5% in 2019, driven by reconstruction, electricity generation and agricultural rebound - despite the impact of cyclone Idai.[4] • Inflation is expected to moderate, to around 8.7% in 2020 from 9.1% in 2019, owing to declining food and international fuel prices.[4]
Policy enablers	• In 2012, the regulator introduced feed-in tariff and power purchase agreement documents, with the national utility as the single buyer.[5] • According to the energy mix in the National Energy Policy 2018, the RE targets in the consumption or energy mix are 10.7% by 2020, 16% by 2025,23% by 2030 and 28.8% by 2035. • Goods used in electricity generation and distribution qualify for duty free imports in Malawi.[5] • Formal guidelines and regulations for grid connected solar rooftops and Off-Grid applications are yet to be developed.[1]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.59 kWh/m^2/ day and specific yield 4.60 kWh/kWp, strong technical feasibility is envisaged for solar projects in Malawi.[5] • Malawi has plans to increase their total generation capacity from 364 MW to 5000 MW and is willing to increase the Solar share in the mix.[1]
Market Maturity	• Only 18% (11.4% on-grid & 6.6% off-grid) of the population has access to electricity as of 2018. The Energy Access Project was launched in 2019 with an objective to increase access to electricity. The Government of Malawi intends to increase the access to 100% by 2025.[1] • Malawi is witnessing a strong growth of about ~2.7% per year in its rural population.[3] • Malawi has witnessed highest sales growth of Solar Home Systems in the East Africa region. With 50,000 units sold cumulatively, Malawi registered a 480% increase year on year.[2] • Consumers with a mobile money account increased in Malawi from 4% to 20% between 2015 and 2017, indicating a strong potential for growth of off-grid solar.[3]
Infrastructure	• Most of the large-scale solar plants are built along the riverbank due to favourable terrain.[1] • The government is looking for Independent Power Producers and private sector investors to develop additional generation capacity in a short period of time.[1] • The SEforAll Action Agenda (2017) has set a target of 30% on-grid energy access (and 70% off-grid energy access) to be achieved by connecting 1.51 million homes and businesses by 2030. • According to National Energy Policy 2018, by 2023, 50% of low income households who are already connected to the grid shall be enjoying lifeline tariffs.
Financing	• The banking system remains well resilient, capitalized, liquid and profitable. Non-performing loans declined from 15.7% by end of 2017 to to 4.8% in June 2019.[4] • Most of the domestic banks are compliant with the international IFRS9 standards.[4] • The "Pay as You go" (PAYGo) model is gaining popularity for off-grid solar appliances market reaching a new record of 15,000 Solar Home Systems units sold as of 2019.[2]
Energy Imperatives	• Owing to large share of hydro in the overall capacity, country's generation is largely dependent on the unpredictable rains.[1] • Majority of irrigation is carried out using diesel pumps, while only 3,000 hectares (<1%) have been cultivated by solar pumps. There is a large untapped potential of covering 400,000 hectares. The country has also set a target of covering 220,000 hectares by Solar pumps by 2025.[1] • Currently, there are 4 operational mini-grids in the country. UNDP is collaborating with the Malawi Energy Regulatory Authority (MERA) for tariff setting of more Solar Mini Grids.[1] • The Ministry of Energy has been engaged by Electricity Generation Company of Malawi in its activities to establish 3 Solar mini grids in three years time from 2020.


Maldives
Asia & Pacific
Electricity Consumption in MU (2017)
597.0
Installed Solar Capacity in MW (2019)
13.6
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
13.6
World Bank's Ease of Doing Business Score (2020)
53.30
Solar installed capacity Growth rate (CAGR) for 2015-19
35%
Power Trends
Cumulative Solar installed Capacity (MW)
15
10
5
0
0.3
0.3
1.4
1.8
4.1
4.1
6.8
9.5
9.5
13.6
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
600
500
400
300
339
361
388
390
502
557
593
597
2010
2012
2014
2016
Year
Access to Electricity
100.0%
99.8%
99.6%
99.4%
99.2%
99.0%
99.1%
99.5%
99.6%
99.6%
100.0%
99.8%
100.0%
99.8%
100.0%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Market Maturity
Technological feasibility
Macroeconomy
Policy enablers
Financing
Energy Imperatives
Infrastructure
Sub-regional standing
UZBEKISTAN
TURKMENISTAN
TAJIKISTAN
IRAQ
IRAN
AFGHANISTAN
PAKISTAN
INDIA
SAUDI ARABIA
OMAN
YEMEN
MYANMAR
Arabian Sea
SOMALIA
MALDIVES
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• The country has recorded 5.7% real GDP growth in 2019.[9] • The Government is committed to macroeconomic stability and has an ambitious reform agenda focussed around sustaining growth.[9] • The Maldives Monetary Authority is implementing the 2018-22 Strategic Plan that includes modernization of the monetary policy framework.[2]
Policy enablers	• In its 2015 Nationally Determined Contributions (NDC), Maldives has committed to reduce greenhouse gas emissions by 10% by 2030.[3] • Another key target is to meet 30% peak electricity demand from renewable energy.[8] • Preparing Outer Islands for Sustainable Energy Development (POISED) project aims to help the country cut down its reliance on diesel and concentrate on tapping solar power.[6] • The Maldives Energy Policy and Strategy (2016) recommends the introduction of hybrid systems that use renewable energy.[7] • The power sector regulatory framework may be evaluated and long-term clarity provided on interconnection guidelines, provision for third party sales, tariff structures for Renewable Energy etc.[8]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.593 kWh/m^2/day and specific yield of 4.442 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Maldives.[1] • The Maldives also has an abundance of sunshine and investing in solar PV is highly significant from the perspective of energy security.[7] • As the islands are small one of the challenges is to find appropriate land to install solar panels as they require uninterrupted sunshine.[7]
Market Maturity	• Maldives is one of the first countries in South Asia to achieve 100% access to electricity. All the inhabited islands have been generating electricity from diesel-based grid systems which are expensive and unreliable.[6] • All power systems and electrical installations are required to be complied with the regulations of Maldives Electricity Authority.[4] • The Asian Development Bank and the Environment Ministry have started to implement solar battery-diesel hybrid systems in 48 islands out of the 160 inhabited islands of the nation.[6]
Infrastructure	• About 150 outer islands are provided with electricity from community owned power generation and distributions systems.[5] • The country's Scaling-up Renewable Energy Program (SREP) Investment Plan's main objective is to transform the sector through renewable deployment and envisages investments of US$ 139 million.[8] • Floating PV systems are being explored which will avoid the land constraints and can be connected to the electricity grid using undersea cables.[8]
Financing	• Credit, to the private sector, has averaged 11.8% over the past three years bringing private sector credit to GDP ratio to 28.7%, still well below its peers in 2018.[2] • The POISED project was approved in 2014 and has been co-financed by US$ 55 million in grants from ADB and US$ 50 million loan from the European Investment Bank.[6] • Considerable progress has been achieved in improving financial inclusion following an upgrade of the payment system and financial literacy.[2]
Energy Imperatives	• Diesel has been the main fuel source to supply electricity in all the islands and is the major contributor to the country's overall carbon footprint.[3] • Generating electricity from diesel is costly and it requires subsidies of over US$ 40 million a year.6 • 7.5 MW of solar projects, 5.6 MWh of battery storage systems and 11.6 MW of energy-efficient diesel systems have already been installed as part of the POISED project.[6] • The Ministry of Environment and Energy estimated that by utilizing the rooftop space of buildings, the country could fulfil as much as 30% to 80% of the electricity demand on islands.[7]

Mali

Africa

Electricity Consumption in BU (2017)

1.4

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

52.90

Installed Solar Capacity in MW (2019)

19.6

Installed Off-Grid Solar Capacity in MW (2019)

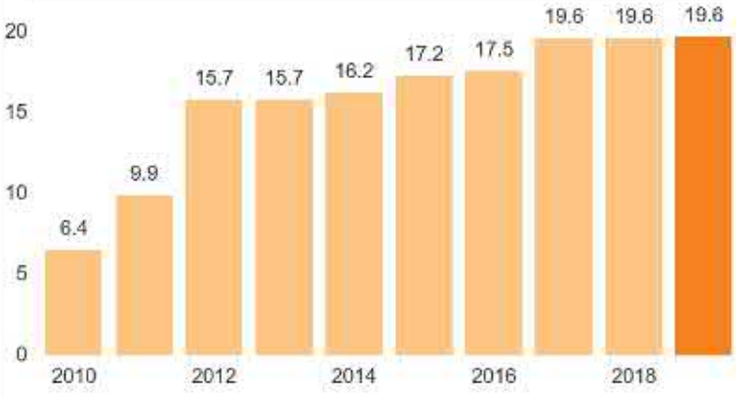
19.6

Solar installed capacity Growth rate (CAGR) for 2015-19

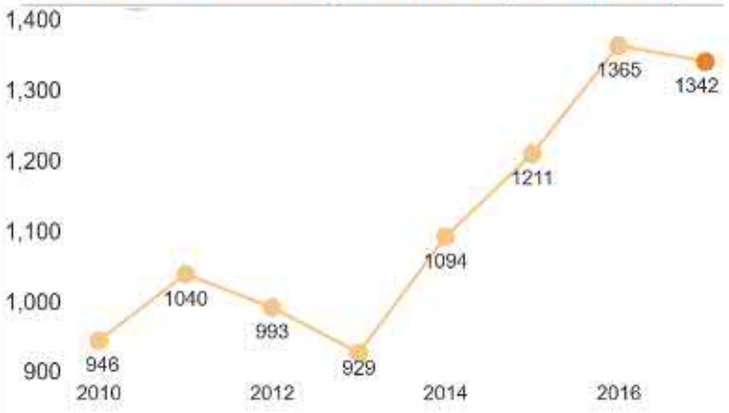
3%

Power Trends

Cumulative Solar installed Capacity (MW)

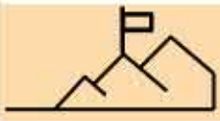


Overall Electricity Consumption (MU)



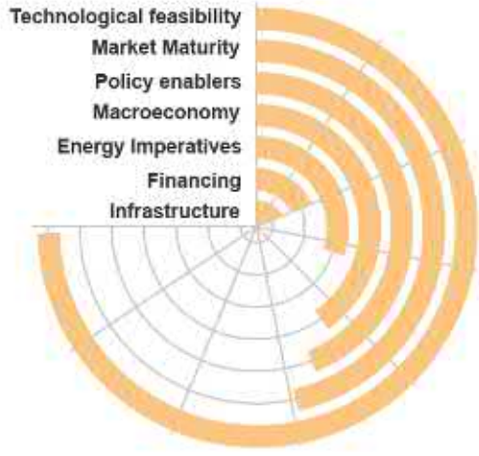
Access to Electricity

Ease of Doing Solar Classification

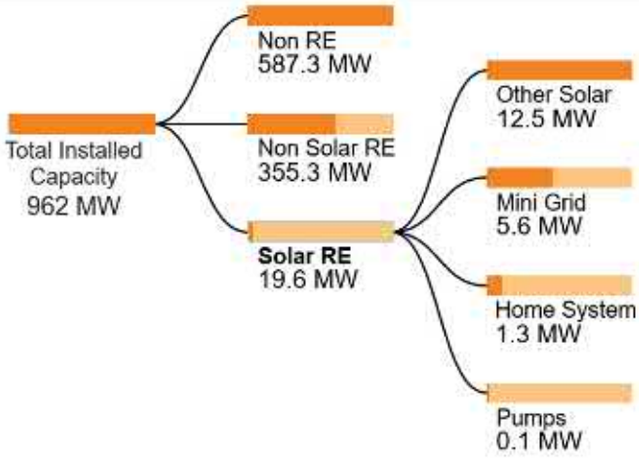


Influencer

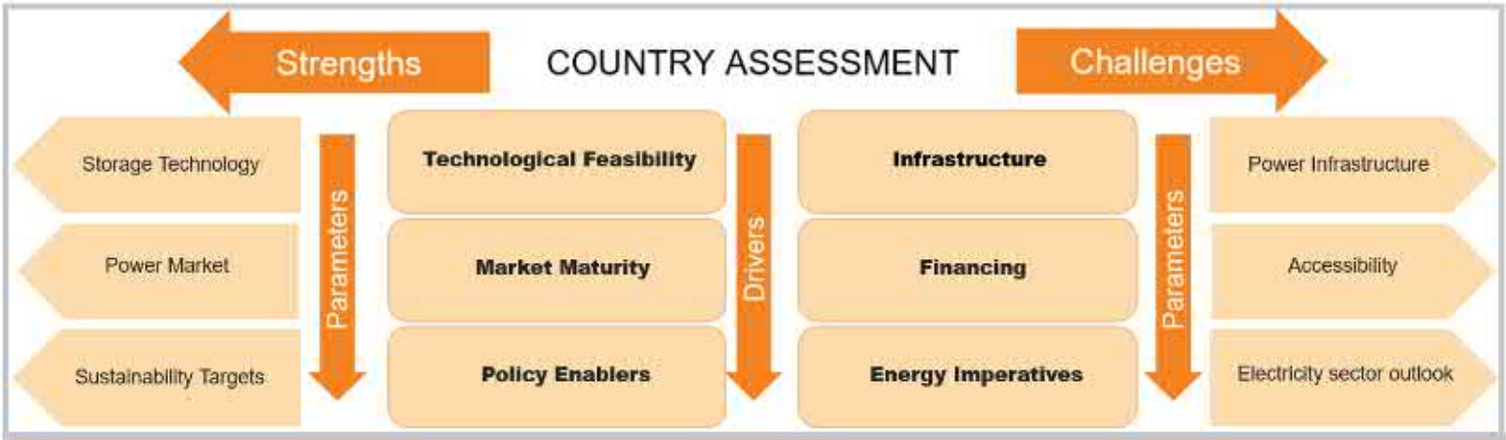
Performance against 7 Drivers



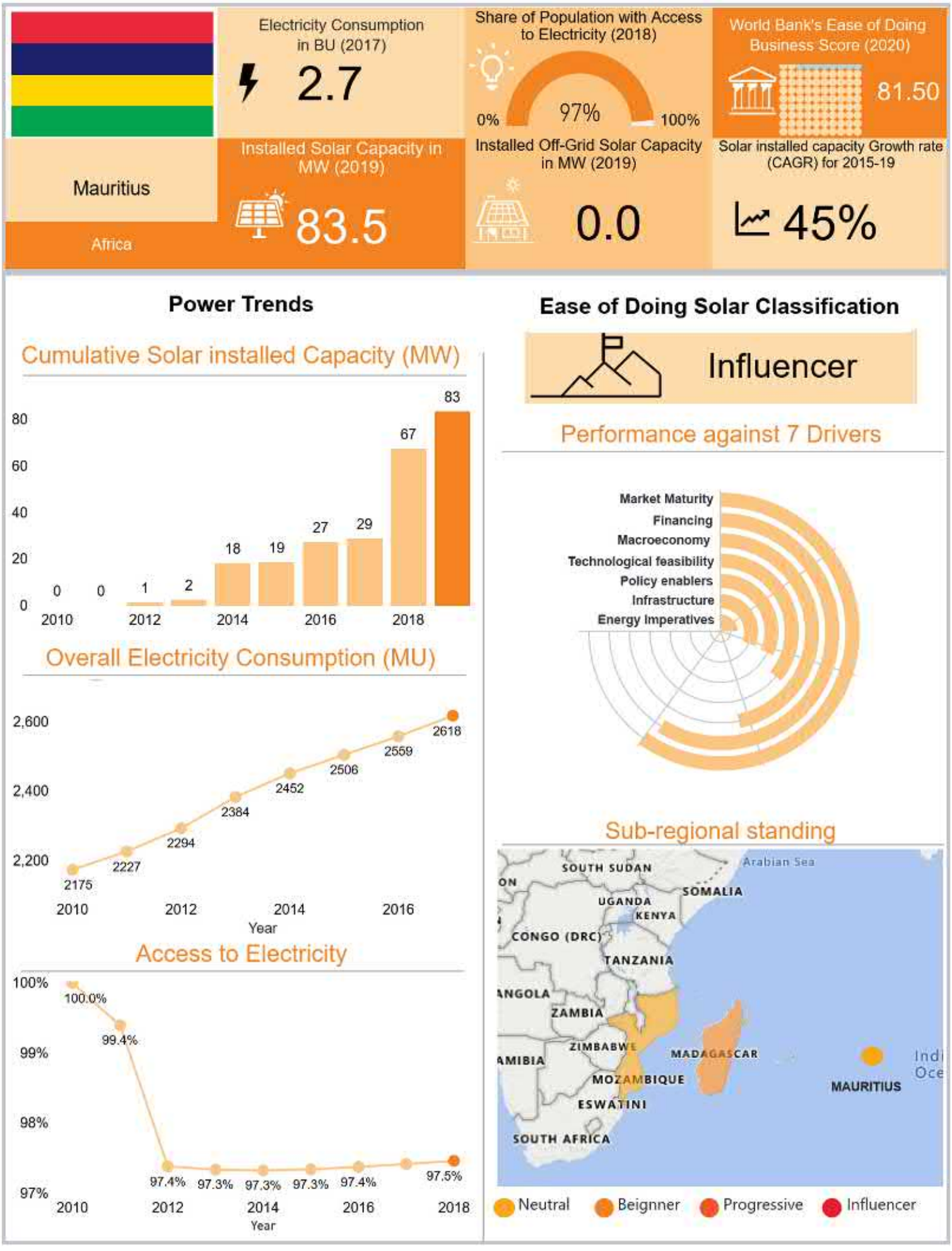
Installed Generation Capacity by Source

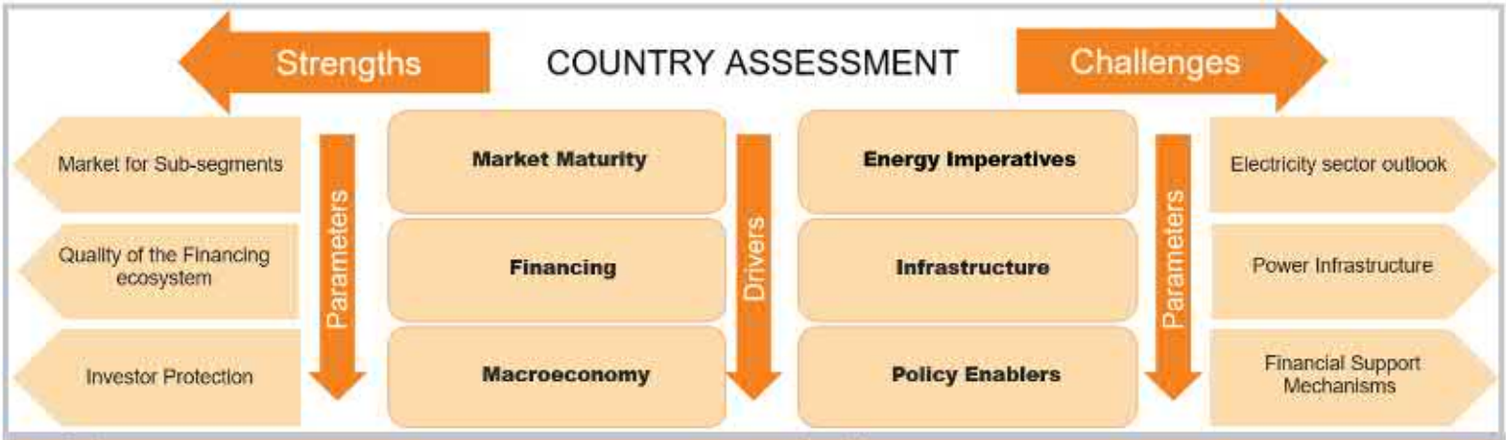


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Despite a negative GDP growth after 2012 crisis, Mali has shown signs of bouncing back with real GDP growth rate at 5% in 2019. It is further expected to grow at 4.9% in 2020 and 2021 by improving the political and security situation.[1] • GDP per capita (at current prices) of Mali is USD 890.7 in 2019.[7] • Mali has recorded a budget deficit of 3.1% of GDP and a 0.4% inflation in 2019, with public debt of 35.5% of the GDP at the end of 2018.[1]
Policy enablers	• In 2003, Mali started Programme for Renewable Energy for the Advancement of Women (PENRAF) to promote renewable sources of energy through installing solar lighting, drying, hot water systems and by introducing technologies such as renewable energy-powered water pumping and solar cooking.[4] • "Rural Electrification by Solar Energy" policy, developed by World Bank, is increasing solar penetration in Mali. It is estimated that energy production from renewable will reach 10% by 2020, and 15% by 2025 in rural areas.[4] • The goal of National Renewable Energy Action Plan (NREAP) is to increase the renewable energy share in total primary energy supply from less than 1% in 2002 to 15% in 2020.[4] • Renewable Energy equipment are exempted from the import levy of VAT, fees and taxes.[4]
Technological Feasibility	• Solar PV for water pumping, lighting, refrigeration and telecommunications systems, solar water heaters and food dryers are proven technologies in current state of Mali's renewable energy sector.[5] • Owing to relatively high average solar irradiation level (GHI) of 6.02 kWh/m^2/day and specific yield 4.68 kWh/kWp, strong technical feasibility is envisaged for solar projects in Mali.[10]
Market Maturity	• The nationwide access to electricity was recorded at 50.9% in 2018, which is five times higher than that in 2001.[3,9] • Of the total installed capacity of 740 MW in 2018, Mali's Solar installed capacity is 20 MW.[6] • Under Paris agreement, in the Nationally Determined Contributions (NDC), Mali has committed to reduce its GHG emissions by 35% by 2030 compared to the 1990 levels.[3]
Infrastructure	• The electricity supply shortage is approximately 140 MW indicating a critical infrastructure deficit in the country.[1] • Solar production is expected to ramp up and account for around 4% of total energy generated by 2020.[2] • Mali's off-grid renewables target for Mini-grids is to reach approximately 8 MW by 2020.[3] • Mali's target electricity access to rural population, through renewables (mini-grid and isolated systems), is set to 36.9% by 2020 and 66.6% by 2030.[3]
Financing	• Mali has adopted a National Strategic Framework for Economic Revitalization and Sustainable Development 2019–23 to implement the Plan for Public Finance Management Reform 2017–21.[1] • Private and Public sector investments, as a % of GDP, are low at 9.5% and 8.7% respectively indicating an under-industrialized economy.[1] • Government of Mali (GoM) has allocated budget of USD 6.7 million, in 2014, for renewable energy sector. This number has increased to USD 21.2 million in 2018 and is expected to touch USD 70 million by 2020.[3]
Energy Imperatives	• Mali is a member of the West African Economic Monetary Union (UEMOA) whose objective is to attain a target of ~82% of electricity from renewables by 2030.[3] • UEMOA has carried out a feasibility study, for large solar power plants in the region, identifying five sites including Mali. The total capacity of 574 MW is planned by 2030.[3] • As of 2018, 25.4% of rural population has access to electricity.[8]


Mauritius
Africa
Electricity Consumption in BU (2017)
2.7
Installed Solar Capacity in MW (2019)
83.5
Share of Population with Access to Electricity (2018)
0%
97%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.0
World Bank's Ease of Doing Business Score (2020)
81.50
Solar installed capacity Growth rate (CAGR) for 2015-19
45%
Power Trends
Cumulative Solar installed Capacity (MW)
0
0
1
2
18
19
27
29
67
83
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
2175
2227
2294
2384
2452
2506
2559
2618
Year
Access to Electricity
100.0%
99.4%
97.4%
97.3%
97.3%
97.3%
97.4%
97.5%
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Market Maturity
Financing
Macroeconomy
Technological feasibility
Policy enablers
Infrastructure
Energy Imperatives
Sub-regional standing
Arabian Sea
SOUTH SUDAN
SOMALIA
UGANDA
KENYA
CONGO (DRC)
TANZANIA
ZAMBIA
ZIMBABWE
MADAGASCAR
MOZAMBIQUE
MAURITIUS
ESWATINI
SOUTH AFRICA
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• Mauritius is a small open economy that has shown remarkable resilience and agility over the years to become an upper-middle income country.[2] • The economy continues to grow at a steady pace, benefiting from the services sector and a strong domestic demand. Real GDP expanded by 3.5% in 2019.[1,2] • As the revised tax treaty with India comes into effect, the business sector is transitioning with efforts underway to move into high value-added services and tap into other markets.[2] • Mauritius is also becoming a gateway for investment flows into Africa.[2]
Policy enablers	• The Long-Term Energy Strategy (LTES) plan has recently been revised where the government brought forward the target to achieve 40% RE by the year 2030 from the current level of 22%.[3,4] • In the 2016 budget, the government decided to remove all value-added taxes on PV inverters and batteries to increase the interest of investors and the people in solar energy.[3] • The Small-Scale Distributed Generation scheme launched by the Central Electricity Board (CEB) in 2010 allowed Independent Power Producers (IPPs) to generate energy on their own through sustainable sources and export the excess to the grid through a net metering system.[3] • Medium-Scale Distributed Generation Scheme for a maximum of 10 MW would also be introduced to enable beneficiaries to produce electricity for their consumption and sell the excess to CEB.[4]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation (GHI) of 5.098 kWh/m^2/day and specific yield of 4.20 kWh/kWp, a moderate technical feasibility is envisaged for solar projects in Mauritius.[5] • Much of Mauritius receives almost year-round, intensive sunlight that makes solar energy an attractive energy option.[4]
Market Maturity	• In collaboration with the Government, the Central Electricity Board (CEB) devised an integrated electricity plan (IEP) that aims to balance the demand and supply of energy.[3] • The share of the CEB's production for 2018 was 43% while the remaining 57% was purchased from IPPs.[3] • Mauritius Renewable Energy Agency (MARENA) is in the process of establishing a "National Grid Code and Development of Standards, Funding and Incentive Strategy for Renewable Energy in Mauritius" in 2020.[4]
Infrastructure	• The government seeks international competitive bidding for most of its power projects and favours joint ventures between the local private sector and international firms.[4] • Multiple projects were announced along with the 2020 Budget - 2 MW floating solar PV plant at Tamarind reservoir, capacity augmentation of the Henrietta solar farm from 2 MW to 10 MW, deployment of 1,000 solar panels on houses of low-income families and commissioning a battery energy storage system of 14 MW. This is a strong indication of country's commitment towards RE deployment.[4]
Financing	• A prudent stance by financial services firms and supervisory agencies has helped maintain stability.[2] • Bank lending has continued to recover amid improving financial conditions. Credit to the private sector grew at about 4% in 2017 after registering negative growth in 2016. Private sector credit growth has remained robust in 2018.[2] • Bank capital is well above the regulatory minimum and banks meet enhanced liquidity requirements.[2] • The non-performing loan (NPL) ratio has declined from 7.8% at end-2016 to 6.4% at end-2018 Q3.[2]
Energy Imperatives	• Mauritius heavily depends on imported petroleum products to meet its energy requirements. The country does not have fossil fuel reserves but has significant levels of renewable resources.[3] • As of mid-2020, the total capacity committed for solar stood at 125.5 MWdc, of which 105 MWdc is owned by the private sector.[4] • Significant progress is substantiated by the 4.0% increase in electricity generated from RE sources from 624 MU to 649 MU for the period 2017–2018.[3] • Home Solar Project launched in 2018 included installation of 10,000 rooftop solar panels.[3]

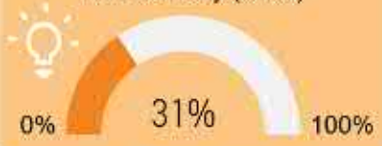
Mozambique

Africa

Electricity Consumption in BU (2017)

14.5

Share of Population with Access to Electricity (2018)



World Bank's Ease of Doing Business Score (2020)

55.00

Installed Solar Capacity in MW (2019)

55.0

Installed Off-Grid Solar Capacity in MW (2019)

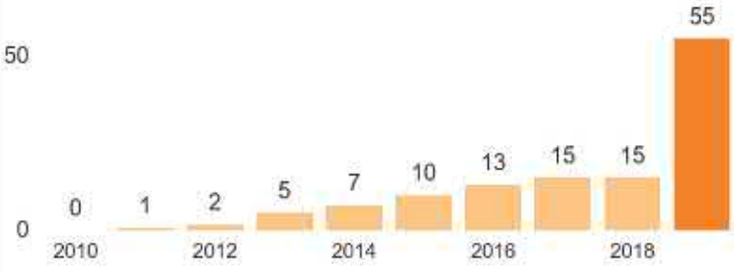
15.0

Solar installed capacity Growth rate (CAGR) for 2015-19

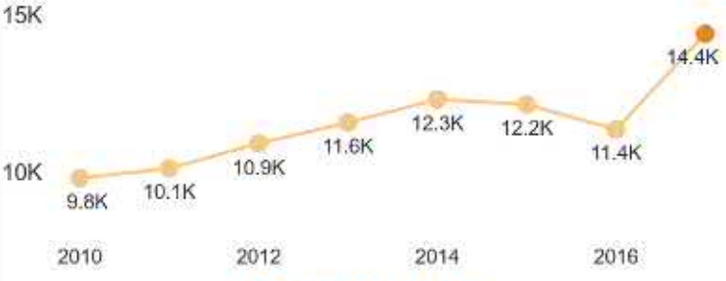
53%

Power Trends

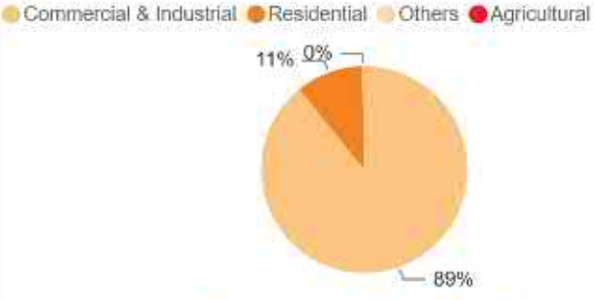
Cumulative Solar installed Capacity (MW)



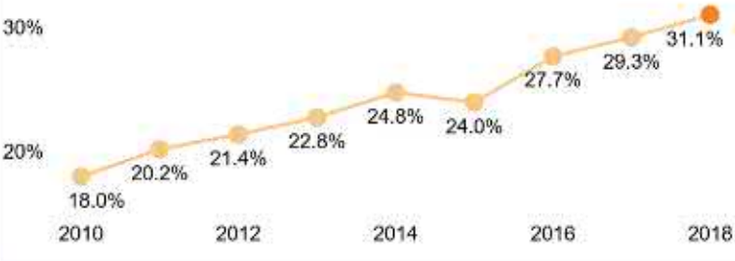
Overall Electricity Consumption (MU)



Consumer Mix

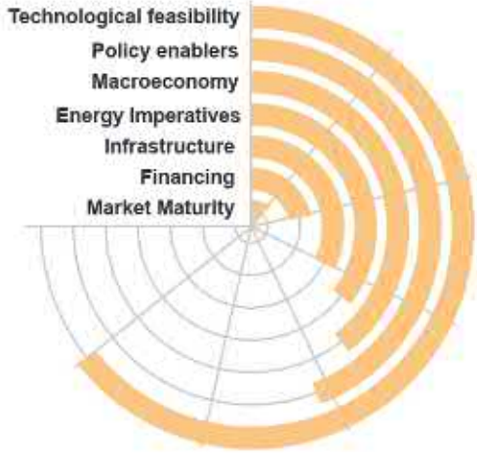


Access to Electricity

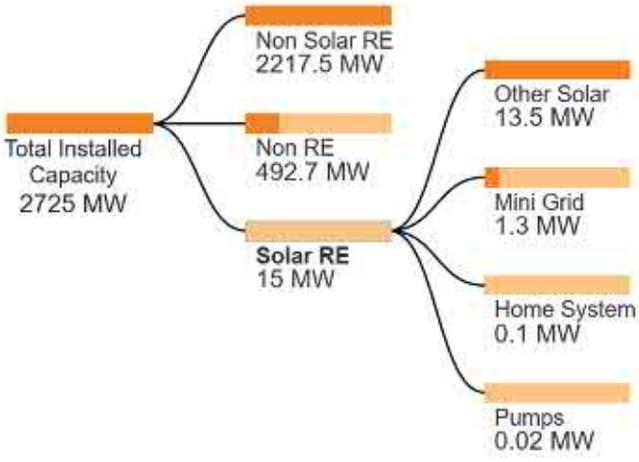


Ease of Doing Solar Classification

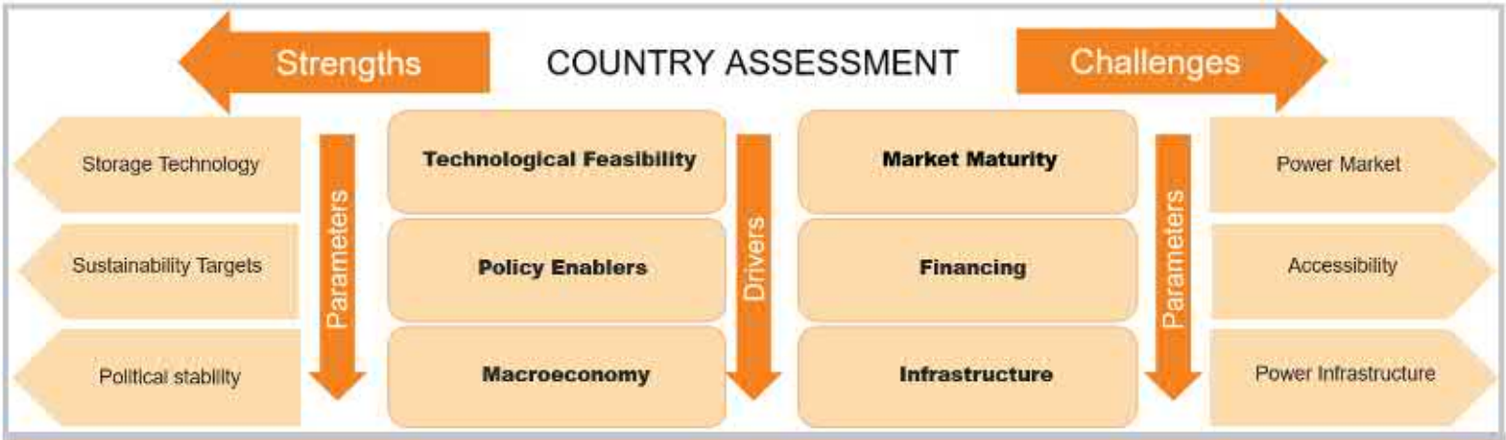
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• The country recorded 2.2% real GDP growth during 2019.[7] • Fuel and wheat subsidies were eliminated, a fuel price adjustment mechanism was adopted and electricity tariffs were increased in 2017-18.[3] • Inflation declined from a peak of 26.5% in November 2016 to 3.5% in April 2019 reflecting a disciplined and effective monetary policy stance and subdued food prices.[3]
Policy enablers	• The National Energy Fund's mandate is to support off-grid electrification and as a part of the 15-year strategy, the fund intends to provide solar power to 2.1 million people in rural areas.[4] • In 2018, the Government launched the National Energy for All Programme to focus on grid expansion and highlight the role of off-grid solar, renewable energy-based solutions.[1] • In 2014, a Decree was approved creating a feed-in tariff regime for RE.
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation level (GHI) of 5.382 kWh/m^2/day and specific yield of 4.44 kWh/kWp, a moderate technical feasibility is envisaged for solar projects in Mozambique.[6] • The country has about 23 GW solar potential, out of which 2.7 GW could be easily harnessed.[8]
Market Maturity	• 31% of the population has access to electricity in the country due to the limited transmission and distribution networks and less favourable market conditions for the new generation.[2,5] • The Government aims to electrify all households by 2030.[2] • During Jul-Dec 2019, Mozambique recorded 7,000 units of Solar Products sales.[10] • 33% of the population are classified above 'poor' income. This may pose a challenge in meeting the regular payments required from the PAYGo credit service in the country.[11] • Private sector off-grid electrification initiatives are scarce but emerging with an identified market potential of approximately 4 million households.[9]
Infrastructure	• As of 2016, Fundo de Energia's (FUNAE) role has shifted from a fund to an implementation agency with the aim of promoting private sector investment in off-grid generation.[8] • Through U.S. Trade and Development Agency (USTDA), a grant for a 100 MW solar PV plant at the Nacala International Airport is approved. It is expected to be developed in increments of 20-40 MW and includes an associated energy storage facility.[2]
Financing	• The banking system remains stable with new regulations, that increased capital adequacy ratios and established minimum liquidity requirements, in place since 2017.[3] • Since its creation, Fundo de Energia's (FUNAE) has successfully funded and implemented off-grid systems around Mozambique, which have reportedly provided some form of electricity access to approximately 5 million population.[6] • A comprehensive debt strategy aimed at bringing down debt levels to moderate risk of distress over the medium term is being adopted.[3]
Energy Imperatives	• At 187 GW, Mozambique has the largest power generation potential in Southern Africa from untapped coal, hydro, gas, wind, and solar resources.[2] • Hydropower accounts for about 81% of installed capacity. However, natural gas and renewable energy sources occupy a growing share of energy mix.[2] • The electricity market is dominated by hydropower generation capacity, largely utilized for exports to neighbouring countries via the Southern African Power Pool (SAPP).[9] • The industrial and commercial segments are expected to drive demand growth as residential consumers struggle with the existing highly subsidized tariffs.[2]

Myanmar

Asia & Pacific

Electricity Consumption in BU (2017)

16.8

Installed Solar Capacity in MW (2019)

88.0

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

48.0

World Bank's Ease of Doing Business Score (2020)

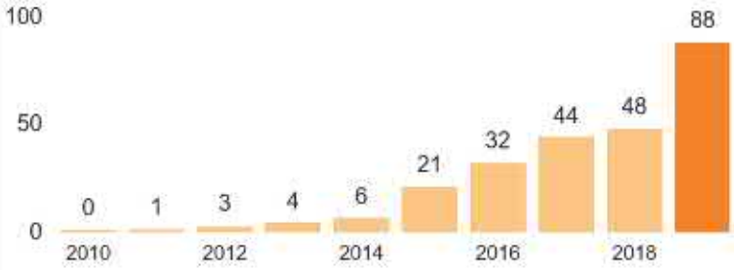
46.80

Solar installed capacity Growth rate (CAGR) for 2015-19

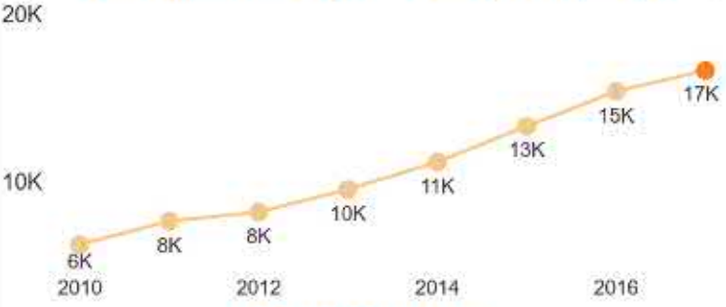
43%

Power Trends

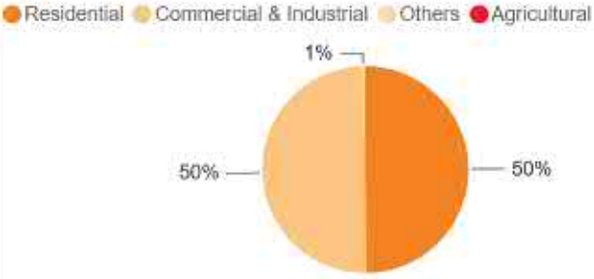
Cumulative Solar installed Capacity (MW)



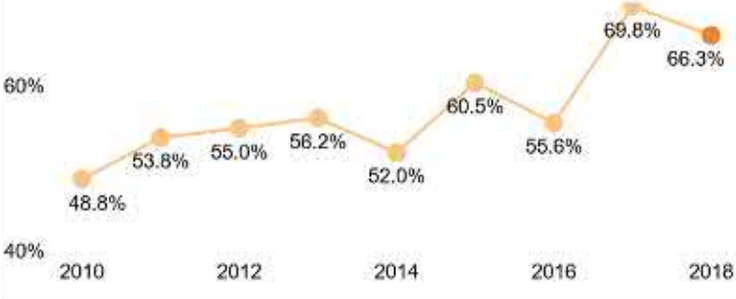
Overall Electricity Consumption (MU)



Consumer Mix



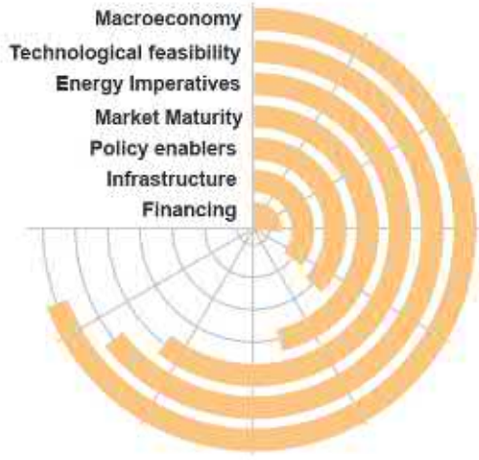
Access to Electricity



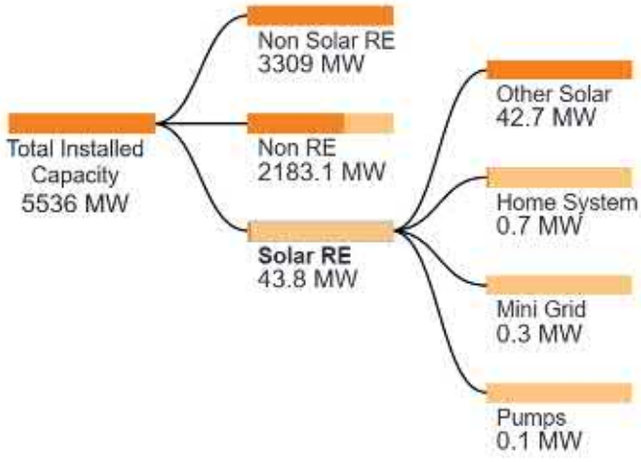
Ease of Doing Solar Classification

Potential

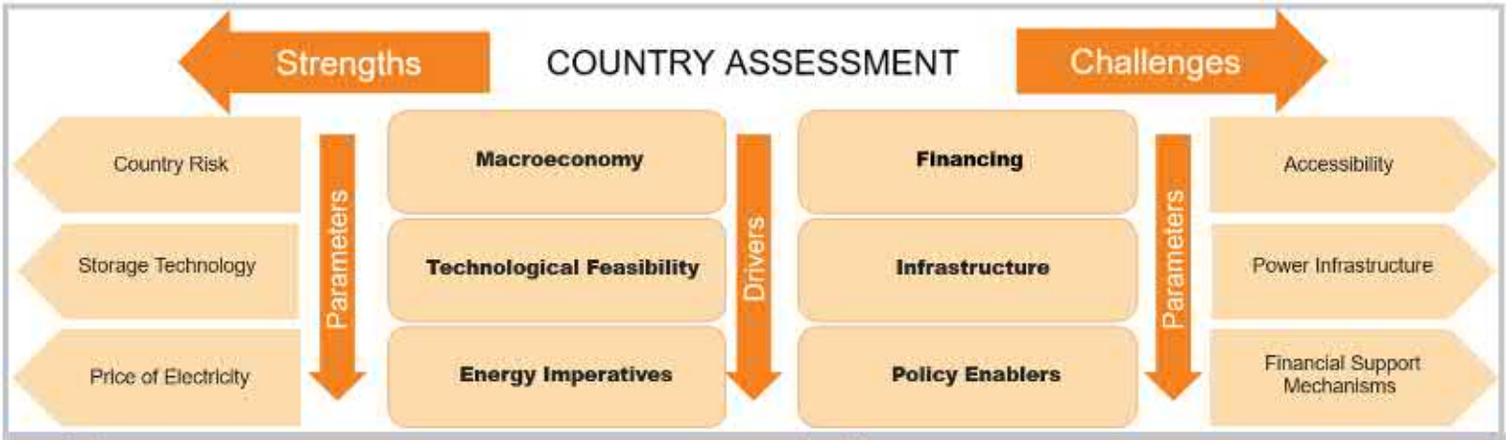
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• For 2019, Myanmar recorded a GDP (Real) growth of 6.5% supported by higher government spending and private investment, as well as continued growth in the manufacturing and the tourism sectors.[7] • Inflation has recently spiked mainly due to supply side factors, including doubling of electricity tariff.[2] • The revenue-to-GDP ratio is on a declining trend, partly due to declining natural resource revenue and stagnant tax revenues.[2]
Policy enablers	• The Government of Myanmar aims to electrify all households, by 2030, through grid-connected and off-grid power system development.[5] • The country permits foreign investment in power projects of any size with a maximum ownership of 80%. Previously, the Governing law stated that power projects under 10MW may be owned only by locals.[5] • The National Tax Law enacted in January 2016 exempts solar panels, solar charger controllers and solar inverters from commercial taxation.[5] • Myanmar offers many fiscal incentives such as solar module subsidies and duty exemptions on equipment related to standalone solar systems.[4]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation (GHI) of 4.69 kWh/m^2/day and specific yield 4.01 kWh/ kWp, moderate technical feasibility is envisaged for solar projects in Myanmar.[6] • The highest solar radiation levels are found in the Central Dry Zone of the country, which coincides with the most densely populated areas.[1] • The Asian Development Bank has estimated a Solar technical potential of 40 BUs per year. Few other studies have indicated that about 60% of the country is suitable for solar PV generation.[1] Solar energy can complement the hydropower generation to address energy crisis during the dry season.[1]
Market Maturity	• In March 2016, Myanmar Electric Power Enterprise signed a 22-year power purchase agreement, for 225MW of generating capacity, with a Singapore based developer. It was the first PPA via a competitive bid.[5] • Myanmar is one of the largest markets for Solar Home Systems (SHS) in the region. However, the country saw a 60% decrease in SHS sales. PAYGo models continues to be stable whereas cash sales is decreasing sharply due to the lack of Government tenders.[3] • Myanmar also received high scores in the overall PAYGo MAI index, indicating relatively strong performance during 2019.[4]
Infrastructure	• The World Bank has recently estimated that USD 2 billion investment per year will be needed to cater to the growing energy demand in the next 10 years.[1]
Financing	• Systemic risks in the banking system continue to be elevated, raising the urgency for comprehensive financial sector reforms and contingency planning to preserve financial stability.[2] • Credit growth to the private sector continued to slow amid private bank deleveraging but is still robust at 16% by the end of Sept 2019, down from 21% a year earlier.[2] • Fiscal policy is expected to continue to provide a modest stimulus in the near-term, though revenue mobilization will be critical to scale up SDG-related spending in a sustainable way.[2]
Energy Imperatives	• Ministry of Energy envisions generation capacity rising from 4.4 GW to 15 GW by 2030, of which 50% would be hydro, 28% oil and gas combustion turbine, 20% coal and 2% solar and wind.[6] • Total energy consumption has been rising rapidly at a rate of 8% per year on average since 2013, reaching 24 Mtoe in 2018.[8] • Electricity demand is expected to grow rapidly, increasing the need for emergency power dispatch. • The electricity tariffs are highly subsidized for households. In 2018, the price of electricity was 2.8 US cents per kWh for households and 7.0 US cents per kWh for industrial customers.[8] • Utility-scale solar is almost non-existent with only a few rooftop facilities in factories and large buildings.[1] • PAYGo sales have grown from 4,000 units in H2 2017 to 27,000 in H2 2018.[4]

Namibia

Africa

Electricity Consumption in BU (2017)

4.1

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

61.40

Installed Solar Capacity in MW (2019)

135.0

Installed Off-Grid Solar Capacity in MW (2019)

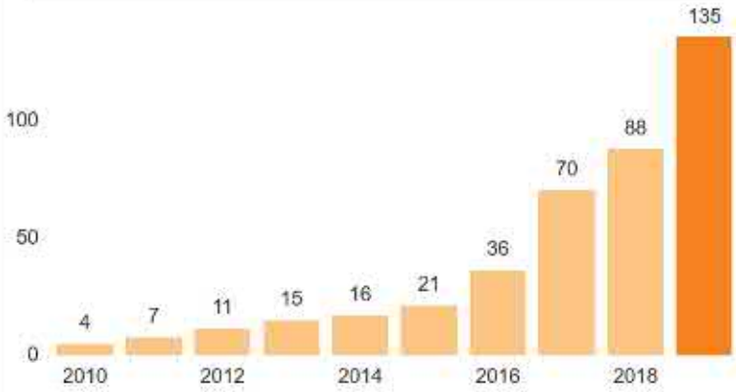
22.0

Solar installed capacity Growth rate (CAGR) for 2015-19

59%

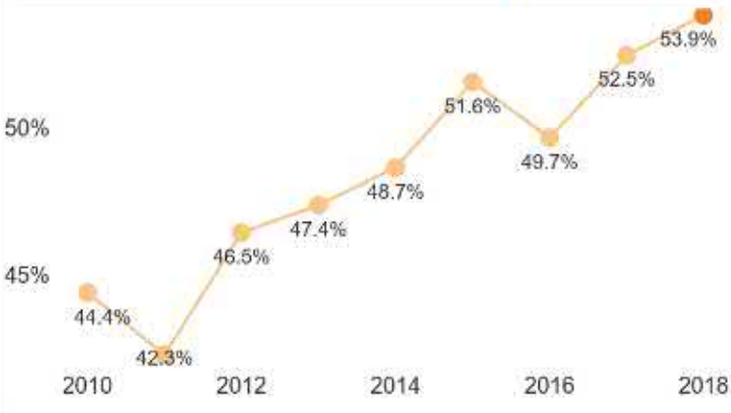
Power Trends

Cumulative Solar installed Capacity (MW)

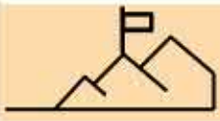


Overall Electricity Consumption (MU)

Access to Electricity

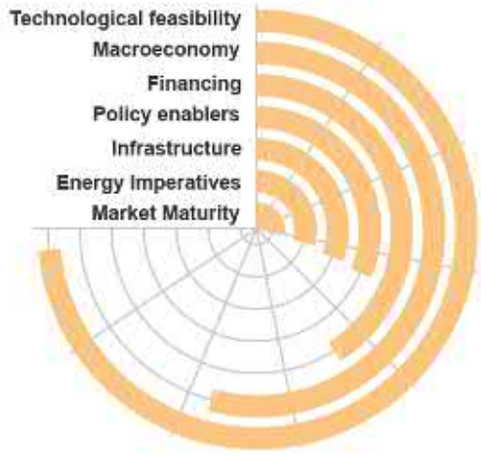


Ease of Doing Solar Classification

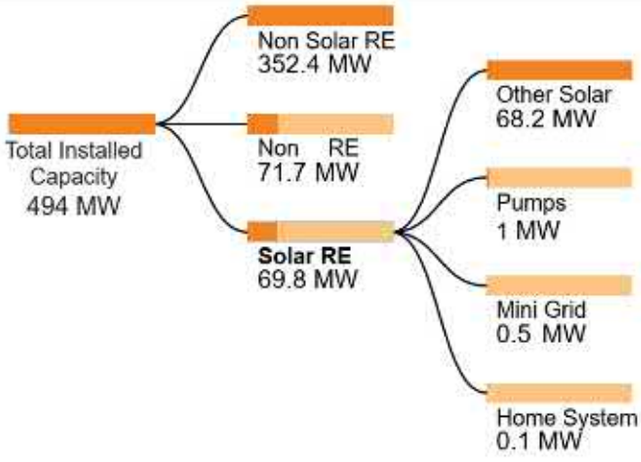


Influencer

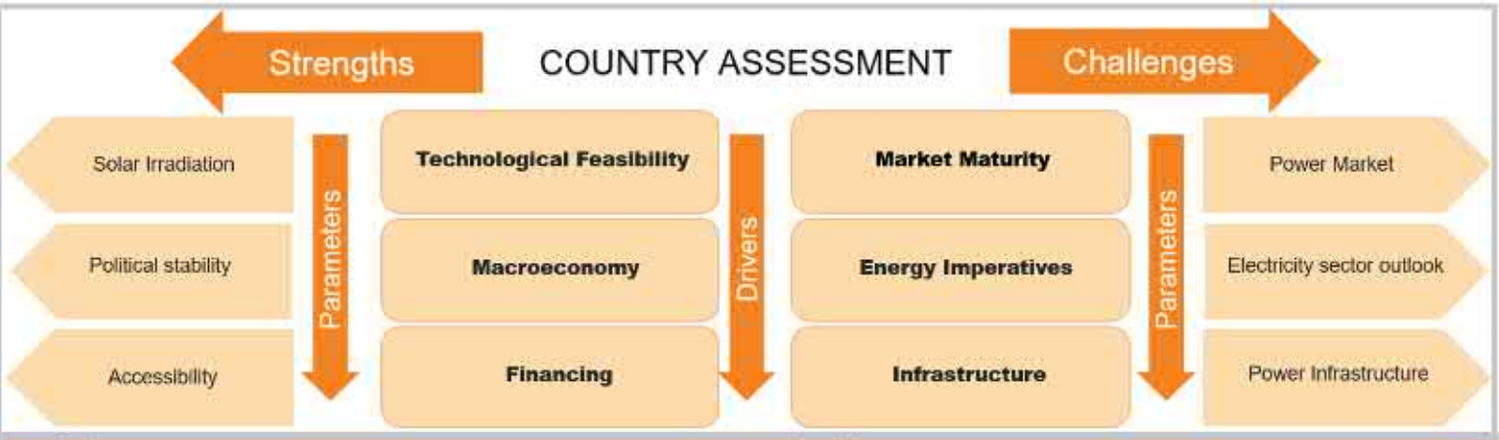
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Real GDP contracted by 1.4% in 2019 but is expected to turn positive during 2020 as per IMF as the impact of last year droughts are fading and production is picking up pace in the mining sector.[2,3] • Namibia is a mineral rich and an upper-middle-income country with a population of about 2.5 Mn. (2019).[4]
Policy enablers	• The Government's aims to expand power generation capacities with targets to supply 50% of country's electricity demand from renewable sources.[8] • A total of 669 MW of grid-connected renewable energy capacity is expected to be installed by 2035. The expansion is set to take place through competitive tenders with Independent Power Producers (IPPs) subject to power purchase agreements with NamPower or Regional Electricity Distributors (REDs).[8] • Namibia has a feed-in tariff (REFIT program) since 2015 for solar, biomass and wind projects (sized between 500 kW and 5 MW).[9] • From July 2017, renewable energy systems below 500 kVA may inject excess power into the grid as part of Namibia's net metering program.[9]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 6.41 kWh/m²/day and specific yield 5.379 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Namibia.[7]
Market Maturity	• The electricity market has been dominated by the state-owned utility Namibia Power Corporation, which controls generation, transmission, distribution and the trading of electricity in the country.[8] • The power sector in Namibia has undertaken several reforms aimed at attracting IPPs by providing a stable investment environment. Such reforms include the consolidation of about 70 distributors into five Regional Electricity Distribution companies and the establishment of transparent tariff setting procedures. These reforms are overseen by the regulator, the Electricity Control Board (ECB).[1] • Electricity trading by private players is expected to be possible from 2026 onwards once the liberalization process is completed.[8]
Infrastructure	• Namibia has massive solar potential but have yet to realize large-scale renewable projects.[6] • Namibia, along with Botswana, is set to sign an agreement under Power Africa initiative to develop solar projects totalling 5 GW.[6]
Financing	• The banking sector is mature and access to credit financing is possible. Investors and financiers show an increased interest in renewable projects with a few banks already financing REFIT projects.[8] • Namibia Financial Institutions Supervisory Authority (NAMFISA) has developed a strategy for a five-year period (from 2017 to 2022) focusing on Financial Inclusion, Financial literacy, Financial Deepening and Consumer Safety.[5]
Energy Imperatives	• While the country's generation mix is dominated by hydropower, most of the electricity is imported from South Africa's Eskom and to some extent from the Southern Africa Power Pool (SAPP).[1] • Despite the small population and the very low electrification rate of 38%, the nationwide electricity requirement of around 3,600 MUs is only partially met.[8] • The country has total installed capacity of 671 MW as of 2019, including 135 MW solar PV.[10] • Due to growing demand for electricity – on average around 4% annually – and in order to reduce electricity imports, the National Integrated Resource Plan (NIRP) of 2016 calls for power plant capacities to be expanded to 1,677 MW by 2035.[8]

Nauru

Asia & Pacific

Electricity Consumption in MU (2017)

35.0

Installed Solar Capacity in MW (2019)

0.8

Share of Population with Access to Electricity (2018)

0% 100% 100%

Installed Off-Grid Solar Capacity in MW (2019)

0.01

World Bank's Ease of Doing Business Score (2020)

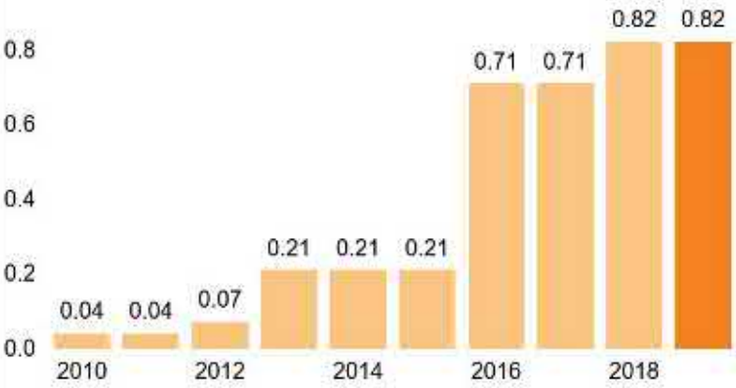
-

Solar installed capacity Growth rate (CAGR) for 2015-19

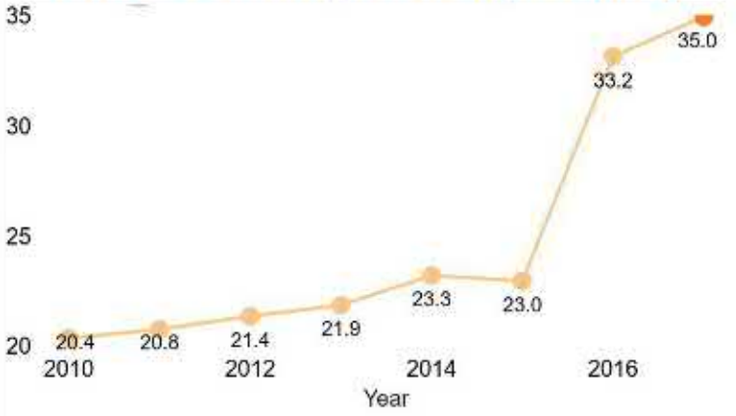
41%

Power Trends

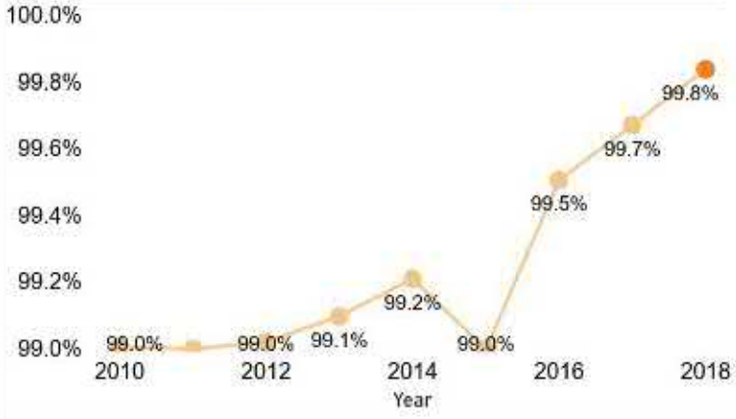
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



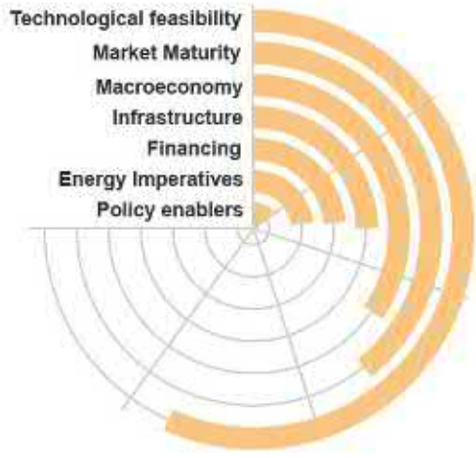
Access to Electricity



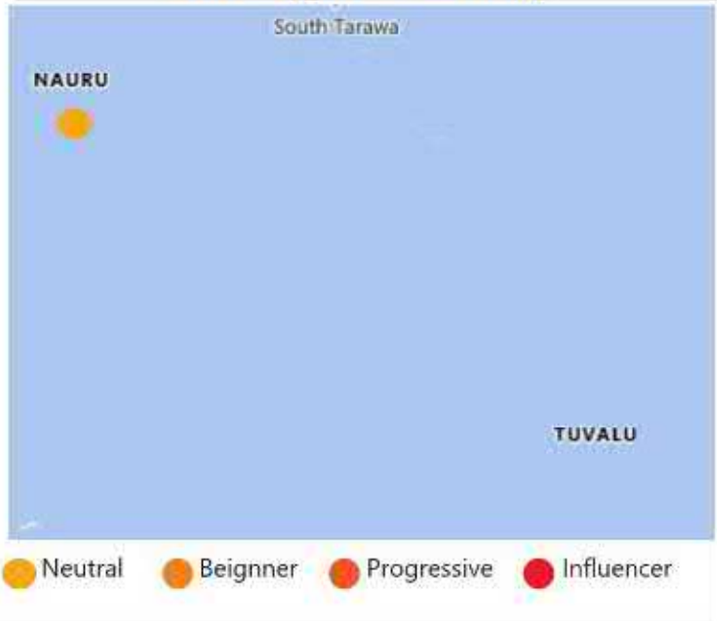
Ease of Doing Solar Classification

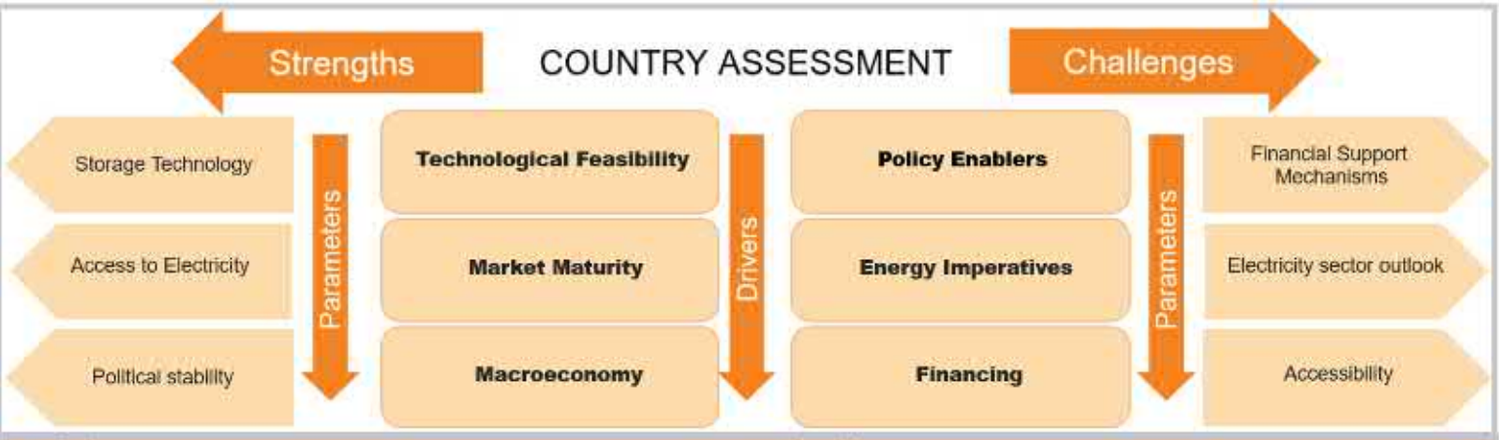
Progressive

Performance against 7 Drivers



Sub-regional standing





Drivers	Insights
Macro-economy	• The country recorded 1% real GDP growth in 2019. Growth was stronger in 2018 but slowed in 2019. The outlook is subdued with growth expected to reach 2% in the medium term.[1,8] • Total public debt is estimated at 86.8% of GDP (A$138.8 million) in 2018 and is mostly denominated in local currency.[1] • The Government has undertaken a number of reforms since 2004 that have enabled it to capitalize on the resumption of phosphate mining and high levels of assistance. It has run balanced budgets and significantly reduced Government debt as well as introduced reforms in the financial sector, state-owned enterprises' restructuring, utilities, transport infrastructure and governance reforms.[10]
Policy enablers	• Under the Nauru Energy Road Map (NERM) 2018-2020, one of the key targets is to supply 50% of grid electricity from renewable energy sources.[2,5] • Work is underway, with assistance from development partners, on solar power generation capacity addition that will generate as much as 50% of electricity needs.[1] • The government is also moving to cleaner fuels for its vehicles.[1] • The Nationally Determined Contribution (2015) for 2020-2030 intends to replace existing diesel operated plants with large-scale grid connected solar systems with an estimated cost of USD 42 million.[5]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.880 kWh/m^2/day and specific yield of 4.651 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Nauru.[9]
Market Maturity	• Governance challenges are significant and are exacerbated by limited public sector capacity.[1] • Nauru is yet to have legislation relating to environmental approvals, electrical safety, power quality and standards.[6]
Infrastructure	• The Rehabilitation Corporation has rehabilitated 5 hectares of land and has started work on a further 6 hectares to clear land for solar projects.[1] • Progress in integrating climate change strategy into budget planning is lagging due to capacity constraints and lack of coordination between agencies.[1] • The construction of the 11-33KV transmission line across the island, provides better integration and stability to accept more grid integrations, thereby complimenting further Energy mix. The ADB funded 6 MW Solar farm project will also strengthen the control systems and overall system monitoring. • Large-scale Solar Procurement, from Independent Power Producers, is not seen as a immediate priority due to the relatively small size of Nauru's demand.[6]
Financing	• Efforts in financial sector reforms are commendable but challenges remain. The Bendigo Bank Agency, the sole financial institution and provider of financial services in Nauru has helped in re-establishing trust in the financial sector by contributing to improvements in financial inclusion and payment services.[1] • Availability of formal credit products is expected to support private sector growth.[1]
Energy Imperatives	• Imported petroleum products are the primary source of energy in Nauru. • The country is 100% electrified and renewable energy contributed around 1% to electricity supply with the remaining 99% provided by diesel generators during 2016.[2] • Nauru generated 24 MUs of electricity as of 2016 (covering 108% of its annual consumption needs).[3,5] • Inauguration in November 2019 of a 1.1 MW ground-mounted solar PV project funded by the Government of New Zealand and the European Union (EU). The addition of this project raised the RE penetration in Nauru's energy mix to around 10%. ADB is financing the 6 MW Nauru Solar Development, which will bring RE penetration from around 10% to ~47%.

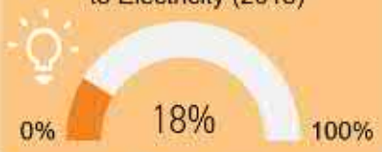
Niger

Africa

Electricity Consumption in BU (2017)

1.1

Share of Population with Access to Electricity (2018)



World Bank's Ease of Doing Business Score (2020)

56.80

Installed Solar Capacity in MW (2019)

27.1

Installed Off-Grid Solar Capacity in MW (2019)

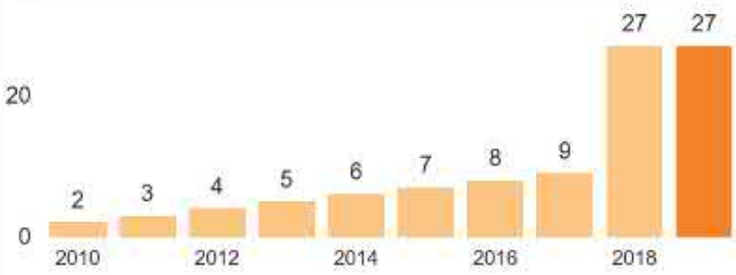
20.1

Solar installed capacity Growth rate (CAGR) for 2015-19

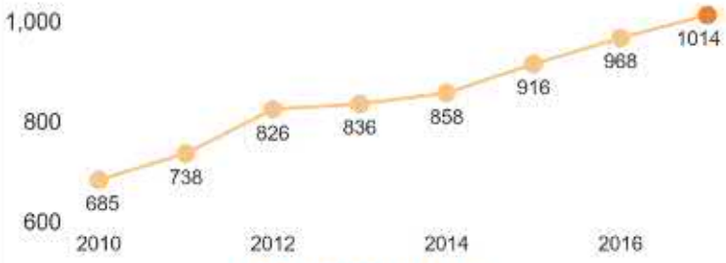
40%

Power Trends

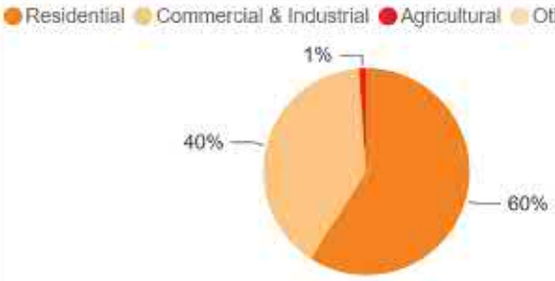
Cumulative Solar installed Capacity (MW)



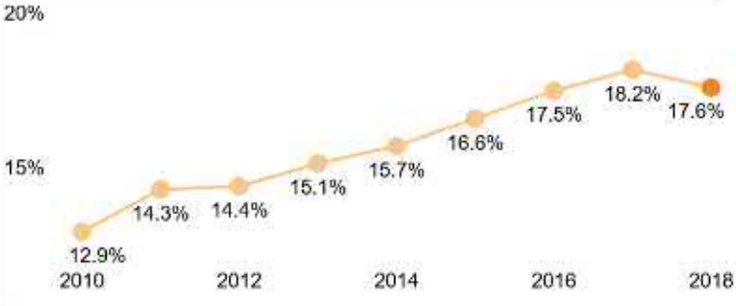
Overall Electricity Consumption (MU)



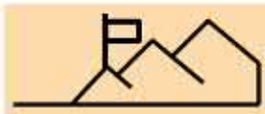
Consumer Mix



Access to Electricity

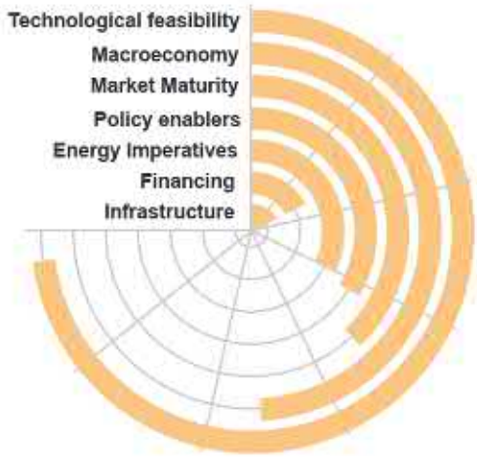


Ease of Doing Solar Classification

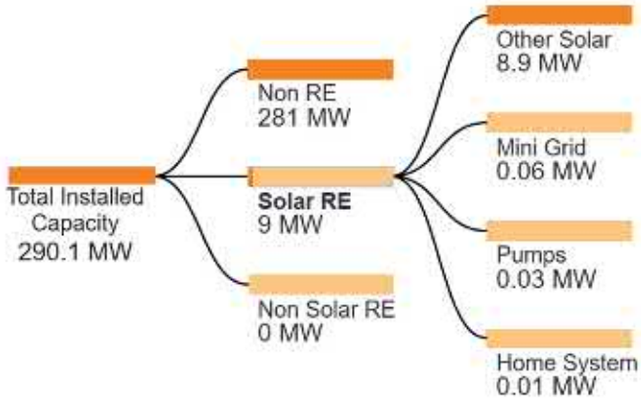


Progressive

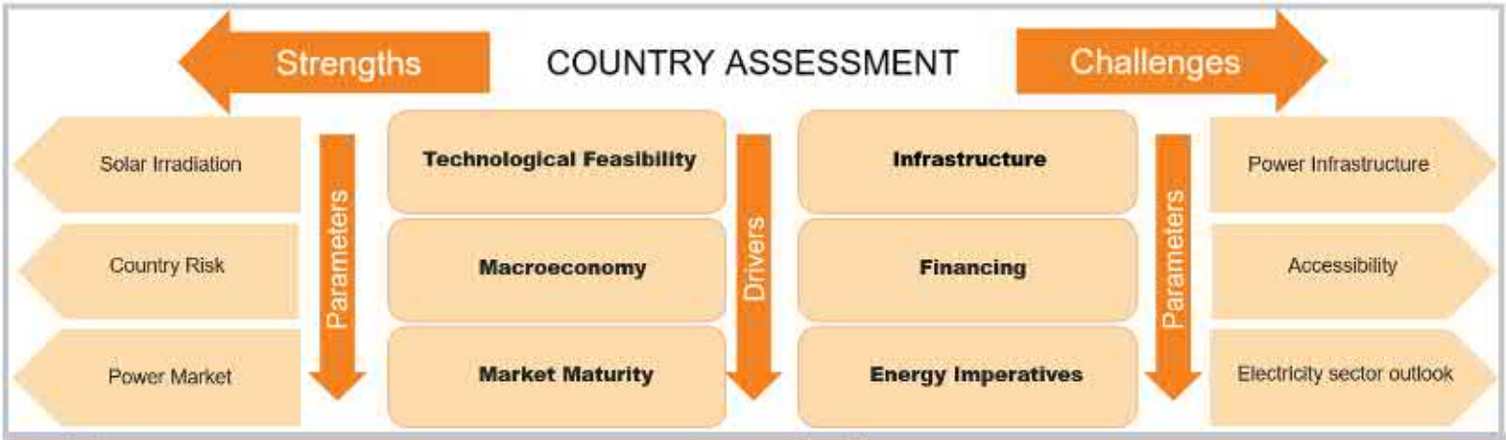
Performance against 7 Drivers



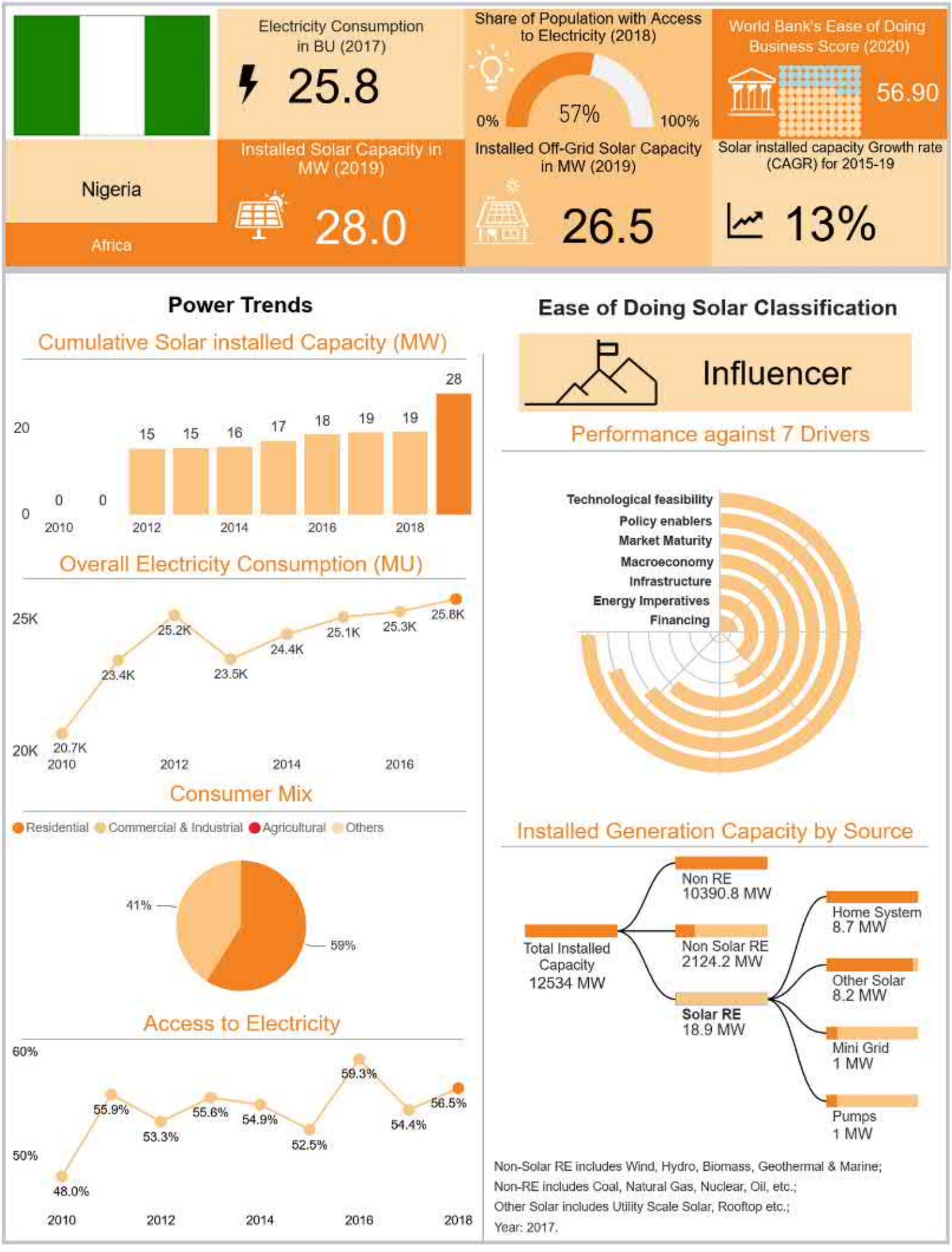
Installed Generation Capacity by Source

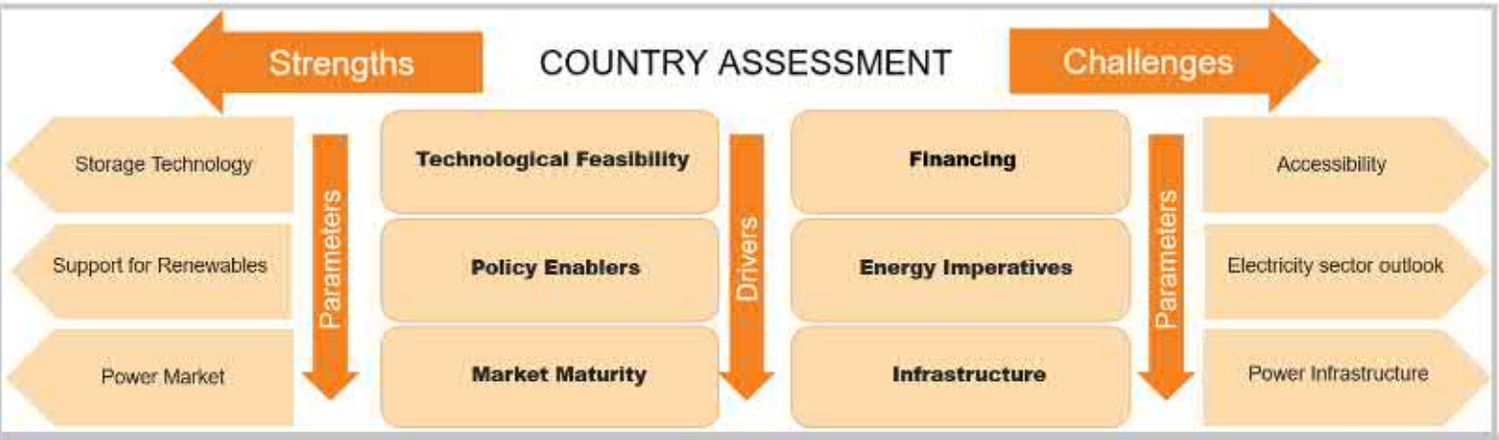


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



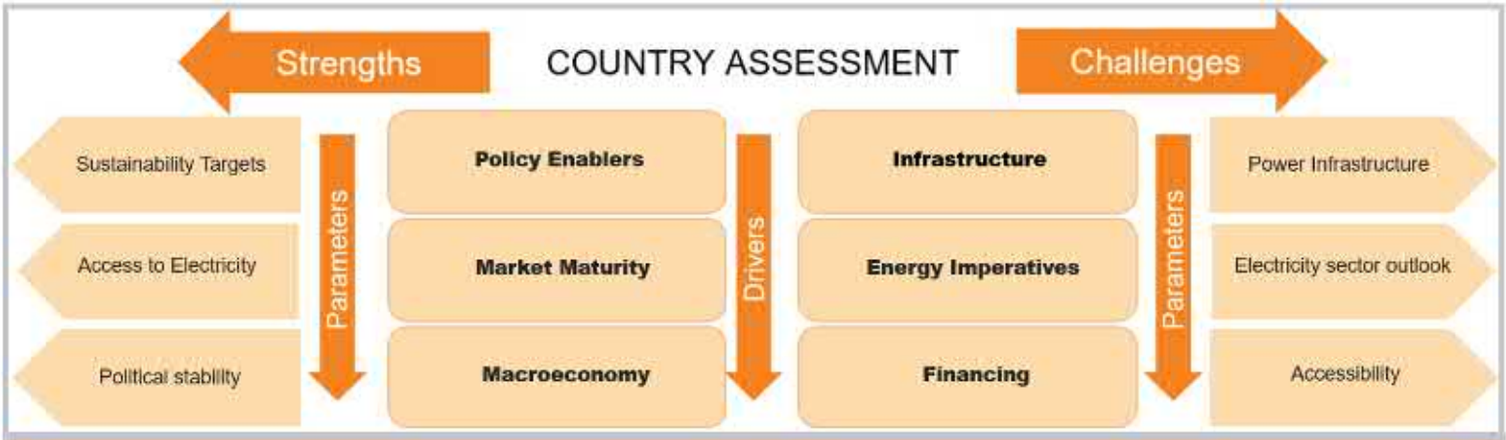
Drivers	Insights
Macro-economy	• Niger is a landlocked country in West Africa and a member of the Economic Community of West African States (ECOWAS).[3] • GDP (at current prices) has grown with an annual rate of 5.83% in 2019. • Economic growth is on account of strong performance by the primary and tertiary sectors and growth in the private sector.
Policy enablers	• Niger's National Renewable Energy Strategy aims to increase the share of RE sources, in the installed capacity, by adding 205 MW of RE (including large hydro) by 2020 and 402 MW by 2030. The plan also outlines the concurrent objective of connecting 15% of the population to off-grid renewables by 2020 and 30% by 2030.[7] • The strengthening of democratic institutions and the government's commitment to attaining its goals is expected to help the country stay on a high growth trajectory over the next few years.[1] • In 2017, the Nigerian government introduced 100% import duty exemption to equipment and components required for generating electricity from RES.[7]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 6.265 kWh/m^2/day and specific yield 4.837 kWh/ kWp, strong technical feasibility is envisaged for solar projects in Niger.[9]
Market Maturity	• Niger rationalised its legal framework in 2016 with the establishment of a Regulatory authority and implementation of Electricity Code. • Broadening access to electricity is a National development objective. As of 2018, less than 20% of the population had access to electricity with only 12% access to electricity in rural areas.[8] • Niger remains a 100% cash market with no PAYGo sales. The Niger Solar Electricity Access Project (NESAP), supported by the World Bank, is likely to improve this trend.[4] • Niger's economic future hinges on developing its still nascent domestic private sector. Currently, it accounts for less than 10% of GDP.[6]
Infrastructure	• Niger is witnessing a strong growth in total rural population with a growth rate of 3.9% per year implying need for a higher electrification rate.[5] • The existing power infrastructure is developing and the country continues to depend on imported electricity from neighbouring country, Nigeria. • Domestic private sector needs strengthening to ensure sustainably higher living standards and provide jobs for Niger's rapidly growing labour force.[6]
Financing	• Niger's banks are stable but, at ~14% of GDP, private sector credit is feeble; measures are needed to enhance financial intermediation and encourage banks to extend more credit to the private sector.[6] • High dependence on external finance and low domestic capacity in implementing large projects could lead to macroeconomic slippage.[1] • Income levels in the country is low. Hence priority is given to mobilization of grants, followed by soft loans and Public-Private Partnerships.[2] • The investment outlook is promising as several large-scale projects financed by the private sector and donors are giving strong momentum to the economy.[6]
Energy Imperatives	• Electricity prices are now at par with those in the United States, yet power cuts are pervasive.[6] • Niger began issuing tenders for solar projects in 2016 under the Electricity Law including hybrid projects.[7] • The government is looking to put out more RE tenders to diversify the sector away from a reliance on Nigerian imports which are set to increase in coming years.[7] • Niger's Solar Home Systems sales recorded the largest percentage increase in the region with an impressive 325% and reaching record volumes of 14,000 units sale from Jul'19 to Dec'19 period.[4]


Nigeria
Africa
Electricity Consumption in BU (2017)
25.8
Installed Solar Capacity in MW (2019)
28.0
Share of Population with Access to Electricity (2018)
0%
57%
100%
Installed Off-Grid Solar Capacity in MW (2019)
26.5
World Bank's Ease of Doing Business Score (2020)
56.90
Solar installed capacity Growth rate (CAGR) for 2015-19
13%
Power Trends
Cumulative Solar installed Capacity (MW)
20
0
0
0
15
15
16
17
18
19
19
28
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
25K
20K
20.7K
23.4K
25.2K
23.5K
24.4K
25.1K
25.3K
25.8K
2010
2012
2014
2016
Consumer Mix
Residential
Commercial & Industrial
Agricultural
Others
41%
59%
Access to Electricity
60%
50%
48.0%
55.9%
53.3%
55.6%
54.9%
52.5%
59.3%
54.4%
56.5%
2010
2012
2014
2016
2018
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Technological feasibility
Policy enablers
Market Maturity
Macroeconomy
Infrastructure
Energy Imperatives
Financing
Installed Generation Capacity by Source
Total Installed Capacity 12534 MW
Non RE 10390.8 MW
Non Solar RE 2124.2 MW
Solar RE 18.9 MW
Home System 8.7 MW
Other Solar 8.2 MW
Mini Grid 1 MW
Pumps 1 MW
Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) is USD 448.12 billion and has grown at an annual rate of 2.2% in 2019.[5,6] • The Government launched Economic Recovery and Growth Plan 2017-20 (ERGP) to improve the economy and increase real GDP growth rate to 3.3% by 2021.[8]
Policy enablers	• The Government of Nigeria approved the feed-in tariff regulations in 2015 that mandates electricity distribution companies to source at least 50% of their electricity requirements from renewables.[11] • In 2016, Nigeria adopted the Mini-Grid Policy in order to regulate the mini-grids and speed up electrification process.[11] • Approved in 2018, Nigeria Electrification project, with a commitment of USD 350 million, aims to implement solar hybrid mini grids for rural economic development, stand-alone solar systems for homes and sustainable power to public educational institutions.[10] • The Renewable Energy Master Plan (REMP) intends to increase the supply of renewable electricity and targets 500 MW solar PV installed capacity by 2025.[11]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.44 kWh/m^2/day and specific yield of 4.29 kWh/kWp, strong technical feasibility is envisaged for solar projects in Nigeria.[2] • Stand-alone solar photovoltaic (PV) systems offer pay-as-you-go (PAYGo) business models in areas where mini-grids are not sustainable.[4]
Market Maturity	• 57% of population had access to electricity as of 2018. Country is set to achieve a target of universal electricity access by 2030.[3,4] • Renewable energy share, in total electricity consumption, is 83% as of 2017.[3] • Renewable generation is 23%, of total electricity generation, in 2018 and is targeted to increase to 36% by 2030.[7,11]
Infrastructure	• Approved in 2018, The Nigeria Electricity Transmission Access Project (NETAP) pledged a commitment of USD 486 million aiming to increase the capacity of the transmission network in Nigeria.[10] • The Power Sector Recovery Operation (PSRO) for Nigeria was launched in 2020 to improve the reliability of electricity supply and to ensure that at least 4,500 MWh (megawatt hour) of electricity is supplied to the distribution grid from 2022 onwards which is necessary for grid stability.[10]
Financing	• International financial flow, in 2017, was USD 5,075.7 million (in PPP terms) to support clean and renewable energy.[5] • Nigeria has been one of International Finance Corporation's (IFC) fastest growing portfolio and represents IFC's fifth largest global country exposure with a committed volume of USD 1.8 billion.[9]
Energy imperatives	• Nigeria's per capita electricity consumption of 152 kWh is significantly lower in comparison to the global average.[1] • 31% of rural population had access to electricity in 2018.[3] • Nigeria's total installed capacity was 13,089 MW in 2019 with 16% (2,152 MW) share of renewables.[7] • Hydro dominates the renewable with 2,111 MW capacity whereas solar constitute for 28 MW capacity as of 2019.[7] • The Rural Electrification Agency (REA) has been authorized to establish a Rural Electrification Fund (REF) to promote fast and cost-effective expansion of electricity access in rural areas through on-grid, mini grid and off-grid electrification solutions featuring renewable energy and hybrid power systems.[4]


Palau
Asia & Pacific
Electricity Consumption in MU (2017)
74.1
Installed Solar Capacity in MW (2019)
1.3
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.2
World Bank's Ease of Doing Business Score (2020)
53.70
Solar installed capacity Growth rate (CAGR) for 2015-19
9%
Power Trends
Cumulative Solar installed Capacity (MW)
0.29
0.58
0.67
0.75
0.91
0.91
1.28
1.28
1.28
1.28
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
72.2
71.8
63.8
65.0
66.8
67.0
70.9
74.1
Year
Access to Electricity
98.5%
98.5%
97.6%
98.9%
99.8%
99.4%
100.0%
100.0%
Year
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Policy enablers
Market Maturity
Macroeconomy
Technological feasibility
Financing
Energy Imperatives
Infrastructure
Sub-regional standing
Koror
PALAU
Palikir
Bismarck Sea
PAPUA NEW GUINEA
Solomon Sea
Port Moresby
Honiara
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• GDP (at current prices) has grown at an annual rate of 0.5% (in 2019).[13,14] • Palau is heavily dependent on tourism and foreign grants making economy vulnerable to external factors due to global and regional volatility. It is also vulnerable to climate change and natural disasters.[6,7] • The economic growth slowed down due to decrease in tourism in 2019, tourism being a significant contributor to the economy.[6,7]
Policy enablers	• More than 99.7% of the island's electricity is generated using imported fossil fuels. Palau aims to reduce this dependence by increasing RE adoption.[3] • Palau's has enacted the Net Metering Act in 2009, emphasising net metering as a catalyst for the growth of solar PV in the country.[10]
Technological Feasibility	• Owing to moderate level of average solar irradiation level (GHI) of 4.98 kWh/m^2/day and specific yield 4.01 kWh/kWp, moderate technical feasibility is envisaged for solar projects in Palau. • Palau has high dependence on costly fuel imports which makes a strong business case for increasing solar contribution in the energy mix.[3]
Market Maturity	• There is no independent energy regulator in Palau. Palau's Public Utilities Corporation (PPUC) is a sole entity which generates, transmits, and distributes electricity in Palau.[3,2] • 100% population in Palau has access to electricity as of 2018.[1] • ENGIE EPS is building a 100 MW solar power plant (micro grid supported with energy storage) for the Government of Palau. • In addition, request for proposals for Independent Power Producer (IPP) to develop solar and storage system have also been floated in 2019.[10]
Infrastructure	• Transmission and distribution losses in Palau, at 20%, are moderate and may not be a significant area of concern.[3] • National grid integration, covering all the parts of the island nation, is a major challenge.[3] • Currently the infrastructure is inadequate and needs to be scaled up to meet current requirements and future capacity addition plans.[10] • Maintenance of the solar installations has proven challenging due to shortage of spares and skilled technicians.[10]
Financing	• Financing from National Development Bank of Palau (NDBP) is available for purchase and installation of renewable energy equipment for homes and businesses.[12] • Palau is establishing an infrastructure reserve fund and is entering into public private partnerships (PPP) regime for sustainable development.[10]
Energy Imperatives	• 95% of the power is generated from imported fossil fuels making RE a good alternative for meeting future energy demand.[3] • The installed generation capacity has grown at a CAGR of 10% between 2014 and 2017. • Palau has set RE goal to meet 20% of electricity demand from renewable sources by 2020.[3]

Papua New Guinea

Asia & Pacific

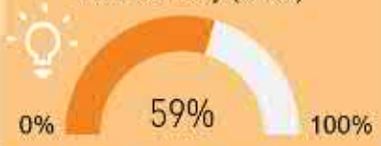
Electricity Consumption in BU (2017)

4.0

Installed Solar Capacity in MW (2019)

1.3

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

1.0

World Bank's Ease of Doing Business Score (2020)

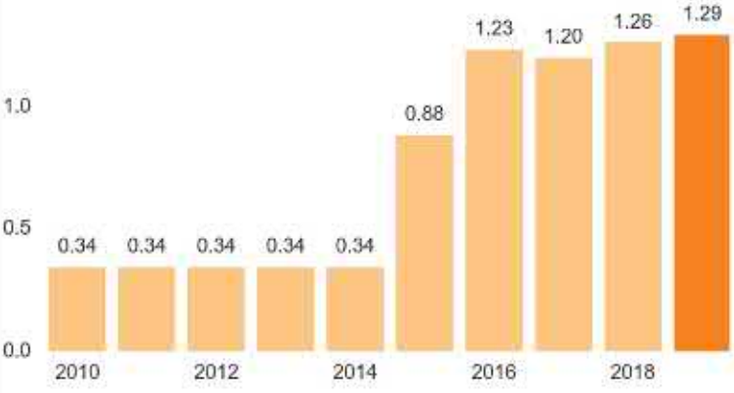
59.80

Solar installed capacity Growth rate (CAGR) for 2015-19

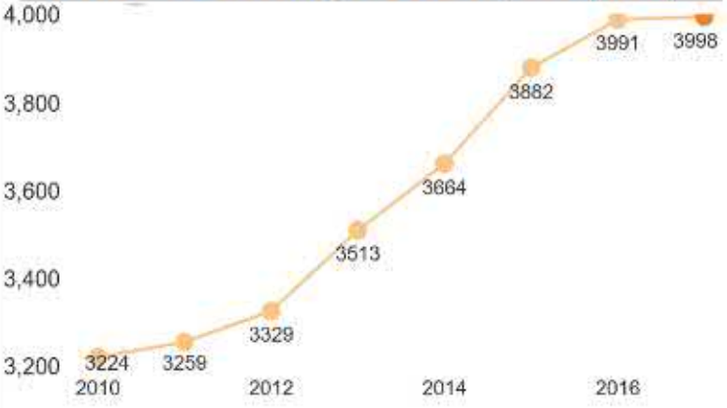
10%

Power Trends

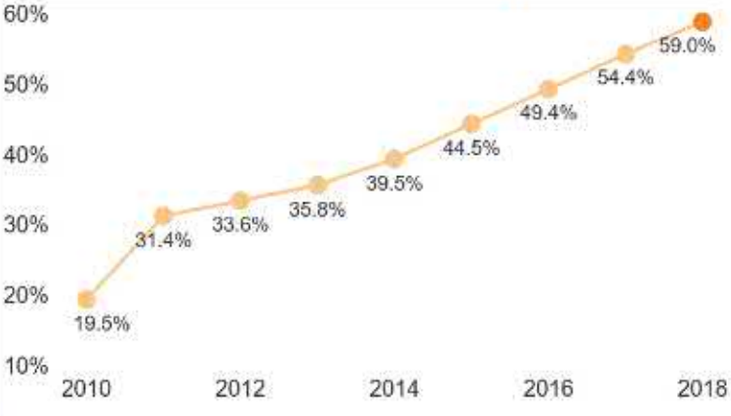
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



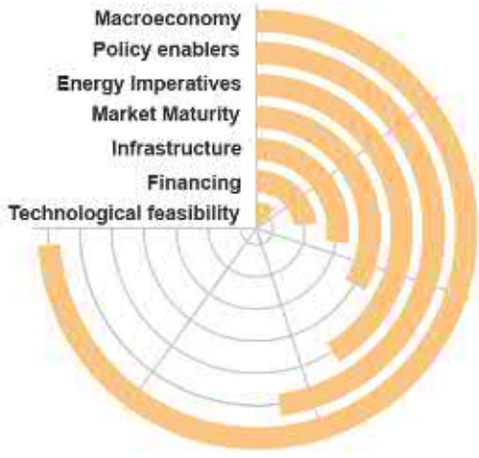
Access to Electricity



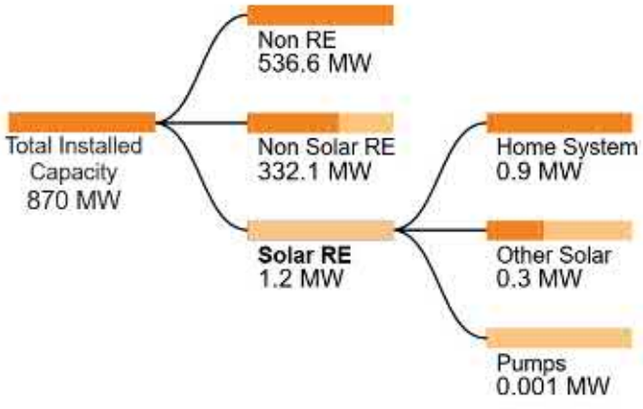
Ease of Doing Solar Classification

Potential

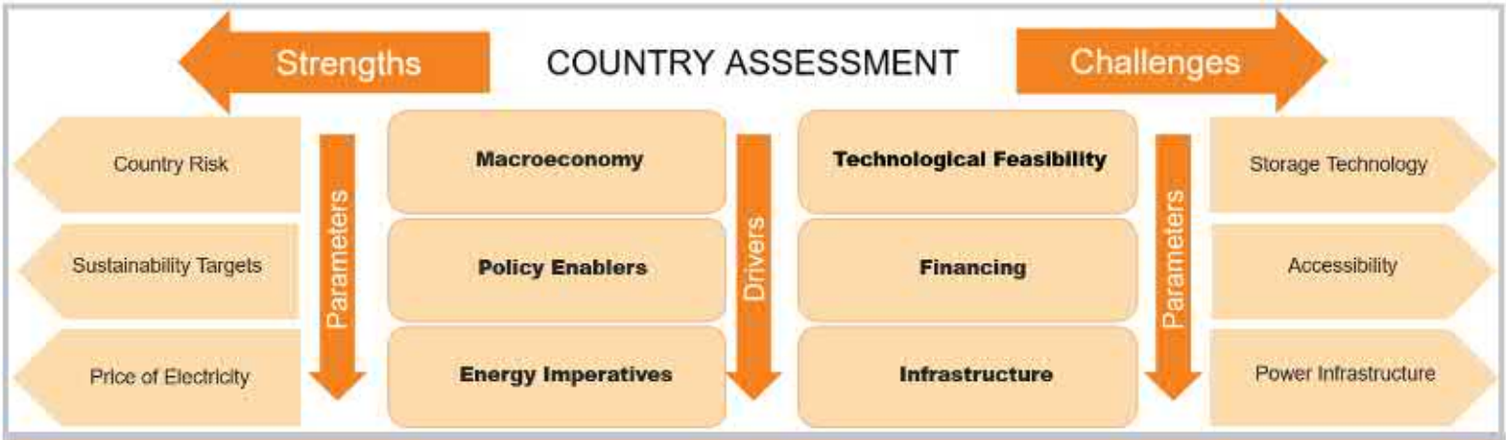
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) grew at a rate of 5% and was poised at USD 24.97 billion in 2019.[4,5] • Real GDP growth is expected to rebound from an expected contraction in 2020 to an expansion of more than 3% in 2021.[8]
Policy enablers	• Long-term support to Papua New Guinea was outlined in May 2019 when the World Bank and Papua New Guinea Government agreed on the 2019-2022 Country Partnership Framework for the country.[6] • The Government of Papua New Guinea (GoPNG) places a high priority on accessing climate finance for mitigating its contribution to climate change. It is aptly supported by existing policies and strategies such as the Vision 2050 Plan, National Strategy for Responsible Sustainable Development for PNG, PNG Climate Change Management Act and National Climate Compatible Development Management Policy.[7] • Papua New Guinea has been a member of the Global Green Growth Institute (GGGI) since 2012. GGGI has recently started providing Readiness and Preparatory Support to facilitate fund access from the Green Climate Fund.[7]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation level (GHI) of 4.48 kWh/m^2/day and specific yield of 3.59 kWh/kWp, a moderate technical feasibility is envisaged for solar projects in Papua New Guinea.[2] • PNG Power is implementing a pilot rooftop solar power project with the International Finance Corporation (IFC) in Port Moresby with an aim to use rooftop solar to generate 2% of peak demand for electricity in the capital.[9] • IFC's successful off-grid solar programme, Lighting PNG, which enabled around 20% of the population to gain access to basic lighting.[9]
Market Maturity	• 59% of population had access to electricity as of 2018.[3] • Renewable energy share in total energy consumption was 50% as of 2017.[3] • Papua New Guinea aims to derive 32% of its electricity from renewables by 2030 to become fully carbon-neutral by 2050 under the Paris Agreement.[9]
Infrastructure	• The country has an abundance of natural energy resources - hydropower, natural gas and solar. Most of these are underutilized for instance, less than 250 MW of its hydropower potential of 15,000 MW is har-nessed.[8] • Only about 13% of the population has access to on-grid electricity and remaining electrified population relies on off-grid electricity. The cost of service delivery is high, and the supply of power is less reliable.[8]
Financing	• International financial flow in 2017 was USD 260.9 million (in PPP terms) to support clean and renewable energy.[3] • In 2017, The IFC launched a pilot (with Origin Energy PNG) to support renewable energy use in off-grid communities through Pay-as-you-Go (PayGo) model helping make clean distributed energy affordable and accessible.[9]
Energy Imperatives	• Papua New Guinea's Per capita electricity consumption of 460 kWh as of 2019 is relatively low in comparison to the global average.[1] • The government has set an ambitious goal to reach 70% grid electrification rate in the country by 2030 through the National Electrification Rollout Plan (NEROP).[8]

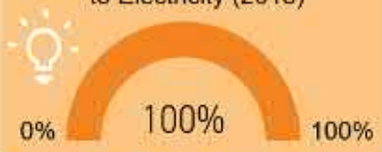
Paraguay

Latin America & Caribbean

Electricity Consumption in BU (2017)

11.6

Share of Population with Access to Electricity (2018)



World Bank's Ease of Doing Business Score (2020)

59.10

Installed Solar Capacity in MW (2019)

0.06

Installed Off-Grid Solar Capacity in MW (2019)

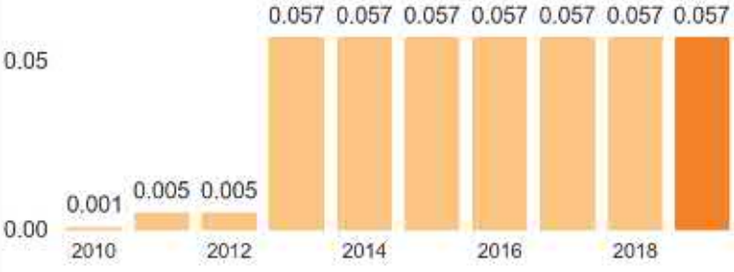
0.0

Solar installed capacity Growth rate (CAGR) for 2015-19

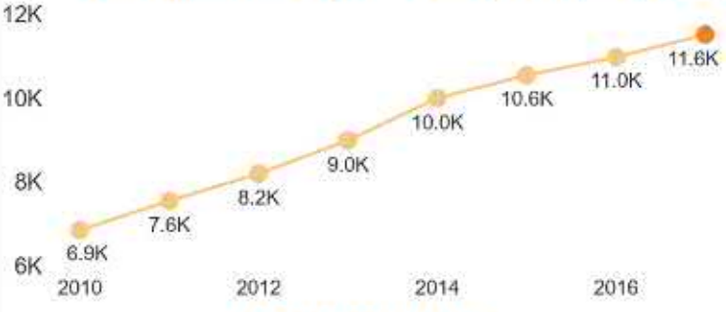
0%

Power Trends

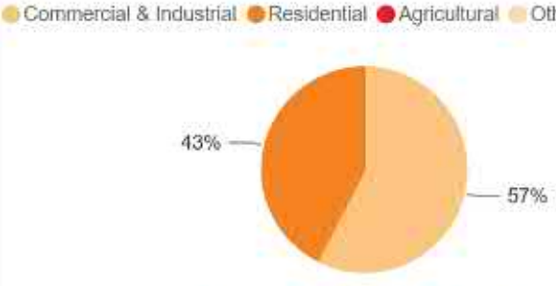
Cumulative Solar installed Capacity (MW)



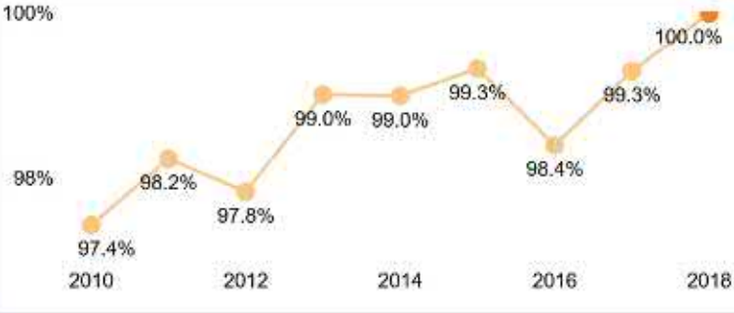
Overall Electricity Consumption (MU)



Consumer Mix

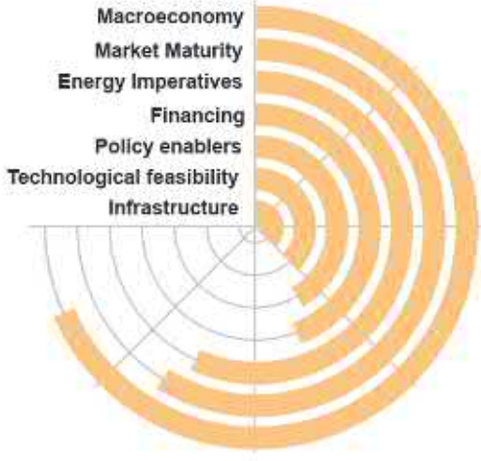


Access to Electricity

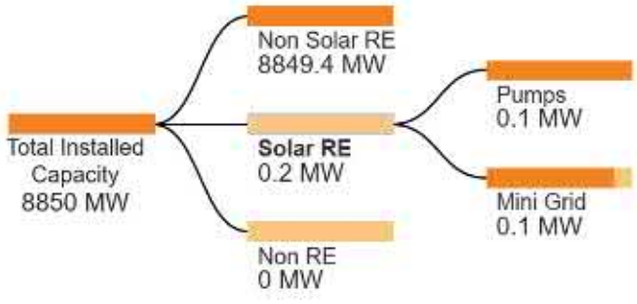


Ease of Doing Solar Classification

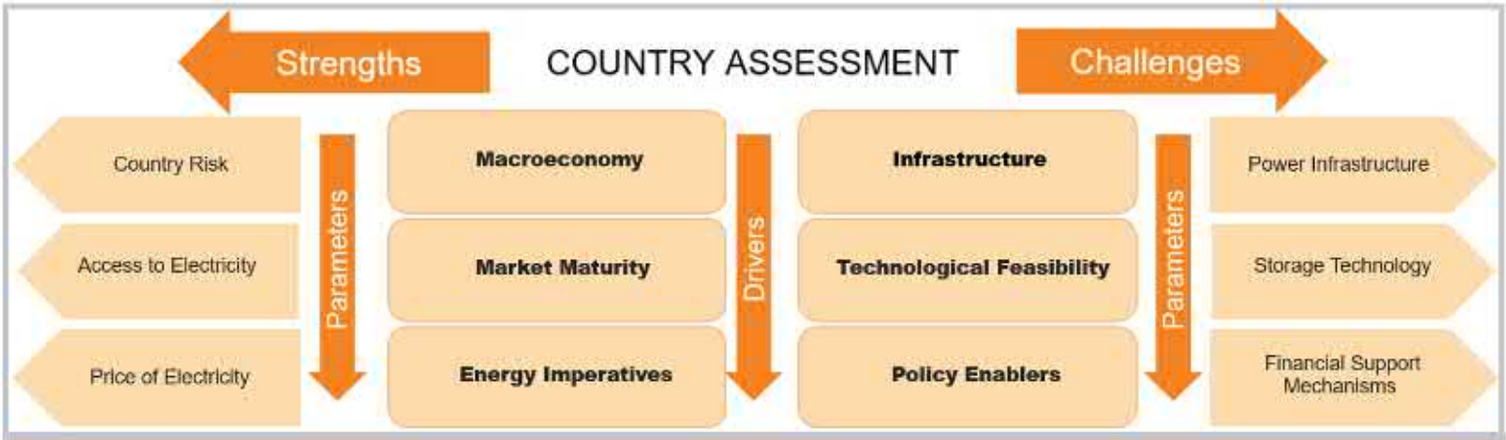
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 0.2% in 2019.[1] • Paraguay is an upper-middle-income country with a GDP per capita of USD 5,414 in 2019.[2,3] • Agriculture, retail and construction sectors are the main contributors to the economy.[18] • The GDP (current) is recorded at USD 38.14 billion as of 2019.[4]
Policy enablers	• The "National Development Plan 2030" aims to increase the consumption of renewable energy by 60% and reduce fossil fuel consumption by 20% in the total national energy consumption.[15] • The "National Climate Change Plan and Mitigation Strategy (2014)" is formulated to promote renewable energy generation by strengthening institutional capacity, increasing access to finance and adopting favourable policies.[17] • In 2006, a law was implemented to allow Independent power producers in the country with aim to attract private sector investments in the sector.[19]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.08 kWh/m^2/day and specific yield of 4.24 kWh/kWp, strong technical feasibility is envisaged for solar projects in Paraguay.[5]
Market Maturity	• As of 2018, 100% of the population had access to electricity in Paraguay.[3] • Despite having significant potential, solar doesn't have any contribution to the total generation as of 2019.[6] • In 2018, Paraguay has become the fourth largest exporter of electricity in the world with more than 70% of the total generation in the country exported to Brazil and Argentina.[12]
Infrastructure	• The National grid is well connected with Brazil and Argentina through high voltage interconnectors. • The Development Bank of Latin America has approved a loan of USD 250 million to National Electricity Administration (ANDE) in 2019 to modernize the national power grid and to improve the quality of electricity supply service.[14] • As of 2014, Transmission and distribution losses stand at 6.5% of output indicating a considerably robust power network.[16] • Under the "Power Sector Expansion Plan 2014 - 23", Paraguay plans to add 2,833 km transmission line length and 9,215 MVA of transformer capacity with an investment of USD 2,148 million by 2023.
Financing	• Paraguay has a credit rating of Ba1 with a stable outlook in 2020.[8] • According to UNCTAD's World Investment Report 2020, Paraguay has recorded FDI inflows of USD 478 million in 2019.[7] • Paraguay has an Ease of Doing score of 59.1 (out of 100) and ranks 125th among 190 countries in 2020. Businesses face challenges in getting credit, construction permits, enforcing contracts, access to electricity, paying taxes, and trading across borders.[20] • Paraguay has recorded a public debt at 21.6% of GDP and fiscal deficit of 1.3% of GDP in 2018 and 2.8% inflation in 2019.[10,11] • All the banks are fully compliant with the IFRS9 standards.[10]
Energy Imperatives	• Per capita consumption of 2200 kWh is relatively low in comparison to the global average.[9] • Owing to large water reserves, hydropower production contributes nearly 100% in the generation mix as of 2019.[6] • As per "Power Sector Expansion Plan 2014-2023", the electricity demand is expected to reach 4,369 MW by 2023, growing at a CAGR of 5%. • As of 2019, the residential sector accounts approximately 43.1% of the total electricity demand in the country.[13]

Peru

Latin America & Caribbean

Electricity Consumption in BU (2017)

46.5

Installed Solar Capacity in MW (2019)

326.3

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

45.8

World Bank's Ease of Doing Business Score (2020)

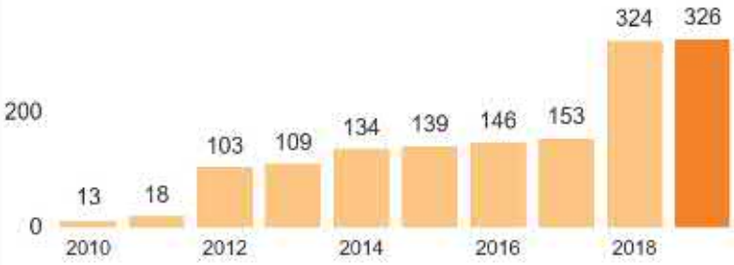
68.70

Solar installed capacity Growth rate (CAGR) for 2015-19

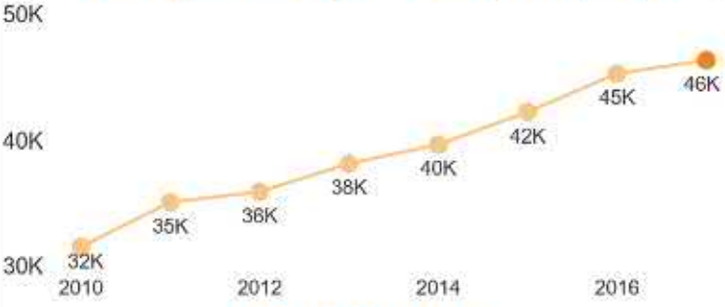
24%

Power Trends

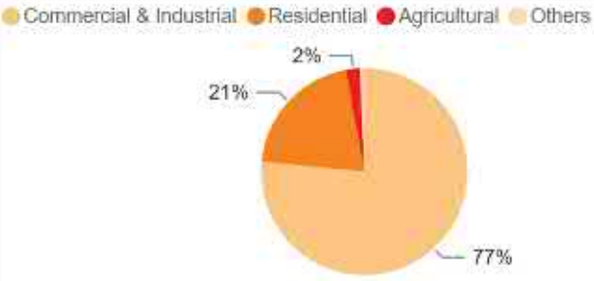
Cumulative Solar installed Capacity (MW)



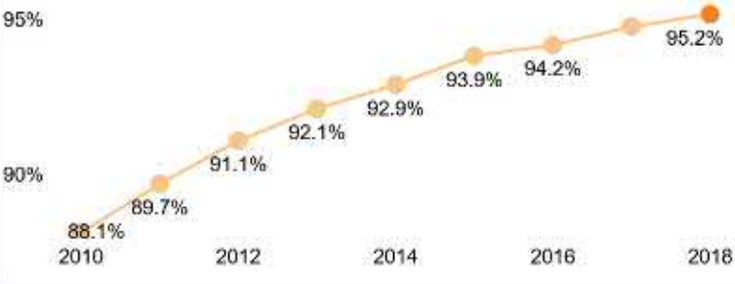
Overall Electricity Consumption (MU)



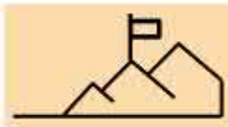
Consumer Mix



Access to Electricity

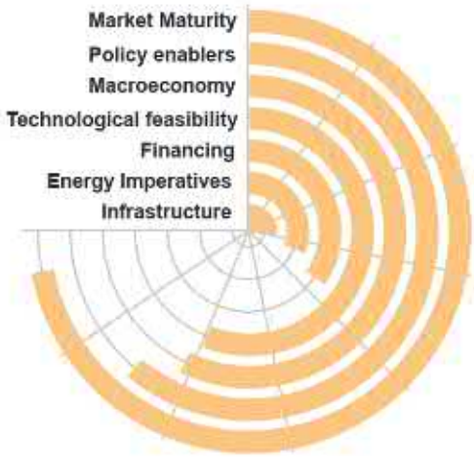


Ease of Doing Solar Classification

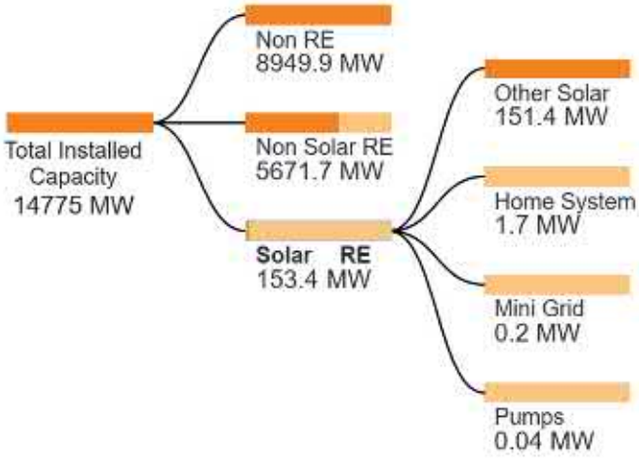


Influencer

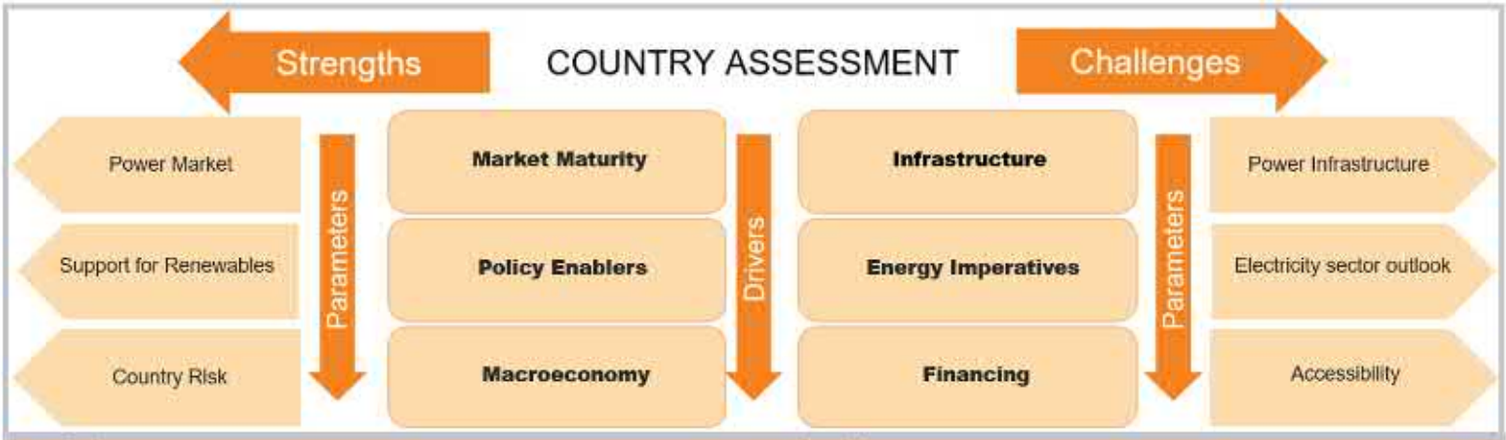
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Peru's GDP (Real) has grown at an annual rate of 2.2% in 2019.[18] • Peru is an upper-middle-income country with a GDP per capita of approximately USD 6,977 in 2019.[7,19] • The major sectors, contributing to the Peruvian economy, are tourism, telecom, agricultural and mining industry. Gold and copper accounted for approximately 41% of the total products exported in 2019.[22]
Policy enablers	• Since 2008, accelerated depreciation benefit of up to 20% is being provided on machinery, equipment and civil construction for RE generation to attract investors and increase RE capacity.[9] • Peru's Legislations allows mandatory dispatch for all grid connected RE generators.[10] • National Rural Electrification Plan 2013-2022 aims to invest USD 1,280 million in rural electrification systems with USD 294 million in solar PV.[11] • RE generators receive a premium price if the spot price is lower than the price offered in the auctions.[5]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation level (GHI) of 4.67 kWh/m^2/day and specific yield of approximately 3.77 kWh/ kWp, a moderate technical feasibility is envisaged for solar projects.[16] • Challenging topography such as steep slopes and large forest areas could be a deterrent for the installation of large-scale solar parks.[13] • Theoretical potential for Solar is estimated to be 260 GW.[12,13]
Market Maturity	• The transmission sector was entirely privatized by 2010. The distribution segment also has significant private participation.[1] • Peru has an active power market comprising of bilateral contracts and a power market. Open access regulations offer a high level of transparency in procedures, market prices, quantities, and settlements.[5] • As of 2018, 95% of the population in Peru has access to electricity with 82% population in rural areas having access to electricity.[7] • The price of solar power has fallen from USD 220 per MWh in the first auction held in 2009 to USD 48.39 per MWh in a recent auction in 2016.[8]
Infrastructure	• Peru and Ecuador are jointly constructing a High-voltage transmission line to connect the national grids. The project is expected to be operational by 2024.[6] • Transmission projects, worth USD 144 million, were awarded in 2019 and projects worth USD 270.7 million are expected to be awarded in 2020 including strengthening of the Peru-Ecuador cross-border interconnection network.[4] • The Central and Southern regions are often prone to congestion due to weak transmission infrastructure.5 • The country has established a centralized transmission planning process and concession contracts to identify the system's expansion needs.[5]
Financing	• Credit rating of A3 with a stable outlook in 2020 is a positive indicator for the investors.[15] • PPP law, reformed in 2015, allow access to domestic financial instruments to raise funds from the private sector for infrastructure projects.[3] • Electric Social Compensation Fund was established in 2004 to promote private investment for off grid RE power in rural areas through subsidies.[2] • According to UNCTAD's World Investment Report 2020, FDI inflows has increased from USD 6,488 million in 2018 to USD 8,892 million in 2019.[14]
Energy Imperatives	• Per capita consumption of approximately 1,700 kWh is relatively low in comparison to the global average of 3,400 kWh in 2019.[20] • Solar contributed a mere 1% in the total generation of 57,155 MUs in 2019.[12,13] • The industrial sector accounts for a significant share of (57% in 2017) of the total electricity demand.[21] • Owing to large water reserves, hydropower plants constitute ~ 55% in the total generation in 2019.[12] • With industrial development, steady economic growth and improving standards of living, the power consumption is expected to reach 72.3 BUs by 2025 growing at a CAGR of 3.9%.[21]

Plurinational State of Bolivia

Latin America & Caribbean

Electricity Consumption in BU (2017)

8.4

Installed Solar Capacity in MW (2019)

120.0

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

4.9

World Bank's Ease of Doing Business Score (2020)

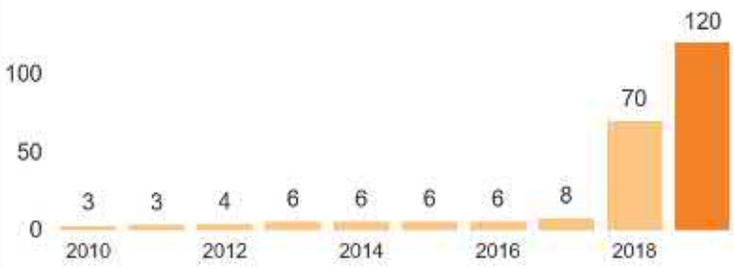
51.70

Solar installed capacity Growth rate (CAGR) for 2015-19

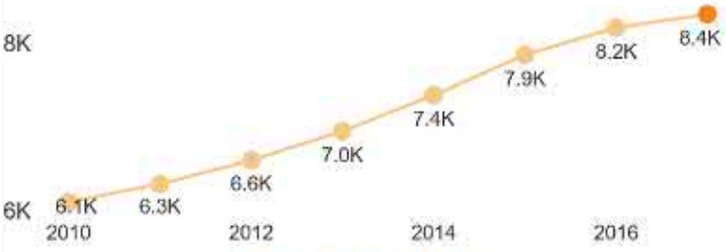
116%

Power Trends

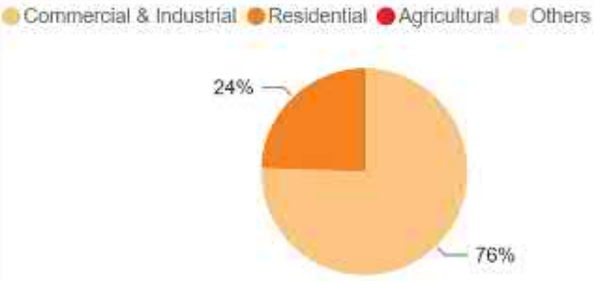
Cumulative Solar installed Capacity (MW)



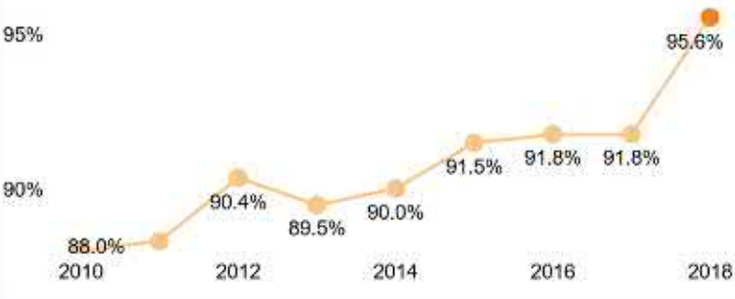
Overall Electricity Consumption (MU)



Consumer Mix



Access to Electricity

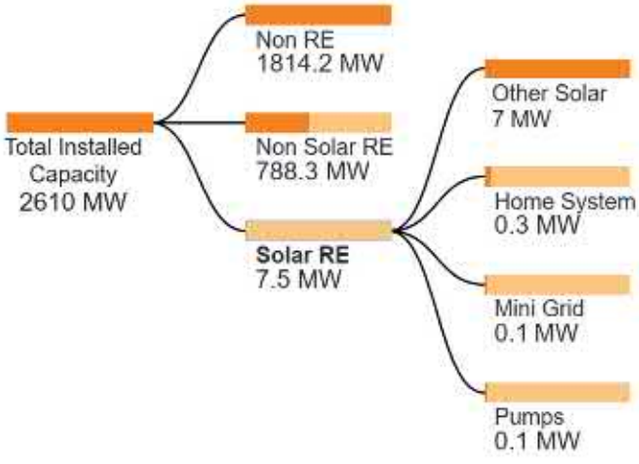


Ease of Doing Solar Classification

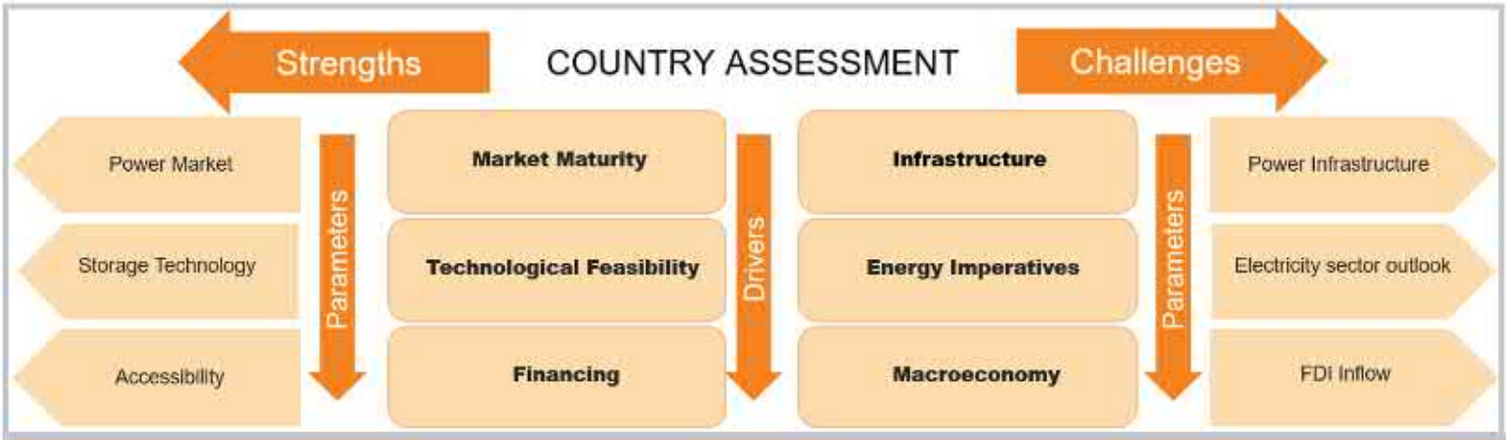
Influencer

Performance against 7 Drivers

Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Bolivia is a low-middle-income economy as per World Bank's classification; [1,2] • For the 10 consecutive years, till 2018, Bolivia witnessed a GDP growth of more than 4% year on year. However, this trend ended in 2019, when GDP (Real) grew at an annual rate of 2.8%.[1,2]
Policy enablers	• Decentralized Infrastructure for Rural Transformation (IDTR) programme ran until 2011. The project saw investments of USD 10.15 million in solar PV resulting in installation of 10,174 solar PV systems between 2003 and 2011.[3] • In 2014, the second phase of the IDTR project named Electricity and Renewable Energy Access programme, was launched with a World Bank loan of USD 21.3 million.[3] • Under Bolivia Electric Plan 2020-2025, the country aims to install 183 MW of RE capacity of which 20 MW will be Solar PV.[4] • Ministry of Hydrocarbons and Alternative Energies had authorised import duty tax exemption for the equipment donated by the European Economic Community through the Euro-Solar programme.[5]
Technological Feasibility	• Bolivia has one of the highest levels of solar irradiation in Latin America. • Owing to high levels of average solar irradiation levels of 5.42 kWh/m^2/day and specific yield of 4.52 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Bolivia.[6]
Market Maturity	• 96% population had access to electricity as of 2018.[7] • In 2010, the Bolivian Government nationalised the three biggest electricity generation companies representing about 80% of total generation capacity.[15] • The Inter-American Development Bank (IDB) has approved a USD 51.6 million loan for Bolivia which will strengthen sustainable development of the electricity sector including the promotion of RE such as geothermal, solar and wind power.[19]
Infrastructure	• A 60 MW Solar PV plant has been built in the Bolivian highlands (Altiplano) which is the largest salt desert in the highlands of the world.[16] • Bolivia has commissioned a 50MW photovoltaic (PV) plant in the western region of Oruro in Sept 2019.[12] About 70% of the total budget of EUR 86 million for this solar power plant project was financed by AFD, 10% by the European Union and 20% by the Central Bank of Bolivia.[12,17] • There are no restrictions on foreign ownership of electricity assets if the electricity company is established under Bolivian regulations.[8]
Financing	• FDI inflows decreased slightly in 2019 reaching USD 1.38 billion from USD 1.46 billion in 2018.[1] • Concessional loans from international donors, for the development of renewable energy projects, are accepted by law on a case-by-case basis.[8]
Energy Imperatives	• Per capita electricity consumption in 2019 was 891 kWh, relatively low in comparison to the global average.[9] • The Solar PV market grew from 3 MW in 2010 to 120 MW in 2019.[10] • Electricity generation from solar PV was 189 MUs, 1.86% of the total electricity generation.[11] • Off-grid Solar is an economical option for more than 360,000 rural Bolivian households in remote areas with limited access to the grid. • Bolivia is primarily dependent on gas-based power generation which accounted for 61.8% of its total generation in 2019.[11]

Republic of the Gambia

Africa

Electricity Consumption in MU (2017)

235.0

Installed Solar Capacity in MW (2019)

2.2

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

2.0

World Bank's Ease of Doing Business Score (2020)

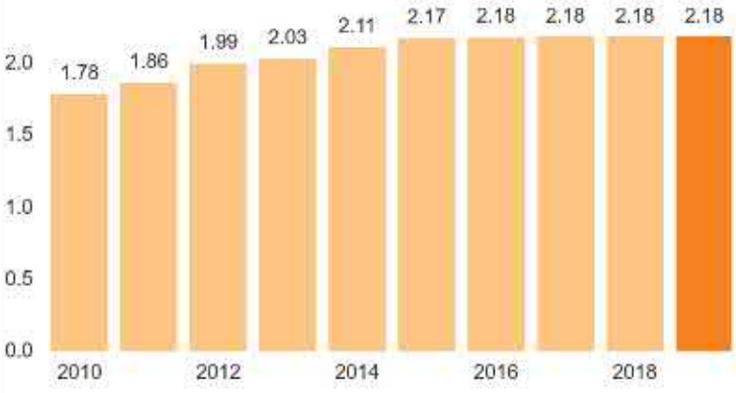
50.30

Solar installed capacity Growth rate (CAGR) for 2015-19

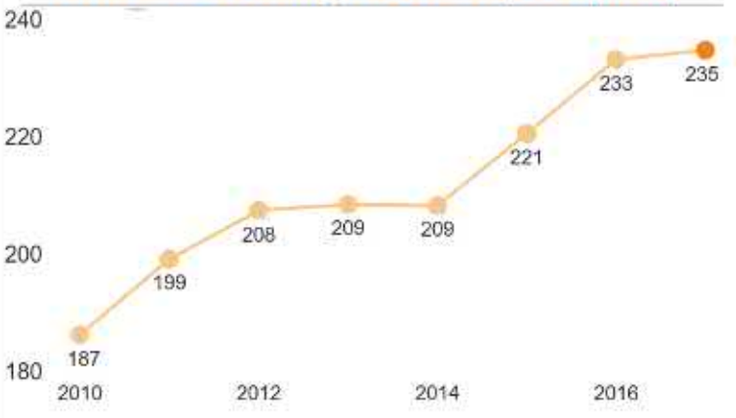
0%

Power Trends

Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)

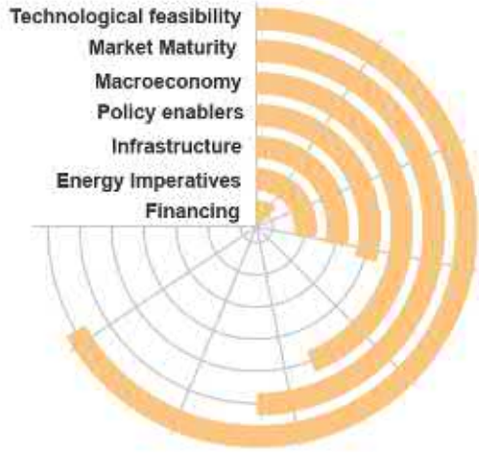


Access to Electricity

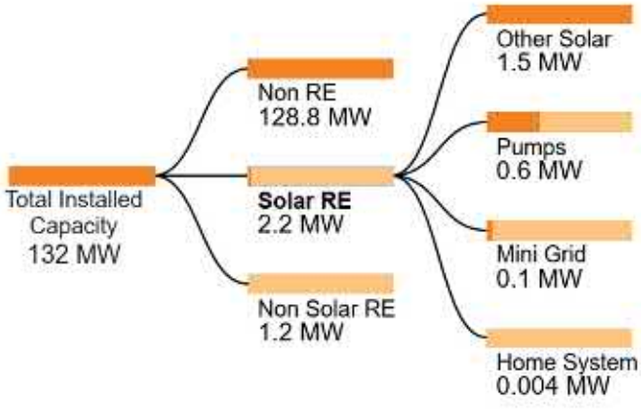
Ease of Doing Solar Classification

Progressive

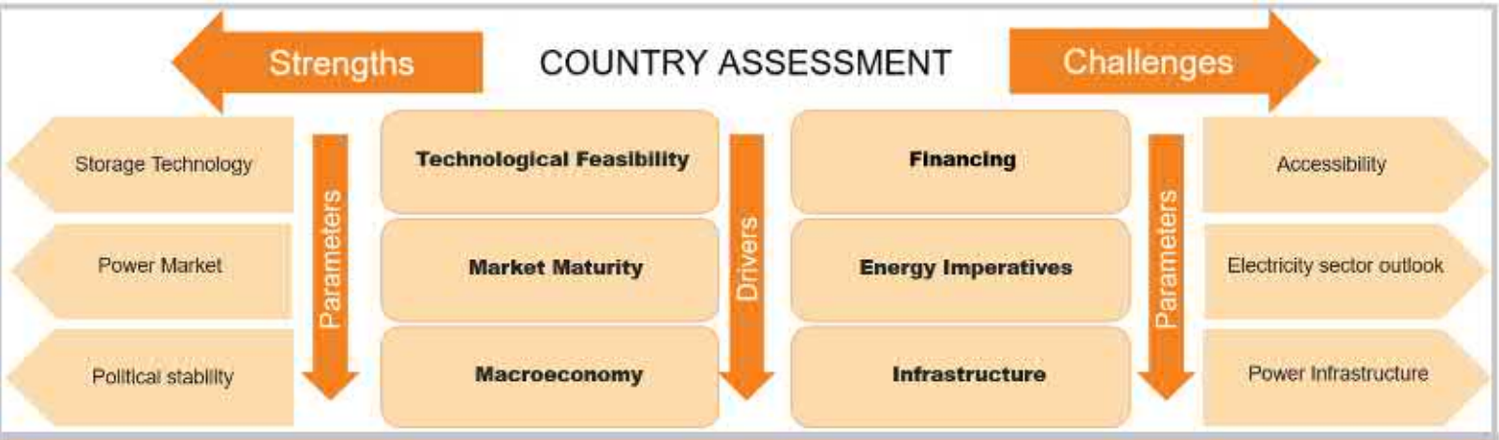
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 6% in 2019.[16,17] • GDP (Real) growth accelerated to 6.5% in 2018 driven by a recovery in agriculture, tourism, construction and trade. However, due to delays in budget support disbursements, it then fell to 6% in 2019.[1]
Policy enablers	• The Government of Gambia has set an objective to increase electricity generation and enhance fuel diversity with 30% share envisaged from renewable energy sources by 2030.[5] • The Renewable Energy Act seeks to promote renewable energy development, provide incentives and access to grid for RE projects.[5] • Gambia has also provided tax exemption for imports and 15 years corporate tax exemption for newly registered renewable energy projects.[5]
Technological Feasibility	• Owing to relatively high average solar irradiation levels of 5.748 kWh/m^2/day and specific yield of 4.57 kWh/kWh, strong technical feasibility is envisaged for solar projects in Gambia.[2] • Gambia has high dependence on costly fuel imports which makes a strong business case for increasing solar contribution in the energy mix.[6]
Market Maturity	• As of 2018, 65% of rural population has no access to electricity, hence off-grid solar systems can be a viable solution to improve access to electricity in rural areas.[9] • The Power sector in Gambia is regulated by Public Utilities Regulatory Authority (PURA). However, the generation, transmission and distribution utilities are bundled and managed by a sole entity, National Water and Electricity Company (NAWEC).[6]
Infrastructure	• Investments of EUR 142 million are planned for grid extensions and harnessing solar energy. European Investment Bank, World Bank and European Union are major contributors.[15] • With 60% share of agricultural land in total land area, identification of suitable land for developing utility scale solar projects may pose a key challenge.[4]
Financing	• The Gambia aims to transition to competitively tendered process for Independent Power Producers (IPPs) to attract private sector investments in the power sector.[6] • International financial flows, in support of clean and renewable energy, to Gambia was USD 24.8 million in 2017 which was nil in 2011.[9]
Energy Imperatives	• Per capita electricity consumption of 132 kWh is significantly lower in comparison to the global average.18 • The generation mix of Gambia is nearly 100% percent from Heavy fuel oil (HFO) and Diesel (LDO), exposing the power sector to the volatility in oil prices.[3] • Considerable improvements were observed in power sector performance as blackouts dropped from 15-20 per day to 2-3 per day in 2017.[14] • Improved operational performance led to a reduction in transmission and distribution losses from 28% in 2015 to 19% in 2019.[14]

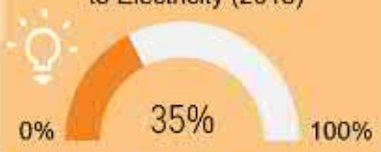
Rwanda

Africa

Electricity Consumption in MU (2017)

595.9

Share of Population with Access to Electricity (2018)



World Bank's Ease of Doing Business Score (2020)

76.50

Installed Solar Capacity in MW (2019)

37.5

Installed Off-Grid Solar Capacity in MW (2019)

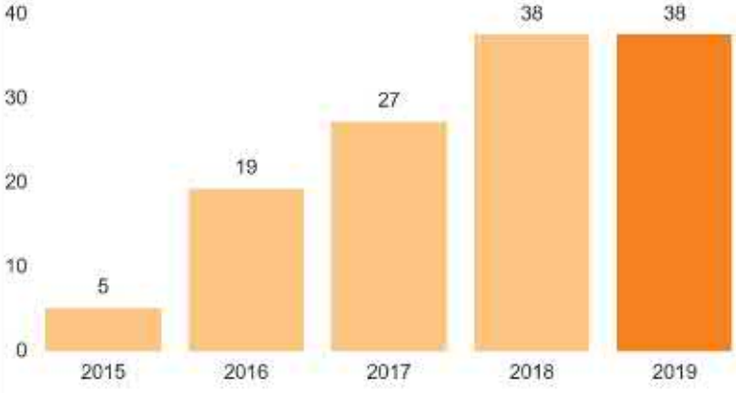
25.4

Solar installed capacity Growth rate (CAGR) for 2015-19

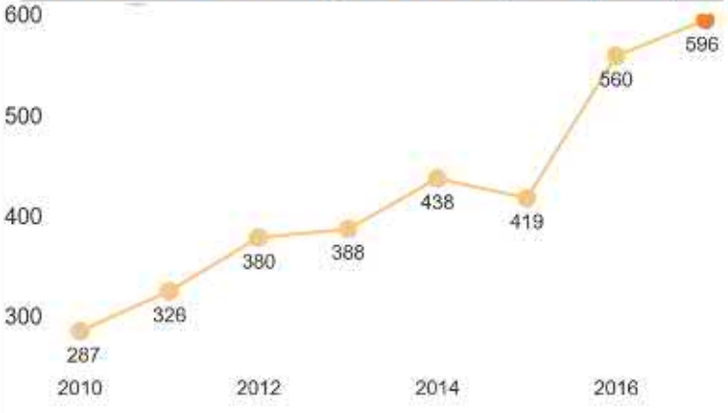
65%

Power Trends

Cumulative Solar installed Capacity (MW)

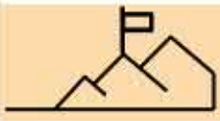


Overall Electricity Consumption (MU)



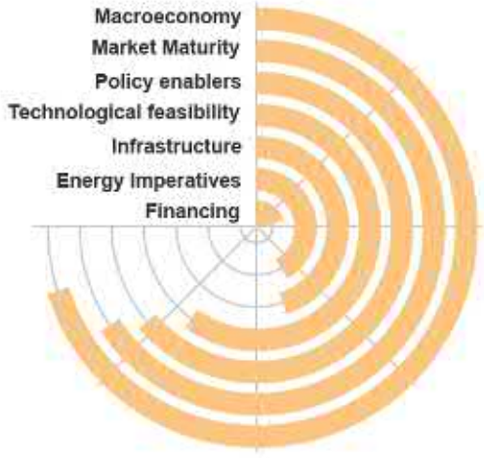
Access to Electricity

Ease of Doing Solar Classification

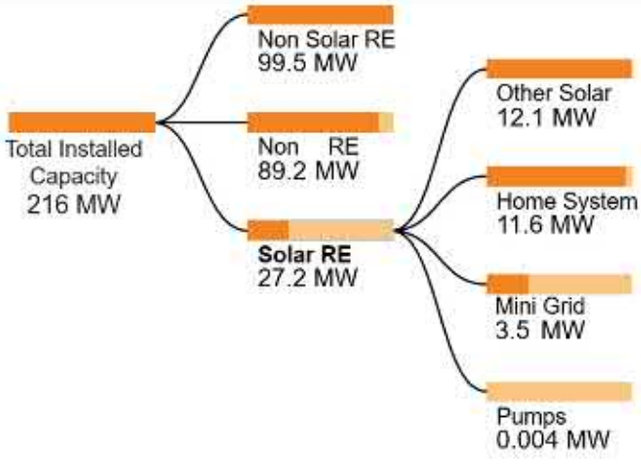


Influencer

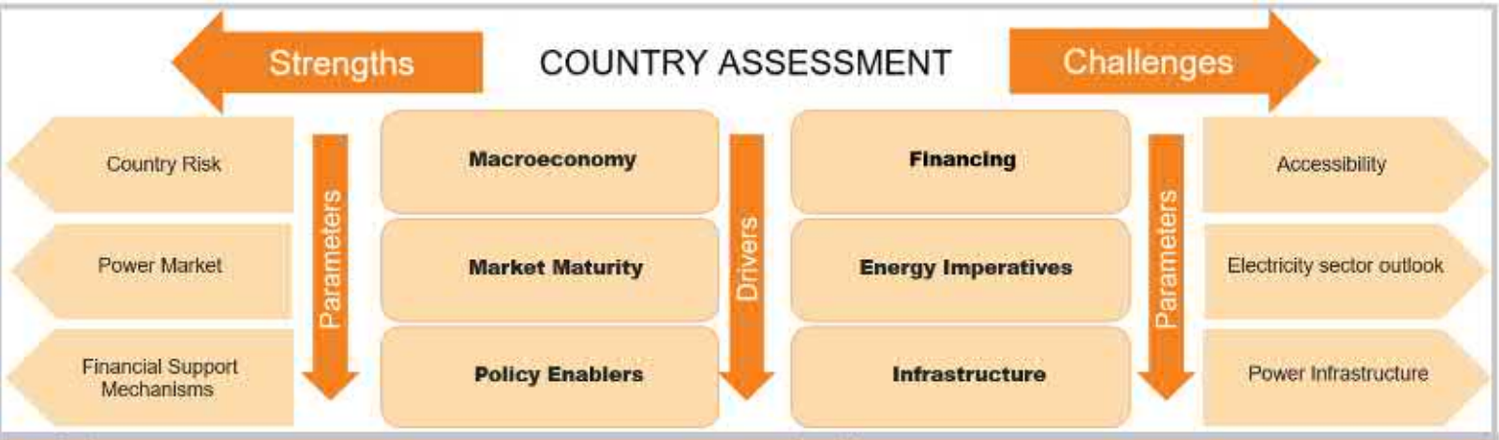
Performance against 7 Drivers



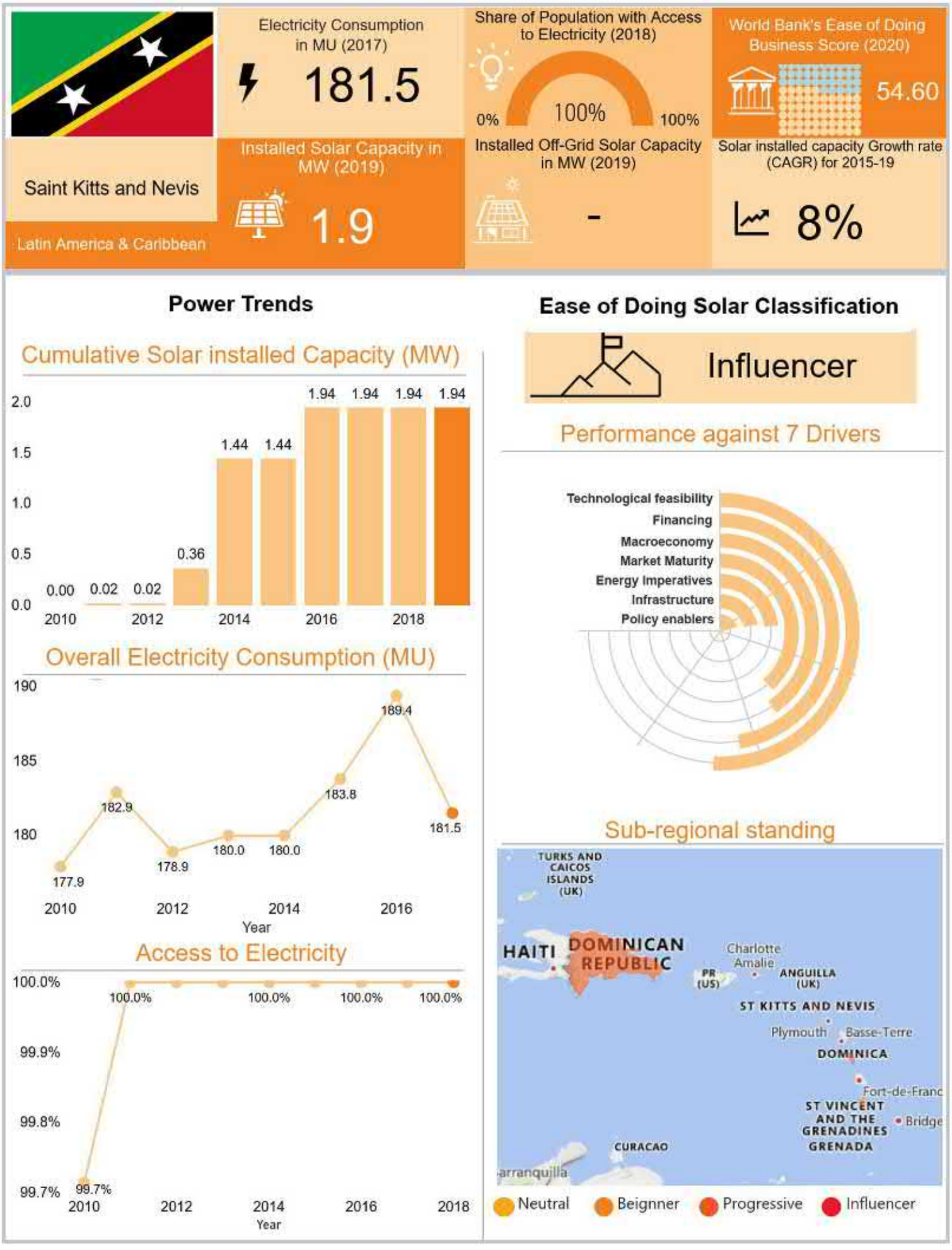
Installed Generation Capacity by Source

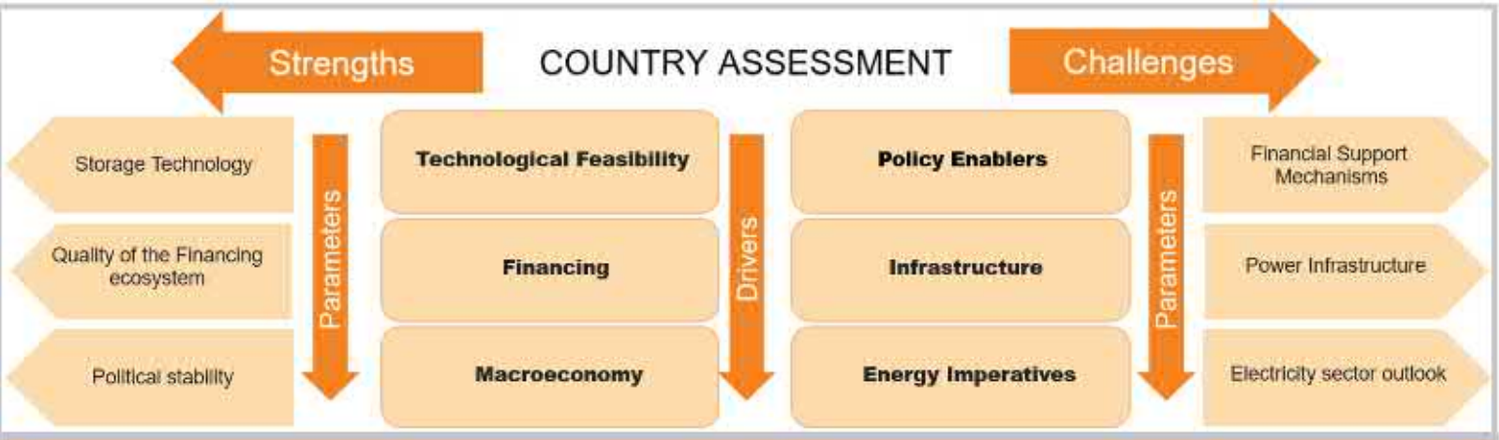


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.

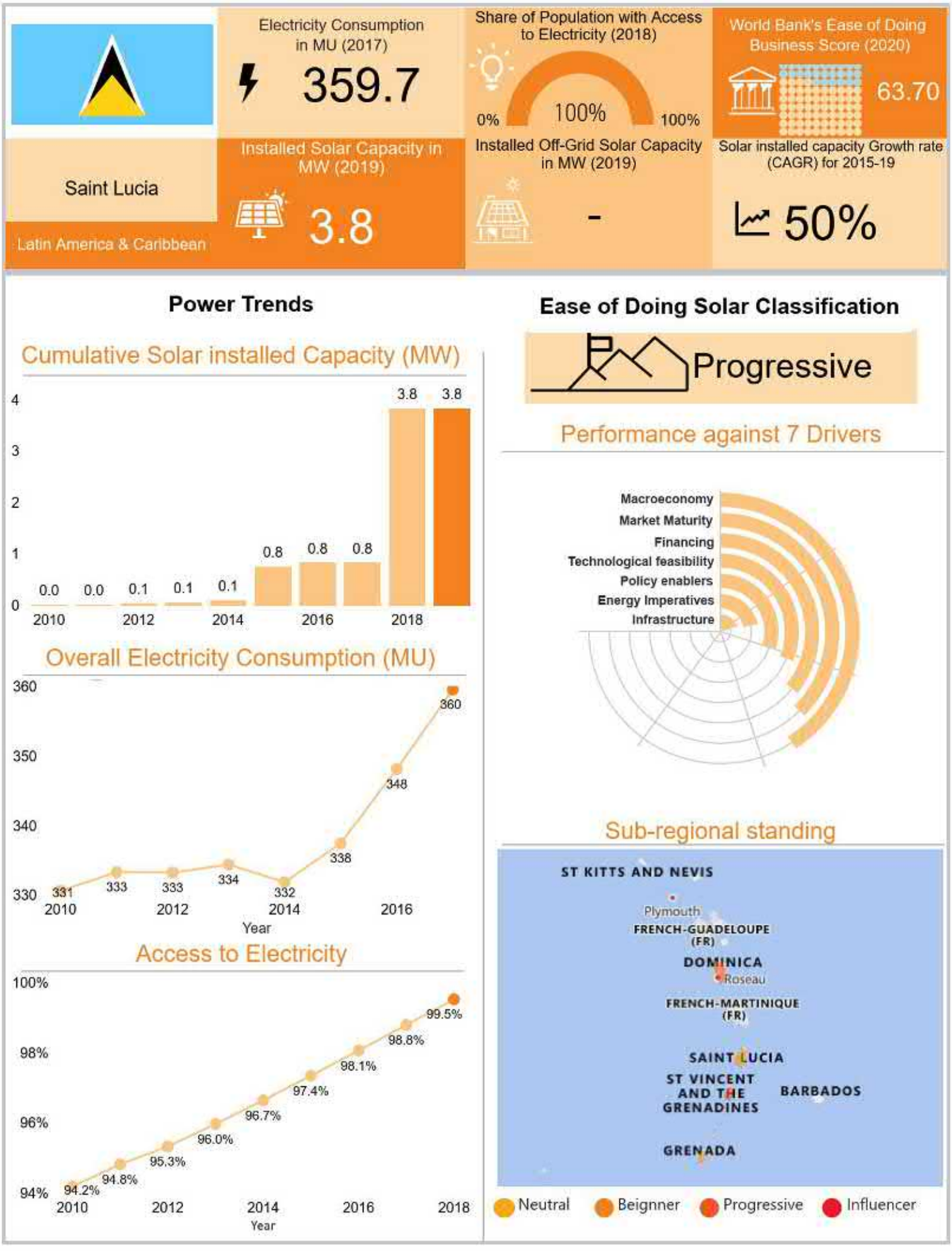


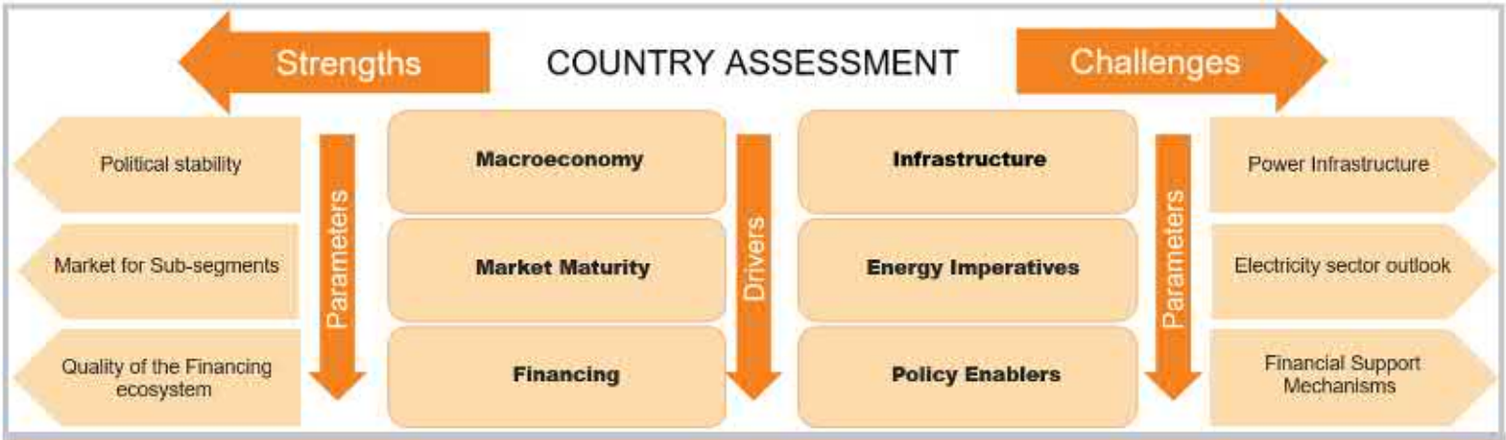
Drivers	Insights
Macro-economy	• GDP (at current prices) has grown at an annual rate of 10.1% in 2019.[10] • In the last two decades, Rwanda has made reasonable economic growth with GDP (at current prices) rising from USD 8.58 billion in 2015 to 10.12 billion in 2019 with a CAGR of 4.2%.[2,3]
Policy enablers	• In 2015, the Government had announced an 18% VAT exemption for renewable energy products with a special focus on wind and solar to boost renewable energy.[18] • Government has a strong enabling environment to attract investment in the energy sector through instruments in place such as Investment code, PPP law, favourable tax incentive, electricity law, simplified licensing framework for isolated grids, Ministerial guideline for standards for solar home systems etc.[20] • Government of Rwanda aims to ramp up its generation capacity to 512 MW by 2023-24 with an objective to increase the share of solar in the energy mix.[1] • Rwanda has set a a target of having 60% of the generation mix from renewables.
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 5.08 kWh/m^2/day and specific yield of 4.08 kWh/kWp, strong technical feasibility is envisaged for solar projects in Rwanda.[4] • The "National Electricity Strategy" (2008-20) aims to install 30,000 solar water heaters to reduce annual wood consumption as fuel for water heating.[1]
Market Maturity	• The Power sector is regulated by Rwanda Utilities Regulatory Authorities (RURA). The Power utilities are partially unbundled and managed by state-owned utility Rwanda Energy Group through its subsidiaries Energy Development Corporation Limited and Energy Utility Corporation Limited.[14] • Rwanda is an active member of the Eastern African Power Pool which aims to optimize the available energy resources and reduce electricity cost in the region.[6] • The Electricity Access Rollout Programme (EARP) aims to achieve universal electricity access by 2024. Currently, 54% of the population has access to electricity of which 14% is electrified using off-grid solutions dominated by solar home systems.[15,16] • Solar constituted 5.5% of the total installed capacity of 216 MW in 2016.[1]
Infrastructure	• Currently, more than 500 kms of transmission lines are under construction / procurement to strengthen the regional electricity trade.[1] • USD 7 billion investments are estimated to be required in generation, transmission and distribution infrastructure between 2013 and 2025 to increase the capacity and meet the growing future demand.[1] • Off-grid & mini-grid segments have received funding of EUR 177 Mn. from the European Union in 2016.[17] • The Government of Rwanda, Mara Corporation Ltd, and SB Energy Corp have signed an MoU in 2018 to develop a 30 MW solar power plant with a storage facility.
Financing	• The country has a stable outlook with a credit rating of B2 in 2018.[7] • According to UNCTAD's World Investment Report 2020, FDI inflows has increased from USD 382 million in 2018 to USD 420 million in 2019.[13] • In 2018, the Government of Rwanda had announced funding to support local lending and co-finance renewable energy projects in the country.[12] • The Government of Rwanda has signed a USD 48.9 million funding agreement with the World Bank, in 2017, to provide affordable loans to purchase solar energy-based systems.[9]
Energy Imperatives	• Per capita electricity consumption of 30 kWh is the lowest within the East African sub-region.[1] • Owing to numerous rivers, Hydropower is the primary source for electricity generation with a 46.8% share of total electricity generation in 2017.[1] • Rwanda has an electricity tariff of USD 0.22 per kWh, which is highest in the Eastern African region.1 • Rwanda Energy Group's strategic plan for 2019-24 aims to reduce electricity losses to 15% by 2024 (currently at 19.4%).[21]


Saint Kitts and Nevis
Latin America & Caribbean
Electricity Consumption in MU (2017)
181.5
Installed Solar Capacity in MW (2019)
1.9
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
-
World Bank's Ease of Doing Business Score (2020)
54.60
Solar installed capacity Growth rate (CAGR) for 2015-19
8%
Power Trends
Cumulative Solar installed Capacity (MW)
2.0
1.5
1.0
0.5
0.0
0.00
0.02
0.02
0.36
1.44
1.44
1.94
1.94
1.94
1.94
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
190
185
180
177.9
182.9
178.9
180.0
180.0
183.8
189.4
181.5
2010
2012
2014
2016
Year
Access to Electricity
100.0%
99.9%
99.8%
99.7%
99.7%
100.0%
100.0%
100.0%
100.0%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Technological feasibility
Financing
Macroeconomy
Market Maturity
Energy Imperatives
Infrastructure
Policy enablers
Sub-regional standing
TURKS AND CAICOS ISLANDS (UK)
HAITI
DOMINICAN REPUBLIC
Charlotte Amalie
PR (US)
ANGUILLA (UK)
ST KITTS AND NEVIS
Plymouth
Basse-Terre
DOMINICA
Fort-de-France
ST VINCENT AND THE GRENADINES
Bridge
GRENADA
CURACAO
Neutral
Beignner
Progressive
Influencer

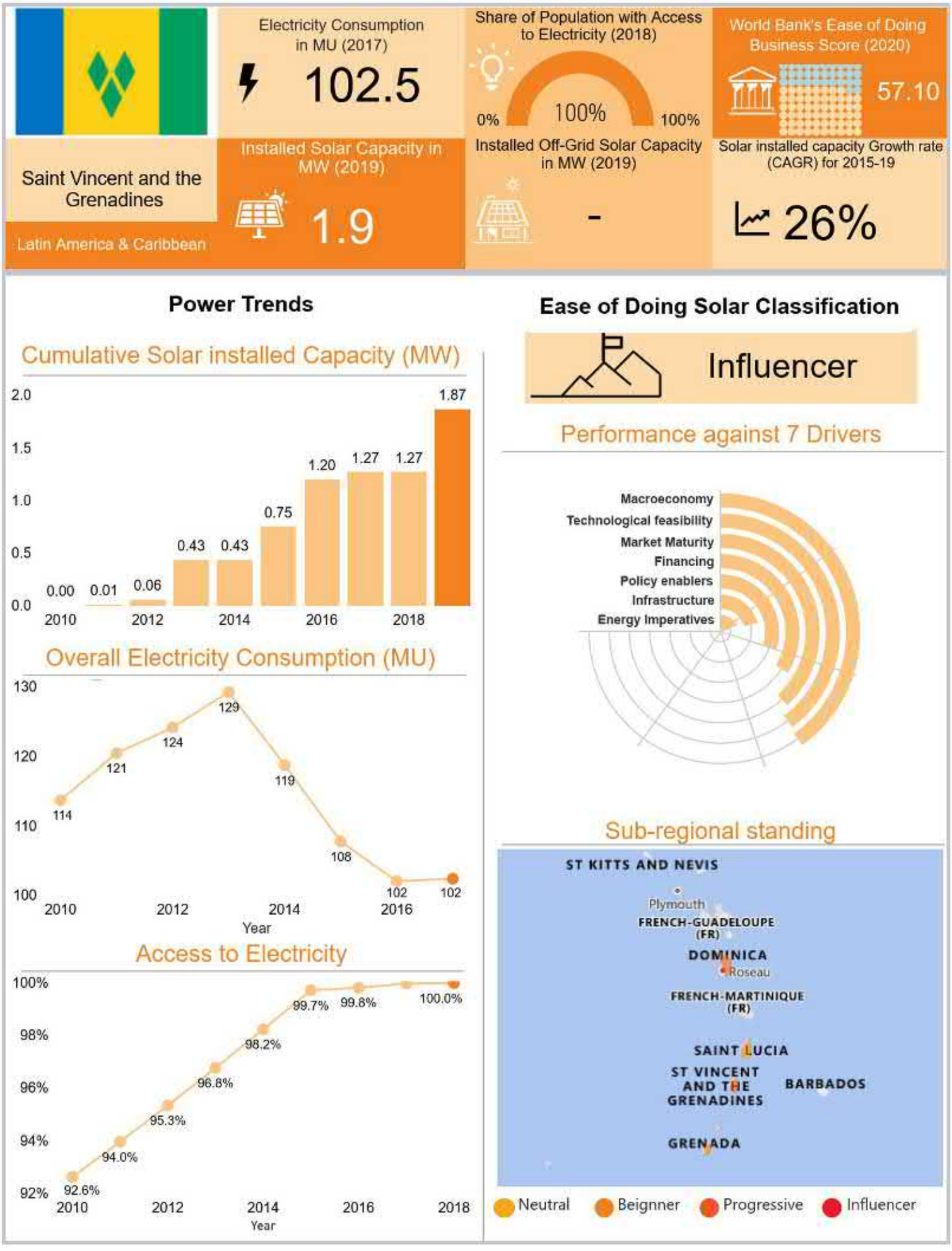


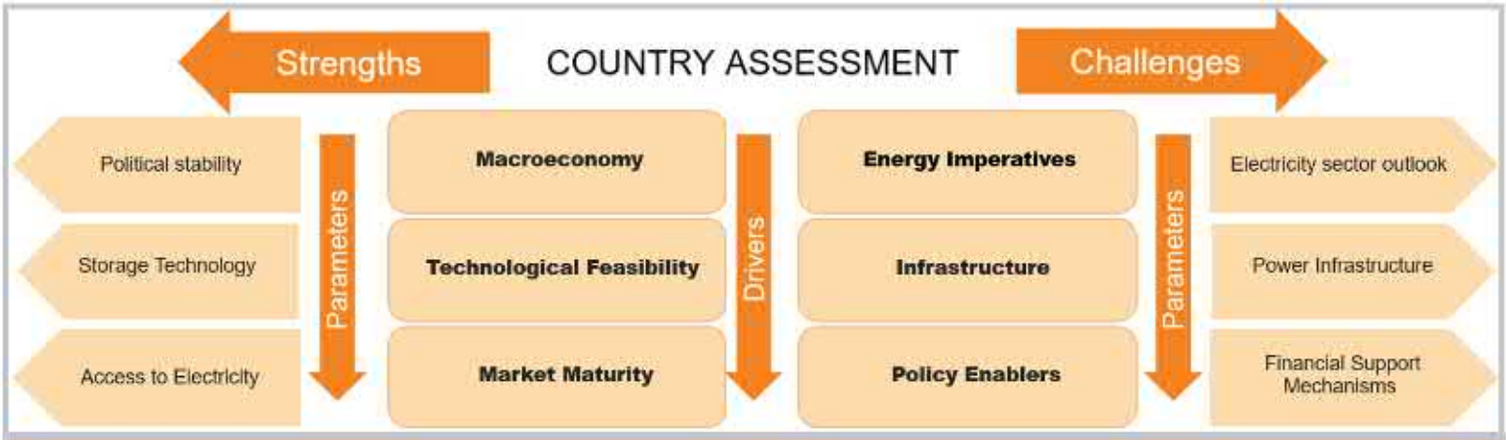
Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 2.9 % in 2019.[3] • Saint Kitts and Nevis is a high-income country with GDP per capita of 19,896 USD in 2019.[2,7] • Tourism and Agriculture are the major contributors to the country's economy.[17] • The GDP (current) is recorded USD 1.05 billion in 2019.[1]
Policy enablers	• Under the "Paris Intended National Determined Contributions (INDC) agreement 2015", the government has set a target to generate 50% of the country's electricity from renewables by 2030.[12] • Measures such as Import duty exemptions on solar energy equipment and fifteen-year tax holiday for RE investors has created a favourable environment for the RE sector.[11] • The absence of grid interconnection standards, net metering for grid connected RE generation are limiting the participation of global technology players in the solar market.[11]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.58 kWh/m^2/day and specific yield of 4.64 kWh/ kWp, strong technical feasibility is envisaged for solar projects in Saint Kitts and Nevis.[4]
Market Maturity	• There is no independent energy regulator in the country. St. Kitts Electricity Company Ltd. (SKELEC) in St. Kitts and Nevis Electricity Company Ltd. (NEVLEC) in Nevis are two entities that generate, transmit, and distribute electricity in the country.[6] • Saint Kitts and Nevis has achieved 100% access to electricity in 2010.[7] • Solar PV capacity is expected to increase from 2 MW in 2019 to 40.2 MW in 2030 at a CAGR of 34.9%.[9] • In 2019, the government partnered with Swiss energy storage company LeclanchE SA to build a 35.6 MW solar plant with 44.2 MWh battery storage which is expected to be completed by end of 2020.[9]
Infrastructure	• The interconnection of islands by national gird is a major challenge.[10] • Electricity system losses stand at 17% and 20.3% of output for St. Kitts and Nevis respectively which are slightly on the higher side.[5] • To meet the rising future demand, the government is planning to increase the total installed capacity from 64.9 MW in 2019 to 138.6 MW by 2030 at a CAGR of 34.9%.[9] • The European Union has signed a Budget Support Program with Saint Kitts and Nevis in 2019 and will provide USD 5.6 million in funding for the development of the renewable energy sector in the country.[9]
Financing	• According to UNCTAD's World Investment Report 2020, FDI inflows has increased from USD 85 million in 2018 to USD 92 million in 2019.[13] • Saint Kitts and Nevis has recorded a current account balance of -1.7 % of GDP and -0.2% inflation in 2019.[14] • Saint Kitts and Nevis has an Ease of Doing score of 54.6 (out of 100) and ranks 139th among 190 countries in 2020. Businesses face challenges in getting credit, construction permits, enforcing contracts, access to electricity, paying taxes, and trading across borders.[16] • All the banks are fully compliant with the IFRS standards.[15]
Energy Imperatives	• Per capita consumption of ~3700 kWh is comparable to the global average as of 2019.[8] • With economic and population growth, the annual electricity consumption is expected to grow from 184.7 GWh to 224.9 GWh in 2019-2030 period with a CAGR of 1.8%.[9] • The electricity tariff in 2015 is USD 0.26 per kWh, which is relatively low as compared to the Caribbean national average of USD 0.33 per kWh.[6] • Imported oil is the primary source of electricity generation with a 94.3% share in the total installed capacity of 64.9 MW in 2018.[9]


Saint Lucia
Latin America & Caribbean
Electricity Consumption in MU (2017)
359.7
Installed Solar Capacity in MW (2019)
3.8
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
-
World Bank's Ease of Doing Business Score (2020)
63.70
Solar installed capacity Growth rate (CAGR) for 2015-19
50%
Power Trends
Cumulative Solar installed Capacity (MW)
4
3
2
1
0
0.0
0.0
0.1
0.1
0.1
0.8
0.8
0.8
3.8
3.8
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
360
350
340
330
331
333
333
334
332
338
348
360
2010
2012
2014
2016
Year
Access to Electricity
100%
98%
96%
94%
94.2%
94.8%
95.3%
96.0%
96.7%
97.4%
98.1%
98.8%
99.5%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Macroeconomy
Market Maturity
Financing
Technological feasibility
Policy enablers
Energy Imperatives
Infrastructure
Sub-regional standing
ST KITTS AND NEVIS
Plymouth
FRENCH-GUADELOUPE (FR)
DOMINICA
Roseau
FRENCH-MARTINIQUE (FR)
SAINT LUCIA
ST VINCENT AND THE GRENADINES
BARBADOS
GRENADA
Neutral
Beignner
Progressive
Influencer



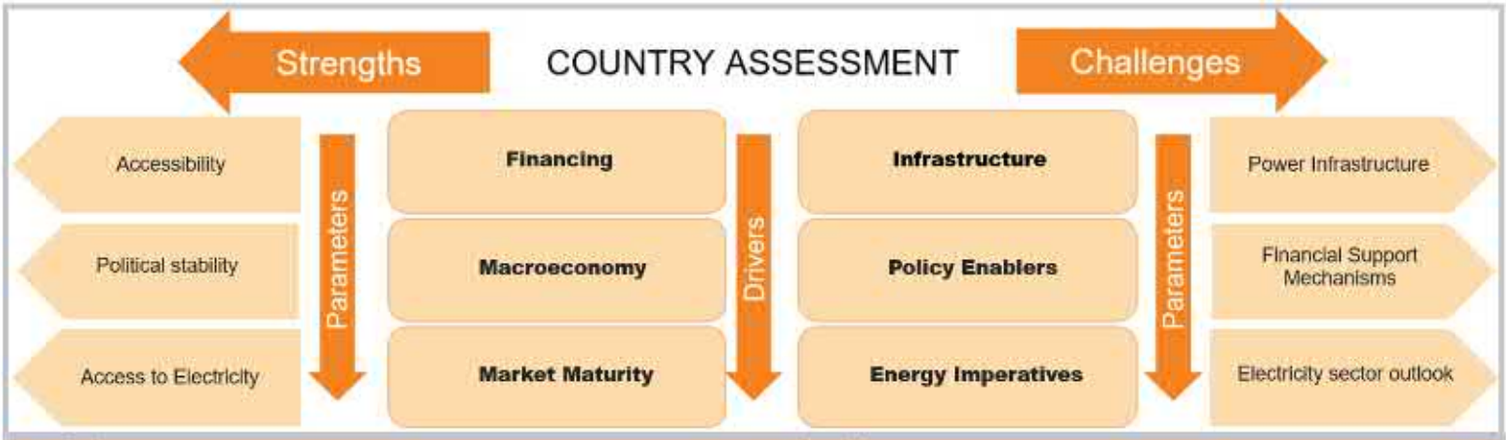
Drivers	Insights
Macro-economy	• GDP (at current prices) has grown at an annual growth rate of 1.7% (in 2019).[9,10] • Country's economy relies heavily on tourism and agriculture (mainly bananas) which are the primary drivers of the economy.[5]
Policy enablers	• The government has set target to generate 35% of the country's energy from renewables by 2020 and 50% by 2030.[6] • As per National Energy Policy, Saint Lucia aims to reduce electricity costs and ensure energy independence through increased adoption of renewable energy.[3] • Introduced in 2009, Net metering is catalysing the growth of solar PV in the country.[3] • Import duty exemptions and Income tax deductions for RE projects will encourage use and generation of renewable energy.[3]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.4 kWh/m^2/day and specific yield of 4.52 kWh/kWp, strong technical feasibility is envisaged for solar projects in Saint Lucia.[13] • Saint Lucia has nearly 100% dependence on costly fuel imports which makes a strong business case for increasing solar contribution in the energy mix.
Market Maturity	• The Power Sector in Saint Lucia is regulated by National Utilities Regulatory Commission (NURC). The electricity system of Saint Lucia is wholly operated by the privately-owned firm, St Lucia Electricity Services Ltd (LUCELEC).[3] • 100% population in Saint Lucia has access to electricity as of 2018.[12]
Infrastructure	• Investments, in the existing grid, would be required to support safe and reliable integration of renewable energy.[1] • Land acquisition, the permitting process and the policy adjustments are among the major challenges delaying major renewable energy projects in Saint Lucia.[11] • 47 MW of Renewable energy power plants are under planning and construction phases.[3]
Financing	• There is a lack of policy and financial instruments to drive the uptake of Renewable Energy technologies.[3] • Saint Lucia is opening its market to enable private sector investments.
Energy Imperatives	• Imported oil is the primary source of energy thereby making the country's economy vulnerable to global oil price fluctuations that directly impact the cost of electricity.[3] • The volcano that sits in the middle of Saint Lucia is among the largest natural source of energy (geothermal) with a potential of 170 MW.[1] • Solar has only 4% share in installed capacity (total installed capacity of 92.5 MW), despite having 36 MW potential.[3]


Saint Vincent and the Grenadines
Latin America & Caribbean
Electricity Consumption in MU (2017)
102.5
Installed Solar Capacity in MW (2019)
1.9
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
-
World Bank's Ease of Doing Business Score (2020)
57.10
Solar installed capacity Growth rate (CAGR) for 2015-19
26%
Power Trends
Cumulative Solar installed Capacity (MW)
2.0
1.5
1.0
0.5
0.0
0.00
0.01
0.06
0.43
0.43
0.75
1.20
1.27
1.27
1.87
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
130
120
110
100
114
121
124
129
119
108
102
102
2010
2012
2014
2016
Year
Access to Electricity
100%
98%
96%
94%
92%
92.6%
94.0%
95.3%
96.8%
98.2%
99.7%
99.8%
100.0%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Macroeconomy
Technological feasibility
Market Maturity
Financing
Policy enablers
Infrastructure
Energy Imperatives
Sub-regional standing
ST KITTS AND NEVIS
Plymouth
FRENCH-GUADELOUPE (FR)
DOMINICA
Roseau
FRENCH-MARTINIQUE (FR)
SAINT LUCIA
ST VINCENT AND THE GRENADINES
BARBADOS
GRENADA
Neutral
Beignner
Progressive
Influencer

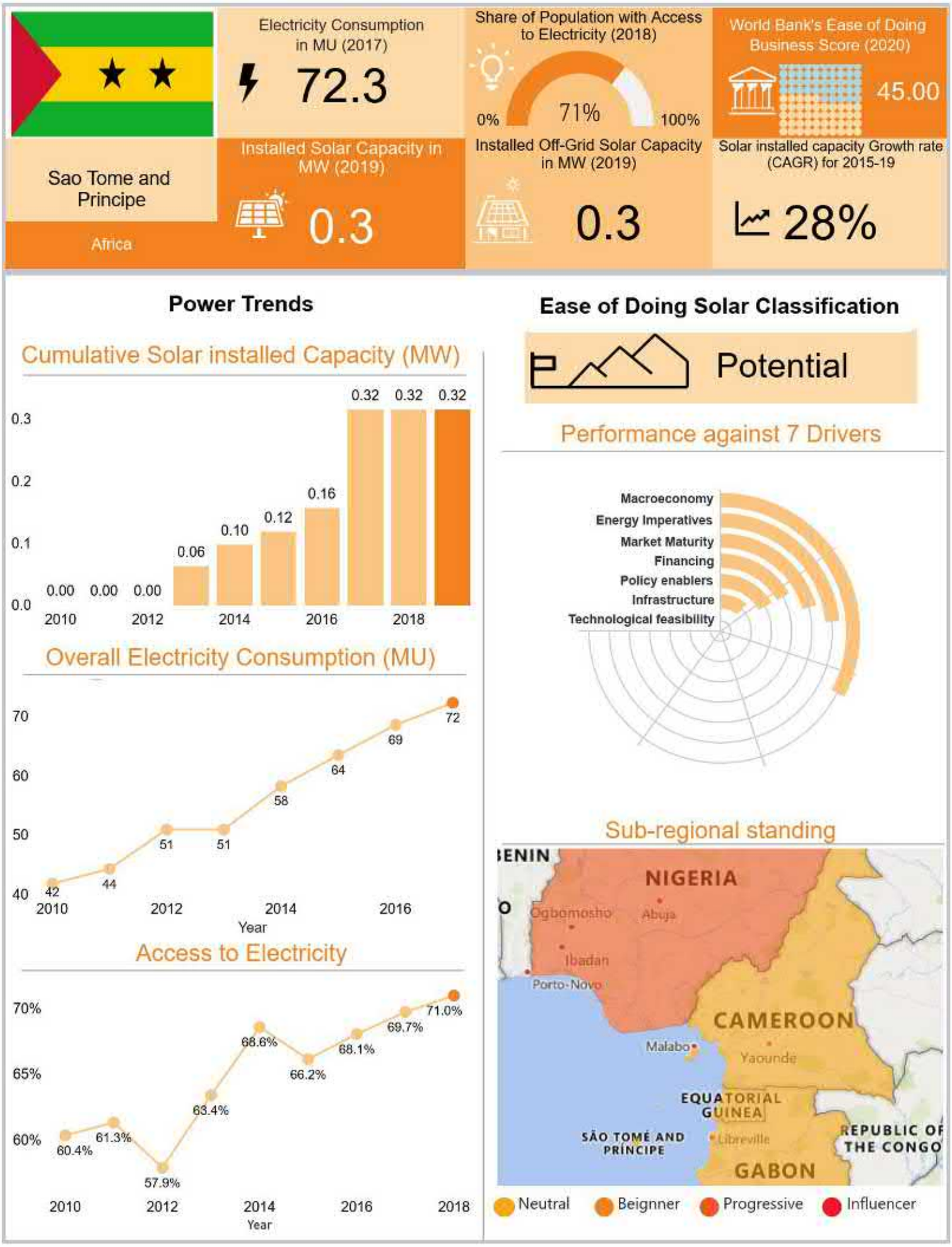


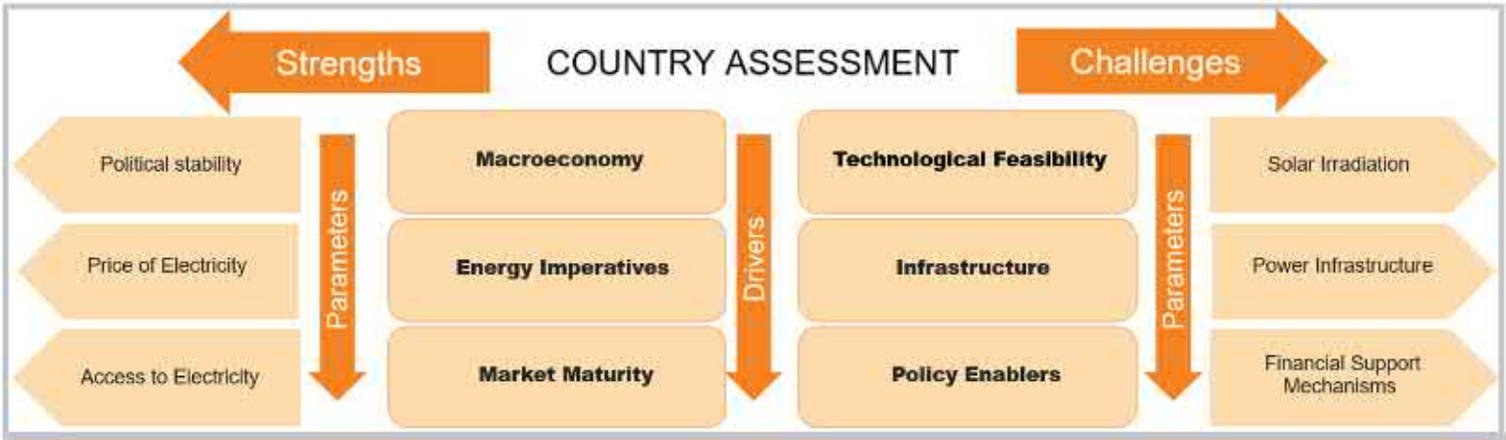
Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual growth rate of 0.4% in 2019.[3] • Saint Vincent and Grenadines is an upper middle-income country with GDP (Real) per capita of 7,463 USD in 2019.[11,12] • Agriculture, tourism and construction activity are the major contributors to the economy.[5]
Policy enablers	• The National Energy Action Plan 2010 targets to generate 60% of the country's electricity from renewables by 2020.[4] • Introduced in 2009, Net metering is catalysing the growth of solar PV in the country.[4] • Tax rebates to solar collectors, solar electricity-generating equipment and other equipment will encourage use and generation of renewable energy.[2] • Absence of interconnection standards for grid connected RE generation are limiting the participation of global technology players in the solar market.[4]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.19 kWh/m^2/day and specific yield 4.26 kWh/ kWp, strong technical feasibility is envisaged for solar projects in the country.[17]
Market Maturity	• There is no independent energy regulator in the country. St Vincent Electricity Services Ltd. (VINLEC) is a sole entity which generates, transmits, and distributes electricity in the country.[4] • Saint Vincent and Grenadines had achieved 100% electrification in 2016.[11] • Solar PV capacity is expected to increase from 1.9 MW in 2019 to 4.8 MW in 2030, growing at a CAGR of 9.0%.[2] • VINLEC has signed a contract with solar energy firms, in 2018, to start the engineering, procurement and construction for the utility's first solar battery storage micro grid.[2] • Per capita consumption of 900 kWh is relatively low in comparison to the global average.[10]
Infrastructure	• The interconnection of islands by national gird is a major challenge.[2] • Electricity system losses stand at 7% of output, indicating a considerably better quality of network.[7] • The Caribbean Development bank has provided a funding of USD 27 million, in 2019, for the geothermal energy drilling project to increase the share of renewable energy in generation mix.[2] • The Government plans to increase total installed capacity from 58.1 MW in 2019 to 71.1 MW by 2030 to meet the rising future demand.[2]
Financing	• Country has a credit rating of B3 with stable outlook in 2020, indicating a robust business environment.[13] • FDI inflows have increased from USD 100 million in 2018 to USD 113 million in 2019.[14] • Public debt is 47.4% of the GDP at the end of 2017.[15,16] • IMF has projected that the current account deficit is expected to decrease from 16% of GDP in 2018 to 12% of GDP in 2022 on account of rise in exports of goods and services and lower dependence on imported fossil fuels by 2022.[16]
Energy Imperatives	• Imported oil is the primary source for electricity generation with 83% share in the total installed capacity of 57.5 MW in 2018.[2] • The annual electricity consumption is expected to grow from 150.9 MUs to 199.6 MUs in 2019-2030, growing at a CAGR of 2.6%.[2] • The electricity tariff, for residential consumers, is relatively low (USD 0.26 per kWh) as compared to the Caribbean national average of USD 0.33 per kWh.[4] • Only 10-15 MW of geothermal power will be harnessed in near future despite having high potential of 890 MW.[2]


Samoa
Asia & Pacific
Electricity Consumption in MU (2017)
133.0
Installed Solar Capacity in MW (2019)
13.5
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.01
World Bank's Ease of Doing Business Score (2020)
62.10
Solar installed capacity Growth rate (CAGR) for 2015-19
30%
Power Trends
Cumulative Solar installed Capacity (MW)
15
10
5
0
0.0
0.0
0.0
0.2
3.1
4.8
7.2
13.5
13.5
13.5
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
140
120
100
80
92
90
93
93
107
116
134
133
2010
2012
2014
2016
Year
Access to Electricity
100%
99%
98%
97%
96.7%
97.3%
98.2%
97.9%
99.7%
99.9%
96.8%
100.0%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Financing
Macroeconomy
Market Maturity
Technological feasibility
Energy Imperatives
Policy enablers
Infrastructure
Sub-regional standing
TUVALU
TOKELAU (NZ)
SAMOA
Apia
AS (US)
WALLIS AND FUTUNA (FR)
FIJI
Suva
NIUE (NZ)
Neutral
Beignner
Progressive
Influencer

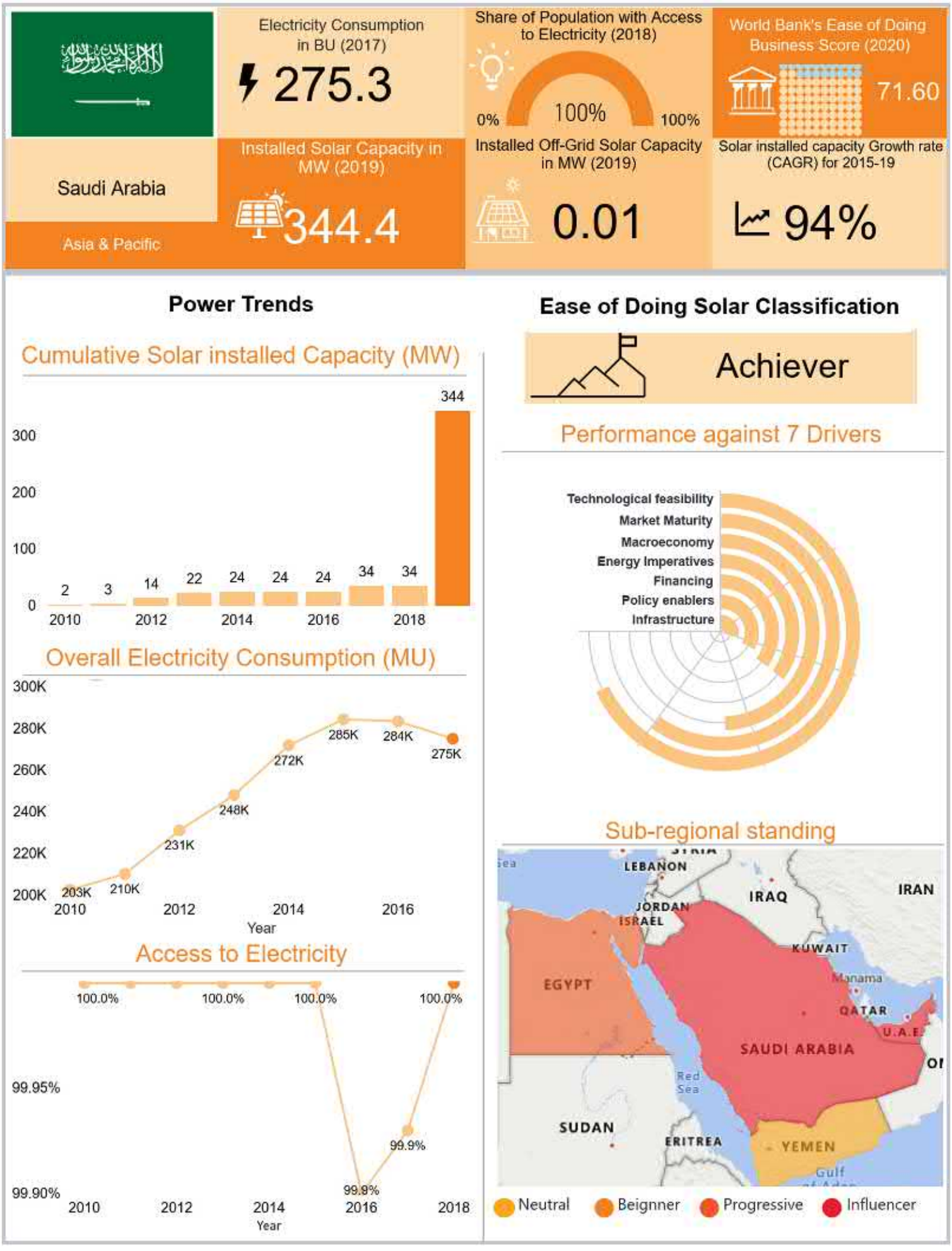


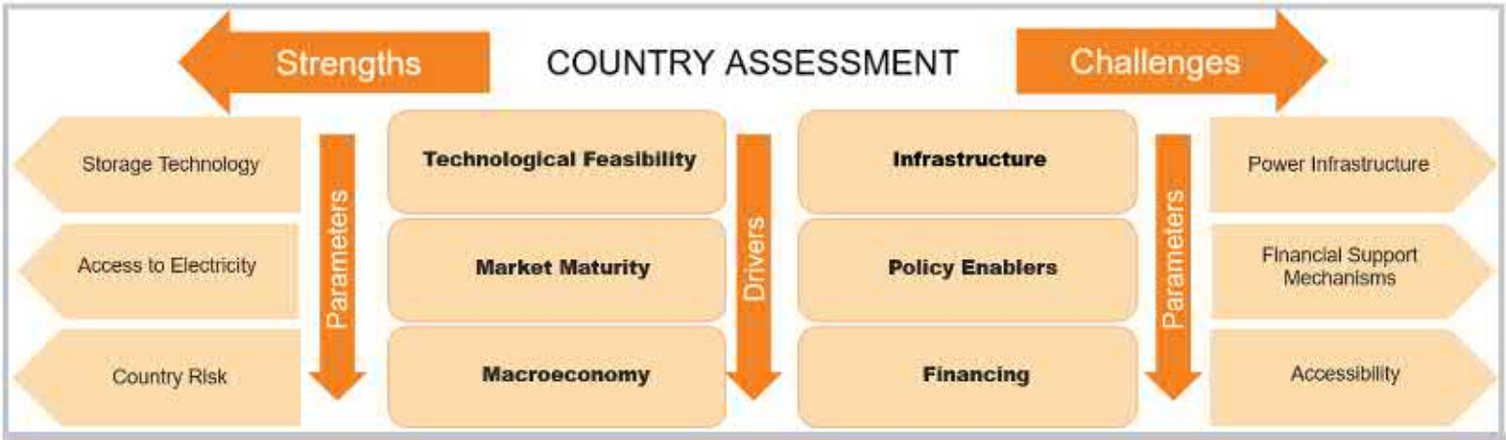
Drivers	Insights
Macro-economy	• GDP (at current prices) grew, at a rate of 3.5%, to USD 850.655 million in 2019.[4,5] • The economy primarily relies on agriculture, manufacturing, tourism and remittances from Samoans living overseas.[8] • Samoa's GDP per capita was USD 4,315 in 2019.[10,6]
Policy enablers	• In March 2013, the Government of Samoa (GoS) and the New Zealand Ministry of Foreign Affairs (NZ MFAT) agreed to work in partnership to increase the generation from RE sources in Samoa.[7] • Electric Power Corporation (EPC) has developed interconnection agreements that allow private consumers to install their own small-scale renewable power systems.[8]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation (GHI) of 4.78 kWh/m^2/day and specific yield of 3.93 kWh/kWp, a moderate technical feasibility is envisaged for solar projects in Samoa.[2] • The Renewable Energy Division of the Ministry of Natural Resources and Environment (MNRE) undertakes feasibility studies and research into renewable energy sources for Samoa.[8]
Market Maturity	• 100% of population had access to electricity as of 2018.[3] • EPC, an autonomous government owned Corporation, is responsible for the generation, transmission, distribution and sale of electricity in Samoa.
Infrastructure	• Investments in solar PV capacity of 200 kW in Opulu and 150 kW in Savaii are being undertaken with assistance from Japan and the Asian Development Bank.[8]
Financing	• International financial flow in 2017 was USD 2 million (in PPP terms) to support clean and renewable energy.[3] • Domestic Credit Provided by banking sector is 78.7% of GDP as of 2017.[6] • The country's four commercial banks provide almost 60% of credit to the economy, while the Samoa National Provident Fund and the Development Bank of Samoa account for approximately 30% of credit.[6] • The Central Bank of Samoa (CBS) is the country's monetary authority and primary regulator of financial institutions.[6] • From 2011 to 2017, credit supply to service industries grew at an average of 11% per year.[6] • The National Financial Inclusion Strategy, 2017–2020 (NFIT n.d.), by the Central Bank of Samoa has been implemented to increase access and usage of financial services.[6] • The IMF (in 2019) emphasized the importance of completing reforms, particularly the strengthening of the regulatory and supervisory framework, the development of a framework for governance and performance of public financial institutions and the establishment of a credit bureau in the country.[6]
Energy Imperatives	• Samoa's Per capita electricity consumption of 688 kWh as of 2019 is relatively low in comparison to the global average.[1] • Samoa has more than doubled renewable energy capacity since 2013 from 7.5 MW to 15.4 MW in 2016.[9] • Project "IMPRESS (Improving the Performance and Reliability of Renewable Energy Power System in Samoa)" funded through the Global Environment Facility (GEF) with USD 6.07 million and USD 46 million co-financing by the Government of Samoa aims to enhance sustainable and cost-effective energy production in Samoa. The project is set to support national efforts towards achieving 100% RE electricity generation by 2025. • A goal of Samoa's Energy Sector Plan is to "promote the use of indigenous energy resources and renewable energy technologies".[8]


Sao Tome and Principe
Africa
Electricity Consumption in MU (2017)
72.3
Installed Solar Capacity in MW (2019)
0.3
Share of Population with Access to Electricity (2018)
0%
71%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.3
World Bank's Ease of Doing Business Score (2020)
45.00
Solar installed capacity Growth rate (CAGR) for 2015-19
28%
Power Trends
Cumulative Solar installed Capacity (MW)
0.3
0.2
0.1
0.0
0.00 0.00 0.00 0.06 0.10 0.12 0.16 0.32 0.32 0.32
2010 2012 2014 2016 2018
Overall Electricity Consumption (MU)
70
60
50
40
42 44 51 51 58 64 69 72
2010 2012 2014 2016
Year
Access to Electricity
70%
65%
60%
60.4% 61.3% 57.9% 63.4% 66.2% 68.6% 68.1% 69.7% 71.0%
2010 2012 2014 2016 2018
Year
Ease of Doing Solar Classification
Potential
Performance against 7 Drivers
Macroeconomy
Energy Imperatives
Market Maturity
Financing
Policy enablers
Infrastructure
Technological feasibility
Sub-regional standing
BENIN
NIGERIA
Ogbomosho
Abuja
Ibadan
Porto-Novo
CAMEROON
Malabo
Yaounde
EQUATORIAL GUINEA
SÃO TOMÉ AND PRÍNCIPE
Libreville
GABON
REPUBLIC OF THE CONGO
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• GDP (at current prices) is estimated at US$ 429 million and has grown at an annual growth rate of 1.3% in 2019.[3,8] • The Republic of Sao Tome and Principe performs better than the Sub-Saharan Africa average on the UNDP Human Development index and has made significant progress improving other social indicators.[4] • Country's growth is driven by agriculture, tourism and oil-fuelled foreign direct investment of which tourism contributes to approximately 32.9% of GDP.[4,9]
Policy enablers	• The World Bank had approved a USD 16 million project financing from International Development Association (IDA) in 2016. This funding aims at increasing renewable energy generation and improve the reliability of the electricity supply in the country.[4] • Government has targeted to achieve 50% of energy from renewable sources, in the generation mix, by 2030. ALER (Associação Lusófona de Energias Renováveis) has been working together with its member-the Ministry of Infrastructure, Natural Resources and Environment (MIRNA) to achieve this goal.[12] • The World Bank's Energy Sector Management Assistance Program (ESMAP) has provided technical assistance through its "Small Islands Developing State Multi Donor Trust Fund (SIDS DOCK MDTF)" with funding from Denmark and Japan to help improve (Empresa de Agua e Electricidade) EMAE's capacity and quality of services to distribute power and increase energy access to the population in the country.[7]
Technological Feasibility	• Owing to moderate levels of average solar irradiation (GHI) of 4.3 kWh/m2/day and specific yield of 3.46 kWh/kWp, a moderate technical feasibility is envisaged for solar projects in Sao Tome and Principe.[2] • Several major studies in Sao Tome and Principe considered innovative solutions to increase capacity and availability of electricity services; A Least Cost Power Development Plan (LCPDP) has been prepared.[4]
Market Maturity	• 71% of population had access to electricity as of 2018 and the country targets to achieve universal access by 2030.[5,6] • As of 2017, renewable energy share in total final energy consumption is 38%.[5] • As of 2019, Solar contributed 12% in total renewable capacity in the country.[11]
Infrastructure	• Transmission and distribution networks are old and poorly maintained leading to high technical losses.[7] • The interconnected power generation infrastructure in the Island nation is limited and diesel consumption, by oil fired power plants, constitutes a large portion of the operating expenses.[13] • The Global Environment Facility (GEF) funded project "Strategic program to promote renewable energy and energy efficiency investments in the electricity sector of São Tomé and Príncipe" is implemented by UNIDO in partnership with the Ministry of Public Works, Infrastructure, Natural Resources and Environment (MOPIRNA). The project contributes to the Vision 2030 "São Tomé e Príncipe 2030: the country we need to build" that aims to transform the country into a climate-resilient and vibrant island hub.[6]
Financing	• Country's Power Sector Recovery Project was approved in 2016 with a commitment amount of USD 16 million. The project aims to increase renewable energy generation and improve the reliability of the electricity supply.[10] • The current portfolio, funded by International Development Association (IDA), of power sector related projects had commitments of USD 80 million of which nearly 28% is disbursed.[4] • Growth was boosted by higher public investment which averaged EUR 43.7 million (about 12% of GDP) in 2017-18 as new externally financed projects began.[9]
Energy imperatives	• Per capita electricity consumption of 419 kWh is significantly lower in comparison to the global average.[1] • As of 2018, 56% of rural population had access to electricity.[5] • Total installed capacity in the country was 48 MW in 2019 which includes 2 MW of hydro capacity.[11] • Currently the country has one of the highest power generation costs in Sub Sahara Africa.[6]


Saudi Arabia
Asia & Pacific
Electricity Consumption in BU (2017)
275.3
Installed Solar Capacity in MW (2019)
344.4
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.01
World Bank's Ease of Doing Business Score (2020)
71.60
Solar installed capacity Growth rate (CAGR) for 2015-19
94%
Power Trends
Cumulative Solar installed Capacity (MW)
344
300
200
100
0
2
3
14
22
24
24
24
34
34
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
300K
280K
260K
240K
220K
200K
203K
210K
231K
248K
272K
285K
284K
275K
2010
2012
2014
2016
Year
Access to Electricity
100.0%
100.0%
100.0%
100.0%
99.95%
99.90%
99.9%
99.9%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Achiever
Performance against 7 Drivers
Technological feasibility
Market Maturity
Macroeconomy
Energy Imperatives
Financing
Policy enablers
Infrastructure
Sub-regional standing
LEBANON
IRAQ
IRAN
JORDAN
ISRAEL
KUWAIT
EGYPT
Manama
QATAR
U.A.E.
SAUDI ARABIA
Red Sea
SUDAN
ERITREA
YEMEN
Gulf
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• Saudi Arabia is a high-income economy. It is the leading producer of Oil in the world.[1] • GDP (Real) has grown at an annual rate of 0.3% in 2019.[2] • The economy of Saudi Arabia largely depends on oil production: limited diversification is a key challenge.[3]
Policy enablers	• The National Renewable Energy Program (NREP) is a strategic initiative under Vision 2030 and the King Salman Renewable Energy Initiative; the program aims to maximize the potential of renewable energy in Saudi Arabia.[4] • The country's solar target for 2023 has been revised upwards from 5.9 GW to 20 GW and that for 2030 is set at 40 GW. • By 2030 the country aims to generate 30% of its electricity from RE sources. • Saudi offers a wide range of investor-centric incentives such as custom duty exemptions, land incentives and repatriation of Capital.[5]
Technological Feasibility	• Owing to average of 8.9 hr/day of sunshine, high average solar irradiation levels of 6.21 kWh/m^2/day and specific yield of 5.17 kWh/kWp, Solar has strong technical feasibility.6,5 • Solar-Parks are being developed in advance to boost project's bankability and expedite execution.[5]
Market Maturity	• 100% population has access to electricity as of 2018.[7] • Saudi Electricity Company is the sole authority that manages generation (directly) and transmission (through its subsidiary, the National Grid) in the country. • The power transmission system is operated according to the Saudi Arabian Grid Code which was established in 2012. • Annual electricity consumption in amounted to 114.2 BUs in 2000 which increased to 302.9 BUs in 2016 at a CAGR of 6.3%. It is expected to increase to 602.3 BUs in 2030 at a CAGR of 5%.[8]
Infrastructure	• Saudi Arabia's Finance Ministry expects to generate investments worth SR 14 billion (USD 3.7 billion) in the second and third rounds of NREP. • Saudi Arabia has become part of an interconnected grid established among Gulf countries leading to increased power reliability in the region.[8]
Financing	• Country has a negative financial outlook with a credit rating of A1 Negative as of May 2020.[9] • An investor-centric ecosystem is established by the government for private sector investors.[13] • Up to 75% of solar project financing is available as soft loans from Saudi Industrial Development Fund.[5]
Energy Imperatives	• Per capita electricity consumption, in 2019, was 10,429 kWh which is relatively high in comparison to the global average.[10] • The Solar PV capacity grew from 2 MW in 2010 to 344 MW in 2019. • 2,170 MW of renewable energy capacity is under development in the country of which 700 MW was awarded in 2019.[12]

Senegal

Africa

Electricity Consumption in BU (2017)

4.0

Share of Population with Access to Electricity (2018)

0% 67% 100%

World Bank's Ease of Doing Business Score (2020)

59.30

Installed Solar Capacity in MW (2019)

134.0

Installed Off-Grid Solar Capacity in MW (2019)

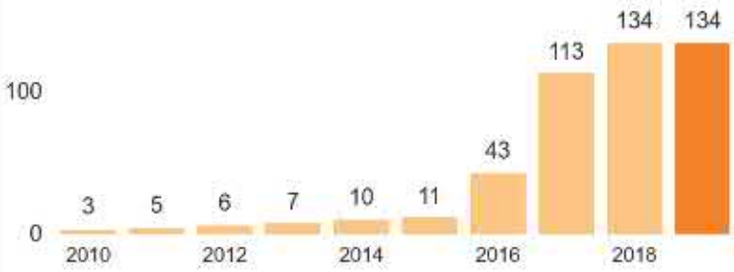
12.0

Solar installed capacity Growth rate (CAGR) for 2015-19

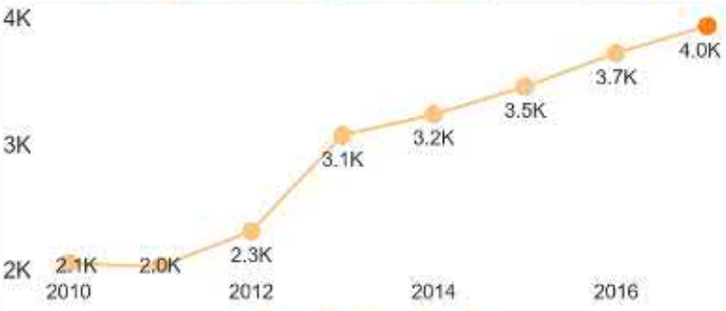
87%

Power Trends

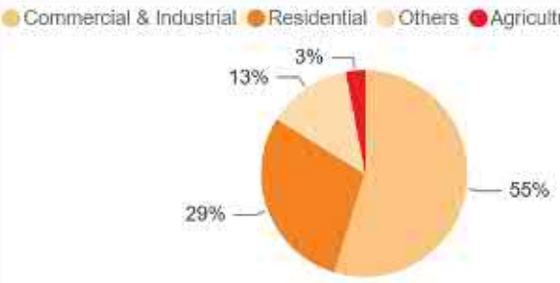
Cumulative Solar installed Capacity (MW)



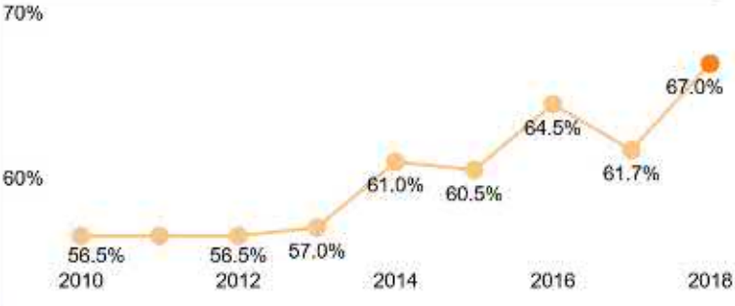
Overall Electricity Consumption (MU)



Consumer Mix



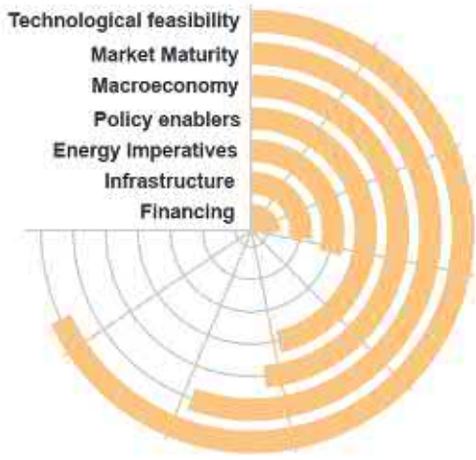
Access to Electricity



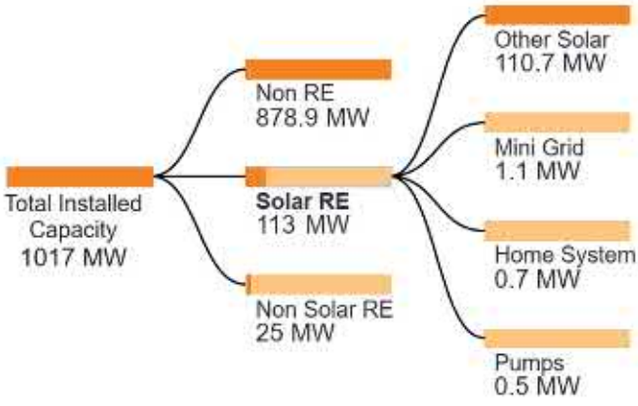
Ease of Doing Solar Classification

Influencer

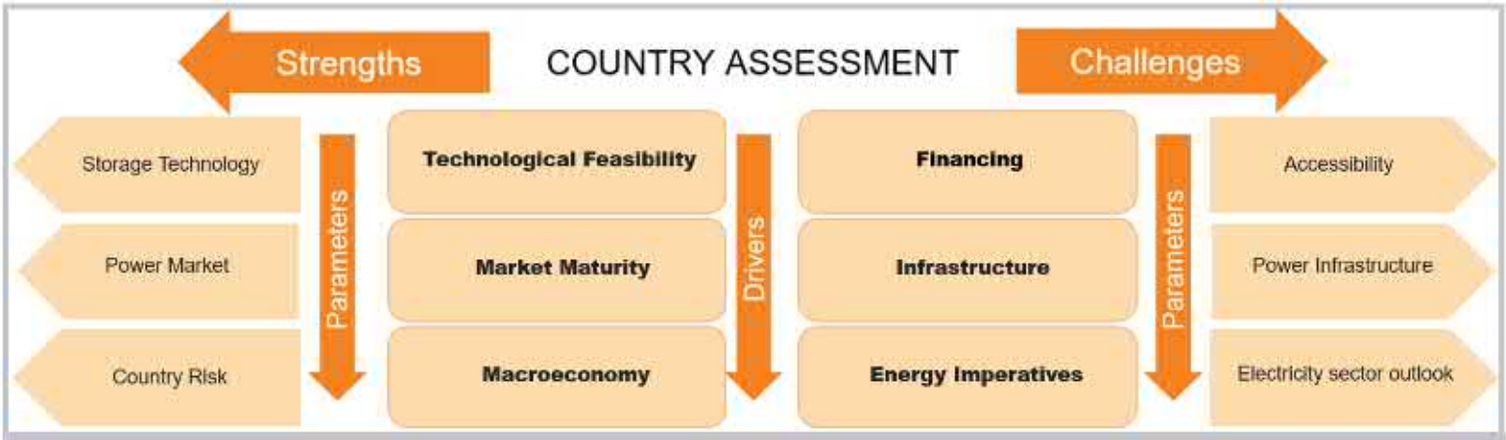
Performance against 7 Drivers



Installed Generation Capacity by Source

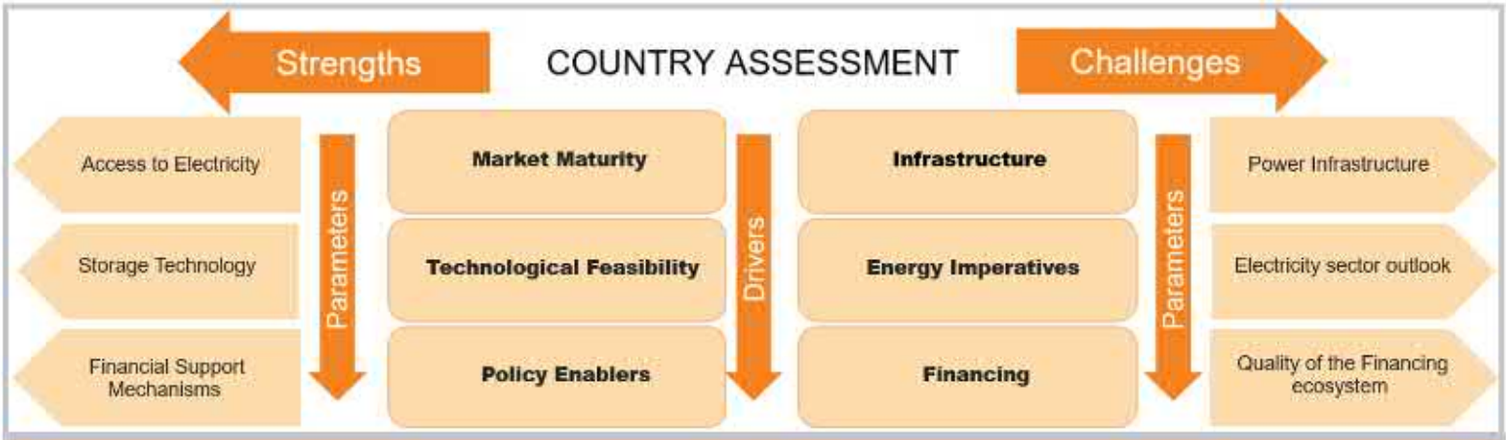


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) has grown at an annual rate of 5.3% (in 2019).[8,19] • Key industries include fishing, construction, mining and tourism sectors.[5] • It is an open economy with major trade flows to Europe and India. Senegal is largely natural resource based economy.
Policy enablers	• Senegal targets to generate at least 15% of the country's electricity from renewables by 2025.[5] • Senegal offers VAT exemptions for the renewable energy technology products.[6] • Senegal Government has set priority to reduce dependence on fossil fuels, making renewables as a strong alternative to meet electricity demand.[5]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.8 kWh/m^2/day and specific yield of 4.58 kWh/kWp, strong technical feasibility is envisaged for solar projects in Senegal.[2] • Senegal depends highly on costly imported fossil fuels for power generation, making cost of electricity vulnerable to fluctuations in fossil fuel prices.[3] • Senegal is strategically located to import economical renewable power from the West African Power Pool.
Market Maturity	• Senegal is one of the first sub Saharan African country to bring in power sector reforms in 1998. Senegal's electricity sector was unbundled into three entities – National Utility, Rural Electrification Body and an Electricity Regulatory Board.[7] • La Commission de Régulation du Secteur de l'électricité (CRSE) regulates the power sector in Senegal. Société Nationale d'électricité du Sénégal (SENELEC) transmits and distributes electricity in Senegal.[5] • 67% population has access to electricity as of 2018; country targets to achieve universal access to electricity by 2025.[1]
Infrastructure	• Investments of approximately USD 33 billion are required in electricity sector, till 2040, to increase access to electricity, expand power networks and unlock potential of renewable energy.[1] • With 46% of land earmarked for agricultural purpose, identification of suitable land for developing utility scale solar projects can be seen as an area where support is required from the Government.[12]
Financing	• Government of Senegal has invested USD 232 million for network expansion and reliability enhancement of transmission and distribution network. • L'Agence Sénégalaise d'Electrification rurale (ASER), a government agency, finances solar projects in rural areas in Senegal.[11]
Energy Imperatives	• Rural areas have 47% access to electricity, thus offering a large opportunity for off-grid-solar.[3] • Senegal is a member of the West African Economic Monetary Union (UEMOA) whose objective is to attain a target of ~82% of electricity from renewables by 2030.


Seychelles
Africa
Electricity Consumption in MU (2017)
469.9
Installed Solar Capacity in MW (2019)
3.5
Share of Population with Access to Electricity (2018)
0%
100%
100%
Installed Off-Grid Solar Capacity in MW (2019)
1.0
World Bank's Ease of Doing Business Score (2020)
61.70
Solar installed capacity Growth rate (CAGR) for 2015-19
25%
Power Trends
Cumulative Solar installed Capacity (MW)
0.0
0.0
0.0
0.3
1.0
1.4
1.9
2.6
3.5
3.5
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
335
357
392
388
395
409
452
470
Year
Access to Electricity
97.0%
98.3%
98.6%
98.0%
100.0%
100.0%
100.0%
Year
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Market Maturity
Technological feasibility
Policy enablers
Macroeconomy
Financing
Energy Imperatives
Infrastructure
Sub-regional standing
CHAD
SOUTH SUDAN
SOMALIA
UGANDA
KENYA
CONGO (DRC)
TANZANIA
ANGOLA
ZAMBIA
ZIMBABWE
MOZAMBIQUE
ESWATINI
SOUTH AFRICA
MADAGASCAR
Arabian Sea
SEYCHELLES
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• GDP (at current prices) has grown at an annual rate of 3.9% (in 2019).[11,3] • The service sector (mainly tourism) contributes more than 80% of GDP and employment, while industry contributes 16% (5% from manufacturing).[8] • Seychelles is classified as a high-income country with a per capita GDP of USD 17,401.[12,4,3] • Through fiscal discipline and debt management, debt as % of GDP has reduced from 130% in 2008 to 58% in 2019. The government is now targeting to reduce its debt to 50% by 2021.[8] • Owing to tightened monetary policy stance since 2018, the inflation rate fell from 4.5% in early 2018 to 1.4% in September 2019.[6]
Policy enablers	• Seychelles targets to generate 5% of the country's electricity from renewables by 2020 and 15% by 2030. 1 • Provisions by the Government, such as VAT exemption and reduction in corporate tax for renewable energy projects, are attracting investments in the RE space.[2] • Net Metering was introduced in 2014, which is catalysing growth of rooftop solar in country. • The Seychelles Energy-Efficiency and Renewable Energy Programme (SEEREP) and the Small and Medium Enterprise (SME) loan scheme launched by the government in 2014 to provide loans at low interest rate to residential and commercial sector for the purchase of solar PV.[17]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.63 kWh/m^2/day and specific yield of 4.35 kWh/kWp, strong technical feasibility is envisaged for solar projects in Seychelles.[14]
Market Maturity	• Power sector in Seychelles is regulated by Energy Commission (SEC). The generation, transmission, and distribution of electricity is largely managed by by Public Utilities Corporation (PUC) with some participation from the Independent power producers.[7] • 100% population in Seychelles has access to electricity as of 2018.[13] • Currently, installed solar capacity in Seychelles is only 1.62 MW, despite having a potential of 1900 GW.[5,17]
Infrastructure	• Grid infrastructure needs to be strengthened and enhanced to meet current and future load growth and renewable capacity additions.[5] • Seychelles is developing world's largest floating solar power with French developer Qair. • Power transmission and distribution losses stand at 11% of output, indicating a considerably better network.[17]
Financing	• Seychelles has attracted strong Foreign Direct Investments inflows over the last few years.[9] • Seychelles has received international financial inflows to support of clean and renewable energy to the tune of USD 0.9 million in 2017.[13] • The commercial banks are adequately capitalized and profitable. Non-performing loans declined from 7.1% since end-2017 to 3.5% at end-June 2019.[6]
Energy Imperatives	• Per capita electricity consumption at 4238 kWh is relatively high in comparison to the global average.[15] • The average electricity price is USD 0.33 per kWh in the country, which is most expensive in the region.[17] • The energy consumption in Seychelles is steadily rising because of economic and population growth. • Seychelles depends highly on costly imported fossil fuels for power generation thereby making cost of electricity vulnerable to fluctuating fossil fuel prices.[2]

Somalia

Africa

Electricity Consumption in MU (2017)

315.0

Installed Solar Capacity in MW (2019)

7.1

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

7.1

World Bank's Ease of Doing Business Score (2020)

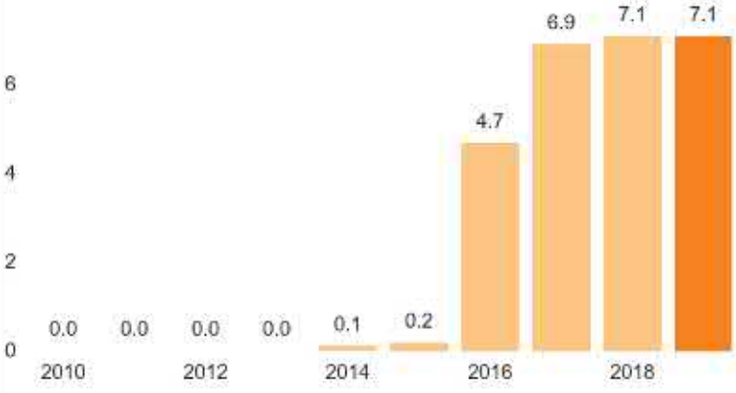
20.00

Solar installed capacity Growth rate (CAGR) for 2015-19

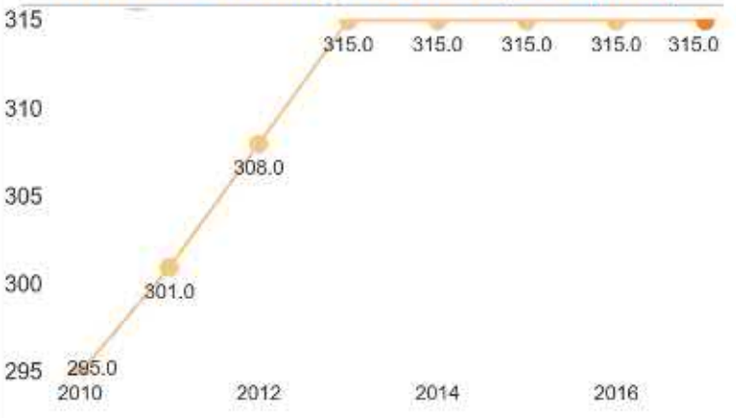
154%

Power Trends

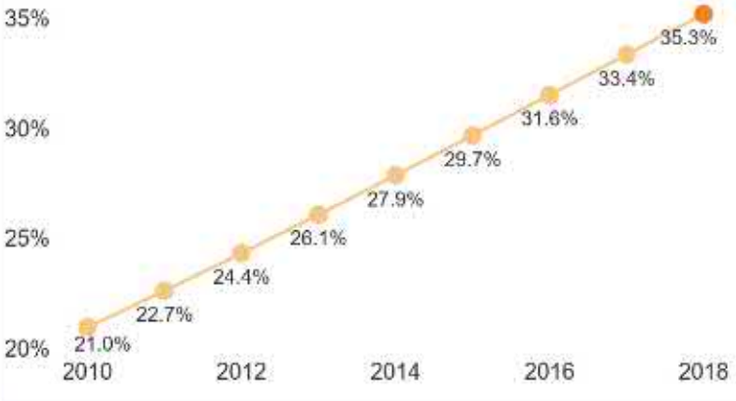
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



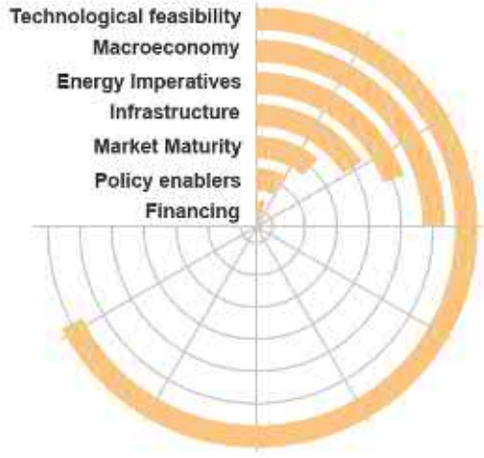
Access to Electricity



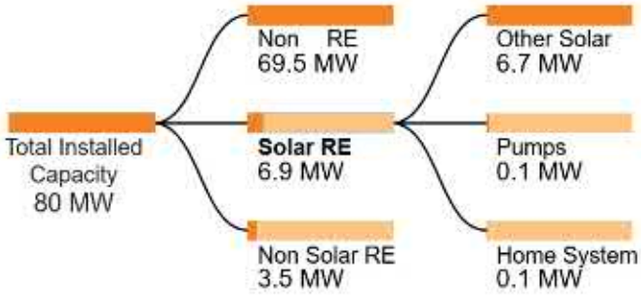
Ease of Doing Solar Classification

Potential

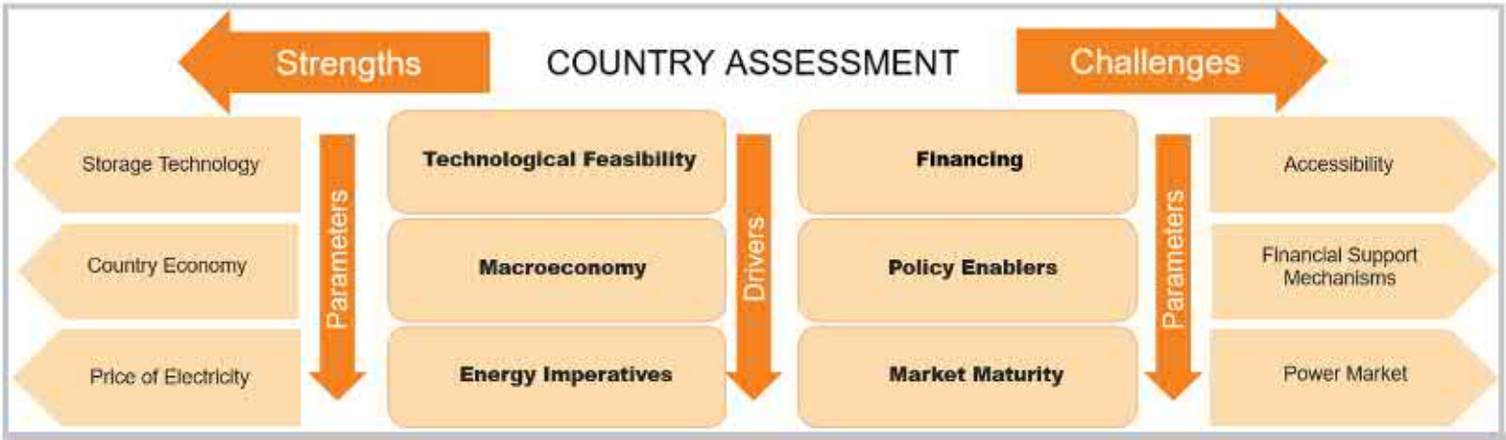
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• The economy grew by an estimated 2.9% in 2019, up from 2.8% in 2018 and projected at 3.5% in 2021.[2] • The current account deficit improved from 9% of GDP in 2018 to 8.3% in 2019 as livestock exports recovered and import growth slowed.[2] • Somalia has satisfactorily implemented three staff- monitored programs (SMP) since 2016 enhancing state legitimacy and improving macroeconomic management and performance.[2]
Policy enablers	• The Country Partnership Framework (CPF FY 2019-22), endorsed in 2018, guides country engagement for an integrated World Bank Group (WBG) response.[5] • The Somalia and Electrical Energy Act was prepared with the support of USAID and the UK's Department for International Development. • USAID currently supports the government and private sector to increase the availability of quality energy and to reduce tariffs. [8]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 6.03 kWh/m^2/day and specific yield of 4.75 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Somalia.[3] • According to a study by the African Development Bank, Somalia's Solar power could potentially generate an excess of 2,000 kWh/m^2.[8] • The supply chain for stand alone off-gird will incentivize to establish Pay-As-You-Go (PAYG) business models and focused distribution networks.[11]
Market Maturity	• 35% of population has access to electricity as of 2018 and country has set a target to achieve universal access by 2030.[3,7] • Renewable energy share in total final energy consumption is 95% as of 2017.[4] • Power Africa has set a target of 500 MW capacity by 2030 up from 111 MW in 2019.[8,9] • Solar contributes 67% in renewable capacity and 6% in total capacity as of 2019.[9]
Infrastructure	• Generation and distribution losses are up to 40% reflecting on a challenging infrastructure.[8] • The World Bank completed a power master plan study in 2018 that details a 20-year least cost plan, gap analysis of regulations, laws, standards and the institutional and human resource development needs to develop the power sector.[8] • Lighting Africa will address key opportunities and constraints in launching off grid solar activities, improve affordability and protect consumers in the country.[10]
Financing	• Somalia Electricity Access Project (SEAP) aims to expand electricity by supporting stand-alone solar market and providing access to finance for local off-grid solar entrepreneurs.[10] • The market for solar home systems in Somalia has significant potential. A study estimated current demand at around 140,000 – 180,000 units for a total value of around USD 14 million per year. The total potential (non-annualized) market size for solar home systems was estimated at USD 188 million.[11]
Energy Imperatives	• Somalia's Per capita electricity consumption of 23 kWh is significantly lower in comparison to the global average as of 2019.[1] • 15% of rural population had access to electricity in 2018.[4] • Power Africa has provided technical assistance to improve access to alternative energy solutions for targeted industries.[8]

South Sudan

Africa

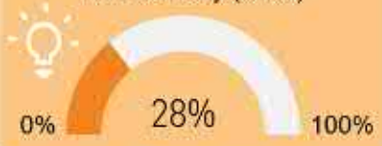
Electricity Consumption in MU (2017)

498.0

Installed Solar Capacity in MW (2019)

0.7

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

0.7

World Bank's Ease of Doing Business Score (2020)

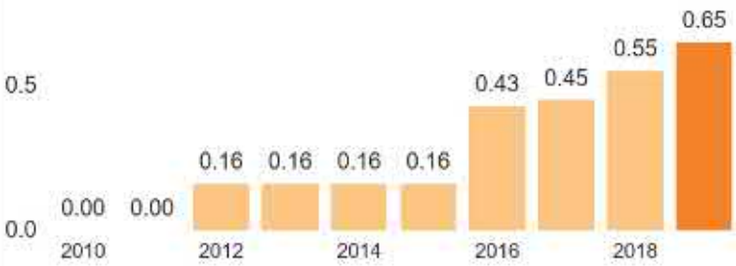
34.60

Solar installed capacity Growth rate (CAGR) for 2015-19

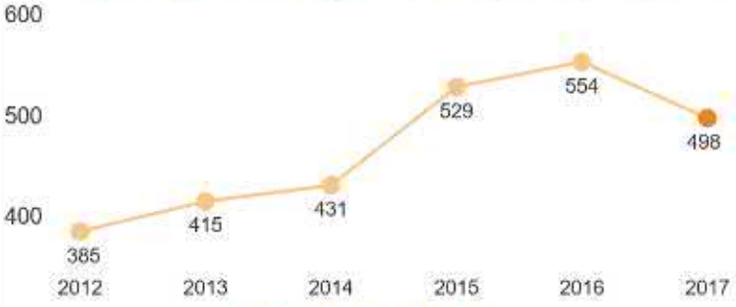
42%

Power Trends

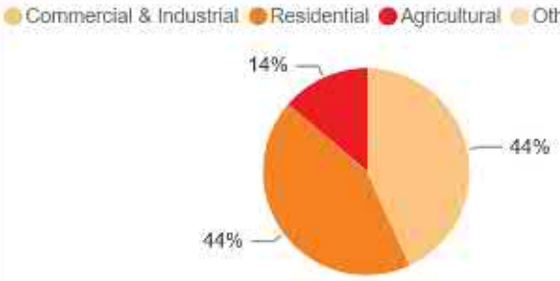
Cumulative Solar installed Capacity (MW)



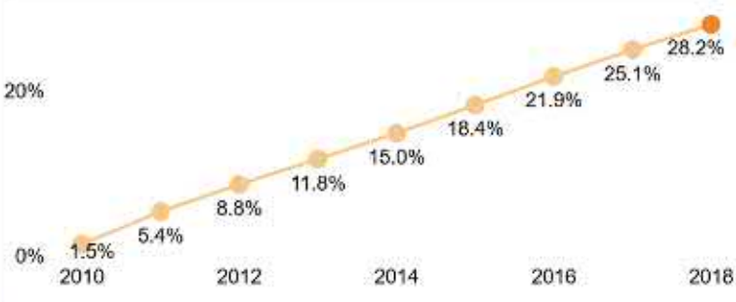
Overall Electricity Consumption (MU)



Consumer Mix



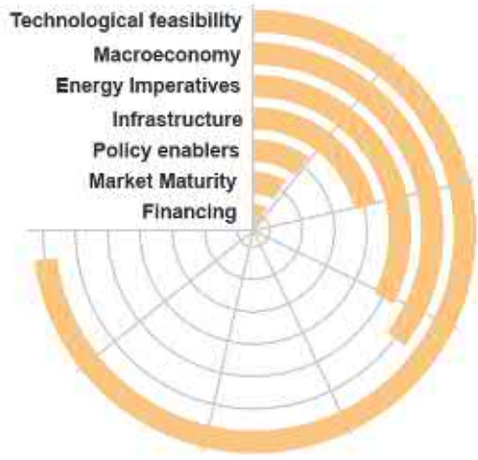
Access to Electricity



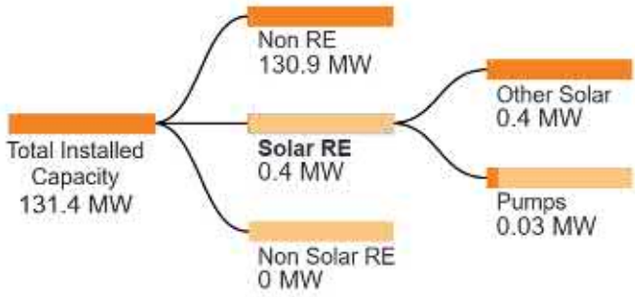
Ease of Doing Solar Classification

Potential

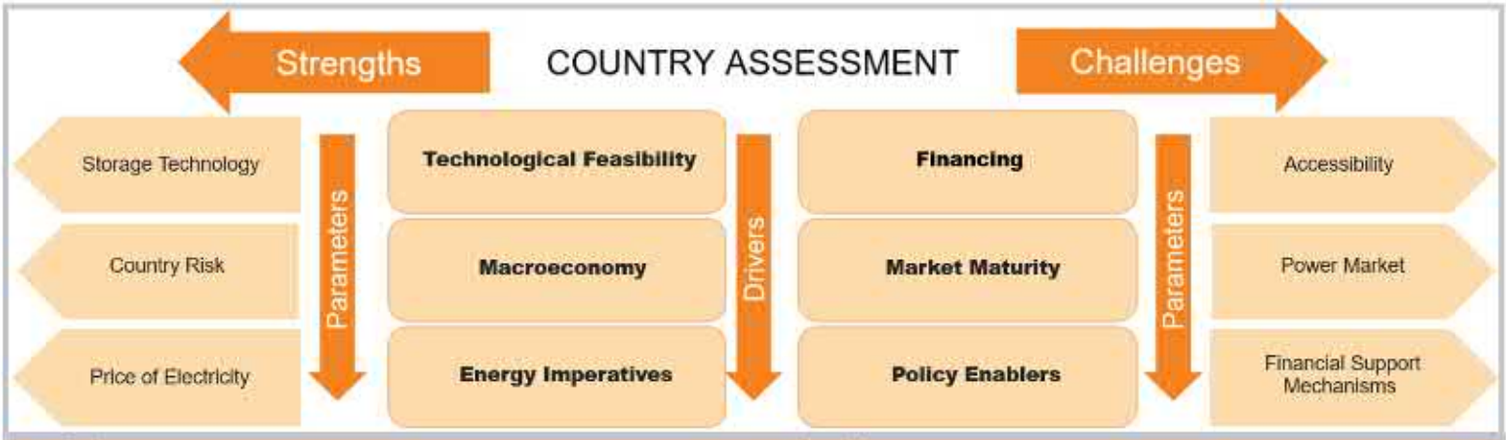
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual growth rate of 11.3% in 2019.[7] • South Sudan is a low-income developing country as per World Bank's classification with a GDP (Real) per capita of less than USD 200 in 2017.[2,15] • The signing of a peace accord, in 2019, is expected to improve the economic conditions and is likely to attract investments in the country.[13,14,15] • Oil and agriculture are the major contributors to the economy. Crude oil accounts for 95% of the exports.[13]
Policy enablers	• In 2019, the Renewable Energy Council of South Sudan (RECOSS) was founded with an aim to promote Renewable Energy Technologies and energy efficiency in the country.[17] • The African Development Bank has proposed targets to achieve a 75% urban electrification rate by 2025.[20] • The solar sector is picking up pace in South Sudan. In 2019, the Government launched a call for consultants to help them to formulate a renewable energy development program. • The government is planning the establish a tender mechanism in upcoming years for the procurement of clean energy generation capacity.
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 5.68 kWh/m^2/day and specific yield of approximately 4.45 kWh/kWp, strong technical feasibility is envisaged for solar projects in South Sudan.[1]
Market Maturity	• As of 2018, 28% of the population had access to electricity in South Sudan.[2] • Despite having significant potential, solar contributed 0.5% in the total generation of 583 MUs in 2018.3 • South Sudan is expected to join the Eastern African Power Pool in the coming years.[4] • The power sector is regulated by South Sudan Electricity Regulation Authority. The sector is unbundled but managed by a sole holding company, South Sudan Electricity Corporation.[19]
Infrastructure	• The Ministry of Electricity and Dam had proposed a plan, in 2018, to interconnect all the states in the country through the national grid by 2040. • Thermal power plants, with a total generation capacity of 500 MW, is expected to come online in the upcoming years to help meet the rising electricity demand. • The Juba Power Distribution System Rehabilitation and Expansion Project, funded by the African Development Bank, aims to install 395 kms voltage lines and 150 transformers in-country by 2020.[18]
Financing	• According to UNCTAD's World Investment Report 2020, South Sudan has recorded estimated FDI inflows of USD 18 million in 2019.[5] • South Sudan has an Ease of Doing score of 34.6 (out of 100) and ranks 185th among 190 countries in 2020. Businesses face challenges in getting credit, construction permits, enforcing contracts, access to electricity, paying taxes and trading across borders.[8] • South Sudan has recorded a Non-interest current account deficit of 4.2% in 2018, inflation of 51.2% of GDP and total debt of 41.7% of GDP in 2019.[9,12,13]
Energy Imperatives	• Per capita electricity consumption of 10 kWh in 2019 is low as compared to the global average.[11] • Owing to considerable oil reserves, oil-based thermal power production contributes approximately 99.5% of the generation mix in 2018.[3] • Since over 80% of the population resides in the rural areas of which 76% of the population doesn't have access to electricity as of 2018, off-grid solar systems can be a viable solution to expand access to electricity in rural areas.[2,6] • Based on economic growth, the electricity demand is expected to reach 1,400 MW by 2030 from 300 MW in 2017, with an annual growth rate of 7-8%.[16] • The electricity rates are some of the highest in the region at approximately USD 0.0042 per kWh.

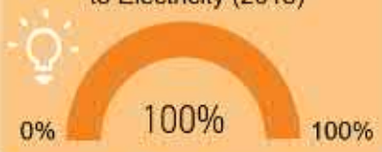
Sri Lanka

Asia & Pacific

Electricity Consumption in BU (2017)

13.5

Share of Population with Access to Electricity (2018)



World Bank's Ease of Doing Business Score (2020)

61.80

Installed Solar Capacity in MW (2019)

214.8

Installed Off-Grid Solar Capacity in MW (2019)

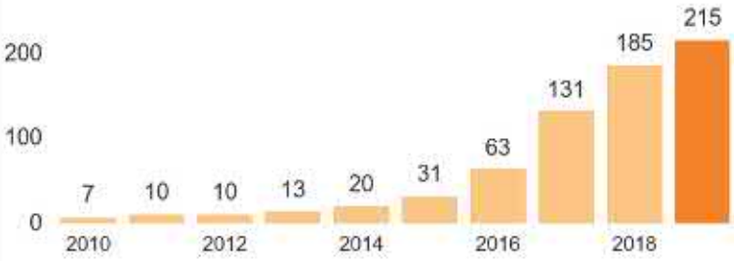
8.1

Solar installed capacity Growth rate (CAGR) for 2015-19

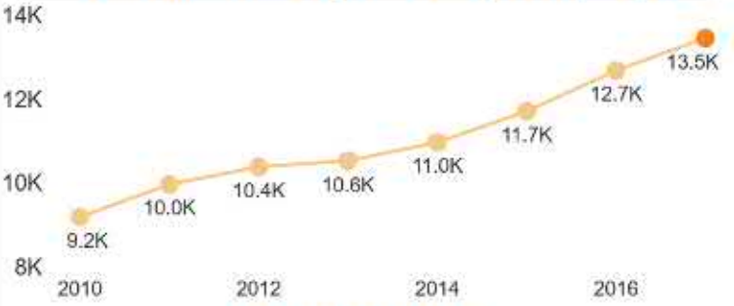
62%

Power Trends

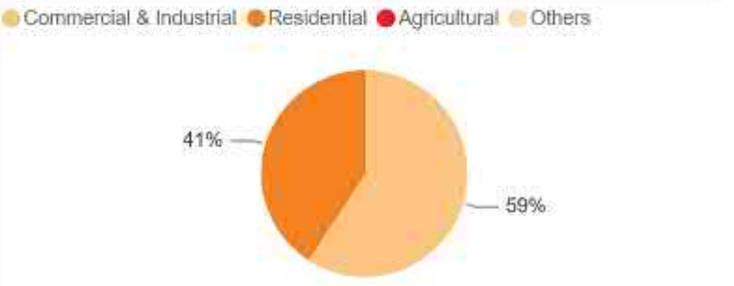
Cumulative Solar installed Capacity (MW)



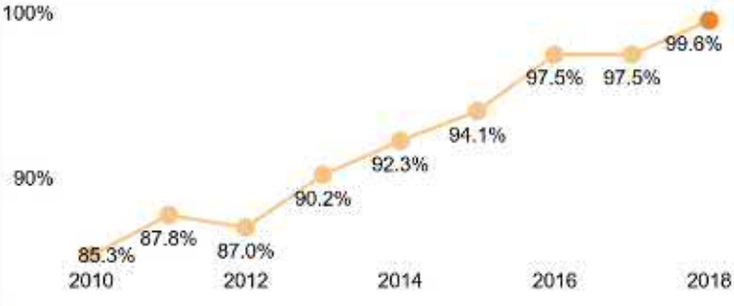
Overall Electricity Consumption (MU)



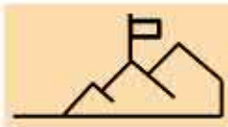
Consumer Mix



Access to Electricity

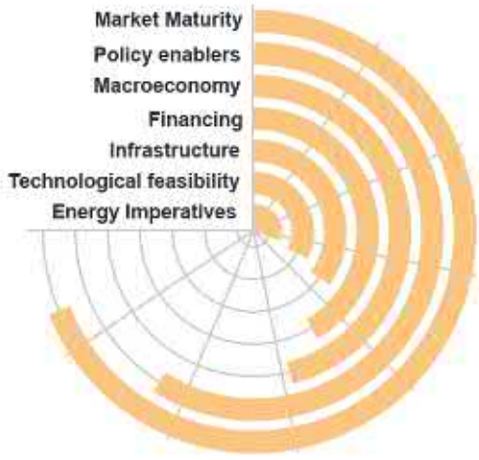


Ease of Doing Solar Classification

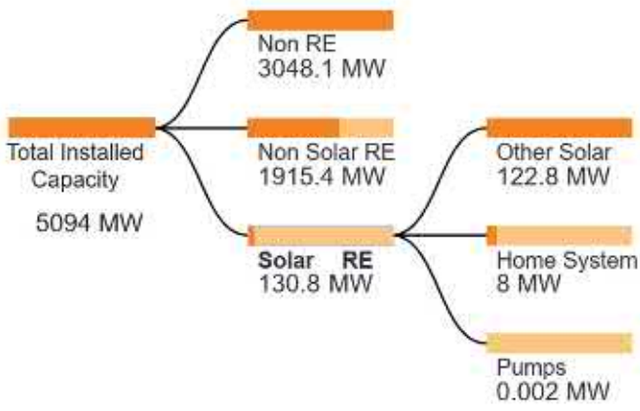


Influencer

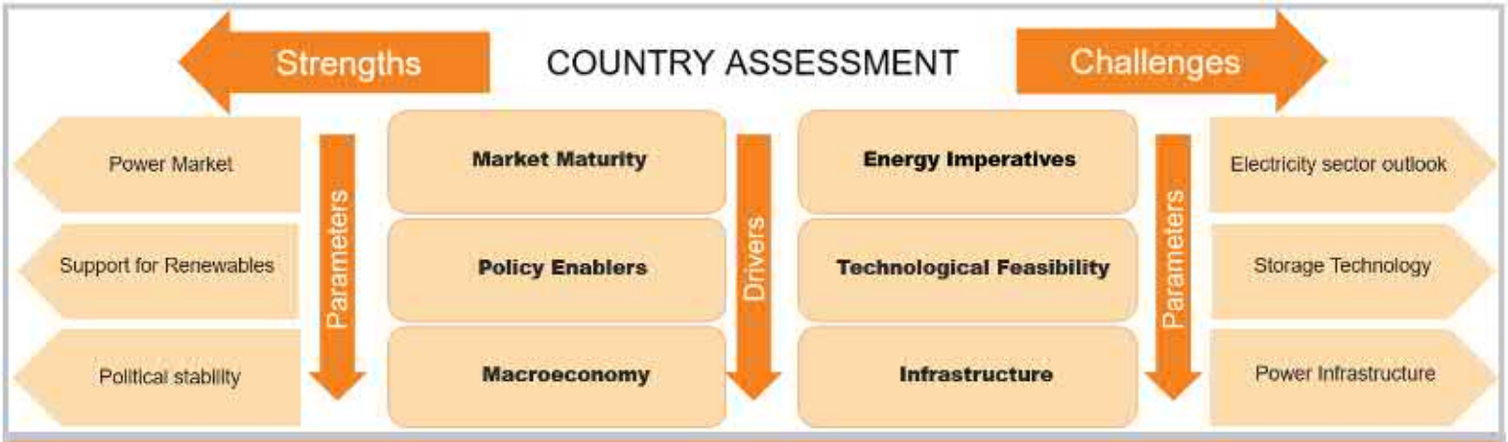
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Sri Lanka is a lower-middle-income country. Its economy is transitioning from a predominantly rural-based economy towards a more urbanized economy oriented around manufacturing and services.[8] • GDP (at current prices) grew at an annual rate of 2.3% and was poised at USD 84 billion as of 2019.[2,3] • The economy grew at an average 5.3 % during 2010-2019 and expected at 4.1% in 2021.[7,8] • Higher debt-to-GDP ratio is an area of concern for the Government.[8]
Policy enablers	• National Energy Policy and Strategies (NEPS 2008) policy document was formulated by the Ministry of Power and Renewable Energy in 2006 and further updated in 2008 and 2010. The broad strategies defined under this policy include -providing basic energy needs, ensuring energy security and promoting indigenous resources among other.[12] • The SESDP targets include increasing the share of electricity generation from renewable sources from 50% in 2014 to 60% by 2020 and the electricity generation capacity from 4,050 MW in 2015 to 6,400 MW by 2025.[12] • Financial policy initiatives such as Feed-In-Tariffs (FITs) and Net metering are expected to catalyse growth of renewable energy in the country.[12]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 5.28 kWh/m^2/day and specific yield of 4.17 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Sri Lanka.[4] • Sri Lanka targets 100% renewable electricity by 2050 for which Long Term Generation Expansion Plan (2018-37) has been developed by the Ceylon Electricity Board (CEB).[12]
Market Maturity	• 100% population of Sri Lanka had access to electricity as of 2018.[5] • The transmission system is owned and maintained by the Ceylon Electricity Board, the sole electricity buyer, which purchases power from generation licensees through Power Purchase Agreements.
Infrastructure	• The World Bank Group (WBG) Urban Transport and Energy InfraSAP laid out structured diagnostics of the country's sectors and provided perspectives to support the development of these sectors including WBG-assisted solutions.[9] • The Climate Resilience Multi-Phased Program (CRes MPA) approved by the Bank will support the Government to modernize forecasting and early warning services of high impact weather.[9]
Financing	• Sovereign rating of Caa1 with stable financial outlook reflects country's credit view.[6] • Commercial Bank of Ceylon actively finances renewable energy projects, primarily mini hydro, wind, solar and biomass projects.[12] • Refinancing requirements are expected to be high in the coming years with annual gross foreign exchange requirements estimated at 6-7% of GDP during 2020-2022.[10] • As of 2020, the active IDA and IBRD portfolio comprise of 19 projects of a total commitment of USD 2.2 Billion.[11] • The World Bank Group active trust fund resources in Sri Lanka have increased from USD 9.8 million to approximately USD 20 million since 2016 and consists of 24 active grants as of 2020.[11]
Energy Imperatives	• Sri Lanka's Per capita electricity consumption of 759 kWh as of 2019 which is relatively low in comparison to the global average.[1] • Renewable energy share in total final energy consumption is 48% as of 2017.[5] • The Ministry of Power and Renewable Energy has launched "Battle for Solar Energy" initiative. This rooftop initiative targets to add 200 MW of solar electricity to the national grid by 2020 and 1,000 MW by 2025.[12]

Sudan

Africa

Electricity Consumption in BU (2017)

13.0

Installed Solar Capacity in MW (2019)

18.6

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

18.6

World Bank's Ease of Doing Business Score (2020)

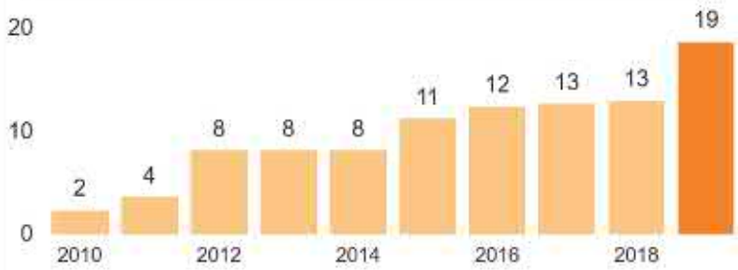
44.80

Solar installed capacity Growth rate (CAGR) for 2015-19

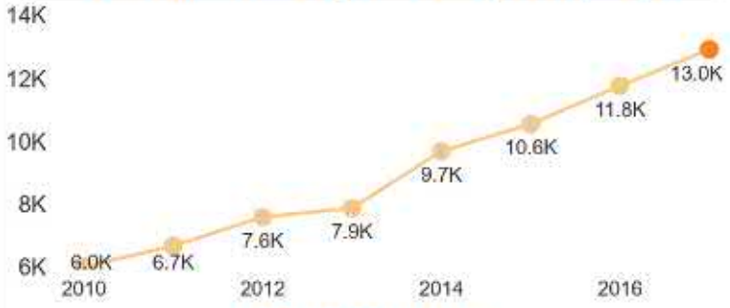
14%

Power Trends

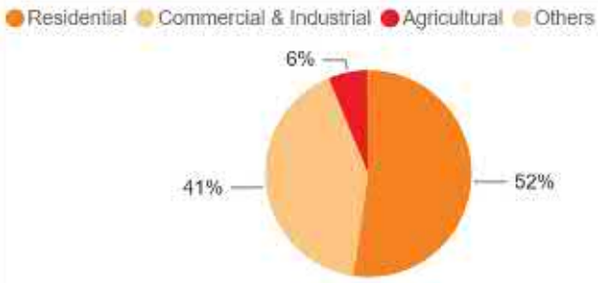
Cumulative Solar installed Capacity (MW)



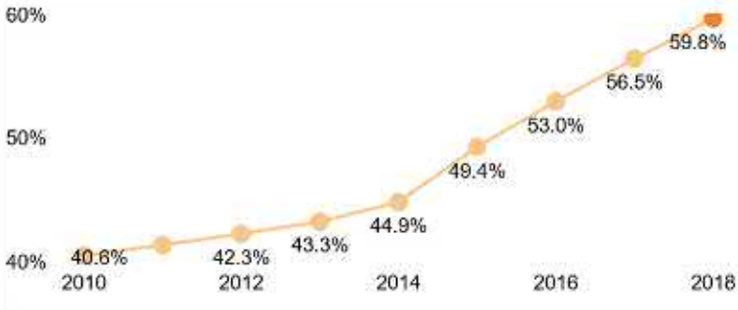
Overall Electricity Consumption (MU)



Consumer Mix



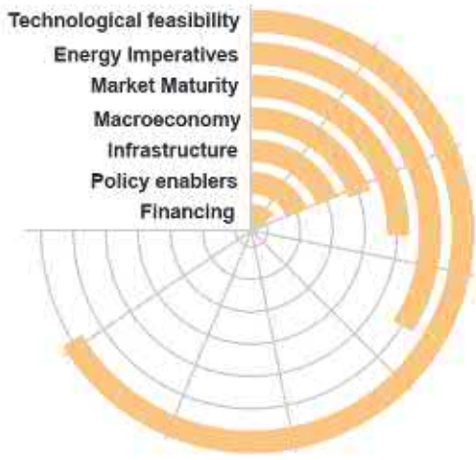
Access to Electricity



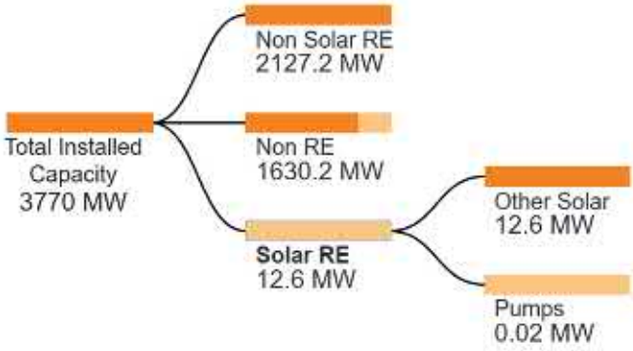
Ease of Doing Solar Classification

Potential

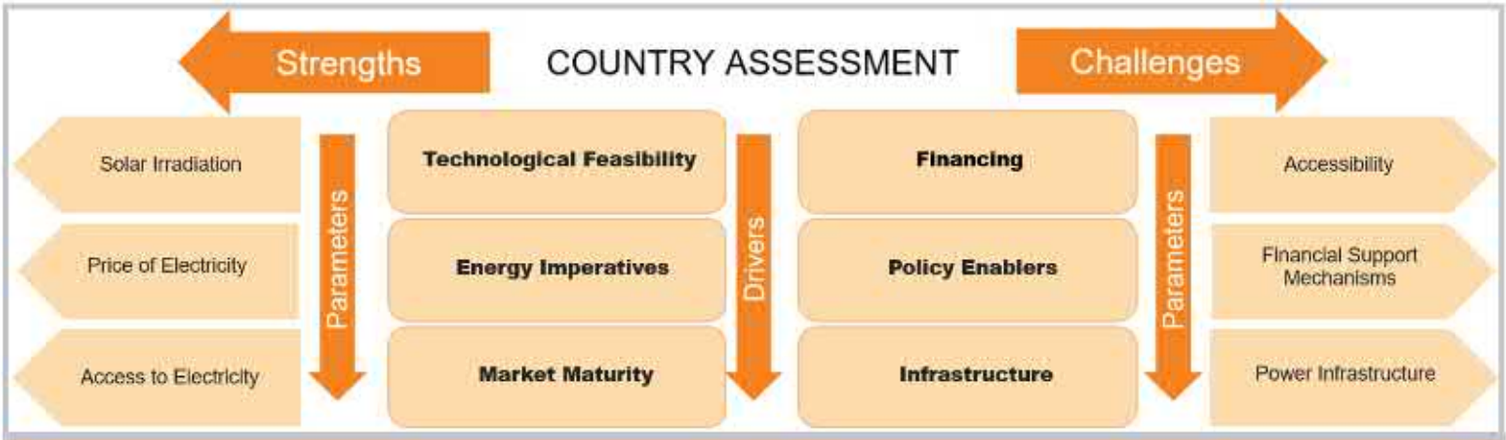
Performance against 7 Drivers



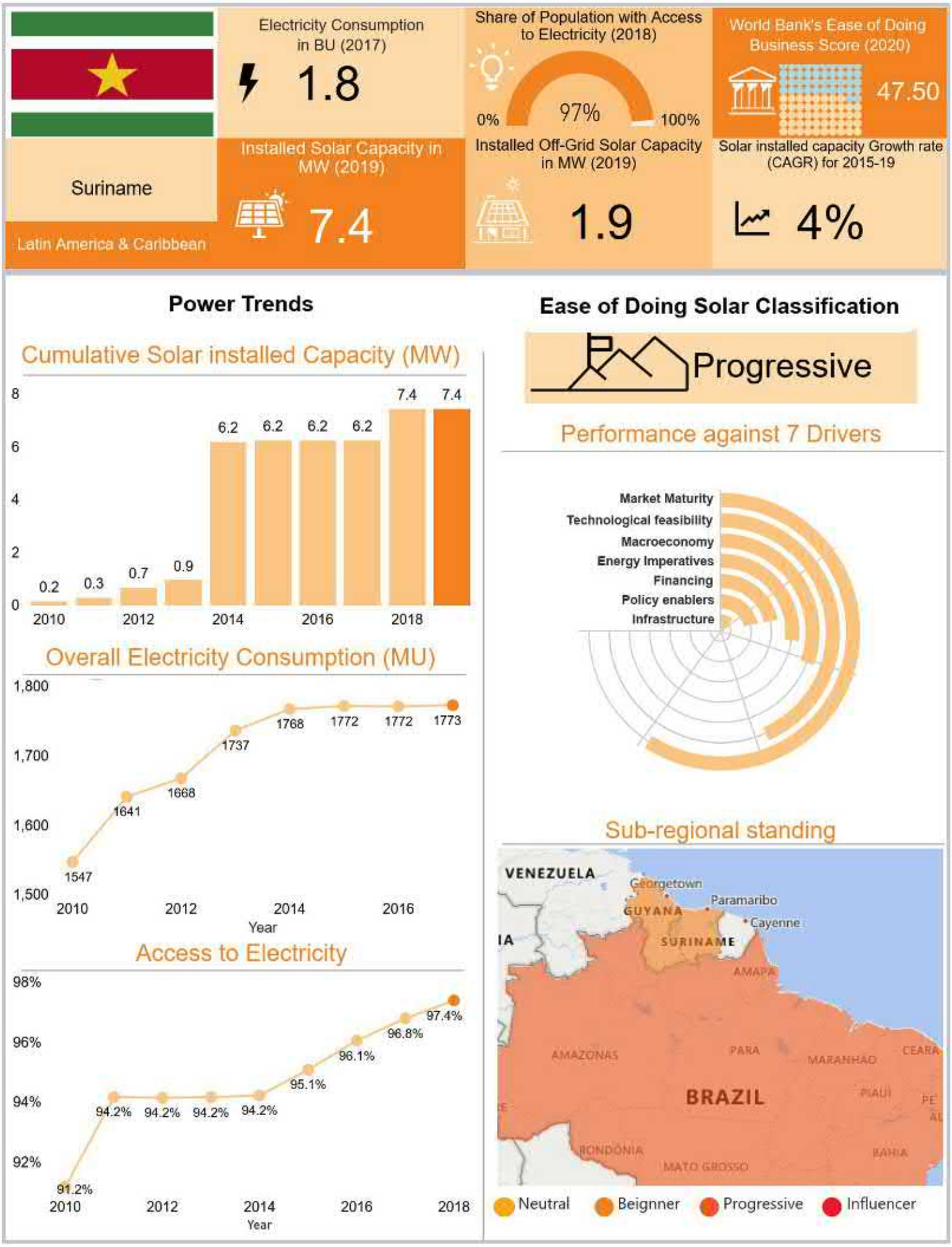
Installed Generation Capacity by Source

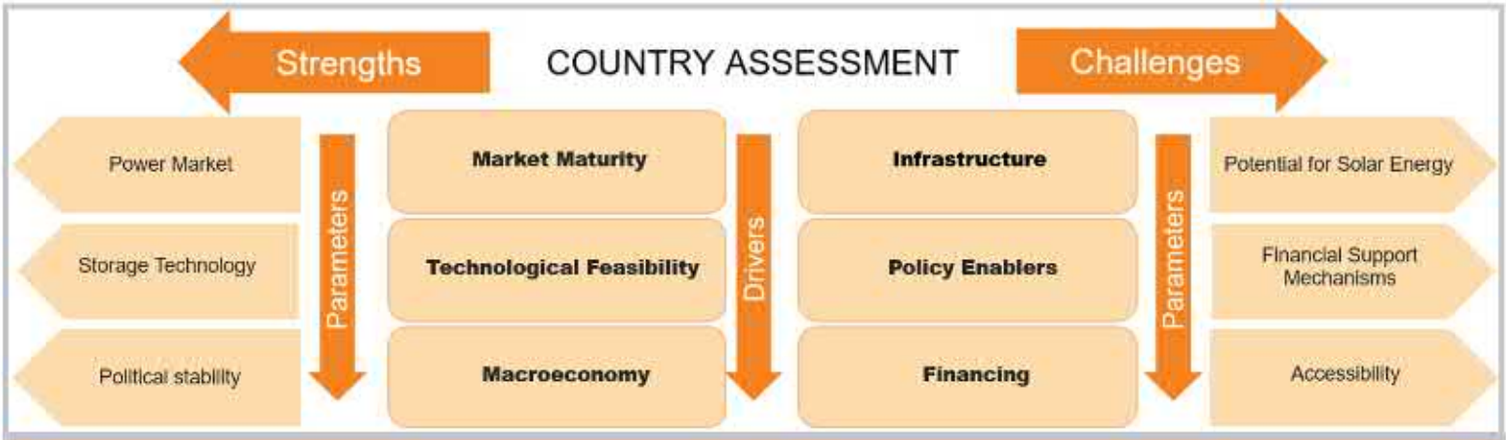


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• After the separation of South Sudan (from the erstwhile Sudan), Sudan's economy has witnessed relatively low development on account of economic challenges due to trade restrictions imposed till 2017.[7] • The country's GDP (Real) has contracted by 2.5% in 2019.[8] • Agricultural and service sector are the major contributors to the economy.[6]
Policy enablers	• In 2014, Government of Sudan started National Appropriate Mitigation Action (NAMA) with an objective to implement favourable policies such as net metering, feed-in-tariff, import duty exemption for renewable energy components to stimulate growth of solar and wind power in the country.[10] • NAMA is also aligned with Sudan's National Strategic Vision 2001-2025 which focuses on capacity enhancement of existing renewable technologies to increase their share in energy mix.[10] • The government plans to provide 2.5 million Solar Home Systems by 2031 in areas where gird is not available.[3]
Technological Feasibility	• Owing to one of the highest average solar irradiation level (GHI) in the world of 6.32 kWh/m^2/day and specific yield of 4.94 kWh/kWp, strong technical feasibility is envisaged for solar projects in Sudan.[13] • Out of the total agricultural land (63% of the total land area), only 15-20% is currently under cultivation. Hence, there is a large potential for utility scale solar power projects in the country that can also help Sudan become a region solar hub.[6] • Solar PV is perceived as a proven technology in Sudan, finding its applications in lighting, water pumping as well as powering appliances.[9,4]
Market Maturity	• Power Sector in Sudan is regulated by Electricity Regulatory Authority (ERA). The generation, transmission and distribution sectors are unbundled but managed by a sole holding company, Sudan Electric Holding Company.[2] • The holding company has four subsidiaries i.e. Sudanese Hydro Power Generation Company, Sudanese Thermal Power Generation Company, Sudanese Electricity Transmission Company, Sudanese Electricity Distribution Company.[2] • 60% of the population has access to electricity as of 2018.[14]
Infrastructure	• The Government of Sudan is planning to interconnect the country's isolated grids into one national grid in the coming years.[3] • The infrastructure needs to be ramped up to meet universal electrification target by 2031, with at least 80% electrification through grid.[3] • Sudanese Power system is among the most technically efficient system in sub-Saharan Africa i.e. relatively low T&D losses and reliability indices (SAIFI and SAIDI) in the region.[3]
Financing	• Public Private Partnership (PPP) Act is being finalized to enhance private sector investment in the energy sector.[2] • Procurement and application framework for Independent Power Producers (IPP) is still in evolving phase in the country.[2] • Political and Macroeconomic risks are major reasons for lower levels of participation from international investors and lenders.[2]
Energy imperatives	• Commercial and Industrial consumers represent of 41% of electricity demand in Sudan. • 40% of the oil imported in Sudan is used to generate the electricity thereby making the country's economy vulnerable to global oil price fluctuations that directly impact the cost of electricity.[3] • The electricity demand has been growing at CAGR of 11% since 2013.[3]


Suriname
Latin America & Caribbean
Electricity Consumption in BU (2017)
1.8
Installed Solar Capacity in MW (2019)
7.4
Share of Population with Access to Electricity (2018)
0%
97%
100%
Installed Off-Grid Solar Capacity in MW (2019)
1.9
World Bank's Ease of Doing Business Score (2020)
47.50
Solar installed capacity Growth rate (CAGR) for 2015-19
4%
Power Trends
Cumulative Solar installed Capacity (MW)
8
6
4
2
0
0.2
0.3
0.7
0.9
6.2
6.2
6.2
6.2
7.4
7.4
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
1,800
1,700
1,600
1,500
1547
1641
1668
1737
1768
1772
1772
1773
2010
2012
2014
2016
Year
Access to Electricity
98%
96%
94%
92%
91.2%
94.2%
94.2%
94.2%
94.2%
95.1%
96.1%
96.8%
97.4%
2010
2012
2014
2016
2018
Year
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Market Maturity
Technological feasibility
Macroeconomy
Energy Imperatives
Financing
Policy enablers
Infrastructure
Sub-regional standing
VENEZUELA
Georgetown
Paramaribo
GUYANA
Cayenne
SURINAME
AMAPA
AMAZONAS
PARA
MARANHAO
CEARA
BRAZIL
PIAUI
RONDÔNIA
MATO GROSSO
BAHIA
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• GDP (real) has grown at an annual growth rate of 2.3% in 2019.[16] • Suriname is an upper-middle-income country with a GDP per capita of USD 6,854.[12,15] • The GDP (Real) is poised at USD 3.98 billion as of 2019.[19] • Suriname's economy is characterized by a strong dependence on exports of minerals and a large public sector. Alumina, bauxite, gold and oil accounts for 75% of total exports.[3]
Policy enablers	• As per an agreement under Caribbean Community (CARICOM) Energy Policy in 2013, Suriname aims to achieve 47% of renewable electricity generation of total generation by 2027.[10] • Introduced in 2016 in the country, Net metering is catalysing the growth of solar PV in the country.[6] • In 2016, Government has introduced renewable energy tenders to attract investments in RE projects.[7] • The Suriname Electricity Act 2016 has mandated the utility to prioritise purchase of the power generated from wind and solar plants to encourage private generation from renewable energy plants.[8]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 5.38 kWh/m^2/day and specific yield 4.24 kWh/kWp, strong technical feasibility is envisaged for solar projects in Suriname.[9] • Solar PV for lighting, water heating, powering telecom towers and cooling systems are proven technologies in Suriname.[14]
Market Maturity	• As of 2018, 97% of the population has access to electricity; in rural areas this number is 94%.[12] • In the generation sector, a 71% share of installed capacity is owned by private companies and the remaining share is owned by the Government.[4] • The Caribbean Development Bank has partnered with the Government of Suriname, in 2017, to construct three solar PV-hybrid power plants by 2021.[1] • In 2018, solar PV has contributed a share of 2.24% in the total installed capacity of 307 MW.[4]
Infrastructure	• The Caribbean Development Bank, in 2017, has approved loan of USD 65 million to upgrade and expand the transmission and distribution network to deliver high quality power supply to consumers.[1] • Electricity system losses stand at 12.6% of output, indicating a considerably better power network.[4] • To meet its growing demand, the installed capacity is expected to be ramped up from 505.3 MW in 2019 to 654.5 MW in 2030 at a CAGR of 2.4% with an aim to increase the share of solar in the mix.[4] • The Inter-American Development Bank, in 2019, provided an investment loan of USD 30 million to improve the quality of electricity supply in rural areas. Also, under this loan solar mini-grids and solar plants with battery storage are planned to be installed in villages to supply 24/7 electricity.[18]
Financing	• In 2019, Suriname has recorded a fiscal deficit of 9.1% of GDP, an inflation rate of 4.4% and public debt of 72% of GDP.[3,17] • The country has a credit rating of Caa3 with a negative outlook in 2020.[17] • The banks in the country are being prepared in correspondence with IFSR standards starting in 2021.[11] • The banking sector is vulnerable with high non-performing loans (of 12.5% of gross loans) and low returns of 0.7% on assets.[11]
Energy Imperatives	• Country has per capita electricity consumption of 3,100 kWh.[13] • Owing to large oil and water resources, oil-based thermal and hydropower plants constitute 60.9% and 37.5% in the generation mix (2018) respectively.[4] • On account of economic growth and increasing population, the annual electricity consumption is expected to grow from 1,899 MUs to 2,472 MUs in the period 2019-30, with a CAGR of 2.4%.[4] • Lower power prices and poor access to credit for financing of renewable energy projects has resulted in bearish growth of renewable energy.[4]

Togolese Republic

Africa

Electricity Consumption in BU (2017)

1.4

Installed Solar Capacity in MW (2019)

3.0

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

3.0

World Bank's Ease of Doing Business Score (2020)

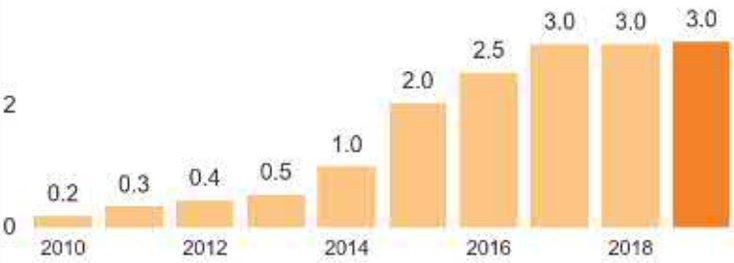
62.30

Solar installed capacity Growth rate (CAGR) for 2015-19

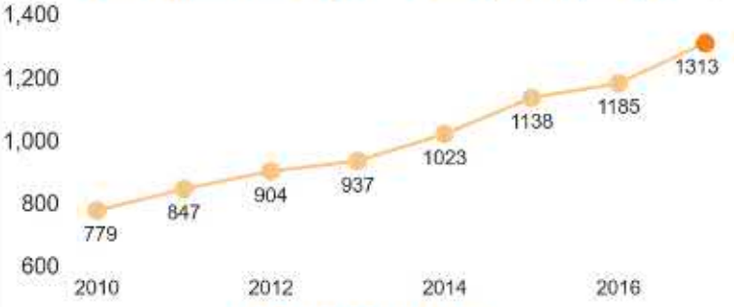
11%

Power Trends

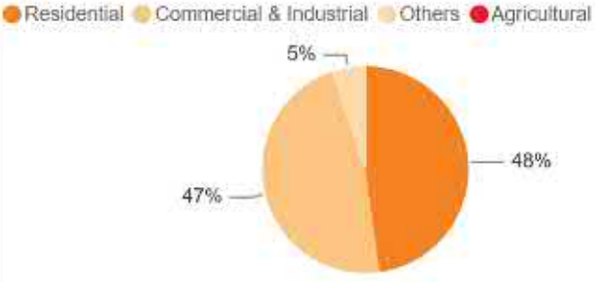
Cumulative Solar installed Capacity (MW)



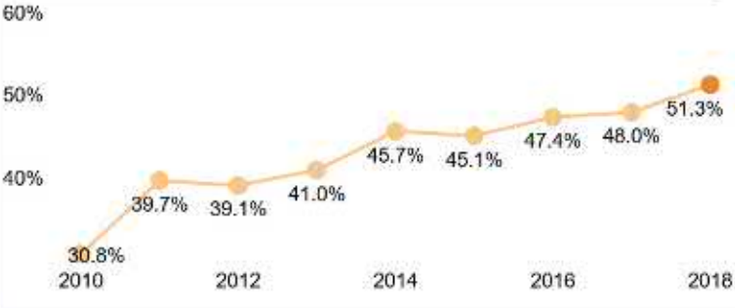
Overall Electricity Consumption (MU)



Consumer Mix



Access to Electricity

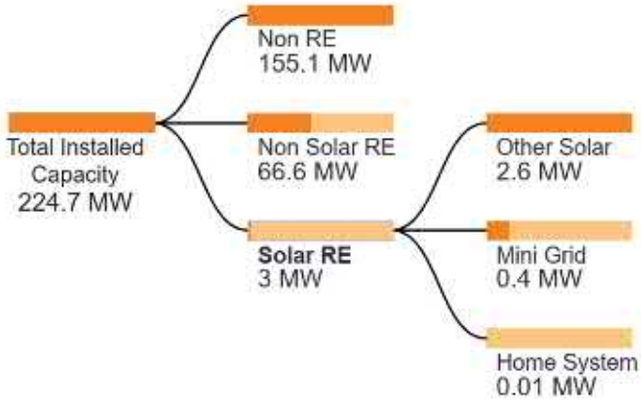


Ease of Doing Solar Classification

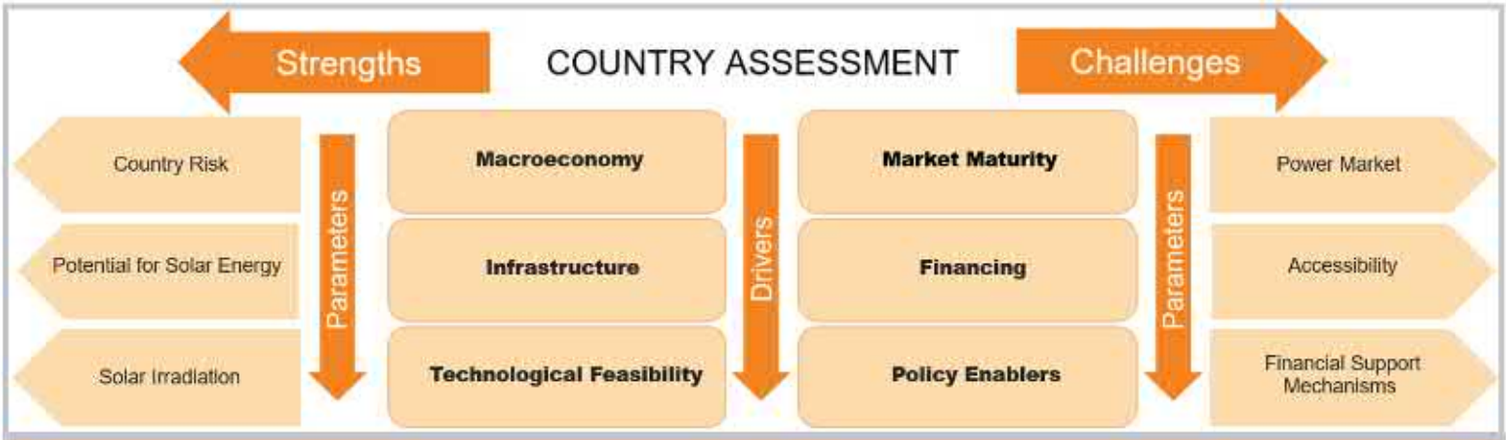
Potential

Performance against 7 Drivers

Installed Generation Capacity by Source

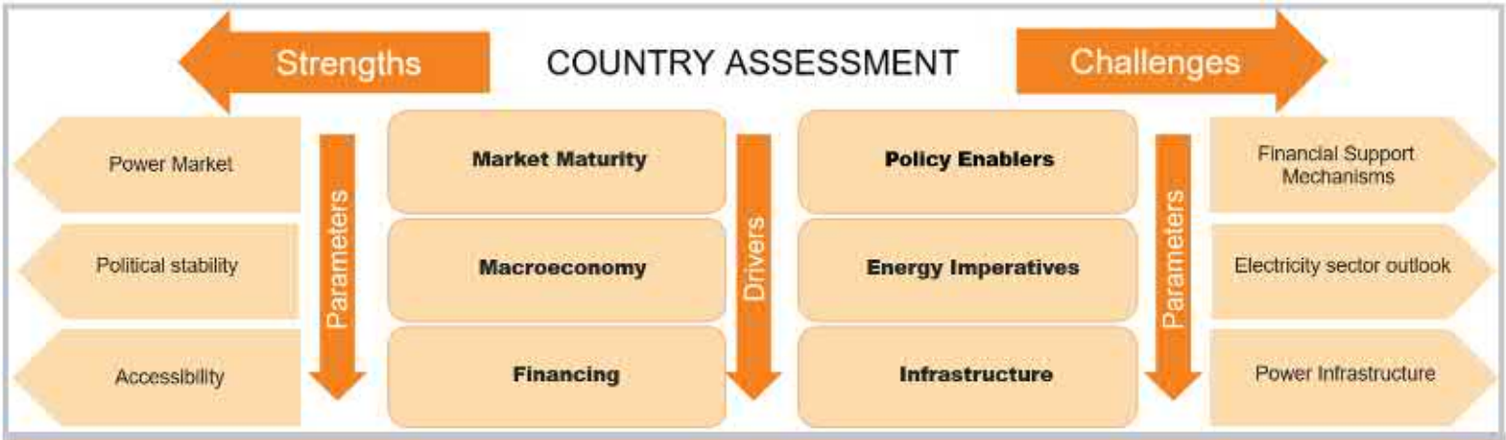


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (at current prices) is USD 5.46 billion in 2019 growing at an annual rate of 5.3%.[4,5] • Economic prospects are encouraging with expected growth of 5.5%, in 2021, backed by a good performance of agriculture sector and a fair management of monetary matters.[6,7] • The Government introduced fiscal consolidation program that reduced its public debt from 81% of GDP in 2016 to 72.6% of GDP in 2018.[6]
Policy enablers	• The Government of Togo introduced National Development Plan (NDP) 2018-2022 which helps to achieve the 17 Sustainable Development Goals (SDGs) by 2030.[15,16] • Togo aims to deploy over 300 mini-grids by 2030 and plans to exempt VAT and custom duty on mini-grid components.[11] • Togo is a member of the West African Economic Monetary Union (WAEMU) whose objective is to achieve a target of approximately 82% of renewable energy in the electricity mix by 2030.[20] • In 2020, India's National Thermal Power corporation (NTPC) was chosen as Project Management Consultancy (PMC) for a 300 MW solar projects in Togo.[19]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.22 kWh/m^2/day and specific yield of 4.12 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Togo.[1] • Togo joined Scaling Solar program and signed an agreement with International Finance Corporation (IFC) in 2019 to develop up to 90MW of solar power projects.[14]
Market Maturity	• 51% of population has access to electricity as of 2018 with 22% access to electricity in Rural areas. Country has set a target to achieve universal access by 2030.[3,11] • Renewable energy share in total final energy consumption is 71% as of 2017.[3]
Infrastructure	• Power Africa provides transaction support to private sector companies seeking to operate in Togo; The IFC, a Power Africa partner is supporting Togo's off-grid efforts.[10] • In 2017, the government of Togo launched a presidential initiative "CIZO" financed by African Development Bank (AFDB) to increase rural electrification rates to 40% by 2022 and equip rural areas with solar energy kits.[10,12] • Togolese Rural Electrification and Renewable Energy Agency (AT2ER), an online platform, was launched in 2019 to monitor the deployment and operation of clean energy off-grids in Togo.[18]
Financing	• The European Union has increased its financial and technical support to the country and the African Development Bank implemented a Country Strategy for 2016–2020.[8] • The World Bank's International Development Association (IDA) approved USD 150 million development Policy financing for Togo, in 2019, which helps to improve fiscal and debt management, reduce the cost of electricity and promote the use of renewable energy.[9] • The Abu Dhabi Fund for Development (ADFD) and the International Renewable Energy Agency (IRENA) have announced a USD 15 million loan for a 30 MW grid-connected solar PV plant.[17]
Energy Imperatives	• Togo's Per capita electricity consumption of 36 kWh is significantly lower in comparison to the global average as of 2019.[2] • Total installed capacity in the country is 228 MW, as of 2019, including 70 MW of renewable energy.[21] • As of 2019, Hydro constitutes approximately 96% (67 MW) of renewable capacity with remaining 4% (3 MW) coming from solar PV.[21] • Globeleq, the leading independent power producer in sub-Saharan Africa has signed a joint development agreement, in 2019, to develop a utility-scale renewable energy project.[13]


Tonga
Asia & Pacific
Electricity Consumption in MU (2017)
55.0
Installed Solar Capacity in MW (2019)
6.2
Share of Population with Access to Electricity (2018)
0%
99%
100%
Installed Off-Grid Solar Capacity in MW (2019)
0.3
World Bank's Ease of Doing Business Score (2020)
61.40
Solar installed capacity Growth rate (CAGR) for 2015-19
24%
Power Trends
Cumulative Solar installed Capacity (MW)
0.1
0.1
1.1
1.7
1.7
2.7
3.2
6.2
6.2
6.2
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
42.6
44.6
44.7
46.4
47.8
49.2
53.3
55.0
Year
Access to Electricity
92.1%
92.8%
94.4%
95.3%
96.2%
97.0%
98.0%
98.9%
Year
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Market Maturity
Macroeconomy
Financing
Technological feasibility
Infrastructure
Energy Imperatives
Policy enablers
Sub-regional standing
WALLIS AND FUTUNA (FR)
SAMOA
Apia
AS (US)
FIJI
Suva
NIUE (NZ)
TONGA
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• GDP (Real) has contracted marginally at an annual rate of 0.1% in 2019.[1] • Tonga's growth potential is limited due to its exposure to natural disasters, loss of workers to emigration and seasonal worker programs.[2] • Tonga is a small and open island economy with heavy dependence on foreign aid and remittances. Its debt-to-GDP ratio is estimated at around 40%.[3]
Policy enablers	• Government of Tonga (GoT) has set a goal to generate 50% of electricity from RE sources by the end of 2020 and 70% by 2030.[4] • Under the Tonga Energy Road Map (TERM) five major solar plants have been constructed.[4] • The GoT is currently preparing a 'National Energy Framework Bill' to set out institutional, regulatory and policy reforms and lead to streamlined policy and decision making.[4]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation levels (GHI) of 4.80 kWh/m^2/day and specific yield of 4.09 kWh/kWp, moderate technical feasibility is envisaged for solar projects in Tonga.[5] • Tonga is highly dependent on imported fuels to meet its overall electricity requirements.[6]
Market Maturity	• 99% population in Tonga has access to electricity as of 2018. Country's per capita electricity consumption in 2019 was 506 kWh which is significantly lower in comparison to the global average.[7] • The state-owned Tonga Power Ltd (TPL) generates, transmits and distributes electricity to four Tonga islands.[8] • TPL operates under a regulatory framework "Electricity Concession Contract (ECC)".[12] • Solar home systems provide power for nearly all the households in the smaller outer islands.[13]
Infrastructure	• The Solar PV installed capacity grew from 1 MW in 2010 to 6 MW in 2019.[10] • Asian Development Bank (ADB) is developing solar PV plants with a cumulative capacity of 1.25 MW in Tonga's remote islands. • The overall system losses, for all four-grid island system, have decreased significantly from 16.01% in 2011 to 10.12% at end of 2019 reflecting improvements to the network.[8]
Financing	• FDI inflows decreased slightly from USD 15 million in 2018 to USD 13 million in 2019.[3] • The Government of Tonga's efforts to achieve 50% renewable energy generation by 2020 is strengthened by the USD 29.9 million support from the Green Climate Fund (GCF).[8]
Energy Imperatives	• The country observed an increase in demand for electricity by 8.4% from 57.9 MUs in 2018 to 62.8 MUs at end 2019.[8] • Total renewable energy generation, in FY19, increased by 12.2% to 6.4 MUs from 4.14 MUs in the previous year.[8] • Tonga Renewable Energy Project comprises country's first utility-scale battery energy storage systems which will allow more RE to be integrated into the grid while maintaining power quality and system reliability.[11]

Trinidad and Tobago

Latin America & Caribbean

Electricity Consumption in BU (2017)

10.5

Installed Solar Capacity in MW (2019)

3.3

Share of Population with Access to Electricity (2018)

0% 100% 100%

Installed Off-Grid Solar Capacity in MW (2019)

-

World Bank's Ease of Doing Business Score (2020)

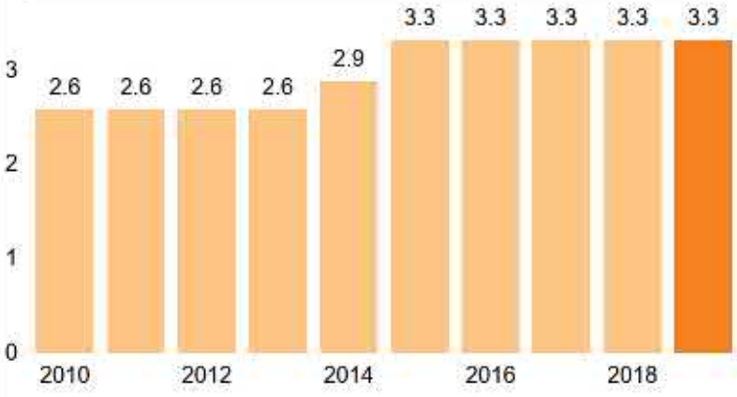
61.30

Solar installed capacity Growth rate (CAGR) for 2015-19

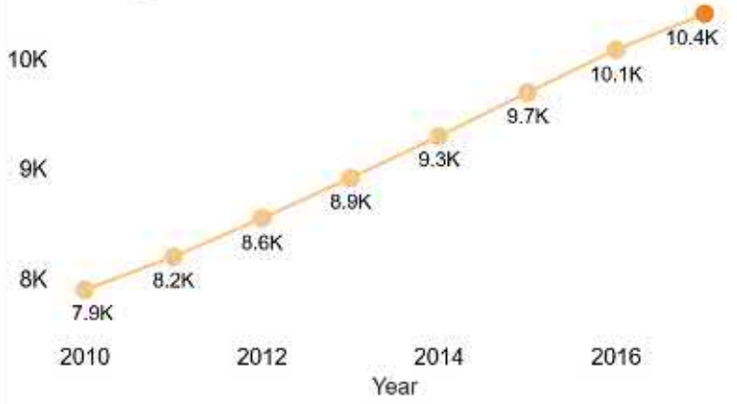
0%

Power Trends

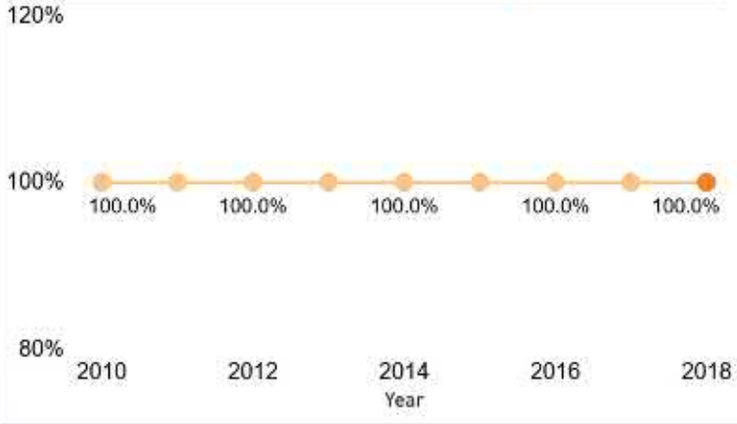
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



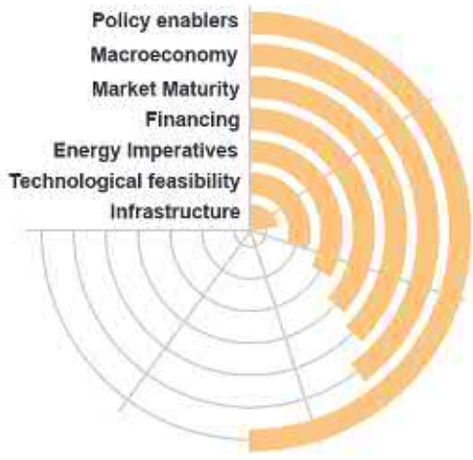
Access to Electricity



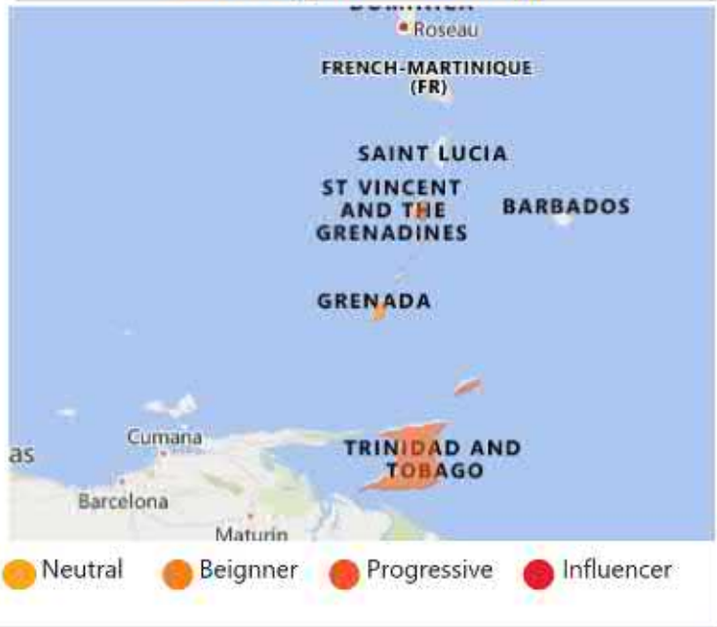
Ease of Doing Solar Classification

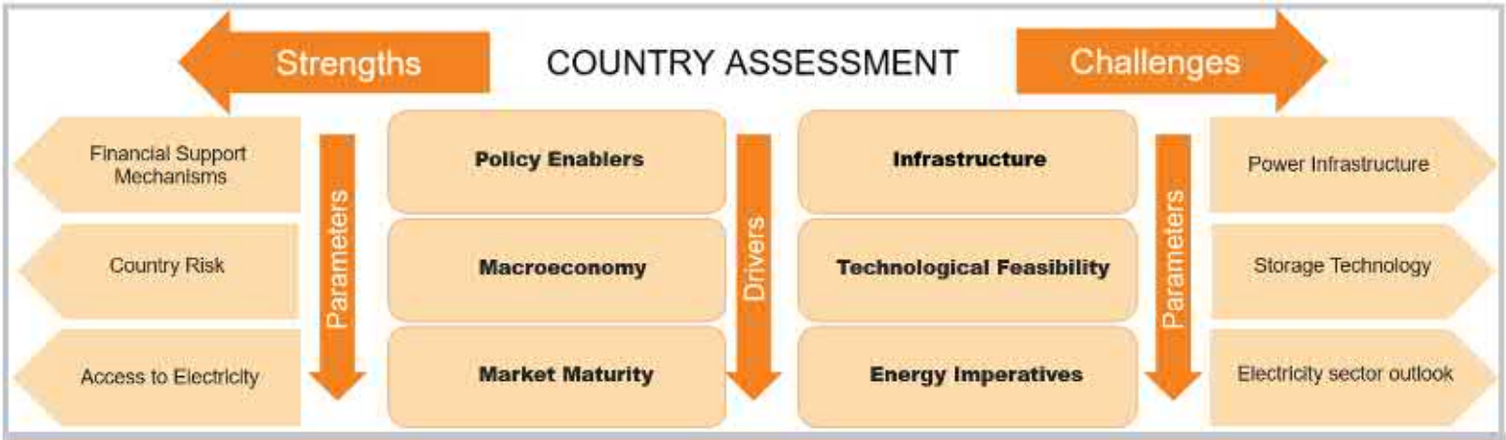
Influencer

Performance against 7 Drivers



Sub-regional standing





Drivers	Insights
Macro-economy	• Trinidad and Tobago is a high income country with GDP per capita (at current prices) of USD 17,276.[19,10] • Oil and gas are the major contributor to the economy as it accounts for 40% of GDP and 80% of the total exports.[8] • Diversifying the economy remains a key challenge for the country.[2]
Policy enablers	• As per Finance Act, 13 of 2010, 0-Rated VAT, import duty exemptions, accelerated depreciation is provided for certain solar and wind equipments.[19] • The Government, in budget 2015, has set a target to generate 10% of electricity from RE by 2021.[6] • The Ministry of Energy and Energy Affairs (MEEA) is in the process of reviewing the legislative and regulatory environment and the National Electrical Code to create an enabling environment for Renewable Energy.[5]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 5.38 kWh/m^2/day and specific yield 4.33 kWh/kWp, strong technical feasibility is envisaged for solar projects in Trinidad and Tobago.[22] • Solar PV for water pumping, lighting, water heating are proven technologies in country.[11]
Market Maturity	• The country has achieved 100% access to electricity in 2006 itself.[13] • Despite having a large potential, solar contributed to only 0.2% in the generation mix as of 2018.[12] • Country's power sector is regulated by Regulated Industries Commission. The transmission and distribution are unbundled and managed by state-owned Trinidad and Tobago Electricity Commission, whereas the generation is managed by three Independent Power Producers.[4] • Trinidad and Tobago's economy is dominated by energy-intensive industries that consume more than half of the country's electricity.
Infrastructure	• The interconnections of the grids, in the two islands of the country, is a key challenge for the grid infrastructure.[4] • Electricity system losses, at 11%, indicate a considerably efficient electricity network.[20] • Obsolete infrastructure and low power factor quality, due to inefficient consumer loads, have caused voltage fluctuations and increased the vulnerability to blackouts.[23]
Financing	• Foreign Direct Investment, of USD 400-500 million, is expected in the coming years for the development and construction of 200 MW of wind and solar power capacity. • The country has a credit rating of Ba1 with a negative outlook in 2020.[16] • Most of the domestic banks are compliant with the international IFRS9 and Basel II (banking) standards.[18] • The commercial banks and the insurance sector are well-capitalized, profitable, and have robust asset quality. Ratio of non-performing loans-to-gross loans have fallen from 3.1% in 2016 to 2.9% in 2017.[18]
Energy Imperatives	• Per capita electricity consumption at 6,300 kWh is considerably high in comparison to the global average.[15] • With the growth in population and economy, the power consumption is expected to grow at a CAGR of ~3% between 2019-23 i.e. from 10,964 MUs in 2019 to 12,323 MUs in 2023.[12] • Owing to abundant Natural gas resources in the country, gas-based thermal power production contributed 99.1% of the total installed capacity of 2,135 MW in 2018.[12] • Country targets to achieve 10% of power generation, from RE, by 2021.[12] • Trinidad and Tobago's electricity rates are the lowest in the Caribbean at approximately USD 0.04 per kWh and well below the regional average of USD 0.33 per kWh.[4]

Tuvalu

Asia & Pacific

Electricity Consumption in MU (2017)

9.6

Installed Solar Capacity in MW (2019)

2.2

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

1.4

World Bank's Ease of Doing Business Score (2020)

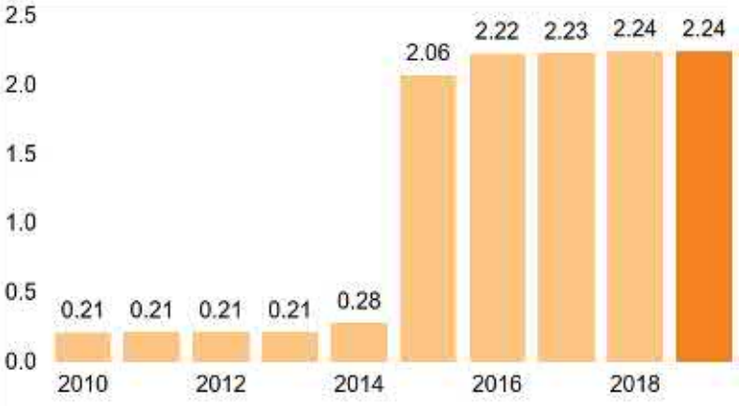
-

Solar installed capacity Growth rate (CAGR) for 2015-19

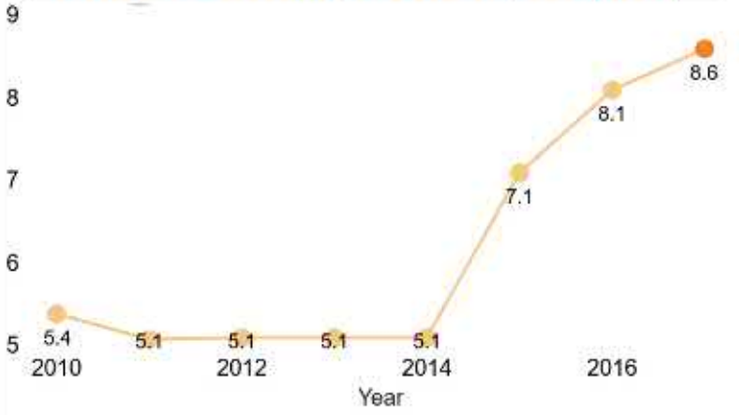
2%

Power Trends

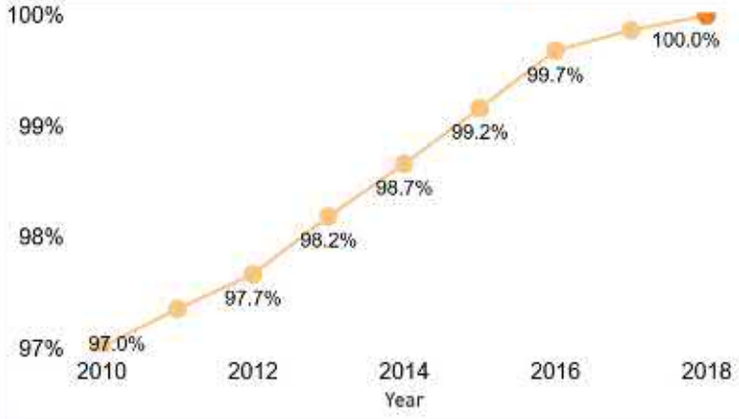
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



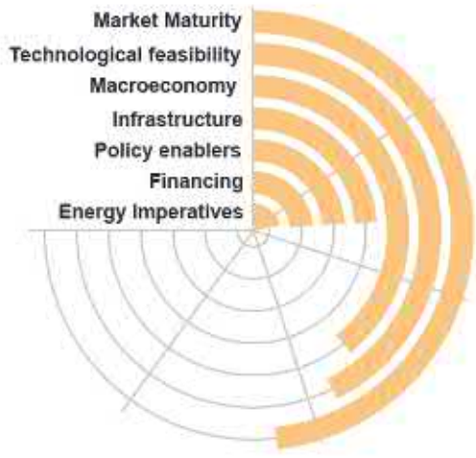
Access to Electricity



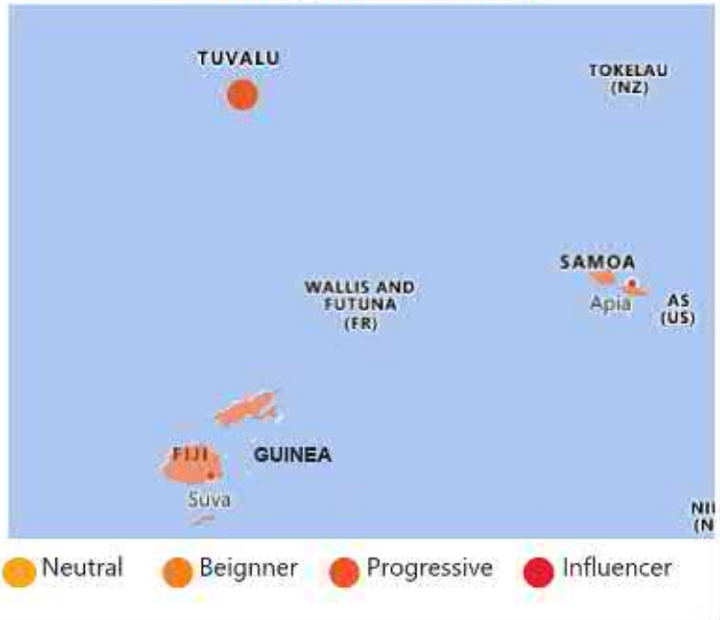
Ease of Doing Solar Classification

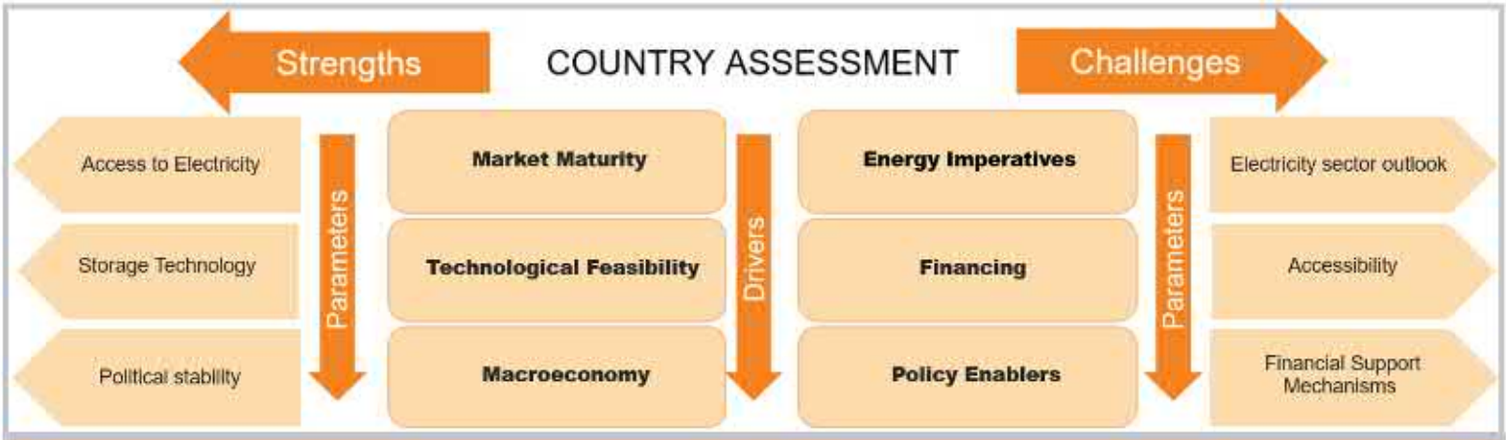
Influencer

Performance against 7 Drivers



Sub-regional standing





Drivers	Insights
Macro-economy	• Tuvalu is a smaller economy remotely placed from major markets in the Pacific with a narrow production base and growth mainly driven by public expenditure. • It is classified as an upper middle-income country as per World Bank's classification.[1] • GDP (Real) has grown at an annual rate of 6.0% in 2019.[2] • Approximately 7-10% of GDP is spent on imported fuel (around USD 2 million depending on oil prices) making energy the costliest as well as the most significant sector of the Tuvalu economy.[3]
Policy enablers	• "Funafuti Road Map to 100% Renewable Energy" as part of the "Tuvalu Renewable Energy Project" provides a pathway for current and future stages of renewable energy development in the capital Funafuti (towards a 100% renewable energy contribution). • The Master Plan for Renewable Electricity and Energy Efficiency aims 100% renewable energy by the end of 2020 (extended to 2025) out of which approximately 95% power demand to be fulfilled by Solar PV.[4]
Technological Feasibility	• Owing to high levels of average solar irradiation of 5.34 kWh/m^2/day and specific yield of 4.26 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Tuvalu.[5] • Tuvalu, like many Pacific Nations, has traditionally relied on imported fossil fuels for electricity generation.[3]
Market Maturity	• 100% population had access to electricity as of 2018.[6] • In 2018, Tuvalu had approximately 16% of the total electricity generation coming from renewable energy sources.[3] • The publicly owned Tuvalu Electricity Corporation owns and operate the generation and distribution assets.[3] • Current generation costs in Funafuti are high due to reliance on diesel for the bulk of its generation.[3]
Infrastructure	• With a total land area of just 26 sq. km, Tuvalu faces the challenge of land availability for utility scale Solar PV.[7] • The Tuvalu Photovoltaic Electricity Network Integration Project is located in the rural islands of Vaitupu which is a solar PV mini grid with battery storage with a capacity of 46 kWp.[7] • The Tuvalu Solar Space Creation Project was financed by the United Arab Emirates' Pacific Partnership Fund through the Abu Dhabi Fund for Development (ADFD) and developed by Masdar (Abu Dhabi's renewable energy company). The 500 kW rooftop solar project, with the help of advanced control technology to ensure grid stability, generates 755,000 kWh per year.[7]
Financing	• Tuvalu relies heavily on official development assistance with budgeted flows in 2018 totalling AUD 24.4 million equivalent to 37.2% of gross domestic product. • In addition to the Asian Development Bank (ADB)and the World Bank, Tuvalu's main development partners are Australia, Japan, New Zealand, the European Union, Taipei and China.[3] • As per Tuvalu Master Plan for Renewable Electricity a total renewable electricity generation capacity of 6 MW is estimated requiring a capital investment of AUD 52 million.[4] • In 2017 Tuvalu was the first recipient of the Green Climate Fund (GCF) contributions for climate change adaptation in the Pacific region for the Tuvalu Coastal Adaptation Project.[3]
Energy Imperatives	• Electricity demand grew at around 6% annually during 2013–2017.[3] • Total Installed capacity in the country is 3 MW which includes Solar PV capacity of ~2 MW as of 2019.[8] • As of 2016, oil contributed to 95% of the total primary energy consumption of the country.[8]

Uganda

Africa

Electricity Consumption in BU (2017)

3.0

Share of Population with Access to Electricity (2018)

World Bank's Ease of Doing Business Score (2020)

60.00

Installed Solar Capacity in MW (2019)

82.2

Installed Off-Grid Solar Capacity in MW (2019)

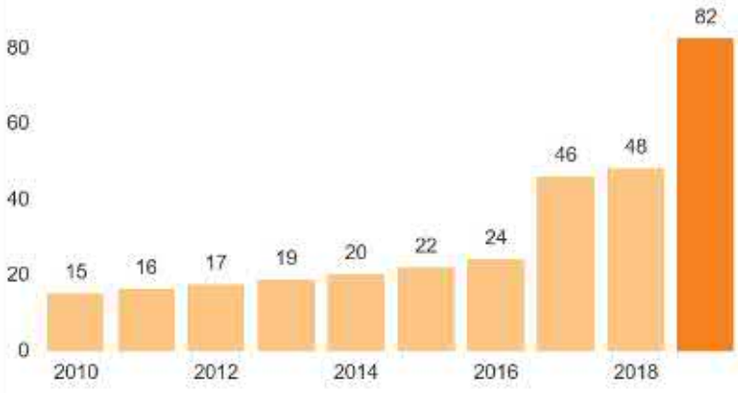
28.2

Solar installed capacity Growth rate (CAGR) for 2015-19

39%

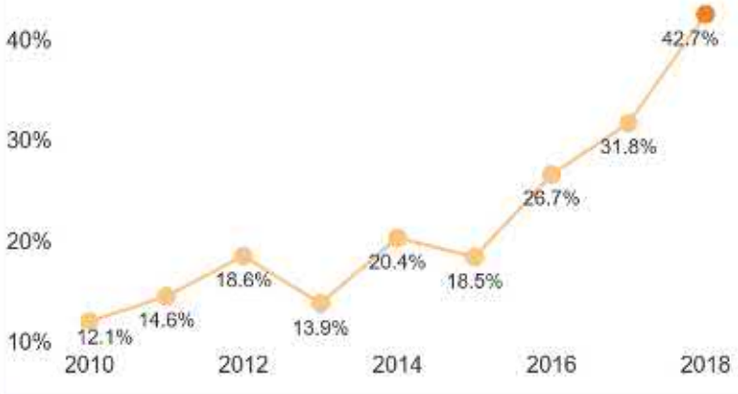
Power Trends

Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)

Access to Electricity

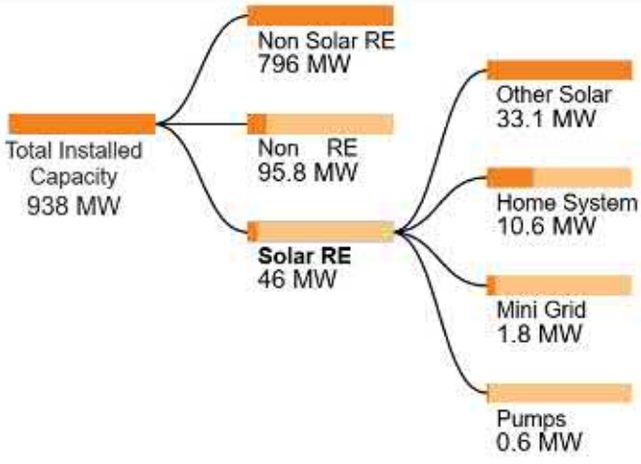


Ease of Doing Solar Classification

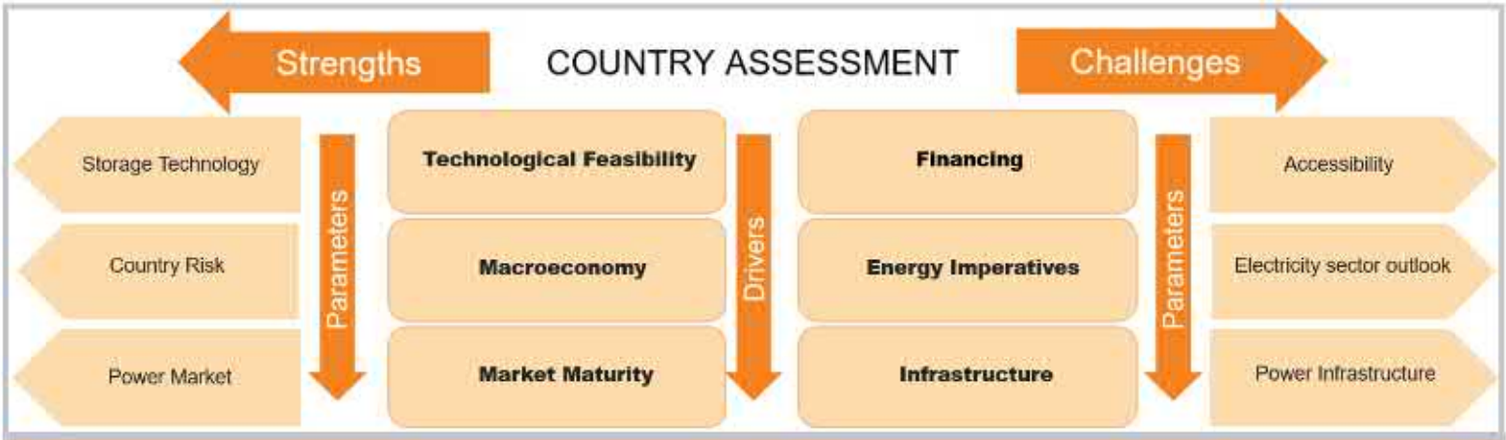
Progressive

Performance against 7 Drivers

Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 4.9% in 2019.[1] • The GDP (current) is poised at USD 34.38 billion as of 2019.[21] • Retail, construction, and telecom industry are the major contributors to the economy.[25] • Most of the country's investements are in large infrastructure projects. As a result, agriculture, tourism, and industrial sector have shown little growth in the previous years.[24]
Policy enablers	• Government of Uganda has shown a strong commitment towards deployment of RE with a roadmap to achieve 3,200 MW by 2030 and reach 100% RE by 2050.[2,3] • Renewable Energy feed-in-tariff policies have been introduced in 2011. For solar PV projects, 10% return on equity has been considered with a tariff ceiling of USD 0.07 per kWh in 2018.[4] • Import duty and VAT have been exempted for solar home systems above 11Wp.[6]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 5.64 kWh/m^2/day and specific yield 4.45 kWh/kWp, strong technical feasibility is envisaged for solar projects in Uganda.[20]
Market Maturity	• Power sector is regulated by Electricity Regulatory Authority (ERA) in Uganda. • The Government of Uganda (GoU), ERA and the German Development Bank KfW have launched the 'Global Energy Transfer Feed-in-Tariff' (GET FiT) auction program in 2013, to promote RE generation.[9] • The Rural Electrification Strategy and Plan 2013- 2022 has a primary objective to achieve 100% electrification by 2040.[7,8] • As of 2018, 43% of the population has access to electricity in Uganda.[12] • Despite having significant potential solar constitute only 1.3% of the total generation of 4,252 MUs.[13]
Infrastructure	• Transmission system losses stand at 3.8% of output indicating a considerably efficient network.[13] • The government is planning to increase the total length of the transmission network to 3,400 km in the coming years to improve access to electricity.[5] • With 34% of total land earmarked for agricultural purpose, identification of suitable land for developing utility-scale solar projects may be a key challenge.[16] • In 2020, Amea Power signed an agreement to install a total capacity of 130 MW wind and 90 MWp solar power plants.
Financing	• Uganda has a credit rating of B2 with a stable outlook in 2020.[22] • The domestic banking system is well-capitalized, profitable and stable. The Non-performing loans to total gross loans ratio fell to 3.4% in 2018 from 5.6% in 2017.[24] • Due to limited financing options for small firms and local businesses, the private sector credit remains low at 12% of GDP.[24] • Around 85% of the population has access to financial services in 2018. The government is in the process of implementing a five-year strategy to further improve financial services.[24]
Energy Imperatives	• Per capita consumption of approximately 900 kWh is relatively low in comparison to the global average of 3,400 kWh in 2019.[14] • Owing to large water reserves, large and small hydropower plants constitute 88% in the generation mix in 2018.[13] • Uganda's installed electricity generation capacity is growing at 6% annually. However, lack of an integrated power system may hinder this growth rate.[17,18] • Since over 75% of the population resides in the rural areas of which 43% of the population has access to electricity, off-grid solar systems can be a viable solution.[11] • In 2018, the tariff for existing solar plants is observed to be USD 0.11 per kWh.[15]

United Arab Emirates

Asia & Pacific

Electricity Consumption in BU (2017)

115.3

Installed Solar Capacity in MW (2019)

1784.8

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

4.7

World Bank's Ease of Doing Business Score (2020)

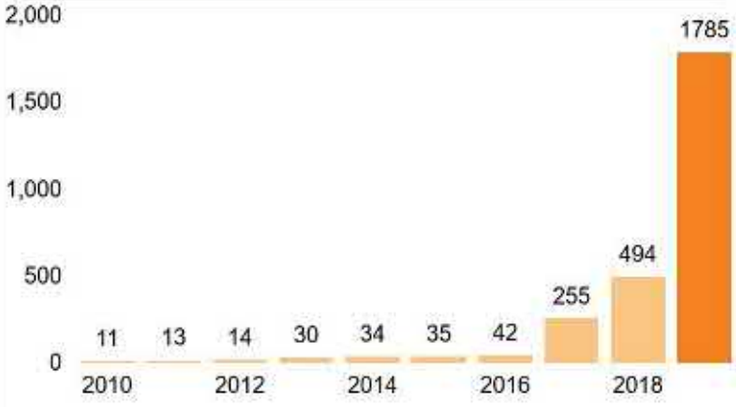
80.90

Solar installed capacity Growth rate (CAGR) for 2015-19

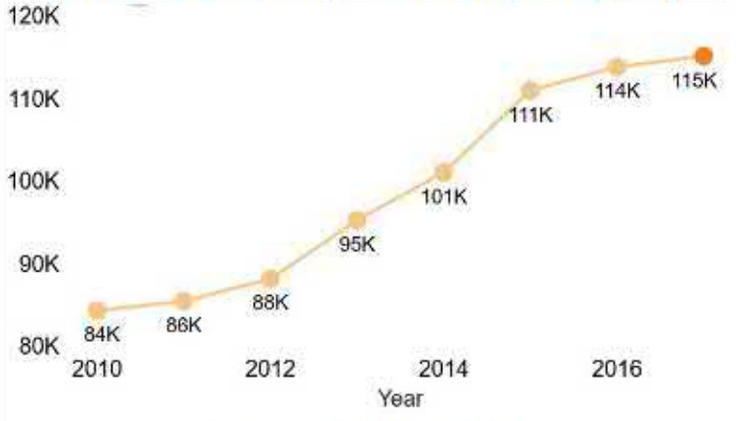
168%

Power Trends

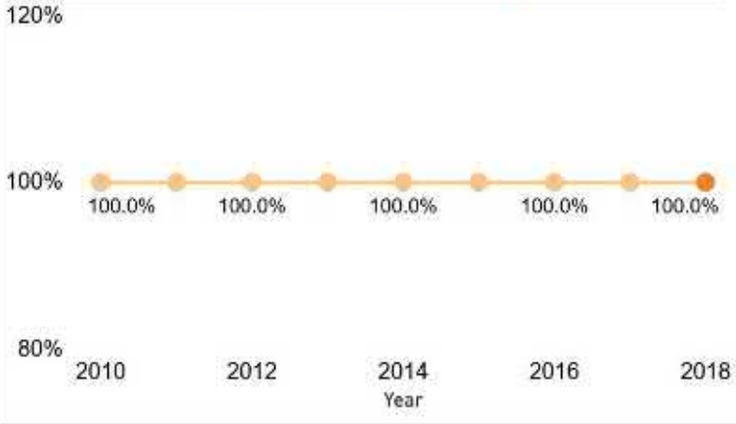
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



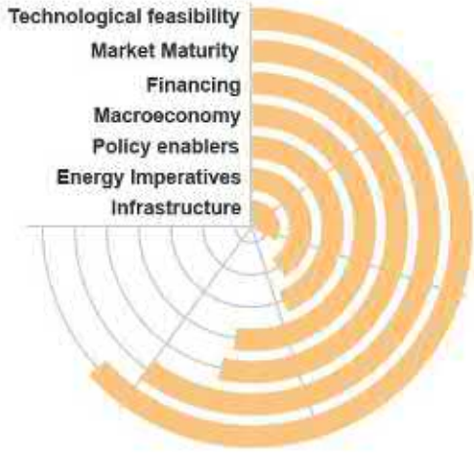
Access to Electricity



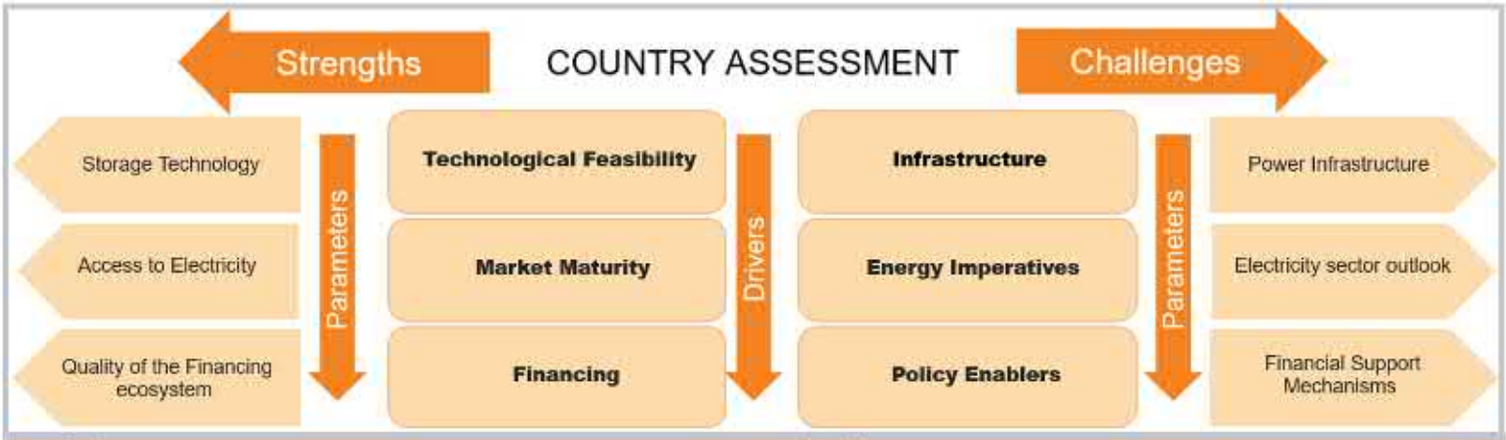
Ease of Doing Solar Classification

Achiever

Performance against 7 Drivers



Sub-regional standing



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 1.3% in 2019.[11] • A high income and developed country with a GDP (current prices) per capita of USD 43,103 in 2019.[12,13] • UAE "Vision 2021" aims to create a sustainable, diversified, competitive knowledge economy with world-class Healthcare, Education and a fair Judiciary and Public safety.[19,14] • Extractive industries, Wholesale and Retail Trade, Financial and Insurance activities, Construction and building are the major sector contributing to the GDP.[19]
Policy enablers	• Dubai has introduced competitive bidding for renewable energy tenders in 2013 as a part of its "Clean Energy Strategy 2050" to attract private investors in RE and increase RE generation.[7] • "Clean Energy Strategy 2050" aims to increase the share of clean energy to 50% in the energy mix and scale down the carbon footprint of power generation by 70% by 2050.[9] • Dubai and Abu Dhabi had introduced net metering scheme in 2015 and 2017 respectively to promote RE generation while other Emirates are planning to adopt the scheme. • Dubai has introduced Renewable Energy Standards, in 2013, to set up a common framework for grid connection agreements.[18]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 6.05 kWh/m^2/day and specific yield 5.02 kWh/kWp, a strong technical feasibility is envisaged for solar projects in UAE.[10] • Despite having a significant potential, solar contributed a mere 1% in the total generation of 135,996 MUs in 2018.[5]
Market Maturity	• 100% of the population has access to electricity in UAE since 1990.[12] • UAE has recently installed its first pilot floating solar PV, with a capacity of 80 kW, off the coast of Nurai island in 2020. In 2019, Dubai has also issued RFP to construct floating solar PV in the Arabian Gulf.[20,21]
Infrastructure	• To meet the growing energy demand, UAE aims to invest AED 600 billion by 2050.[8] • In 2012, Dubai had announced Mohammed bin Rashid Al Maktoum Solar Park which is now expected to reach a capacity of 1 GW by the end of 2020 and 5 GW by 2025.[8] • Since 2009, UAE's national grid is connected to Saudi Arabia, Kuwait, Bahrain, Oman, and Qatar through the GCC Interconnection Grid. According to GCCIA estimates, this grid interconnection has made economic savings of USD 2.2 billion between 2011 and 2016.[17,22] • With new upcoming projects in UAE, the total length of Transmission and Distribution lines is expected to reach 23,982 ckm and 125,546 ckm by 2025.[17]
Financing	• Country's credit rating of A3 with a stable outlook in 2020 is a positive indicator for the investors.[2] • As per UNCTAD's World Investment Report 2020, FDI inflows have increased from USD 10,385 Mn. in 2018 to USD 13,787 Mn. in 2019.[1] • The domestic banks are profitable and increased oil revenues have increased liquidity and private credit.[3] • UAE has an Ease of Doing score of 80.9 (out of 100) and ranks 16th among 190 countries. It ranks 1st in getting access to electricity, 3rd in dealing with construction permits and 9th in enforcing of contracts thus enabling a strong business environment.[15] • Most domestic banks are compliant with the international IFRS9 standards.[16]
Energy Imperatives	• Per capita consumption of 13,800 kWh is significantly high in comparison to the global average of approximately 3,400 kWh in 2019.[4] • Owing to abundant Natural gas resources in the country, gas-based thermal power production contributes 98.3% of the generation mix in 2018.[5] • With economic and population growth, the annual electricity consumption is expected to reach 225 Bus, by 2030, growing at a CAGR of 3.9%.[17] • As of 2017, the commercial and residential sector constitutes 71% of the total electricity demand in UAE.[17]

United Republic of Tanzania

Africa

Electricity Consumption in MU (2017)

-

Installed Solar Capacity in MW (2019)

25.7

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

-

World Bank's Ease of Doing Business Score (2020)

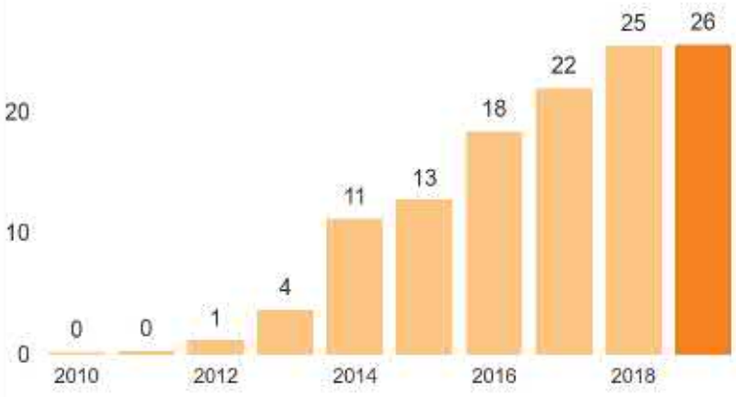
54.50

Solar installed capacity Growth rate (CAGR) for 2015-19

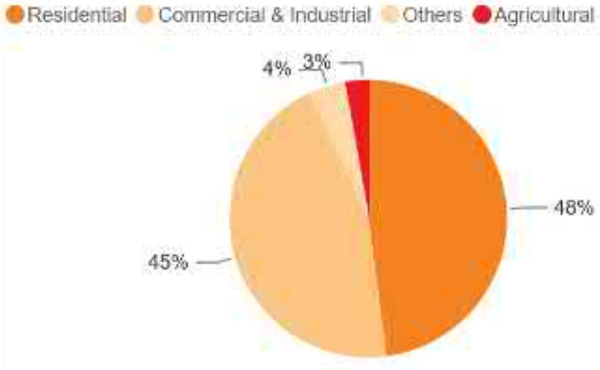
19%

Power Trends

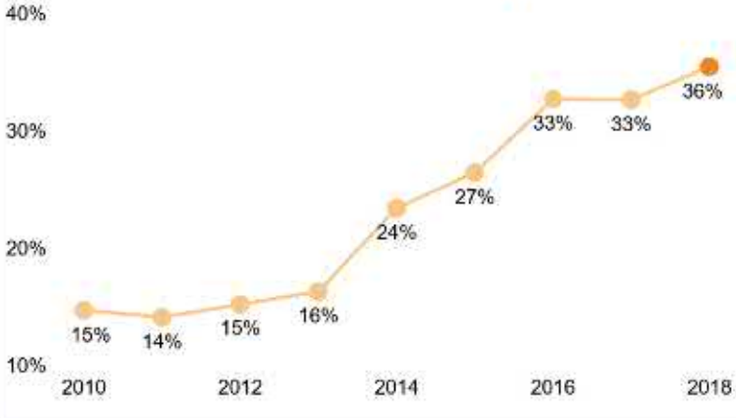
Cumulative Solar installed Capacity (MW)



Consumer Mix



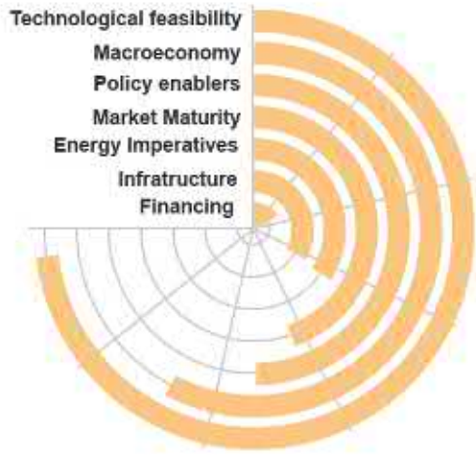
Access to Electricity



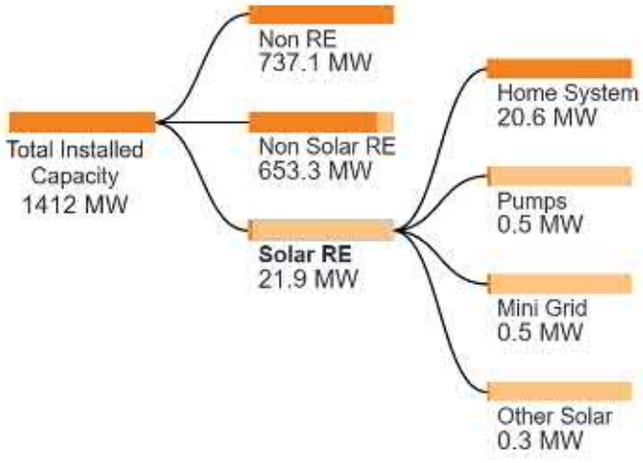
Ease of Doing Solar Classification

Influencer

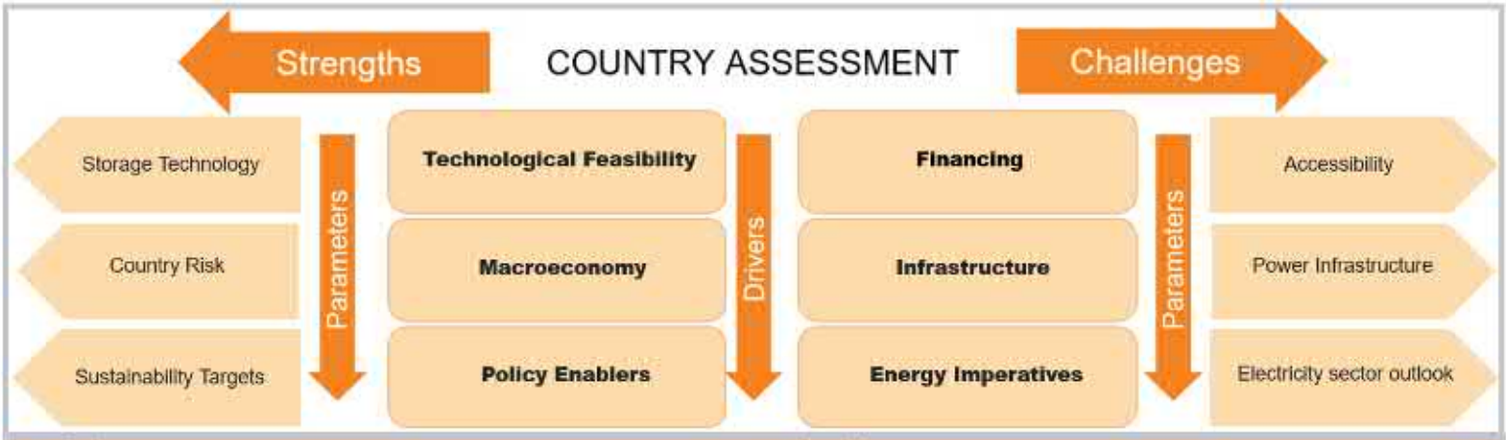
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 6.3% in 2019.[8] • Tanzania is a low-income developing country as per World Bank's classification with a GDP (real) per capita of USD 1,122 in 2019.[5,7] • Its economy is characterized by strong investment growth, substantial public spending and robust private consumption.[16]
Policy enablers	• Under the VAT Act 2014 and EAC customs Management Act 2004, import duty and VAT have been exempted for solar and wind equipment to attract investments in renewables.[13,14] • The National Five-Year Development Plan 2016-17 – 2020-21 (FYDP II) aims to increase the share of renewables in electricity generation. to 70%, by 2025-26.[15] • Introduced in 2008, Feed-in-tariff is catalysing the growth of rooftop solar PV in the country.[10] • The government allowed competitive bidding rules under The Electricity (Development of Small Power Projects) Rules, 2017 for solar and wind projects for capacities between 1 MW and 10 MW.[10] • The Power System Master Plan 2012 targets to achieve an electrification rate of 75% by 2033.[17]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation (GHI) of 5.66 kWh/m^2/day and specific yield 4.51 kWh/kWp, strong technical feasibility is envisaged for solar projects in Tanzania.[11]
Market Maturity	• As of 2018, 36% of the population has access to electricity in Tanzania.[5] • Despite having significant potential, solar contributed a mere 1.2% in the total generation of 7.2 BUs in 2018.[9] • As per the assessment done by USAID in 2018, approximately 55% of the population has access to mobile money platforms indicating high potential for solar home systems.[18] • Many off-grid solar products are paired with PAYGO offerings for easy financing options.[18] • Tanzania is a member of the Eastern African Power Pool which aims to optimize the available energy resources and reduce electricity cost in the region.[19]
Infrastructure	• The National Grid of Tanzania is interconnected to Uganda, Kenya and Zambia. Tanzania imports up to 16 MW of electricity from these countries.[10] • The total length of Transmission and Distribution lines is expected to reach 1,29,584 ckm, by 2025.[10] • As of 2014, transmission and distribution losses in Tanzania are at 18%.[21] • In 2018, Tanzania Electric Supply Company Ltd has issued a request for proposals for the construction of several large-scale PV projects with a combined capacity of 150 MW to increase the share of solar in the energy mix.
Financing	• Tanzania has a credit rating of B2 with a stable outlook in 2020.[2] • FDI inflows have increased from USD 1,056 million in 2018 to USD 1,112 million in 2019.[1] • Tanzania has an Ease of Doing score of 54.5 (out of 100) and ranks 141st among 190 countries in 2020. Businesses face challenges in getting credit, construction permits, enforcing contracts, access to electricity, paying taxes and trading across borders.[3]
Energy Imperatives	• Per capita consumption of 100 kWh is relatively low in comparison to the global average.[20] • Owing to considerable natural gas resources in the country, gas-based thermal power production contributed 48.49% of the generation mix in 2018.[9] • Since over 65% of the population resides in the rural areas of which 81% of the population don't have access to electricity, off-grid solar systems can be a viable solution to improve access to electricity.[5,6] • With economic and population growth, the annual electricity consumption is expected to reach 12.1 BUs by 2022 from 8.4 BUs in 2018, growing at a CAGR of 9.8%.[10] • As of 2017, the residential and industrial sector constitutes 70% of the total electricity demand.[10]

Vanuatu

Asia & Pacific

Electricity Consumption in MU (2017)

68.0

Installed Solar Capacity in MW (2019)

2.7

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

1.3

World Bank's Ease of Doing Business Score (2020)

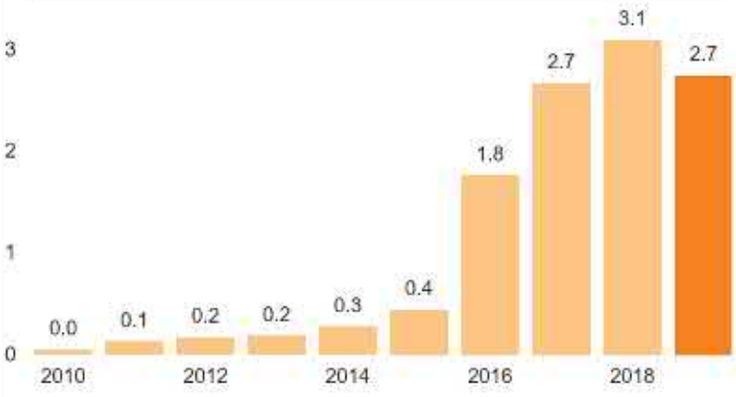
61.10

Solar installed capacity Growth rate (CAGR) for 2015-19

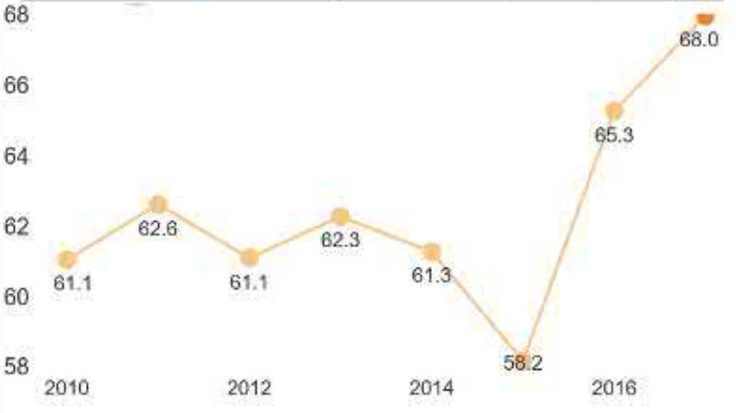
58%

Power Trends

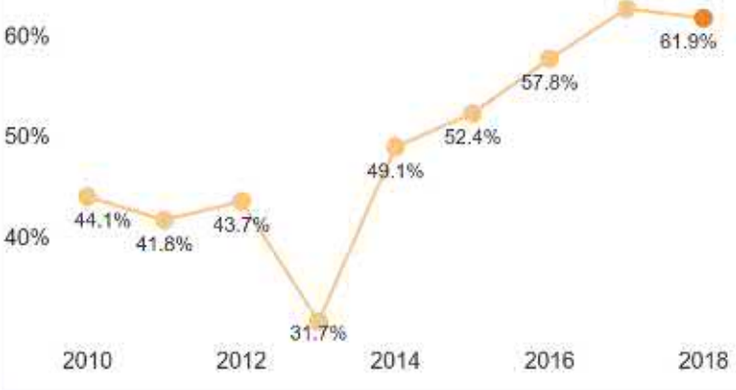
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



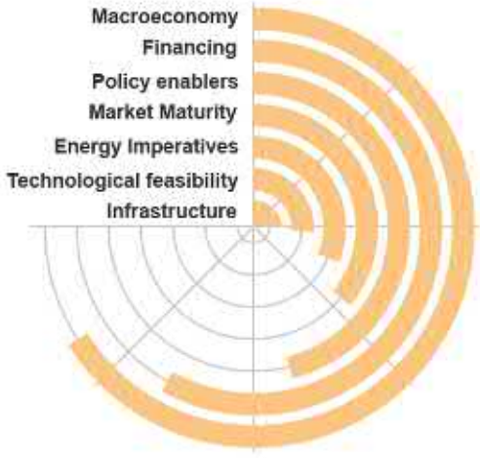
Access to Electricity



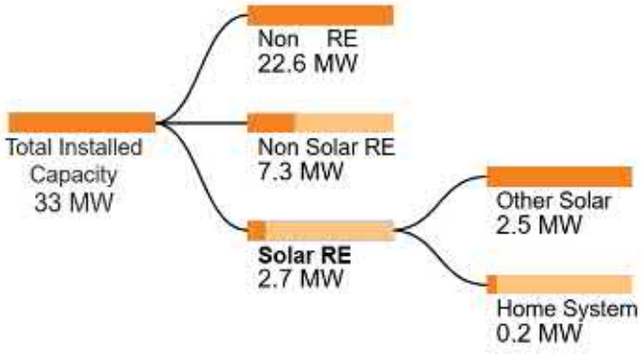
Ease of Doing Solar Classification

Potential

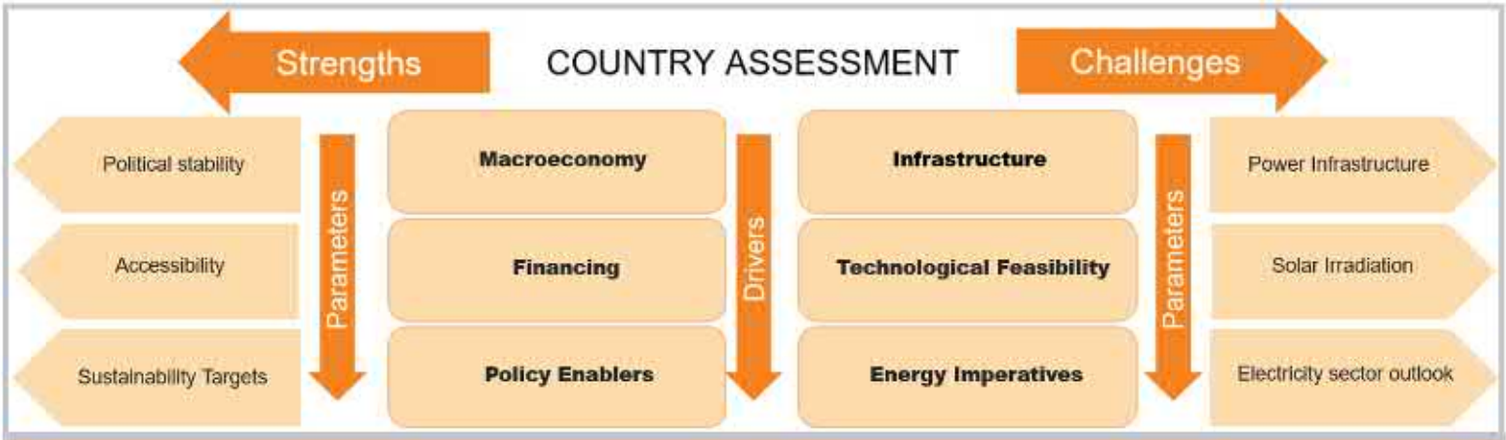
Performance against 7 Drivers



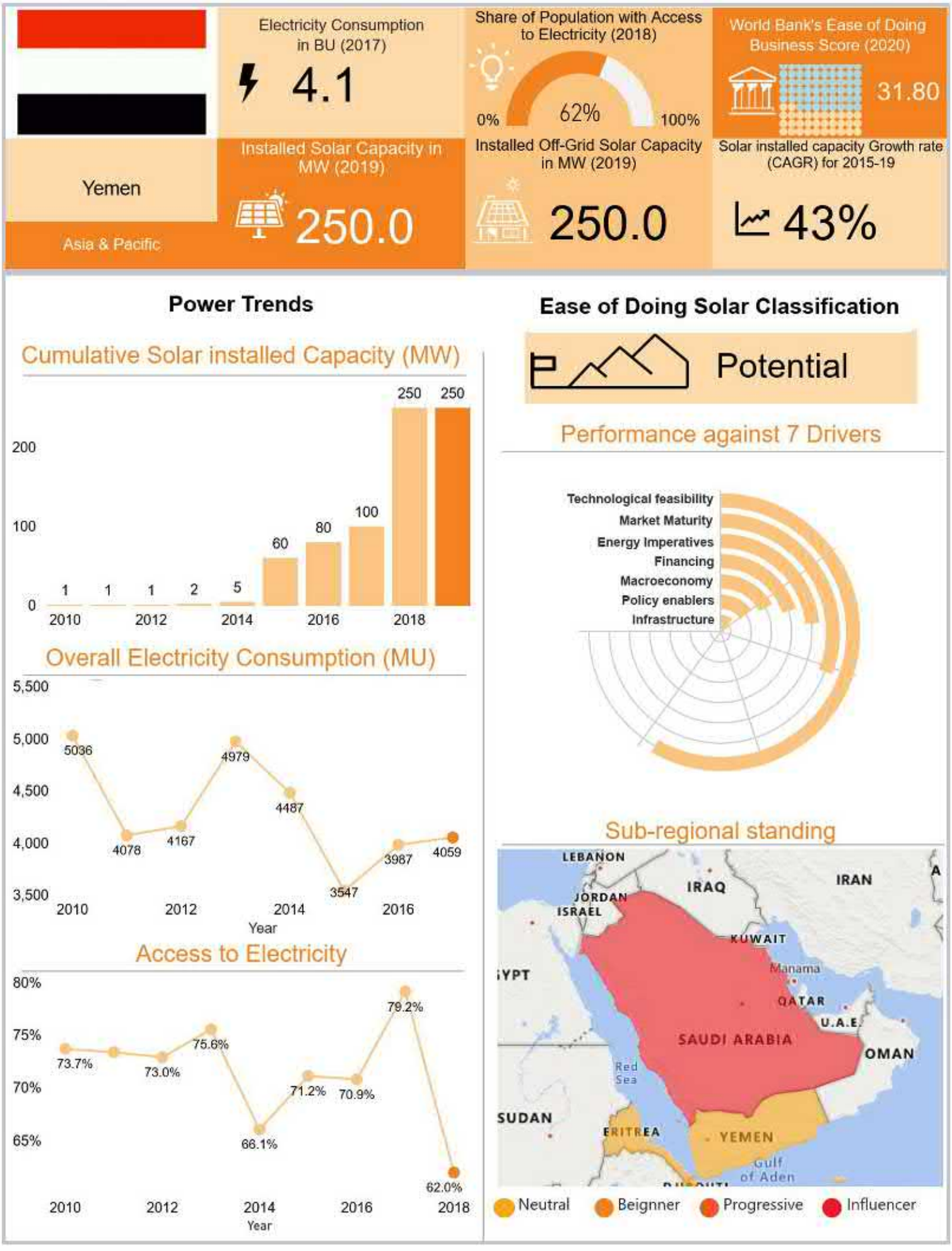
Installed Generation Capacity by Source

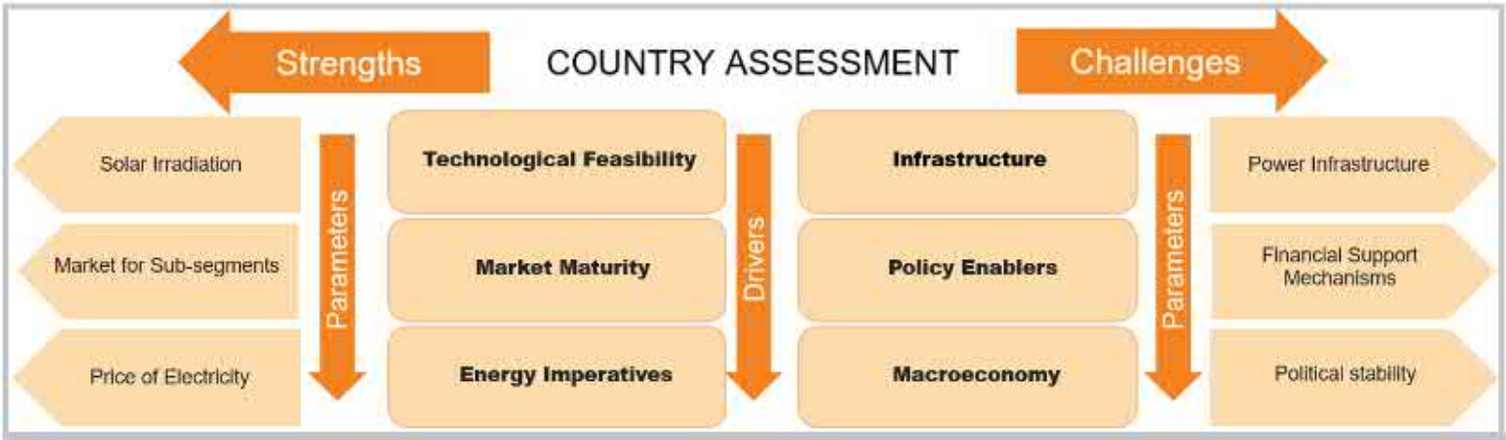


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 2.9% in 2019.[4] • Vanuatu economy is affected by vulnerability to natural disasters and limited commodity exports. Economy is dependent on foreign aid and concessional loans from international development agencies.[5] • Agriculture, fishing, tourism and offshore financial services are the major contributors to the economy.[3] • Vanuatu's 80 islands are mostly volcanic and spread over 710,000 square kms in the western Pacific Ocean. Of these 80 islands, only 65 have permanent population.[8]
Policy enablers	• The National Energy Roadmap (NERM) 2013-2020 aims to achieve 65% of share of renewable energy in the generation mix by 2020.[7,9] • Vanuatu has enacted the Net Metering Act in 2014 which is catalysing the growth of solar PV in the country. • There is no income or corporate tax in Vanuatu since 1994. It also supports RE companies by offering import duty exemptions on RE equipment on a case by case basis thus attracting private investments.[1,17] • Vanuatu Rural Electrification Project (VREP) II 2017, funded by World Bank, aims to subsidize the cost of solar home systems, mini-grids and micro-grids in rural areas benefiting approximately 42,000 people.[13]
Technological Feasibility	• Owing to relatively moderate levels of average solar irradiation (GHI) of 4.3 kWh/m^2/day and specific yield 3.54 kWh/kWp, moderate technical feasibility is envisaged for solar projects in Vanuatu.[12] • In 2019, The Global Green Growth Institute (GGGI), the Ministry of Climate Change and the Ministry of Lands and Natural Resources has signed a solar water pumping project to meet the water needs in the country.
Market Maturity	• As of 2018, 62% of the population has access to electricity; in rural areas this number is 51%.[15] • The National Energy Roadmap (NERM) 2013-2020 aims to achieve 100% access to electricity by 2030.[9] • Lack of regulatory oversight, due to existing concessional contracts, may hinder the growth of renewable energy and can be seen as a roadblock for Independent Power Producers in the country.[1] • Nationally Appropriate Mitigation Action (NAMA), implemented in 2015, is supporting NERM targets by installing RE micro grids and extending the existing grid in the country.[1]
Infrastructure	• Integration of the National grid in all parts of the country, due to large number of dispersed islands, is a major challenge.[1] • The government had issued guidelines in 2014 which provide a clear set of principles and framework to encourage Independent power producers and investors.[19]
Financing	• The National Energy Roadmap (NERM) 2013-2020 aims to provide a framework to attract private sector investments.[9] • According to UNCTAD's World Investment Report 2020, FDI inflows has increased from USD 38 Million in 2018 to USD 41 million in 2019.[10] • Unclear land ownership, regulatory restrictions, high upfront capital costs and constraints to equipment maintenance are key roadblocks for private sector investments in Vanuatu.[2]
Energy Imperatives	• Per capita electricity demand of 189 kWh is significantly lower as compared to the global average.[6] • Electricity generation, from renewable energy, accounts for 36% of the total energy mix in 2017.[15] • Commercial and public sectors account for nearly 80% of the total grid connected electricity demand.[19] • The national electricity consumption is expected to increase from 91,513 MUs in 2020 to 166,719 MUs in 2030 at a CAGR of 6%.[16] • Vanuatu depends heavily on imported diesel for electricity generation in rural areas where grid is not available. Thus has significant availability and price vulnerability to fluctuating oil prices.[1]


Yemen
Asia & Pacific
Electricity Consumption in BU (2017)
4.1
Installed Solar Capacity in MW (2019)
250.0
Share of Population with Access to Electricity (2018)
0%
62%
100%
Installed Off-Grid Solar Capacity in MW (2019)
250.0
World Bank's Ease of Doing Business Score (2020)
31.80
Solar installed capacity Growth rate (CAGR) for 2015-19
43%
Power Trends
Cumulative Solar installed Capacity (MW)
200
100
0
1 1 1 2 5 60 80 100 250 250
2010 2012 2014 2016 2018
Overall Electricity Consumption (MU)
5,500
5,000
4,500
4,000
3,500
5036 4078 4167 4979 4487 3547 3987 4059
2010 2012 2014 2016
Year
Access to Electricity
80%
75%
70%
65%
73.7% 73.0% 75.6% 66.1% 71.2% 70.9% 79.2% 62.0%
2010 2012 2014 2016 2018
Year
Ease of Doing Solar Classification
Potential
Performance against 7 Drivers
Technological feasibility
Market Maturity
Energy Imperatives
Financing
Macroeconomy
Policy enablers
Infrastructure
Sub-regional standing
LEBANON
IRAQ
IRAN
JORDAN
ISRAEL
KUWAIT
Manama
QATAR
U.A.E.
SAUDI ARABIA
OMAN
Red Sea
SUDAN
ERITREA
YEMEN
Gulf of Aden
Neutral
Beignner
Progressive
Influencer



Drivers	Insights
Macro-economy	• GDP (Real) has grown at an annual rate of 2.1% in 2019.[7] • GDP per capita (at current prices) is approximately USD 9682 in 2018.[15] • Yemen continues to face an unprecedented humanitarian, social and economic crisis. Significant damage to vital public infrastructure has contributed to a disruption of basic services in Yemen.[7]
Policy enablers	• The National Strategy for Renewable Energy and Energy Efficiency 2010 aims to achieve 15% share of renewable sources in energy mix by 2025.[1] • World Bank funded USD 50 million towards its "Yemen Emergency Electricity Access Project" in 2018 with a goal to expand electricity access to schools, hospitals and in rural areas using solar.[3] • "Enhanced Rural Resilience in Yemen (ERRY)" project, started by the United Nations Development Programme (UNDP) in 2016, aims to increase solar penetration in the country by installing solar micro-grids.[10]
Technological Feasibility	• Owing to relatively high levels of average solar irradiation level (GHI) of 6.47 kWh/m^2/day and specific yield 5.24 kWh/kWp, a strong technical feasibility is envisaged for solar projects in Republic of Yemen.[16] • Solar PV for water pumping, lighting and water heating are proven technologies in Yemen's renewable energy sector.[5]
Market Maturity	• Due to the ongoing conflict in the country, population with access to electricity has decreased from approximately 71% in 2015 to 62% in 2018.[17] • Absence of quality standards and skilled manpower/technicians for solar are areas of concern. 6 • Solar constituted 12% of total electricity generation (of 3,609 MUs) in 2018.[1]
Infrastructure	• Persistent load shedding and grid instability are major challenges in Yemen's power sector. [2] • Power infrastructure has deteriorated over time due to insufficient investments for maintenance.[2] • The 2018, "Dynamic Damage and Needs assessment (DDN)" report shows 6 out of 10 assessed cities have no access to public electricity.[3] • The Saudi Development and Reconstruction Program for Yemen (SDRPY) has launched a project, in 2020, for installation of new medium-voltage and low-voltage power networks including lines, extensions and transformers.
Financing	• Ongoing conflict has led to a decrease in FDI stock from USD 2,595 million in 2017 to USD 1,942 million in 2019.[13] • Solar loans are making 5% to 20% of total lending among assessed micro finance institutions.[3] • USD 1 billion has been invested in solar PV, in the residential sector since 2012 thereby creating a strong business opportunity for private sector companies.[6]
Energy Imperatives	• Per capita electricity consumption of 140 kWh, in 2019, is significantly lower in comparison to the global average.[11] • Residential sector represents 79% of the electricity demand in 2018.[12] • 55% percent of households relied on solar PV as the primary source of lighting in 2017.[14] • Oil is the primary source of electricity generation having 78% share in the energy mix in 2018.[13]

Zambia

Africa

Electricity Consumption in BU (2017)

12.2

Installed Solar Capacity in MW (2019)

96.4

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

7.5

World Bank's Ease of Doing Business Score (2020)

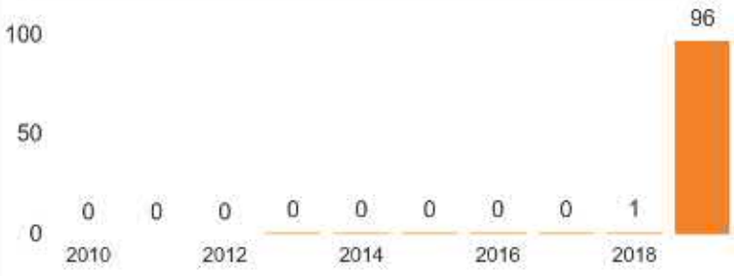
66.90

Solar installed capacity Growth rate (CAGR) for 2015-19

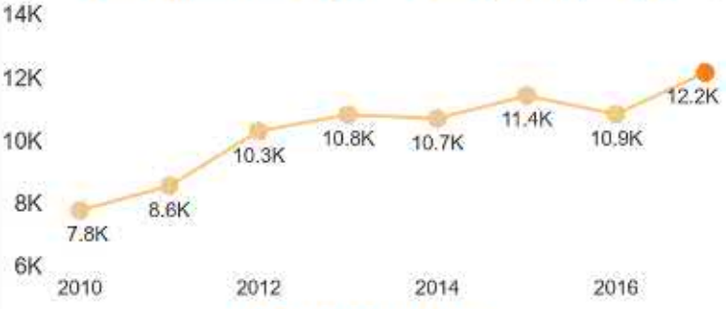
533%

Power Trends

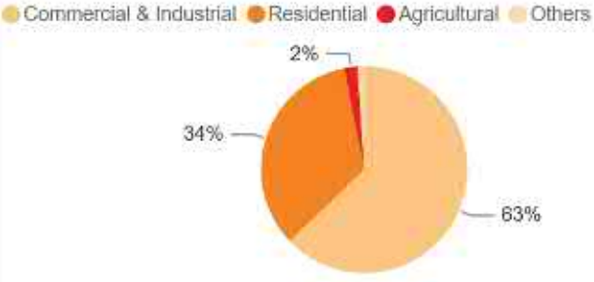
Cumulative Solar installed Capacity (MW)



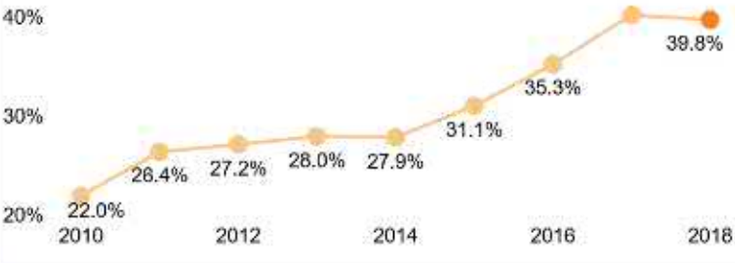
Overall Electricity Consumption (MU)



Consumer Mix



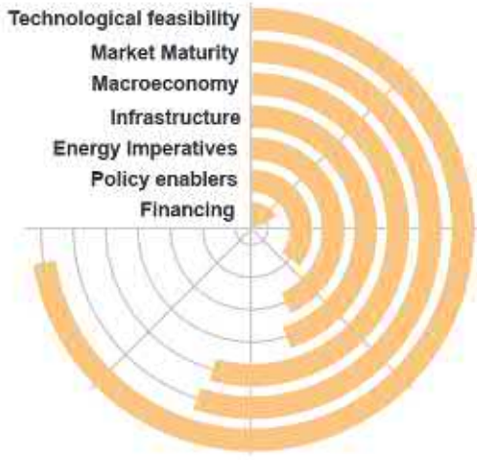
Access to Electricity



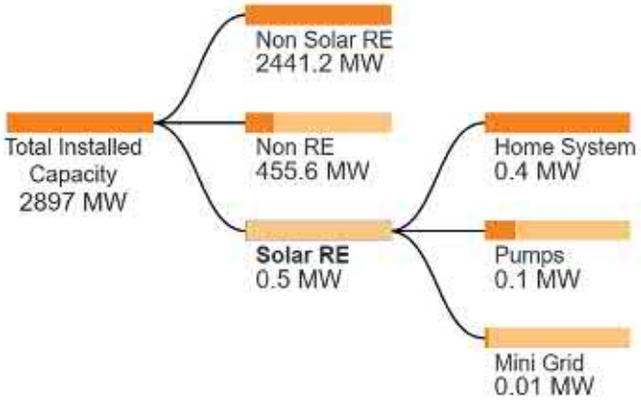
Ease of Doing Solar Classification

Progressive

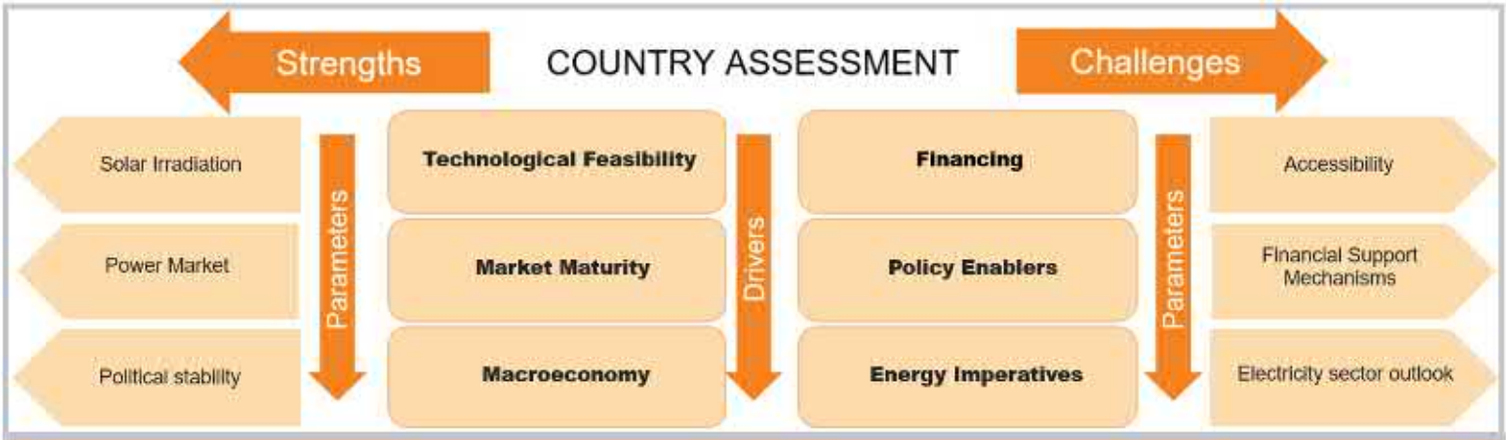
Performance against 7 Drivers



Installed Generation Capacity by Source



Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



Drivers	Insights
Macro-economy	• Zambia has achieved middle-income country status in 2011 after a decade of economic progress. Agriculture, retail industry, mining, construction, and manufacturing are the major contributors to the country's economy.[2] • The GDP growth rate slowed down in the last 5 years due to declining copper prices and agricultural output.[1] • GDP (Real) has grown at an annual rate of 1.5 % in 2019.[12]
Policy enablers	• The Government of Zambia has started the Global Energy Transfer Feed-in-Tariff' (GET FiT) auction program to bring 200 MW of renewable energy into the grid within the next two to five years.[5] • Tax exemptions and improved quality standards, for off-grid solar systems, are likely to attract private sector investments in the solar space.[14] • The Government of Zambia introduced Zambia Distribution Code in 2016 which, aims to promote grid integration of renewable energy technologies.[16]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.88 kWh/m^2/day and specific yield of 4.83 kWh/kWp, strong technical feasibility is envisaged for solar projects in Zambia.[20] • Solar PV is perceived as a proven technology for lighting, cooking, water heating and space conditioning, as well as powering appliances in Zambia.[11]
Market Maturity	• Overall, 40% population has access to electricity with only 11% of the rural population with access to electricity as of 2018.[3] • Government of Zambia aims to achieve 100% electrification by 2030. • Power sector in Zambia is regulated by Energy Regulation Board (ERB) in Zambia. The generation, transmission and distribution are primarily controlled by Zambia Electricity Supply Corporation Limited (ZESCO) with limited participation of private sector.[3]
Infrastructure	• Persistent power outages due to low rainfall and grid instability is a challenge.[8] • Various generation and transmission projects are not implemented due to inability to secure financing. [15] • Infrastructure needs to be scaled up, especially in rural areas, to increase penetration of electricity in the country.[14]
Financing	• Availability of business models, such as the "pay-as-you-go", is catalysing the growth of off-grid solar products in the market.[14] • The country's fiscal weakness and sustained currency devaluation are significant risk factors for investments in the country.[14] • Access to affordable funding and relatively higher tax rates are some challenges for the companies in the country.[4]
Energy Imperatives	• The government has set a target of an overall increase in electricity generation from 2,800 MW in 2019 to 6,000 MW by 2030, with 10% share from Solar PV.[9,19] • Hydropower dominates the energy mix in Zambia thereby making it vulnerable to electricity shortfalls in summers due to insufficient rains.[3] • Electricity demand in the country has been growing at an average of 3% each year.[7] • Mining and residential sector comprises of 80% of the electricity demand.[4]

Zimbabwe

Africa

Electricity Consumption in BU (2017)

7.8

Installed Solar Capacity in MW (2019)

12.1

Share of Population with Access to Electricity (2018)

Installed Off-Grid Solar Capacity in MW (2019)

9.0

World Bank's Ease of Doing Business Score (2020)

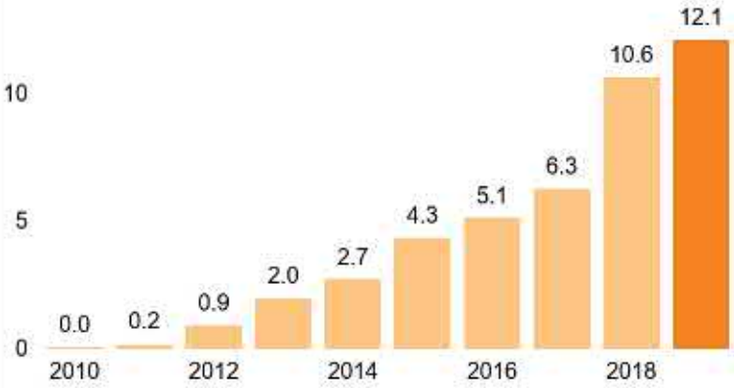
54.50

Solar installed capacity Growth rate (CAGR) for 2015-19

29%

Power Trends

Cumulative Solar installed Capacity (MW)



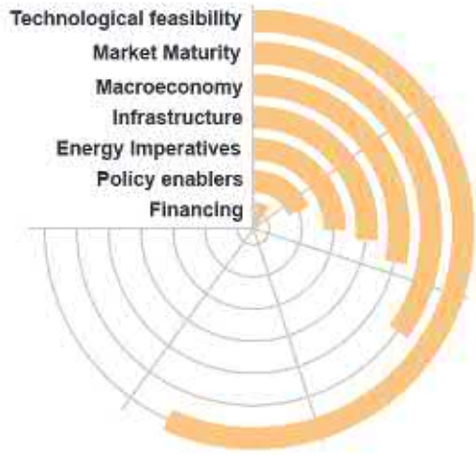
Overall Electricity Consumption (MU)

Access to Electricity

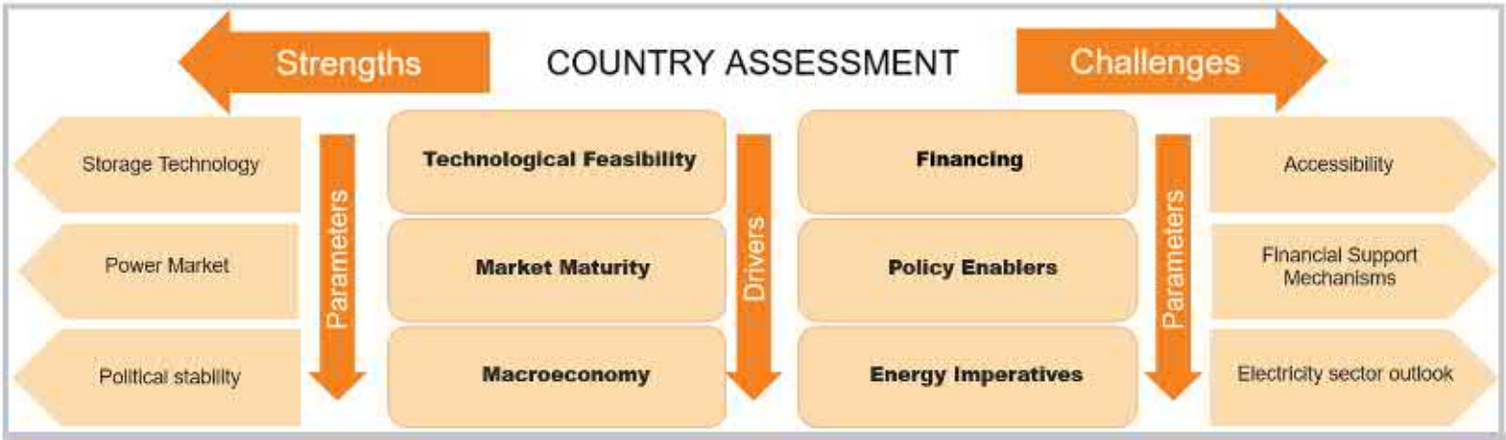
Ease of Doing Solar Classification

Progressive

Performance against 7 Drivers



Sub-regional standing



Drivers	Insights
Macro-economy	• Mining, tourism and agriculture have been main sectors contributing to the country's economy.[2] • Severe drought and Cyclone Idai in 2019 have pushed the country towards an economic crisis.[3] • GDP (Real) has contracted by 8.3% in 2019.[5]
Policy enablers	• Measures such as Import duty exemptions on solar energy equipment and ten-year tax holiday for RE investors has created a favourable environment for the RE sector.[4] • By including measures such as net metering policy in the National Renewable Energy Policy (NREP), Government of Zimbabwe intends to attract investments in the RE space.[11]
Technological Feasibility	• Owing to relatively high average solar irradiation level (GHI) of 5.78 kWh/m^2/day and specific yield of 4.86 kWh/kWp, strong technical feasibility is envisaged for solar projects in Zimbabwe. • In 2018, 41% population had access to electricity, indicating a substantial opportunity for off-grid solar in the country.[13] • A proven technology in Zimbabwe, Solar finds its applications in solar heating systems, solar pumping, as well as powering other appliances.[7]
Market Maturity	• Power sector in Country is regulated by Zimbabwe Energy Regulatory Authority (ZERA).[1] • Power sector in Zimbabwe is partially unbundled with a generation utility and a combined transmission and distribution utility managed by a holding company. There are also a few private companies in the electricity business. • Zimbabwe Electricity Supply Authority Holdings Limited Holdings (ZESA) is a holding company which manages the sector through its subsidiaries Zimbabwe Power Company (ZPC), and Zimbabwe Electricity Transmission and Distribution Company (ZETDC).[1] • To promote private sector investments, the Zimbabwe Electricity Transmission and Distribution Company (ZETDC) has recently invited Independent power producers for net metering scheme.
Infrastructure	• The steady deterioration of the electricity infrastructure so far has resulted in low quality of electricity in the country.[1] • The Action Programme for Infrastructure 2019-2030 (API), provides for rehabilitation of the national power grid and addition of new generation capacity required to sustain strong economic growth.[1] • The API would require about USD 1.14 billion (35% from state enterprise, 23% from donors and 42% from private sector).[1]
Financing	• Unsustainable debt, fiscal deficits, liquidity crisis, limited foreign exchange and shortages of essential goods are key bottlenecks to the economic recovery.[9] • Zimbabwe ranks relatively low on most international business environment indices.[1] • The Government has relaxed clean energy policies to attract private sector investments.[8] • Low tariffs of electricity, owing to heavy subsidies, is posing financial challenges for the utilities present in the country.[1]
Energy Imperatives	• Coal and Hydropower dominate the generation mix in Zimbabwe thereby making it vulnerable to fluctuating coal prices and irregular rainfall.[1] • Demand and supply mismatch are a matter of concern in Zimbabwe.[1] • The Government, through NREP, has set a target to increase solar generation capacity from exiting 12 MW to 1,575 MW by 2030.[11] • Lengthy process for obtaining Operation license in the power sector is a roadblock for private companies.[1]

Appendix 1
Regional outcomes

Regional outcomes

Africa (42 countries)

Countries are arranged in alphabetical order under each classification.

EoDS 2020 classification	ISA member countries	EoDS 2020 classification	ISA member countries
Influencer	Algeria	Progressive	Mozambique
Influencer	Botswana	Progressive	Niger
Influencer	Burkina Faso	Progressive	Uganda
Influencer	Cape Verde	Progressive	Zambia
Influencer	Egypt	Progressive	Zimbabwe
Influencer	Ghana	Potential	Burundi
Influencer	Mali	Potential	Cameroon
Influencer	Mauritius	Potential	Chad
Influencer	Namibia	Potential	Comoros
Influencer	Nigeria	Potential	Democratic Republic of Congo
Influencer	Rwanda	Potential	Equatorial Guinea
Influencer	Senegal	Potential	Eritrea
Influencer	Seychelles	Potential	Gabonese Republic
Influencer	Tanzania	Potential	Guinea
Progressive	Benin	Potential	Guinea-Bissau
Progressive	Cote d'ivoire	Potential	Liberia
Progressive	Djibouti	Potential	Sao Tome and Principe
Progressive	Ethiopia	Potential	Somalia
Progressive	Gambia	Potential	South Sudan
Progressive	Madagascar	Potential	Sudan
Progressive	Malawi	Potential	Togolese Republic

Asia & Pacific (18 countries)

Countries are arranged in alphabetical order under each classification.

EoDS 2020 classification	ISA member countries	EoDS 2020 classification	ISA member countries
Achiever	India	Progressive	Kiribati
Achiever	Saudi Arabia	Progressive	Nauru
Achiever	United Arab Emirates	Progressive	Palau
Influencer	Cambodia	Progressive	Samoa
Influencer	Fiji	Progressive	Tonga
Influencer	Maldives	Potential	Myanmar
Influencer	Sri Lanka	Potential	Papua New Guinea
Influencer	Tuvalu	Potential	Vanuatu
Progressive	Bangladesh	Potential	Yemen

Latin America & Caribbean (20 countries)

Countries are arranged in alphabetical order under each classification.

EoDS 2020 classification	ISA member mcuntries	EoDS 2020 Classification	ISA member mountries
Achiever	Brazil	Influencer	Trinidad and Tobago
Influencer	Argentina	Progressive	Dominica
Influencer	Bolivia	Progressive	Grenada
Influencer	Costa Rica	Progressive	Paraguay
Influencer	Dominican Republic	Progressive	St. Lucia
Influencer	El Salvador	Progressive	Suriname
Influencer	Jamaica	Potential	Cuba
Influencer	Peru	Potential	Guyana
Influencer	Saint Kitts and Nevis	Potential	Haiti
Influencer	Saint Vincent and the Grenadines	Potential	Venezuela

Appendix 2
Driver wise assessment

1. Macroeconomy

S.no.	ISA member countries	S.no.	ISA member countries
1	India	41	Papua New Guinea
2	Brazil	42	Sri Lanka
3	United Arab Emirates	43	Ethiopia
4	Saudi Arabia	44	Palau
5	Botswana	45	Madagascar
6	Mauritius	46	Cape Verde
7	Peru	47	El Salvador
8	Namibia	48	Argentina
9	Tonga	49	Gambia
10	Fiji	50	Malawi
11	Rwanda	51	Comoros
12	Samoa	52	Nauru
13	Paraguay	53	Niger
14	Dominica	54	Equatorial Guinea
15	Kiribati	55	Egypt
16	St. Lucia	56	Cameroon
17	Grenada	57	Guinea-Bissau
18	Tanzania	58	Togolese Republic
19	Costa Rica	59	Sao Tome and Principe
20	Saint Kitts and Nevis	60	Zambia
21	Saint Vincent and the Grenadines	61	Mali
22	Dominican Republic	62	Guinea
23	Trinidad and Tobago	63	Gabonese Republic
24	Vanuatu	64	Myanmar
25	Guyana	65	Burundi
26	Bangladesh	66	Suriname
27	Ghana	67	Algeria
28	Tuvalu	68	Democratic Republic of the Congo
29	Cambodia	69	Haiti
30	Uganda	70	Chad
31	Senegal	71	Liberia
32	Bolivia	72	Zimbabwe
33	Djibouti	73	Mozambique
34	Cote d'ivoire	74	South Sudan
35	Seychelles	75	Cuba
36	Maldives	76	Somalia
37	Jamaica	77	Eritrea
38	Burkina Faso	78	Venezuela
39	Benin	79	Yemen
40	Nigeria	80	Sudan

Note: Countries are arranged based on the scores in each driver category

2. Policy enablers

S.no.	ISA member countries	S.no.	ISA member countries
1	India	41	Cote d'ivoire
2	Argentina	42	Guyana
3	Dominican Republic	43	Benin
4	Brazil	44	Papua New Guinea
5	Trinidad and Tobago	45	Cambodia
6	Peru	46	Botswana
7	Jamaica	47	Tuvalu
8	Seychelles	48	Gambia
9	Ghana	49	Niger
10	Sri Lanka	50	Djibouti
11	Fiji	51	Togolese Republic
12	United Arab Emirates	52	Gabonese Republic
13	Burkina Faso	53	Madagascar
14	Nigeria	54	Kiribati
15	Algeria	55	Cameroon
16	Cape Verde	56	Guinea
17	Bolivia	57	Liberia
18	Palau	58	Ethiopia
19	Rwanda	59	Burundi
20	Senegal	60	Comoros
21	Mali	61	Democratic Republic of the Congo
22	Tanzania	62	Suriname
23	El Salvador	63	Zambia
24	Costa Rica	64	Venezuela
25	Saudi Arabia	65	Saint Kitts and Nevis
26	Mauritius	66	Eritrea
27	Mozambique	67	Zimbabwe
28	Malawi	68	Samoa
29	St. Lucia	69	Tonga
30	Saint Vincent and the Grenadines	70	Sao Tome and Principe
31	Grenada	71	Myanmar
32	Maldives	72	Chad
33	Egypt	73	Guinea-Bissau
34	Vanuatu	74	Equatorial Guinea
35	Bangladesh	75	Cuba
36	Haiti	76	Yemen
37	Dominica	77	Sudan
38	Uganda	78	Nauru
39	Namibia	79	South Sudan
40	Paraguay	80	Somalia

Note: Countries are arranged based on the scores in each driver category

3. Technological feasibility

S.no.	ISA member countries	S.no.	ISA member countries
1	Egypt	41	Brazil
2	Saudi Arabia	42	Tuvalu
3	Chad	43	Benin
4	Botswana	44	Argentina
5	United Arab Emirates	45	Jamaica
6	Somalia	46	Saint Vincent and the Grenadines
7	Mali	47	Burkina Faso
8	El Salvador	48	Burundi
9	Namibia	49	India
10	Yemen	50	Rwanda
11	Zimbabwe	51	Mauritius
12	Nauru	52	Ghana
13	Ethiopia	53	Guinea-Bissau
14	Senegal	54	Guinea
15	Gambia	55	Palau
16	Sudan	56	Costa Rica
17	Madagascar	57	Dominica
18	Cape Verde	58	St. Lucia
19	Tanzania	59	Grenada
20	South Sudan	60	Tonga
21	Niger	61	Samoa
22	Saint Kitts and Nevis	62	Trinidad and Tobago
23	Malawi	63	Myanmar
24	Bolivia	64	Cameroon
25	Uganda	65	Sri Lanka
26	Haiti	66	Democratic Republic of the Congo
27	Maldives	67	Bangladesh
28	Seychelles	68	Guyana
29	Kiribati	69	Togolese Republic
30	Eritrea	70	Paraguay
31	Dominican Republic	71	Equatorial Guinea
32	Cuba	72	Comoros
33	Djibouti	73	Cambodia
34	Algeria	74	Gabonese Republic
35	Mozambique	75	Cote d'ivoire
36	Peru	76	Fiji
37	Nigeria	77	Vanuatu
38	Venezuela	78	Liberia
39	Zambia	79	Papua New Guinea
40	Suriname	80	Sao Tome and Principe

Note: Countries are arranged based on the scores in each driver category

4. Market maturity

S.no.	ISA member countries	S.no.	ISA member countries
1	Tonga	41	Dominica
2	El Salvador	42	Cuba
3	Maldives	43	Grenada
4	Seychelles	44	Paraguay
5	Algeria	45	Zimbabwe
6	United Arab Emirates	46	Gabonese Republic
7	Brazil	47	Uganda
8	Costa Rica	48	Ethiopia
9	Saudi Arabia	49	Benin
10	Egypt	50	Guyana
11	Argentina	51	Zambia
12	Dominican Republic	52	Fiji
13	Mauritius	53	Tanzania
14	Jamaica	54	Yemen
15	Suriname	55	Guinea-Bissau
16	Bolivia	56	Madagascar
17	Peru	57	Niger
18	Cape Verde	58	Malawi
19	India	59	Burkina Faso
20	Sri Lanka	60	Comoros
21	Cambodia	61	Namibia
22	Bangladesh	62	Vanuatu
23	Ghana	63	Myanmar
24	Tuvalu	64	Sao Tome and Principe
25	Botswana	65	Equatorial Guinea
26	Senegal	66	Sudan
27	Cote d'ivoire	67	Cameroon
28	Samoa	68	Djibouti
29	Kiribati	69	Papua New Guinea
30	Gambia	70	Togolese Republic
31	Rwanda	71	Eritrea
32	Nauru	72	Guinea
33	Palau	73	Haiti
34	Nigeria	74	Somalia
35	Saint Kitts and Nevis	75	Mozambique
36	Saint Vincent and the Grenadines	76	South Sudan
37	St. Lucia	77	Liberia
38	Trinidad and Tobago	78	Burundi
39	Venezuela	79	Democratic Republic of the Congo
40	Mali	80	Chad

Note: Countries are arranged based on the scores in each driver category

5. Infrastructure

S.no.	ISA member countries	S.no.	ISA member countries
1	India	41	Peru
2	Brazil	42	Cuba
3	United Arab Emirates	43	Madagascar
4	Mauritius	44	Guinea-Bissau
5	Saudi Arabia	45	Saint Vincent and the Grenadines
6	Argentina	46	Egypt
7	Ghana	47	Dominica
8	Sri Lanka	48	Kiribati
9	Nigeria	49	St. Lucia
10	Zambia	50	Grenada
11	El Salvador	51	Ethiopia
12	Rwanda	52	Fiji
13	Cote d'ivoire	53	Cameroon
14	Zimbabwe	54	Burundi
15	Malawi	55	Maldives
16	Togolese Republic	56	Venezuela
17	Djibouti	57	Palau
18	Nauru	58	Seychelles
19	Uganda	59	Equatorial Guinea
20	Namibia	60	Bolivia
21	Benin	61	Haiti
22	Costa Rica	62	Samoa
23	Tuvalu	63	Gabonese Republic
24	Tanzania	64	Algeria
25	Bangladesh	65	Myanmar
26	Botswana	66	Sudan
27	Dominican Republic	67	Comoros
28	Jamaica	68	South Sudan
29	Paraguay	69	Guyana
30	Mozambique	70	Somalia
31	Gambia	71	Vanuatu
32	Tonga	72	Democratic Republic of the Congo
33	Burkina Faso	73	Mali
34	Guinea	74	Papua New Guinea
35	Cambodia	75	Eritrea
36	Trinidad and Tobago	76	Niger
37	Cape Verde	77	Sao Tome and Principe
38	Saint Kitts and Nevis	78	Suriname
39	Liberia	79	Yemen
40	Senegal	80	Chad

Note: Countries are arranged based on the scores in each driver category

6. Financing

S.no.	ISA member countries	S.no.	ISA member countries
1	Mauritius	41	Botswana
2	United Arab Emirates	42	Togolese Republic
3	Saint Kitts and Nevis	43	Haiti
4	Fiji	44	Cote d'ivoire
5	Cambodia	45	Comoros
6	Cape Verde	46	Sao Tome and Principe
7	Bolivia	47	Burkina Faso
8	Samoa	48	Gabonese Republic
9	Brazil	49	Mozambique
10	El Salvador	50	Burundi
11	Grenada	51	Mali
12	Costa Rica	52	Nigeria
13	Trinidad and Tobago	53	Uganda
14	St. Lucia	54	Equatorial Guinea
15	Saudi Arabia	55	Rwanda
16	Vanuatu	56	Benin
17	India	57	Ghana
18	Tonga	58	Niger
19	Seychelles	59	Myanmar
20	Dominica	60	Argentina
21	Saint Vincent and the Grenadines	61	Sudan
22	Sri Lanka	62	Papua New Guinea
23	Namibia	63	Tanzania
24	Guyana	64	Cameroon
25	Dominican Republic	65	Guinea
26	Egypt	66	Zambia
27	Peru	67	Gambia
28	Paraguay	68	Liberia
29	Bangladesh	69	Zimbabwe
30	Maldives	70	Ethiopia
31	Jamaica	71	Cuba
32	Algeria	72	Malawi
33	Djibouti	73	Madagascar
34	Nauru	74	Guinea-Bissau
35	Tuvalu	75	Chad
36	Kiribati	76	Venezuela
37	Palau	77	South Sudan
38	Suriname	78	Democratic Republic of the Congo
39	Senegal	79	Eritrea
40	Yemen	80	Somalia

Note: Countries are arranged based on the scores in each driver category

7. Energy imperatives

S.no.	ISA member countries	S.no.	ISA member countries
1	India	41	Cameroon
2	United Arab Emirates	42	Equatorial Guinea
3	Saudi Arabia	43	Democratic Republic of the Congo
4	Paraguay	44	Nauru
5	Trinidad and Tobago	45	South Sudan
6	Algeria	46	Botswana
7	Guinea	47	Burkina Faso
8	Brazil	48	El Salvador
9	Myanmar	49	Uganda
10	Ethiopia	50	Djibouti
11	Sudan	51	Benin
12	Suriname	52	Niger
13	Bangladesh	53	Jamaica
14	Argentina	54	Comoros
15	Egypt	55	Gambia
16	Madagascar	56	Cape Verde
17	Cambodia	57	Ghana
18	Zambia	58	Grenada
19	Costa Rica	59	Burundi
20	Zimbabwe	60	St. Lucia
21	Seychelles	61	Tuvalu
22	Rwanda	62	Guyana
23	Mozambique	63	Chad
24	Peru	64	Haiti
25	Mauritius	65	Eritrea
26	Sri Lanka	66	Papua New Guinea
27	Mali	67	Guinea-Bissau
28	Tanzania	68	Samoa
29	Dominican Republic	69	Palau
30	Cote d'ivoire	70	Malawi
31	Bolivia	71	Maldives
32	Togolese Republic	72	Tonga
33	Sao Tome and Principe	73	Kiribati
34	Namibia	74	Vanuatu
35	Yemen	75	Liberia
36	Senegal	76	Saint Vincent and the Grenadines
37	Gabonese Republic	77	Dominica
38	Fiji	78	Somalia
39	Saint Kitts and Nevis	79	Venezuela
40	Nigeria	80	Cuba

Note: Countries are arranged based on the scores in each driver category

Appendix 3
References

Algeria

1. Algeria Country https://import-export.societegenerale.fr/en/country/algeria/presentation-economy
2. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. IEA Policy Database; https://www.iea.org/policies/6103-renewable-energy-and-energy-efficiency-development-plan-2015-2030?country=Algeria&qs=algeria
4. Global Solar Atlas; https://globalsolaratlas.info/detail?r=DZA&c=28.415464,1.6625,5
5. Globaldata Power;https://power.globaldata.com/Analysis/details/Algeria-Solar-PV-Analysis
6. Globaldata Power; https://power.globaldata.com/Analysis/TableOfContents/Algeria-Power-Market-Outlook-to-2025--Update-2015---Market-Trends--Regulations--and-Competitive-Landscape
7. Measures to Promote Renewable Energy for Electricity Generation in Algeria; https://res.mdpi.com/d_attachment/sustainability/sustainability-12-01468/article_deploy/sustainability-12-01468-v2.pdf
8. Per capita electricity consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
9. Renewable Energy Statistics; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf

Argentina

1. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=-34.161818,-62.841797,4&r=ARG
2. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
3. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
4. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
5. Argentina energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/argentina
6. Argentina power market outlook, Global Data https://power.globaldata.com/Analysis/TableOfContents/Argentina-Power-Market-Outlook-to-2030--Update-2019--Market-Trends--Regulations--and-Competitive-Landscape
7. Argentina economic context, Lloyds Bank https://www.lloydsbanktrade.com/en/market-potential/argentina/economical-context
8. Argentina country partnership framework, World Bank; http://documents1.worldbank.org/curated/en/579151556416868661/pdf/Argentina-Country-Partnership-Framework-for-the-Period-FY19-FY22.pdf
9. Argentina overview, IEA https://www.iea.org/countries/argentina

Bangladesh

1. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
2. Bangladesh Country Profile; https://import-export.societegenerale.fr/en/country/bangladesh/investment-country-risk
3. IEA Policy Database; https://www.iea.org/policies/5525-renewable-energy-policy-of-bangladesh
4. Asian Development Bank; https://www.adb.org/sites/default/files/publication/467886/adbi-wp892.pdf
5. Global Solar Atlas; https://globalsolaratlas.info
6. Tracking SDG7; https://trackingsdg7.esmap.org/country/bangladesh
7. Globaldata Power; https://power.globaldata.com/
8. Credit Rating; https://www.moodys.com/credit-ratings/Bangladesh-Government-of-credit-rating-806356877?stop_mobi=yes
9. Algeria Country Risk; https://import-export.societegenerale.fr/en/country/bangladesh/economy-country-risk
10. SREDA; http://www.sreda.gov.bd/index.php/site/page/e0ce-8bba-29ea-4c3a-531e-5f8d-3b9d-db70-a32a-26ec
11. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
12. Renewable Energy Statistics; https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdfGlobal Solar Atlas; https://globalsolaratlas.info/map

Benin

1. Benin Country Profile; https://import-export.societegenerale.fr/en/country/benin/economy-country-risk
2. Real GDP; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. SE4ALL; http://www.se4all.ecreee.org/sites/default/files/paner_editing_final_.pdf
4. International Solar Alliance; https://isolaralliance.org/uploads/docs/8c25de7151846c7b24d446e94b30c2.pdf
5. USAID; https://www.usaid.gov/powerafrica/benin
6. Global Solar Atlas; https://globalsolaratlas.info/detail?r=BEN&c=9.33447,2.30835,7
7. Sun Connect; https://sun-connect-news.org/fileadmin/DATEIEN/Dateien/New/1-s2.0-S0960148119308547-main.pdf
8. Tracking SDG7 ;https://trackingsdg7.esmap.org/country/benin
9. SE4ALL; https://www.se4all-africa.org/seforall-in-africa/country-data/benin/
10. Millennium Challenge Corporation; https://www.mcc.gov/where-we-work/program/benin-power-compact
11. AFRIK21; https://www.afrik21.africa/en/benin-solar-energy-will-gain-momentum-thanks-to-new-electricity-code/
12. Credit Rating; https://www.moodys.com/credit-ratings/Saudi-Arabia-Government-of-credit-rating-660260?stop_mobi=yes
13. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019

Bolivarian Republic of Venezuela

1. GDP per capita current, World Bank https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=VE&view=chart
2. Venezuela Renewable energy policy report, Global Data https://power.globaldata.com/Analysis/TableOfContents/Venezuela-Renewable-Energy-Policy-Report-2019
3. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
4. Venezuela power market outlook, Global Data https://power.globaldata.com/Analysis/TableOfContents/Venezuela-Power-Market-Outlook-to-2030--Update-2018---Market-Trends--Regulations--and-Competitive-Landscape
5. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=6.457914,-66.5875,6&r=VEN
6. Access to Electricity, World Bank https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=VE
7. Venezuela Renewable energy policy brief, IRENA https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2015/IRENA_RE_Latin_America_Policies/IRENA_RE_Latin_America_Policies_2015_Country_Venezuela.pdf?la=en&hash=2F75A381081609FE73316DE296696D96CC115BD0
8. Investment framework and opportunities in Venezuela, Lloyds Bank https://www.lloydsbanktrade.com/en/market-potential/venezuela/investment-environment

Botswana

1. Country Profile Botswana; https://import-export.societegenerale.fr/en/country/botswana/presentation-geography
2. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/BWA
3. SE4ALL; https://www.se4all-africa.org/seforall-in-africa/country-data/botswana/#:~:text=Government%20has%20set%20national%20electricity,petroleum%20for%20its%20energy%20demands.&text=Regarding%20solar%2C%20Botswana%20has%20direct,the%20highest%20in%20the%20world
4. Annual Report; https://www.bpc.bw/about-us/Annual%20Reports/BPC%20Annual%20Report%202019.pdf
5. Globaldata Power; https://globalsolaratlas.info/detail?c=-22.416662,24.6875,6&r=BWA
6. IEA Statistics; https://www.iea.org/data-and-statistics/data-tables?country=BOTSWANA
7. Tracking SDG7; https://trackingsdg7.esmap.org/country/botswana
8. Country Profile; https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Botswana_Africa_RE_SP.pdf
9. Africa Energy Portal; https://africa-energy-portal.org/news/botswana-solar-and-thermal-power-plants-planned-construction-2026
10. Credit Rating; https://www.moodys.com/credit-ratings/Botswana-Government-of-credit-rating-600058010
11. IEA Policy Database; https://www.iea.org/policies/5899-renewable-energy-fund-for-off-grid-solutions
12. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
13. Renewable Energy Statistics; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf
14. Botswana Energy Regulatory Authority; http://www.bera.co.bw/about-us.php#mandate

Brazil

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=-15.114553,-54.316406,4&r=BRA
3. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
4. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=BR
5. Brazil energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/brazil
6. Brazil power outlook, Global Data https://power.globaldata.com/Analysis/TableOfContents/Brazil-Power-Market-Outlook-to-2030--Update-2020---Market-Trends--Regulations-and-Competitive-Landscape
7. Brazil overview, IEA https://www.iea.org/countries/brazil
8. Brazil renewable energy policy handbook 2020, Global Data https://power.globaldata.com/Analysis/TableOfContents/Brazil-Renewable-Energy-Policy-Handbook-2020
9. Brazil renewable energy policy brief, IRENA https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2015/IRENA_RE_Latin_America_Policies/IRENA_RE_Latin_America_Policies_2015_Country_Brazil.pdf?la=en&hash=D645B3E7B7DF03BDDAF6EE4F35058B2669E132B1
10. Brazil investment plan, World Bank http://documents1.worldbank.org/curated/en/967301506029871422/pdf/Concept-Project-Information-Document-Integrated-Safeguards-Data-Sheet-FIP-Brazil-Investment-Plan-Integrated-Landscape-Management-in-the-Cerrado-Biome-Proje.pdf
11. Ensuring greener economic growth for brazil, Climate Policy Initiative; https://climatepolicyinitiative.org/wp-content/uploads/2018/12/BID-Ensuring-Greener-Economic-Growth-for-Brazil.pdf

Burkina Faso

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=12.254128,-1.538086,6&r=BFA
3. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
4. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=BF
5. Burkina Faso energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/time?country=Burkina%20Faso

6. Burkina Faso economic outlook, African Development bank https://www.afdb.org/en/countries/west-africa/burkina-faso/burkina-faso-economic-outlook#:~:text=Real%20GDP%20growth%20is%20estimated,and%20public%20consumption%20(6%25).
7. The Sahel alliance, Alliance Sahel https://www.alliance-sahel.org/en/sahel-alliance/
8. Burkina Faso financial sector overview, Making Finance Work for Africa https://www.mfw4a.org/country/burkina-faso
9. Creating markets in Burkina Faso, International Finance Corporation https://www.ifc.org/wps/wcm/connect/f45fd7a3-f8be-430b-bd9f-eb958ebe2d89/201907-CPSD-Burkina-Faso-EN.pdf?MOD=AJPERES&CVID=mNf5Bxk
10. Burkina Faso overview, World Bank https://www.worldbank.org/en/country/burkinafaso/overview#2
11. Burkina Faso power Africa fact sheet, USAID https://www.usaid.gov/powerafrica/burkina-faso
12. A focus on rural areas, Lighting Africa https://www.lightingafrica.org/country/burkina-faso/
13. Burkina Faso country data, Sustainable Energy for all https://www.se4all-africa.org/seforall-in-africa/country-data/burkina-faso/
14. Burkina Faso energy profile, IRENA https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Burkina%20Faso_Africa_RE_SP.pdf
15. Proposed development policy, World Bank http://documents1.worldbank.org/curated/en/970061513479640534/pdf/BURKINA-FASO-PAD-11212017.pdf
16. Green Climate Fund; https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp105-boad-multiple-countries.pdf

Burundi

1. Burundi economic outlook, African Development Bank Group https://www.afdb.org/en/countries/east-africa/burundi/burundi-economic-outlook
2. Burundi energy profile, UN environment programme https://wedocs.unep.org/bitstream/handle/20.500.11822/20486/Energy_profile_Burundi.pdf?sequence=1&isAllowed=y
3. Burundi Energy profile, IRENA https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Burundi_Africa_RE_SP.pdf
4. Solar Irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=-3.387307,29.926758,8&r=BDI
5. GDP growth, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=BI
6. GDP at current prices, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=BI
7. Access to Electricity, World Bank https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=BI
8. Burundi Country report, IEA https://www.iea.org/countries/burundi
9. S-TAP for Burundi report, World Bank http://documents1.worldbank.org/curated/en/224921560147541144/pdf/Sustainable-Energy-for-All-Technical-Assistance-Program-S-TAP-for-Burundi-Summary-Report.pdf

Cambodia

1. Cambodia Beyond Connections; https://documents.worldbank.org/en/publication/documents-reports/documentdetail/141011521693254478/cambodia-beyond-connections-energy-access-diagnostic-report-based-on-the-multi-tier-framework
2. Real GDP; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
3. Camodia Economic Update; http://documents1.worldbank.org/curated/en/707971575947227090/pdf/Cambodia-Economic-Update-Upgrading-Cambodia-in-Global-Value-Chains.pdf
4. Konrad Adeneiur Stiftung; https://www.kas.de/en/web/kambodscha/single-title/-/content/energy-1
5. Global Solar Atlas; https://globalsolaratlas.info/map?c=35.499924,134.375,5&r=JPN
6. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
7. World Bank; http://documents1.worldbank.org/curated/en/141011521693254478/pdf/Cambodia-Beyond-connections-energy-access-diagnostic-report-based-on-the-multi-tier-framework.pdf
8. Credit Rating; https://www.moodys.com/credit-ratings/Cambodia-Government-of-credit-rating-806356908
9. Renewable Energy Statistics; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf

Cameroon

1. The World Bank; https://data.worldbank.org/country/cameroon
2. Real GDP; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. Afrik21; https://www.afrik21.africa/en/cameroon-chinese-sinohydro-wins-new-renewable-energy-project/
4. GETInvest; https://www.get-invest.eu/market-information/cameroon/governmental-framework/
5. Global Solar Atlas; https://globalsolaratlas.info/detail?r=CMR&c=7.407793,12.34585,6
6. Energy Policies in Cameroon; https://www.researchgate.net/publication/320857953_ENERGY_POLICIES_IN_CAMEROON_A_HOLISTIC_OVERVIEW/link/5bebb217c92851c6b27bd00fc/download
7. Tracking SDG7; https://trackingsdg7.esmap.org/country/cameroon
8. Renewable Energy Statistics; https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf
9. Afrik21; https://www.afrik21.africa/en/cameroon-chinese-sinohydro-wins-new-renewable-energy-project/

Cape Verde

1. Cape Verde Country Profile; https://import-export.societegenerale.fr/en/country/cape-verde/economy-country-risk
2. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD

3. Renewable Energy Development Project; http://documents1.worldbank.org/curated/en/537331580086200738/pdf/Concept-Project-Information-Document-PID-Renewable-Energy-Development-Project-P170236.pdf
4. Global Solar Atlas; https://globalsolaratlas.info/detail?c=16.003576,-24.013367,8&r=CPV
5. Tracking SDG7; https://trackingsdg7.esmap.org/country/Cabo-verde
6. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
7. Renewable Energy Statistics; https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf

Chad

1. Chad Country Profile; https://import-export.societegenerale.fr/en/country/chad/economy-country-risk
2. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. Global Climatescope; https://global-climatescope.org/results/TD#power-market
4. Global Solar Atlas; https://globalsolaratlas.info/detail?r=TCD&c=15.605685,18.73335,5
5. USAID; https://www.usaid.gov/sites/default/files/documents/1860/ChadPACFSDEC2017.pdf
6. Tracking SDG7; https://trackingsdg7.esmap.org/country/chad
7. AMEA Power; https://www.ameapower.com/news/
8. Renewable Energy Statistics; https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf
9. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
10. Africa Energy Portal; https://africa-energy-portal.org/news/chads-renewable-energy-revolution-well-underway

Comoros

1. Staff country reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2020/06/18/Union-of-the-Comoros-2019-Article-IV-Consultation-Staff-Report-Press-Release-49504
2. Country Overview, The World Bank; https://www.worldbank.org/en/country/comoros/overview#3
3. The Comoros' Islands contribution, IRENA; https://www.irena.org/EventDocs/Aboud_Presentation_SIDS_IRENA_workshop.pdf
4. Project Appraisal document, Energy and Extractives Global Practice, Africa Region, The World Bank; http://documents1.worldbank.org/curated/en/798141591296753411/pdf/Comoros-Solar-Energy-Integration-Platform-Project.pdf
5. Statistical Profiles – Comoros, IRENA; https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Comoros_Africa_RE_SP.pdf
6. Indian Ocean: A Regional Network to Measure Solar Potential, Campbell Scientific; https://www.campbellsci.es/indian-ocean-solar
7. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study

Costa Rica

1. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
2. Costa Rica Country Profile; https://import-export.societegenerale.fr/en/country/costa-rica/economy-country-risk
3. Globaldata Power; https://power.globaldata.com/Analysis/TableOfContents/Costa-Rica-Power-Market-Outlook-to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
4. Global Solar Atlas; https://globalsolaratlas.info/detail?r=CRI&c=8.368836,-84.82085,7
5. Tracking SDG7 https://trackingsdg7.esmap.org/country/costa-rica
6. International Finance Corporation; https://ifcextapps.ifc.org/IFCExt/Pressroom/IFCPressRoom.nsf/0/8013CF397C4BA14C8525843F0049132F
7. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
8. Renewable Energy Statistics; https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf
9. Energy Transition; https://energytransition.org/2019/11/green-cost-rica-is-still-not-rosy/

10. https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf

Côte D'Ivoire

1. Côte D'Ivoire Country Profile; https://import-export.societegenerale.fr/en/country/ivory-coast/presentation-geography
2. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. International Finance Corporation; https://www.ifc.org/wps/wcm/connect/3bacce14-0e4d-4f79-9cc8-e6d70a15407d/IFC-Cote_dIvoire-report-v11-FINAL.PDF?MOD=AJPERES&CVID=mhF-kt3
4. GETInvest; https://www.get-invest.eu/market-information/cote-divoire/renewable-energy-potential/#:~:text=C%C3%B4te%20d'Ivoire%20receives%20abundant,the%20north%20of%20the%20country
5. Unlocking Private Investment; https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/climate+business/resources/cote-d-ivoire-unlocking-private-investment
6. Global Solar Atlas; https://globalsolaratlas.info/detail?c=7.563992,-5.542603,7&r=CIV
7. IFC; https://www.ifc.org/wps/wcm/connect/3bacce14-0e4d-4f79-9cc8-e6d70a15407d/IFC-Cote_dIvoire-report-v11-FINAL.PDF?MOD=AJPERES&CVID=mhF-kt3
8. Tracking SGD7; https://trackingsdg7.esmap.org/country/c%C3%B4te-divoire
9. Scaling Solar; https://www.scalingsolar.org/active-engagements/cote-divoire/

Cuba

1. World Bank; https://data.worldbank.org/?locations=CU-XT
2. World Bank; https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=CU
3. World Bank; https://documents.worldbank.org/en/publication/documents-reports/documentdetail/988741468246902367/economic-development-in-cuba
4. Cuba Sustainable Energy Forum; https://www.rvo.nl/sites/default/files/2018/06/TNO-report-Cuba-Sustainable-Energy-Forum.pdf
5. Global Solar Atlas; https://globalsolaratlas.info/detail?c=21.560259,-79.54165,7&r=CUB
6. Tracking SDG7; https://trackingsdg7.esmap.org/country/cuba
7. Solar Energy in Cuba; https://www.researchgate.net/publication/334098544_Solar_Energy_in_Cuba_Current_Situation_and_Future_Development/link/5d16661da6fdcc2462ae8917/download
8. IRENA Newsroom; https://www.irena.org/newsroom/pressreleases/2020/Jan/Record-USD105-Million-of-Funding-Approved-by-ADFD-Under-the-IRENA-ADFD-Project-Facility
9. IRENA Newsroom; https://www.irena.org/newsroom/pressreleases/2016/Aug/Cuba-Seeks-to-Expand-Role-of-Renewable-Energy
10. IRENA Newsroom;; https://www.irena.org/newsroom/articles/2018/Feb/Embracing-Renewables-in-Cuba
11. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
12. Renewable Energy Statistics; https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf

Democratic Republic of the Congo

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W/COD
3. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2019&locations=CD&start=1960&view=chart
4. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=-4.088585,21.75835,5&r=COD
5. DRC energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/democratic-republic-congo
6. Democratic Republic of Africa, Lighting Africa https://www.lightingafrica.org/country/democratic-republic-of-congo/
7. DRC credit rating, Moody's https://www.moodys.com/credit-ratings/Democratic-Republic-of-the-Congo-Govt-of-credit-rating-806356865
8. DRC power Africa fact sheet, USAID https://www.usaid.gov/powerafrica/democratic-republic-congo
9. DRC overview, World Bank https://www.worldbank.org/en/country/drc/overview
10. DRC deals, Global Data https://power.globaldata.com/deals/facts/drc-afdb-provides-73-million-for-grand-inga-dam-feasibility-studies_1907481?geographyId=100059
11. DRC solar PV details, Global Data https://power.globaldata.com/PowerPlants/PlantDetails?PlantType=SolarPV&AssetId=96695
12. DRC introduction, Global EDGE https://globaledge.msu.edu/countries/democratic-republic-of-the-congo
13. DRC member committee, World Energy Council https://www.worldenergy.org/impact-communities/members/entry/congo-democratic-republic-of#:~:text=The%20DRC%20is%20a%20long,with%20environmental%20sustainability%20in%20sight.
14. DRC overview, IEA https://www.iea.org/countries/democratic-republic-of-the-congo
15. DRC projects, World Bank https://projects.worldbank.org/en/projects-operations/project-detail/P156208

Djibouti

1. Djibouti Country Profile; https://import-export.societegenerale.fr/en/country/djibouti/economy-country-risk
2. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. RRA Djibouti; https://www.irena.org/publications/2015/May/Renewables-Readiness-Assessment-Djibouti
4. RCREE; https://www.rcreee.org/member-states/djibouti/4015?page=4
5. Global Solar Atlas; https://globalsolaratlas.info/detail?r=DJI&c=11.813965,42.60415,9
6. Djibouti Market Brief; https://www.ruralelec.org/sites/default/files/aeep_djibouti_country_market_brief_en.pdf
7. Tracking SDG7; https://trackingsdg7.esmap.org/country/djibouti
8. https://www.irena.org/newsroom/articles/2015/May/By-2020-Djibouti-Can-Meet-100-of-Energy-Demand--Through-Renewables
9. United Nations Environment Programme; https://wedocs.unep.org/bitstream/handle/20.500.11822/20491/Energy_profile_Djibouti.pdf?amp%3BisAllowed=&sequence=1
10. MIGA; https://www.miga.org/project/ghoubet-djibouti-windfarm-project
11. EIU; http://country.eiu.com/article.aspx?articleid=1278133511&Country=Djibouti&topic=Economy&subtopic=_7
12. Bloomberg; https://www.bloomberg.com/press-releases/2020-02-24/afc-invests-in-djibouti-s-first-ipp-and-renewable-energy-project
13. US Embassy Djibouti; https://dj.usembassy.gov/cr-energy-concepts-renewable-energy-park-implementation-agreement/
14. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019

Dominica

1. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=15.425113,-61.3625,10&r=DMA
2. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
3. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=DM
4. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/DOM/KHM/DMA
5. Dominica energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/dominica
6. CARICOM power market outlook (Dominica), Global Data https://power.globaldata.com/Analysis/TableOfContents/Power-Market-in-CARICOM-and-Associated-Countries---Installed-Capacity--Capacity-Mix--Renewable-Roadmap--Electricity-Tariffs-and-Future-Outlook-to-2030

Dominican Republic

1. GDP per capita, World Bank https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=DO
2. GDP growth, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=DO
3. Dominican Republic power market outlook, Global Data https://power.globaldata.com/Analysis/TableOfContents/Dominican-Republic-Power-Market-Outlook-to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
4. Dominican Republic overview, World Bank https://www.worldbank.org/en/country/dominicanrepublic/overview
5. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=18.708615,-70.1625,8&r=DOM
6. Access to electricity, World Bank https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=DO
7. Dominican Republic credit rating, Moody's https://www.moodys.com/credit-ratings/Dominican-Republic-Government-of-credit-rating-600045733
8. Dominican Republic fact book, CIA https://www.cia.gov/library/publications/the-world-factbook/attachments/summaries/DR-summary.pdf
9. Electric power transmission and distribution losses, World Bank https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?locations=DO
10. Dominican Republic renewable energy roadmap, IRENA https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_REmap_Dominican_Republic_report_2016.pdf

Egypt

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=EG
3. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
4. Egypt Credit rating, Moody's https://www.moodys.com/credit-ratings/Egypt-Government-of-credit-rating-258330
5. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/map?c=26.493928,29.872513,11&r=DMA&s=26.494184,29.871903&m=site
6. Egypt energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/egypt
7. Egypt economic outlook, African Development Bank https://www.afdb.org/en/countries/north-africa/egypt/egypt-economic-outlook#:~:text=Economic%20growth%20in%20Egypt%2C%20estimated,economic%20reform%20programs%20since%202016.&text=Inflation%20pressures%20are%20also%20easing,in%20the%20past%20four%20years.
8. Egypt power market outlook, Global Data https://power.globaldata.com/Analysis/TableOfContents/Egypt-Power-Market-Outlook-to-2030--Update-2019---Market-Trends--Regulations--and-Competitive-Landscape
9. Egypt overview, World Bank https://www.worldbank.org/en/country/egypt/overview#3
10. Egypt Renewable energy policy handbook, Global Data https://power.globaldata.com/Analysis/TableOfContents/Egypt-Renewable-Energy-Policy-Handbook-2020
11. Egypt outlook, IRENA https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Oct/IRENA_Outlook_Egypt_2018_En.pdf

El Salvador

1. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
2. Global Solar Atlas; https://globalsolaratlas.info/map
3. Tracking SDG7, El Salvador; https://trackingsdg7.esmap.org/countries
4. IEA statistics El Salvador; https://www.iea.org/data-and-statistics
5. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
6. Power sector Analysis; https://power.globaldata.com/Analysis/TableOfContents/El-Salvador-Power-Market-Outlook-to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
7. Credit Rating; https://www.moodys.com/credit-ratings/El-Salvador-Government-of-credit-rating-600045734?stop_mobi=yes
8. Ease of doing business score 2020; https://www.doingbusiness.org/content/dam/doingBusiness/country/e/el-salvador/SLV.pdf
9. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
10. GDP Per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SV
11. GDP Current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=SV
12. RE Policies; https://global-climatescope.org/policies/4908
13. RE Policies; https://global-climatescope.org/policies/1844
14. RE Policies; https://global-climatescope.org/policies?country=SV
15. RE Policies; https://global-climatescope.org/policies/4910
16. Master Plan for renewable energy development; https://www.iea.org/policies/6138-master-plan-for-renewable-energy-development-2012-2026?country=El%20Salvador&qs=sal
17. MF article IV review; https://www.imf.org/en/Publications/CR/Issues/2019/05/23/El-Salvador-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-46940
18. Policies; https://global-climatescope.org/policies/5763
19. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/El-Salvador-Power-Market-Outlook-to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
20. El Salvador power imports; https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/impact-stories/el-salvador-powers-up
21. Power system losses; https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?locations=SV
22. https://www.irena.org/IRENADocuments/Statistical_Profiles/Central%20America%20and%20the%20Caribbean/El%20Salvador_Central%20America%20and%20the%20Caribbean_RE_SP.pdf

Equatorial Guinea

1. Equatorial Guinea Country Profile; https://import-export.societegenerale.fr/en/country/equatorial-guinea/presentation-economy
2. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. World Bank; https://www.worldbank.org/en/country/equatorialguinea/overview
4. United Nations Environment Program; https://wedocs.unep.org/bitstream/handle/20.500.11822/20489/Energy_profile_EquatorialGuinea.pdf
5. Global Solar Atlas; https://globalsolaratlas.info/detail?r=GNQ&c=1.159517,8.475,7
6. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
7. Energy Profile Equatorial Guinea; https://wedocs.unep.org/bitstream/handle/20.500.11822/20489/Energy_profile_EquatorialGuinea.pdf?sequence=1&isAllowed=y
8. US Environment Information Administration; https://www.eia.gov/international/analysis/country/GNQ
9. Green Climate Fund; https://www.greenclimate.fund/sites/default/files/document/equatorial-guinea-country-programme.pdf
10. Renewable Energy Statistics; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf
11. Tracking SDG7; https://trackingsdg7.esmap.org/country/equatorial-guinea

Eritrea

1. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/ERI
2. Eritrea Economic outlook; https://www.afdb.org/en/countries/east-africa/eritrea/eritrea-economic-outlook
3. GDP current; https://tradingeconomics.com/eritrea/gdp
4. Tracking SDG7, Eritrea; https://trackingsdg7.esmap.org/countries
5. Global Solar Atlas; https://globalsolaratlas.info/map
6. IEA statistics Eritrea; https://www.iea.org/data-and-statistics
7. Eastern Africa Power Pool; https://pubs.naruc.org/pub.cfm?id=5388F6DB-2354-D714-516F-A8C30F137BA4
8. Rural areas population; https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=ER
9. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
10. Per capita Electricity Consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
11. European Commission Partnership with Eritrea; https://ec.europa.eu/international-partnerships/where-we-work/eritrea_en
12. Ease of doing Business score 2020; https://www.doingbusiness.org/content/dam/doingBusiness/country/e/eritrea/ERI.pdf
13. Renewable energy targets and policies; https://europa.eu/capacity4dev/file/30316/download?token=SjZauJGg
14. Power system losses; https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?locations=ER
15. Eritrea energy profile; https://wedocs.unep.org/bitstream/handle/20.500.11822/20488/Energy_profile_Eritrea.pdf?sequence=1&isAllowed=y

Ethiopia

1. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=9.196536,40.49585,6&r=ETH
2. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
3. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=ET
4. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
5. Ethiopia energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/ethiopia
6. Ethiopia overview, World Bank https://www.worldbank.org/en/country/ethiopia/overview#2
7. Ethiopia economic outlook, African Development Bank https://www.afdb.org/en/countries/east-africa/ethiopia/ethiopia-economic-outlook
8. Ethiopian country report, BTI 2020 https://www.bti-project.org/en/reports/country-report-ETH-2020.html#pos15
9. Access to electricity, World Bank https://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS?locations=ET
10. Ethiopia's policy brief, Climate and Development Knowledge Network https://media.africaportal.org/documents/Ethiopia-Solar-Power-PB_final-web.pdf
11. Ethiopia energy profile, IRENA https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Ethiopia_Africa_RE_SP.pdf
12. Ethiopia energy outlook, IEA https://www.iea.org/articles/ethiopia-energy-outlook
13. Ethiopia policies, IEA https://www.iea.org/countries/ethiopia
14. Ethiopia renewable energy guarantees program project, World Bank http://documents1.worldbank.org/curated/en/363131558922556843/pdf/Ethiopia-Renewable-Energy-Guarantees-Program-Project.pdf

Fiji

1. Asian Development Bank in Fiji; https://www.adb.org/countries/fiji/overview/
2. Nordea; https://www.nordeatrade.com/en/explore-new-market/fiji-islands/economy
3. 2019 Investment Climate Statements, U.S. Department of State; https://www.state.gov/reports/2019-investment-climate-statements/fiji/
4. GDP (Current), The World Bank; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=FJ
5. The Global Solar Atlas, Energy Sector Management Assistance Program (ESMAP); https://globalsolaratlas.info/detail?c=-16.636192,0,2&r=FJI
6. Report “Capacity Needs Assessment for RE-based power generation in Fiji”, Fiji Renewable Energy Power Generation Project; http://www.fdoe.gov.fj/images/PDF/fcnsarv6.pdf
7. Solar Energy for Power Generation in Fiji: History, Barriers and Potentials, Springer Link; https://link.springer.com/chapter/10.1007/978-3-030-30211-5_8
8. World Bank Data; https://www.data.worldbank.com/
9. Country Staff Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2020/03/19/Republic-of-Fiji-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-49279
10. Design Oriented Database of Fiji Renewable Energy Resources prepared for Fiji Department of Energy; http://prdrse4all.spc.int/sites/default/files/designorientedredatabase_w.o._anexes.pdf

Gabon

1. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=-0.822032,11.6125,6&r=GAB
2. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
3. Gabon energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/time?country=Gabon
4. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=GA
5. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
6. Gabon credit rating, Moody’s https://www.moodys.com/credit-ratings/Gabon-Government-of-credit-rating-806356850
7. Gabonese economic outlook, Fitch solutions https://www.fitchsolutions.com/country-risk-sovereigns/economics/gabonese-economic-medium-term-economic-outlook-brightening-29-01-2020
8. Gabon economic context, Lloyds Bank https://www.lloydsbanktrade.com/en/market-potential/gabon/economical-context?vider_sticky=oui
9. Gabon overview, IEA https://www.iea.org/countries/gabon
10. Gabon energy profile, IRENA https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Gabon_Africa_RE_SP.pdf
11. Gabon solar energy, ENGIE https://www.engie.com/en/eight-hybrid-power-plants-Gabon
12. Gabon overview, World Bank https://www.worldbank.org/en/country/gabon/overview#2

Ghana

1. African Development Bank Economic Outlook; https://www.afdb.org/en/countries/west-africa/ghana/ghana-economic-outlook
2. Lighting Up Africa, 2020, The World Bank; https://www.worldbank.org/en/news/feature/2020/08/13/lighting-up-africa-bringing-renewable-off-grid-energy-to-communities
3. The World Bank In Ghana; https://www.worldbank.org/en/country/ghana/overview
4. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
5. World Bank; https://www.data.worldbank.com/

6. Ghana Renewable Energy Master Plan; http://www.energycom.gov.gh/files/Renewable-Energy-Masterplan-February-2019.pdf
7. Global Off-Grid Solar Market Report, July - December 2019, GOGLA; https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf
8. National Energy Statistics 2000-2019, Energy Commission, Ghana; http://energycom.gov.gh/files/ENERGY%20STATISTICS-2020.pdf
9. Real GDP Growth, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W/GHA
10. Renewable Energy Policy Review, Identification of Gaps and Solutions in Ghana, Energy Commission; http://energycom.gov.gh/files/Renewable%20Energy%20Policy%20and%20Regulatory%20Gap%20%20%20%20%20Analysis%20Final(2015).pdf
11. Drive to develop Ghana's electricity infrastructure ends period of unstable supply, Oxford Business Group; https://oxfordbusinessgroup.com/overview/power-moves-drive-develop-electricity-infrastructure-ends-period-unstable-supply-government-moves

Grenada

1. 2019 Investment Climate Statements: Grenada, U.S. Department of State; https://www.state.gov/reports/2019-investment-climate-statements/grenada/
2. Reform of the electricity sector in support of Grenada's climate policy, GIZ GmbH; https://www.giz.de/en/worldwide/37595.html
3. 2018 Energy Report Card Grenada, CCREEE; https://drive.google.com/file/d/1CMWQ_KinFeQ_E66p9k9qzx36Y1dkVcS3/view
4. Energy Transition Initiative, NREL; https://www.nrel.gov/docs/fy15osti/62699.pdf
5. Staff country reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/07/01/Grenada-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-47060
6. Intended Nationally Determined Contribution – Grenada, UNFCCC; https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Grenada%20First/Grenada%20INDC.pdf
7. GDP, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
8. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study

Guinea

1. African Development Bank Economic Outlook; https://www.afdb.org/en/countries/west-africa/guinea/guinea-economic-outlook
2. Expert Level Visit by International Solar Alliance Secretariat, International Solar Alliance; https://www.isolaralliance.org/uploads/docs/f91b1fcb9924d6939ce851427e778d.pdf
3. Staff Country Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2020/04/16/Guinea-Fourth-Review-under-the-Extended-Credit-Facility-Arrangement-and-Financing-Assurances-49338
4. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
5. Pay-As-You-Go Market Attractiveness Index 2019, Lighting Global; https://www.lightingglobal.org/wp-content/uploads/2019/06/PAYGo-MAI-2019-Report.pdf
6. Real GDP growth, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD

Guinea Bissau

1. African Development Bank Economic Outlook; https://www.afdb.org/en/countries/west-africa/guinea-bissau/guinea-bissau-economic-outlook
2. Country Data, SEforALL; https://www.se4all-africa.org/seforall-in-africa/country-data/guinea-bissau/
3. Guinea- Bissau : Technical Assistance Report, IMF; https://www.imf.org/en/Publications/CR/Issues/2020/06/30/Guinea-Bissau-Technical-Assistance-Report-Enhancing-Governance-and-the-Anti-Corruption-49540
4. Energy Profile – Guinea Bissau, UNEP; https://wedocs.unep.org/bitstream/handle/20.500.11822/20507/Energy_profile_GuineaBissau.pdf?sequence=1&amp%3BisAllowed=
5. Renewables and Energy Efficiency in Guinea Bissau - National Status Report / December 2018, ALER; https://www.aler-renovaveis.org/contents/files/aler_relatorio_gb_2018.pdf
6. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
7. Hybridization of thermal power plants of electricity production with solar photovoltaic in Guinea Bissau, Green Climate Fund; https://www.greenclimate.fund/sites/default/files/document/19650-hybridization-thermal-power-plants-electricity-production-solar-photovalta-c-guinea-bissau.pdf
8. Guinea Bissau aims for energy transformation by 2030, UNIDO; https://www.unido.org/news/guinea-bissau-aims-energy-transformation-2030
9. Guinea-Bissau Electricity, Worldometer; https://www.worldometers.info/electricity/guinea-bissau-electricity/

Guyana

1. 2019 Investment Climate Statements, U.S. Department of State; https://www.state.gov/reports/2019-investment-climate-statements/guyana/
2. Guyana Economy, The Commonwealth Secretariat; https://thecommonwealth.org/our-member-countries/guyana/economy
3. Guyana Energy Agency; https://gea.gov.gy/solar/
4. Transition to Renewable and Clean Energy, Guyana Energy Agency; https://gea.gov.gy/wp-content/uploads/2019/07/A4-Transition-to-Renewable-and-Clean-Energy.pdf
5. Country Staff Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/09/16/Guyana-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-48678

6. Real GDP growth, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY
7. The Global Solar Atlas; https://globalsolaratlas.info/detail?c=4.868476,-58.9542,6&r=GUY

Haiti

1. Staff country reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2020/04/20/Haiti-2019-Article-IV-Consultation-Staff-Report-and-Statement-by-the-Executive-Director-for-49351
2. Climatescope 2019, BloombergNEF; https://global-climatescope.org/policies
3. Haiti Power Africa Fact Sheet, USAID; https://www.usaid.gov/haiti/energy
4. Haiti Sets Out to Electrify the Country, Energy and Climate Partnership of the Americas; http://www.ecpamericas.org/News/Default.aspx?id=3633
5. GDP, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG/MOZ/MDV/NRU/KIR
6. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study

India

1. Energy Statistics 2020, Ministry of Statistics and Programme Implementation; http://www.mospi.gov.in/sites/default/files/publication_reports/ES_2020_240420m.pdf
2. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
3. Global Off-Grid Solar Market Report, July - December 2019, GOGLA; https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf
4. Pay-As-You-Go Market Attractiveness Index 2019, Lighting Global; https://www.lightingglobal.org/wp-content/uploads/2019/06/PAYGo-MAI-2019-Report.pdf
5. Staff country reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/12/23/India-2019-Article-IV-Consultation-Press-Release-Staff-Report-Staff-Statement-and-Statement-48909
6. Renewable Energy Sector, Invest India; https://www.investindia.gov.in/sector/renewable-energy
7. Sector at a Glance, Ministry of Power; https://powermin.gov.in/en/content/power-sector-glance-all-india
8. Solar RPO, Ministry of New and Renewable Energy (MNRE); https://mnre.gov.in/solar/rpo
9. Solar research and Development, MNRE; https://mnre.gov.in/research-and-development/solar
10. Solar Suryamitra, MNRE; https://mnre.gov.in/solar/suryamitra
11. Solar Manufacturers and Quality control, MNRE; https://mnre.gov.in/solar/manufacturers-and-quality-control
12. Solar Off-Grid, MNRE; https://mnre.gov.in/solar/solar-offgrid
13. Financing India's Renewable Energy Vision, ORF Issue Brief; https://www.orfonline.org/wp-content/uploads/2020/01/ORF_IssueBrief_336_RenewableEnergy.pdf
14. GDP, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG/MOZ/MDV/NRU/KIR/NAM/COM/MUS/IND

Jamaica

1. Jamaica power market outlook, Global Data https://power.globaldata.com/Analysis/TableOfContents/Jamaica-Power-Market-Outlook- to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
2. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=17.967532,-77.1667,8&r=JAM
3. Access to Electricity, World Bank https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=JM
4. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
5. Access to electricity, rural, World Data https://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS?locations=JM
6. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=JM
7. Jamaica economic overview, Lloyds Bank https://www.lloydsbanktrade.com/en/market-potential/jamaica/economy
8. Jamaica overview, World Bank https://www.worldbank.org/en/country/jamaica/overview
9. Jamaica Energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/jamaica
10. Jamaica Sustainable Energy Roadmap, OAS http://www.oas.org/en/sedi/dsd/Biodiversity/Sustainable_Cities/Sustainable_Communities/Events/SC%20Course%20Jamaica%202016/Module%20IV/Jamaica-Sustainable-Energy-Roadmap-InclAppendices-112013.pdf
11. GDP growth, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2019&locations=JM&start=1960
12. An overview of Jamaican's electricity sector, Ministry of Science, Energy and Technology; https://www.mset.gov.jm/electricity-investments/
13. Energy snapshot, National Renewable Energy Laboratory https://www.nrel.gov/docs/fy15osti/63945.pdf

Kiribati

1. Staff country reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/01/24/Kiribati-2018-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-46546
2. Real GDP growth, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG/MOZ/MDV/NRU/KIR
3. Energy Sector, Save Kiribati; http://www.savekiribati.com/energy.php
4. Kiribati Integrated Energy Road Map, IRENA; https://irena.org/-/media/Files/IRENA/Agency/Publication/2017/Jul/Kiribati_Integrated_Energy_Roadmap_2017.pdf
5. Kiribati Integrated Energy Roadmap, Asia Pacific Energy Forum; https://policy.thinkbluedata.com/node/3713
6. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study

Liberia

1. African Development Bank Economic Outlook; https://www.afdb.org/en/countries/west-africa/liberia/liberia-economic-outlook
2. The World Factbook, Central Intelligence Agency; https://www.cia.gov/library/publications/the-world-factbook/geos/li.html
3. Country at a Glance, IMF; https://www.imf.org/en/Countries/LBR
4. Power Sector Structure, Rural and Renewable Energy Agency; http://www.liberiaruralenergy.org/?q=content/power-sector-structure-public-sector-entities-and-established-roles
5. Rural Electrification Targets, Rural and Renewable Energy Agency; http://www.liberiaruralenergy.org/?q=content/rural-electrification-access-targets
6. Country Reports, The Energy Progress Report, Tracking SDG7; https://trackingsdg7.esmap.org/country/liberia
7. Climatescope 2019, BloombergNEF; https://global-climatescope.org/policies
8. GDP, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/LBR
9. Global Off-Grid Solar Market Report, July - December 2019, GOGLA; https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf
10. Liberia Power Africa Fact Sheet, USAID; https://www.usaid.gov/powerafrica/liberia
11. Sector Scan The Energy Sector in Liberia, Commissioned by the Netherlands Enterprise Agency; https://www.rvo.nl/sites/default/files/2018/07/Sector-Scan-Liberia-Energy.pdf
12. Rural Energy Program Structure; http://www.liberiaruralenergy.org/?q=content/rural-energy-program-structure
13. Renewable Energy Targets; http://www.liberiaruralenergy.org/?q=content/renewable-energy-targets-and-energy-mix
14. Staff country reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/06/19/Liberia-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-47002
15. Country Data, SEforALL; https://www.se4all-africa.org/seforall-in-africa/country-data/liberia/

Madagascar

1. Madagascar Power Africa Fact Sheet, USAID; https://www.usaid.gov/powerafrica/madagascar
2. Staff Country Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2020/02/28/Republic-of-Madagascar-2019-Article-IV-Consultation-and-Sixth-Review-Under-the-Extended-49188
3. Climatescope 2019, BloombergNEF; https://global-climatescope.org/policies
4. Solar Energy Data, IRENA; https://www.irena.org/solar
5. Tracking SDG7 – The Energy Progress Report; https://trackingsdg7.esmap.org/country/madagascar
6. Global Off-Grid Solar Market Report, July - December 2019, GOGLA; https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf
7. Real GDP growth, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG
8. TAKING THE PULSE OF ENERGY ACCESS IN MADAGASCAR, SEforALL; https://www.seforall.org/system/files/2019-12/Taking-Pulse-Madagascar_0.pdf
9. Feature Story, The World Bank; https://www.worldbank.org/en/news/feature/2018/10/10/the-force-of-the-sun-madagascar-embarks-on-renewable-energy-production
10. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study

Malawi

1. Expert Level Visit by International Solar Alliance Secretariat, International Solar Alliance; https://isolaralliance.org/uploads/docs/847cfa6d7996ee9f8e447aba4a8cd4.pdf
2. Global Off-Grid Solar Market Report, July - December 2019, GOGLA; https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf
3. Pay-As-You-Go Market Attractiveness Index 2019, Lighting Global; https://www.lightingglobal.org/wp-content/uploads/2019/06/PAYGo-MAI-2019-Report.pdf
4. Staff Country Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/12/06/Malawi-Second-and-Third-Reviews-Under-the-Three-Year-Extended-Credit-Facility-Arrangement-48858
5. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
6. Real GDP Growth, The World Bank; https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=MW

Maldives

1. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
2. Staff country reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/06/07/Maldives-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-46972
3. Energy Storage Roadmap for the Maldives - 2019, The World Bank; http://documents1.worldbank.org/curated/en/340311572621106332/pdf/Executive-Summary.pdf
4. Energy Balance in the Maldives, Maldives Energy Authority; https://unstats.un.org/unsd/energy/meetings/2016iwc/25maldives.pdf
5. Energy Profile of Maldives, SAARC Energy; https://www.saarcenergy.org/wp-content/uploads/2016/03/Maldives_Electricity_Profile.pdf
6. The POISED project, MERCOM India; https://mercomindia.com/maldives-to-develop-solar-battery-diesel-hybrid-systems/
7. Dimensions of Energy Insecurity on Small Islands: The Case of Maldives - 2019, Asian Development Bank Institute; https://www.adb.org/sites/default/files/publication/543261/adbi-wp1049.pdf
8. Renewable Energy Roadmap: The Republic of Maldives, IRENA; https://www.irena.org/EventDocs/Maldives/Maldivesroadmapbackgroundreport.pdf
9. GDP, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG/MOZ/MDV

Mali

1. Mali economic outlook, African Development Bank Group https://www.afdb.org/en/countries/west-africa/mali/mali-economic-outlook
2. Mali country profile, African Development Bank Group https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Profil_ER_Mal_Web_light.pdf
3. Renewables Readiness Assessment Mali, IRENA https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Sep/IRENA_RRA_Mali_2019_En.pdf
4. Mali overview, IEA https://www.iea.org/countries/mali#overview
5. https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/RE%20Mali%20exec%20summary%20final.pdf
6. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Mar/IRENA_RE_Capacity_Statistics_2019.pdf
7. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ML
8. Access to Electricity, rural, World Bank https://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS?locations=ML
9. Access to Electricity, World Bank https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=ML
10. Solar Irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?r=MLI&c=17.728524,-3.9875,5

Mauritius

1. Real GDP growth, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG/MOZ/MDV/NRU/KIR/NAM/COM/MUS
2. Staff Country Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/04/29/Mauritius-Staff-Report-for-the-2019-Article-IV-Consultation-46830
3. Application of an Institutional Assessment and Design (IAD)-Enhanced Integrated Regional Energy Policy and Planning (IREPP) Framework to Island States, MDPI; https://www.researchgate.net/publication/340408197_Application_of_an_Institutional_Assessment_and_Design_IAD-Enhanced_Integrated_Regional_Energy_Policy_and_Planning_IREPP_Framework_to_Island_States
4. Mauritius Commercial Guide, International Trade Administration; https://www.trade.gov/country-commercial-guides/mauritius-energy
5. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study

Mozambique

1. Country At a Glance, SEforALL; https://www.se4all-africa.org/seforall-in-africa/country-data/mozambique/
2. Mozambique Power Africa Fact Sheet, USAID; https://www.usaid.gov/powerafrica/mozambique
3. Staff Country Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/06/18/Republic-of-Mozambique-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-46996
4. Climatescope 2019, BloombergNEF; https://global-climatescope.org/policies
5. Tracking SDG7 – The Energy Progress Report; https://trackingsdg7.esmap.org/country/mozambique
6. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
7. Real GDP growth, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG/MOZ
8. Mozambique Energy Situation, Energypedia; https://energypedia.info/wiki/Mozambique_Energy_Situation
9. MOZAMBIQUE Energy Sector, GET.invest; https://www.get-invest.eu/market-information/mozambique/energy-sector/
10. Global Off-Grid Solar Market Report, July - December 2019, GOGLA; https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf
11. Pay-As-You-Go Market Attractiveness Index 2019, Lighting Global; https://www.lightingglobal.org/wp-content/uploads/2019/06/PAYGo-MAI-2019-Report.pdf

Myanmar

1. Energies — Open Access Journal, MDPI; https://www.mdpi.com/journal/energies
2. Staff Country Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2020/03/26/Myanmar-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-49292
3. Global Off-Grid Solar Market Report, July - December 2019, GOGLA; https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf
4. Pay-As-You-Go Market Attractiveness Index 2019, Lighting Global; https://www.lightingglobal.org/wp-content/uploads/2019/06/PAYGo-MAI-2019-Report.pdf
5. Climatescope 2019, BloombergNEF; https://global-climatescope.org/policies
6. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
7. Country News, IMF; https://www.imf.org/en/Countries/MMR
8. Myanmar energy report, Enerdata; https://estore.enerdata.net/energy-market/myanmar-energy-report-and-data.html

Namibia

1. Namibia Power Africa Fact Sheet, USAID; https://www.usaid.gov/powerafrica/namibia
2. Staff country reports, IMF; https://www.imf.org/en/News/Articles/2020/03/01/pr2075-imf-staff-concludes-visit-to-namibia
3. GDP, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG/MOZ/MDV/NRU/KIR/NAM
4. Country Overview, The World Bank; https://www.worldbank.org/en/country/namibia/overview
5. NAMFISA Strategy 2017-22; https://www.namfisa.com.na/wp-content/uploads/2020/02/NAMFISA_strategy_booklet_2017_final.pdf
6. Solar Energy Plan, Bloomberg; https://www.bloomberg.com/news/articles/2020-08-21/botswana-namibia-set-to-sign-5-gigawatt-solar-energy-plan
7. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
8. Partnership Ready Namibia: Renewable energy, BMZ; https://www.giz.de/en/downloads/GBN_Sector%20Brief_Namibia_RenewableEnergy_E_WEB.pdf
9. Climatescope 2019, BloombergNEF; https://global-climatescope.org/policies
10. Country Energy Profiles, IRENA; https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Namibia_Africa_RE_SP.pdf

Nauru

1. Staff country reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2020/01/29/Republic-of-Nauru-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-49001
2. Enabling implementation of Nauru Energy Roadmap, Pacific Office of Fiji; https://www.pacific.undp.org/content/pacific/en/home/projects/nauru-energy.html
3. Nauru Electricity Data, Worldometers; https://www.worldometers.info/electricity/nauru-electricity/
4. Nauru Energy Sector Summary, NAOERO; http://prdrse4all.spc.int/sites/default/files/nauru_energy_sector_summary_report_v6.pdf
5. Review of the Nauru Energy Road Map 2014 -2020, UNDP; https://itpau.com.au/wp-content/uploads/2018/11/nerm_review_150118.pdf
6. Legislative Gap Analysis Report, Nauru Energy Sector, UNDP; http://prdrse4all.spc.int/sites/default/files/nauru_lga_report_21feb18.pdf
7. Population Data, The World Bank; https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NR
8. Real GDP growth, IMF; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/GUY/MDG/MOZ/MDV/NRU
9. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study
10. Nauru: 2014 Strategic Country Analysis, Asian Development Bank; https://www.adb.org/sites/default/files/linked-documents/cobp-nau-2015-2017-sd-03.pdf

Niger

1. African Development Bank Economic Outlook; https://www.afdb.org/en/countries-west-africa-niger/niger-economic-outlook
2. Expert Level Visit by International Solar Alliance Secretariat, International Solar Alliance; https://isolaralliance.org/uploads/docs/b9602cf0073ce891902a04aba1d1ef.pdf
3. Renewable Readiness Assessment 2013, IRENA; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2013/RRA_Niger.pdf
4. Global Off-Grid Solar Market Report, July - December 2019, GOGLA; https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf
5. Pay-As-You-Go Market Attractiveness Index 2019, Lighting Global; https://www.lightingglobal.org/wp-content/uploads/2019/06/PAYGo-MAI-2019-Report.pdf
6. Staff Country Reports, IMF; https://www.imf.org/en/Publications/CR/Issues/2019/07/22/Niger-2019-Article-IV-Consultation-Fourth-Review-Under-the-Extended-Credit-Facility-and-48514
7. Climatescope 2019, BloombergNEF; https://global-climatescope.org/policies
8. Tracking SDG7 – The Energy Progress Report; https://trackingsdg7.esmap.org/country/niger
9. The Global Solar Atlas; https://globalsolaratlas.info/global-pv-potential-study

Nigeria

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=9.107322,8.675,6&r=NGA
3. Nigeria energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/time?country=Nigeria
4. Nigeria electrification Policy development, World Bank http://documents1.worldbank.org/curated/en/367411530329645409/pdf/Nigeria-Electrification-PAD2524-06052018.pdf
5. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=NG
6. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
7. Nigeria energy profile, IRENA https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Nigeria_Africa_RE_SP.pdf
8. Nigeria economic outlook, African Development Bank https://www.afdb.org/en/countries-west-africa-nigeria/nigeria-economic-outlook#:~:text=Real%20GDP%20growth%20is%20projected,)%2C%20which%20emphasizes%20economic%20diversification.&text=Nigeria%20has%20many%20opportunities%20to%20transform%20its%20economy%2C%20particularly%20in%20agroprocessing.
9. Nigeria overview, World Bank https://www.worldbank.org/en/country/nigeria/overview#2
10. Nigeria approved projects, World Bank https://projects.worldbank.org/en/projects-operations/projects-summary?countrycode_exact=NG
11. Nigeria overview, IEA https://www.iea.org/countries/nigeria

Palau

1. Tracking SDG7, Palau; https://trackingsdg7.esmap.org/countries
2. RE sector outlook; https://www.reeep.org/republic-palau-2012
3. Palau power market snapshot; https://www.nrel.gov/docs/fy15osti/64291.pdf
4. Palau energy policy; https://eneken.ieej.or.jp/data/3120.pdf
5. Palau energy fact sheet; http://palauenergyoffice.com/wp-content/uploads/2017/09/Palau-energy-factsheet-2016-04-07_V1.pdf
6. Palau economic outlook; https://theodora.com/wfbcurrent/palau/palau_economy.html
7. Palau economy analysis; https://www.lloydsbanktrade.com/en/market-potential/palau/economy
8. Palau energy department; http://palauenergyoffice.com/
9. Palau energy update; https://www.adb.org/sites/default/files/institutional-document/545686/pacific-energy-update-2019.pdf
10. Palau sustainable development goals; https://sustainabledevelopment.un.org/content/documents/23606VNR_FINAL_21June2019_UN_Version.pdf
11. National energy policy; https://policy.asiapacificenergy.org/sites/default/files/Palau%20National%20Energy%20Policy.pdf
12. NDBP loan programs; http://palauenergyoffice.com/ndbp-loan-programs/
13. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
14. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
15. Global Solar Atlas; https://globalsolaratlas.info/map

Papua New Guinea

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=-6.514124,148.4042,5&r=PNG
3. Papua New Guinea energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/time?country=Papua%20New%20Guinea
4. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
5. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
6. Papua New Guinea overview, World Bank https://www.worldbank.org/en/country/png/overview#2
7. Papua New Guinea country report, Global Green Growth Institute https://gggi.org/site/assets/uploads/2019/07/GGPA-PNG-Report_FINAL.pdf
8. Papua New Guinea economic update, World Bank https://www.worldbank.org/en/country/png/publication/papua-new-guinea-in-the-time-of-covid-19---from-relief-to-recovery
9. Energise rural PNG news update, Lighting Global https://www.lightingglobal.org/news/origin-energy-ifc-launch-pay-as-you-go-power-to-energize-rural-papua-new-guinea/

10. Papua New Guinea country profile, IRENA https://islands.irena.org/-/media/Files/IRENA/Sids/CountryProfile/Papua-New-Guinea_Oceania_RE_CP.ashx?la=en&hash=FF644319362BB6ACB715F4F93BC401B5C18FD877

Paraguay

1. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/PRY
2. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PY
3. Tracking SDG7, Paraguay; https://trackingsdg7.esmap.org/countries
4. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=PY
5. Global Solar Atlas; https://globalsolaratlas.info/map
6. IEA statistics Paraguay; https://www.iea.org/data-and-statistics
7. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
8. Credit Rating Paraguay; https://www.moodys.com/research/Moodys-affirms-Paraguays-Ba1-ratings-maintains-a-stable-outlook--PR_425781
9. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
10. IMF Article IV review; https://www.imf.org/en/Publications/CR/Issues/2019/04/30/Paraguay-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-46837
11. IMF data statistics; https://www.imf.org/external/datamapper/PCPIPCH@WEO/PRY
12. Paraguay country profile; https://www.hydropower.org/country-profiles/paraguay
13. Energy Balance Paraguay; https://www.ssme.gov.py/vmme/pdf/Balance2019/BENpy2019-Estadistico.pdf
14. Funding for energy and road development; https://www.caf.com/en/currently/news/2019/12/caf-approves-462-million-for-paraguay-s-energy-and-road-infrastructure/
15. National Development Plan Paraguay; https://unctad.org/meetings/en/Presentation/c1mem2018_S3_Villalba.pdf
16. Power system losses; https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?locations=PY
17. National climate change plan and mitigation strategy; https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp063-idb-paraguay.pdf
18. Paraguay country profile; https://import-export.societegenerale.fr/en/country/paraguay/economy-country-risk
19. Paraguay policy IEA; https://www.iea.org/policies/6015-independent-production-and-trasportation-of-energy-ptiee?country=Paraguay&qs=para
20. Ease of doing business score 2020; https://www.doingbusiness.org/content/dam/doingBusiness/country/p/paraguay/PRY.pdf

Peru

1. Power sector scenario; https://www.esmap.org/sites/esmap.org/files/DocumentLibrary/FINAL_Private%20Sector%20in%20T&D_KS0023-15_web.pdf
2. Electric Social Compensation fund; https://ppp.worldbank.org/public-private-partnership/library/electrical-social-compensation-fund-fose-peru
3. PPP law; https://www.worldbank.org/en/about/partners/brief/peru-building-infrastructure-with-local-financing
4. Invest in Peru; https://www.investinperu.pe/RepositorioAPS/1/2/JER/PROJECT_PRESENTATION/2019/19-09-Portafolio-ENG.pdf
5. RE policies; http://documents1.worldbank.org/curated/en/122241552317273992/pdf/WPS8772.pdf
6. Peru-Ecuador transmission line link; http://www.ecpamericas.org/news/Default.aspx?id=3653
7. Tracking SDG7, Peru; https://trackingsdg7.esmap.org/countries
8. Peru renewable energy report; https://power.globaldata.com/Analysis/TableOfContents/Peru-Renewable-Energy-Policy-Report-2019
9. RE Policies; https://global-climatescope.org/policies/3378
10. RE Policies; https://global-climatescope.org/policies/3372
11. RE Policies; https://www.iea.org/policies/6317-2013-2022-national-rural-electrification-plan-of-peru-plan-nacional-de-electrificacion-rural-pner-periodo-2013-2022?country=Peru&qs=peru
12. IEA statistics Peru; https://www.iea.org/data-and-statistics
13. Peru solar potential; https://www.nrel.gov/docs/fy19osti/73941.pdf
14. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
15. Credit rating; https://www.moodys.com/credit-ratings/Peru-Government-of-credit-rating-601500#
16. Global Solar Atlas; https://globalsolaratlas.info/map
17. IMF article IV review; https://www.imf.org/en/Publications/CR/Issues/2020/01/13/Peru-2019-Article-IV-Consultation-Press-Release-Staff-Report-Staff-Statement-and-Statement-48942
18. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/PER
19. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PE
20. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
21. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/Peru-Power-Market-Outlook-to-2030--Update-2018---Market-Trends--Regulations--and-Competitive-Landscape
22. Economic outlook; https://import-export.societegenerale.fr/en/country/peru/market-sectors
23. Tax exemption for RE; https://www.iea.org/policies/6313-law-that-extends-the-scope-of-the-regime-of-early-recovery-of-the-general-tax-on-sales-to-hydroelectric-generation-companies-ley-que-amplia-los-alcances-del-regimen-de-recuperacion-anticipada-del-impuesto-general-a-las-ventas-a-las-empresas-degeneracion?country=Peru&qs=peru&source=IEA%2FIRENA%20Renewables%20Policies%20Database

Plurinational State of Bolivia

1. World Bank; https://data.worldbank.org/country/BO
2. Bolivia Country Profile; https://import-export.societegenerale.fr/en/country/bolivia/presentation-economy
3. IEA Policy Database; https://www.iea.org/policies/5833-decentralized-infrastructure-for-rural-transformation-idtr-1st-and-2nd-phase?country=Plurinational%20State%20Of%20Bolivia&qs=alg
4. IEA Policy Database; https://www.iea.org/policies/5825-bolivia-electric-plan-2020-2025-plan-del-sector-electrico-del-estado-plurinacional-de-bolivia-2025?country=Plurinational%20State%20Of%20Bolivia&qs=alg
5. IEA Policy Database; https://www.iea.org/policies/5829-import-duty-exemptions?country=Plurinational%20State%20Of%20Bolivia&qs=alg
6. Global Solar Atlas; https://globalsolaratlas.info/detail?r=BOL&c=-16.395605,-63.55,6
7. Tracking SDG7; https://trackingsdg7.esmap.org/country/bolivia-plurinational-state
8. Thomson Law; https://uk.practicallaw.thomsonreuters.com/w-013-5362?transitionType=Default&contextData=(sc.Default)&firstPage=true
9. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
10. Renewable Energy Statistics; https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf
11. Country Profile; https://www.iea.org/countries/bolivia

Republic of the Gambia

1. Gambia economic outlook; https://www.afdb.org/en/countries/west-africa/gambia/gambia-economic-outlook#:~:text=It%20then%20fell%20to%20an,delays%20in%20budget%20support%20disbursements.&text=The%20high%20public%20debt%20and,challenges%20in%20energy%20and%20infrastructure.
2. Global solar atlas; https://globalsolaratlas.info/
3. Gambia electricity access project; https://www.afdb.org/en/documents/republic-gambia-gambia-electricity-access-project-geap-project-appraisal-reports
4. % of agricultural land; https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?locations=GM
5. http://springer.iq-technikum.de/referenceworkentry/10.1007/978-3-642-40871-7_211-1
6. https://www.ecowapp.org/sites/default/files/download_tor.pdf
7. Renewable readiness assessment; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2013/RRA_Gambia.pdf
8. Gambia RE law; http://www.ecowrex.org/system/files/documents/re_law_gambia_2013_0.pdf
9. Tracking SDG7, Gambia; https://trackingsdg7.esmap.org/countries
10. Climate investment Funds- scaling up renewable energy program; https://www.climateinvestmentfunds.org/sites/cif_enc/files/meeting-documents/gambia_eoi_0.pdf
11. Gambia INDC; https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Gambia%20First/The%20INDC%20OF%20THE%20GAMBIA.pdf
12. NAMA Gambia; https://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/MDG%20Carbon%20Facility/NAMA%20Final%20Gambia%202.pdf
13. Gambia energy profile; https://wedocs.unep.org/bitstream/handle/20.500.11822/20510/Energy_profile_Gambia.pdf?sequence=1&isAllowed=y
14. Gambia country profile world bank; https://www.worldbank.org/en/country/gambia/overview#3
15. Gambia renewable energy program; https://www.eib.org/en/press/all/2019-067-european-backing-for-eur-142-million-gambia-renewable-energy-programme
16. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
17. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
18. Per capita electricity consumption; ember.shinyapps.io/GlobalElectricityDashboard/

Rwanda

1. Power sector Overview; https://www.frontiersin.org/articles/10.3389/fenrg.2018.00068/full
2. Energy sector action plan; https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Rwanda_-_Energy_Sector_Review_and_Action_Plan.pdf
3. Rwanda world bank overview; https://data.worldbank.org/country/RW
4. Global Solar Atlas; https://globalsolaratlas.info/map
5. Rwanda monetary policy review; https://www.imf.org/en/Publications/CR/Issues/2020/01/17/Rwanda-First-Review-Under-the-Policy-Coordination-Instrument-and-Monetary-Policy-48956
6. Eastern African Power pool; http://eappool.org/
7. Credit Rating; https://www.moodys.com/credit-ratings/Rwanda-Government-of-credit-rating-806356929
8. Rwanda Economic Update; https://www.worldbank.org/en/news/feature/2019/07/01/rwanda-economic-update-making-electricity-accessible-and-affordable
9. Agreement to increase access to electricity; https://www.worldbank.org/en/news/press-release/2017/07/07/government-of-rwanda-and-the-world-bank-sign-agreement-to-increase-access-to-electricity-through-off-grid-renewable-energy
10. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/W/RWA
11. Rwanda Power sector report; https://www.africanpowerplatform.org/resources/reports/east-africa/rwanda.html
12. RE policies; https://global-climatescope.org/policies/5062
13. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
14. Rwanda energy sector review 2016; https://waterportal.rwb.rw/sites/default/files/inline-files/Energy%20Rwanda%20overview%20fact-pack---rwanda-energy-sector-2016.pdf

15. RE policies; https://global-climatescope.org/policies/3861
16. Tracking SDG7, Rwanda; https://trackingsdg7.esmap.org/countries
17. RE policies; https://global-climatescope.org/policies/3861
18. RE policies; https://global-climatescope.org/policies/3885
19. RE policies; https://global-climatescope.org/policies/4217
20. RE policies; https://global-climatescope.org/policies/5060
21. Rwanda strategic plan; https://www.reg.rw/fileadmin/user_upload/REG_Strategic_plan.pdf

Saint Kitts and Nevis

1. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=KN
2. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=KN
3. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
4. Global Solar Atlas; https://globalsolaratlas.info/map
5. Energy Report Card; https://www.ccreee.org/wp-content/uploads/2020/06/Energy-Report-Card-St.-KItts-_-Nevis-Dec-2018.pdf
6. Power sector snapshot; https://www.nrel.gov/docs/fy15osti/62706.pdf
7. Tracking SDG7, St Kitts and Nevis; https://trackingsdg7.esmap.org/countries
8. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
9. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/St--Kitts-and-Nevis-Power-Market-Outlook-to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
10. Challenges and opportunities in power sector; https://publications.iadb.org/publications/english/document/Challenges-and-Opportunities-for-the-Energy-Sector-in-the-Eastern-Caribbean-Saint-Kitts-and-Nevis-Energy-Dossier.pdf
11. Electricity Report IRENA; https://www.irena.org/IRENADocuments/Statistical_Profiles/Central%20America%20and%20the%20Caribbean/Saint%20Kitts%20and%20Nevis_Central%20America%20and%20the%20Caribbean_RE_SP.pdf
12. Paris INDC agreement; https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Saint%20Kitts%20and%20Nevis%20First/St.%20Kitts%20and%20Nevis%20INDC.pdf
13. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
14. IMF datasets; https://www.imf.org/external/datamapper/datasets
15. IFRS standards; https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/st-kitts-and-nevis/
16. Ease of doing business score 2020; https://www.doingbusiness.org/content/dam/doingBusiness/country/s/st-kitts-and-nevis/KNA.pdf
17. St Kitts and Nevis economic profile; https://www.cia.gov/library/publications/the-world-factbook/geos/sc.html

Saint Lucia

1. Energy sector Snapshot; https://www.nrel.gov/docs/fy15osti/62688.pdf
2. St Lucia Economic outlook; http://pubdocs.worldbank.org/en/681431582655269212/mpo-lca.pdf
3. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/Power-Market-in-CARICOM-and-Associated-Countries---Installed-Capacity--Capacity-Mix--Renewable-Roadmap--Electricity-Tariffs-and-Future-Outlook-to-2030?ReportGeographyId=100196
4. Challenges and opportunities in the energy sector; https://publications.iadb.org/publications/english/document/Challenges-and-Opportunities-for-the-Energy-Sector-in-the-Eastern-Caribbean-Saint-Lucia-Energy-Dossier.pdf
5. St Lucia energy roadmap 2016; https://rmi.org/wp-content/uploads/2017/03/Islands_Saint_lucia_Energy_Roadmap_Report_2016.pdf
6. Renewable energy target; http://documents1.worldbank.org/curated/ru/949751496156024515/pdf/ITM00184-P161316-05-30-2017-1496156021818.pdf
7. RE sector development project world bank; https://ewsdata.rightsindevelopment.org/files/documents/16/WB-P161316.pdf
8. National energy policy st. Lucia; http://www.oas.org/en/sedi/dsd/Energy/Doc/NEP_StLucia_web.pdf
9. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
10. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
11. LUCELEC annual report; https://www.lucelec.com/sites/default/files/annual-reports/LUCELEC-2016-Annual-Report.pdf
12. Tracking SDG7, St Lucia; https://trackingsdg7.esmap.org/countries
13. Global Solar Atlas; https://globalsolaratlas.info/map

Saint Vincent and the Grenadines

1. Challenges and opportunities in energy sector; https://publications.iadb.org/publications/english/document/Challenges-and-Opportunities-for-the-Energy-Sector-in-the-Eastern-Caribbean-Saint-Vincent-and-the-Grenadines-Energy-Dossier.pdf
2. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/St--Vincent-and-Grenadines-Power-Market-Outlook-to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
3. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/VCT
4. Power sector snapshot; https://www.nrel.gov/docs/fy15osti/64127.pdf
5. Country profile CIA; https://www.cia.gov/library/publications/the-world-factbook/geos/vc.html
6. National Energy Policy; http://www.gov.vc/images/PoliciesActsAndBills/SVGNationalEnergyPolicyApprovedMar09.pdf

7. Energy report card; https://www.ccreee.org/wp-content/uploads/2020/06/Energy-Report-Card-SVG-Dec-2018.pdf
8. Country profile IRENA; https://islands.irena.org/-/media/Files/IRENA/Sids/CountryProfile/Saint-Vincent-and-the-Grenadines_Central-America-and-the-Caribbean_RE_CP.ashx?la=en&hash=63DC549EF827408AA57210262232058AE4C04BFF
9. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=VC
10. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
11. Tracking SDG7, St Vincent and the Grenadines; https://trackingsdg7.esmap.org/countries
12. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=VC
13. Credit Rating; https://www.moodys.com/research/Moodys-affirms-St-Vincent-and-the-Grenadines-B3-issuer-ratings--PR_417932#:~:text=Research%3A%20Rating%20Action%3A%20Moody's%20affirms,ratings%3B%20maintains%20stable%20outlook%20%2D%20Moody's
14. World investment report 2020; https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=2769
15. Real GDP growth; https://www.imf.org/external/datamapper/PCPIPCH@WEO/VCT
16. IMF article IV review; https://www.imf.org/en/Publications/CR/Issues/2019/02/25/St-Vincent-and-the-Grenadines-2018-Article-IV-Consultation-Press-Release-Staff-Report-and-46628
17. Global Solar Atlas; https://globalsolaratlas.info/map

Samoa

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=-13.754409,-172.10835,9&r=WSM
3. Samoa Energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/samoa
4. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=WS
5. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
6. Pacific Finance sector briefs Samoa, Asian Development Bank https://www.adb.org/sites/default/files/publication/529851/pacific-finance-sector-samoa.pdf
7. Samoa renewable energy partnership framework, Sustainable Development Goals https://sustainabledevelopment.un.org/partnership/?p=7906
8. Renewable Islands, IRENA https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2014/GREIN_Settings_for_Success.pdf
9. Funding proposal, Green Climate Fund https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp036-adb-cook-islands.pdf
10. GDP per capita current, World Bank https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=WS

Sao Tome and Principe

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=0.840424,6.959839,8&r=STP
3. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2019&locations=ST&start=2001&view=chart
4. Sao Tome overview, World Bank https://www.worldbank.org/en/country/saotome/overview
5. Sao Tome and Principe energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/sao-tome-and-principe
6. Sao Tome and Principe 2030: the country we need to build, Global Network; https://www.gn-sec.net/procurement/renewable-energy-and-energy-efficiency-action-plans-support-national-vision-sao-tome-e
7. Sao Tome and Principe bank investment in renewable energy, ESMAP https://www.esmap.org/node/57542
8. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
9. Sao Tome and Principe economic outlook, African Development Bank; https://www.afdb.org/en/countries-southern-africa-sao-tome-and-principe/sao-tome-and-principe-economic-outlook#:~:text=Macroeconomic%20performance%20and%20outlook,agriculture%2C%20construction%2C%20and%20services.&text=Public%20debt%20increased%20from%2064.2,increasing%20the%20country%27s%20debt%20vulnerability.
10. Sao Tome and Principe approved projects, World Bank; https://projects.worldbank.org/en/projects-operations/project-detail/P157096?lang=en&tab=procurement
11. Sao Tome energy profile, IRENA; https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Sao%20Tome%20and%20Principe_Africa_RE_SP.pdf
12. Sao Tome and Principe report, ALER https://www.aler-renovaveis.org/en/activities/publications/national-reports/aler-wins-instituto-camoes-application-for-the-publication-of-sao-tome-and-principe-report/

Saudi Arabia

1. Saudi Arabia Country Profile; https://import-export.societegenerale.fr/en/country/saudi-arabia/presentation-economy
2. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. World Atlas; https://www.worldatlas.com/articles/the-economy-of-saudi-arabia.html
4. Power Saudi Arabia; https://www.powersaudiarabia.com.sa/web/index.html

5. Invest Saudi; https://investsaudi.sa/media/1550/renewable_energy-digital.pdf
6. Global Solar Atlas; https://globalsolaratlas.info/detail?c=24.507143,45.065918,5&r=SAU
7. Tracking SDG7; https://trackingsdg7.esmap.org/country/saudi-arabia
8. Globaldata Power; https://power.globaldata.com/Analysis/TableOfContents/Saudi-Arabia-Power-Market-Outlook-to-2030--Update-2017---Market-Trends--Regulations--and-Competitive-Landscape
9. Credit Rating; https://www.moodys.com/credit-ratings/Saudi-Arabia-Government-of-credit-rating-660260?stop_mobi=yes
10. Per Capita Consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
11. Renewable Energy Statistics; https://www.irena.org/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf
12. Power Saudi Arabia; https://www.powersaudiarabia.com.sa/web/attach/news/Round%203%20RFP_Press%20release_EN.pdf

Senegal

1. Senegal Energy outlook; https://www.iea.org/articles/senegal-energy-outlook
2. Global Solar Atlas; https://globalsolaratlas.info/map
3. Senegal Power market; https://www.usaid.gov/powerafrica/senegal
4. Senegal Energy sector; https://www.get-invest.eu/market-information/senegal/energy-sector/
5. Energy Policy Senegal; https://hal.archives-ouvertes.fr/hal-01956187/document
6. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
7. RCEP Senegal Scoping mission report; https://www.wearefactor.com/docs/Senegal.pdf
8. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
9. Senegal financing policy; http://documents1.worldbank.org/curated/pt/331641576983717851/pdf/Senegal-Third-Multi-Sectoral-Structural-Reforms-Development-Policy-Financing.pdf
10. REN 21 Policies; http://energyaccess.org/wp-content/uploads/2018/04/IRENA_IEA_REN21_Policies_2018.pdf
11. Senegal green mini grids analysis; https://greenminigrid.afdb.org/sites/default/files/senegal-3.pdf
12. Agricultural land % Senegal; https://www.land-links.org/country-profile/senegal/#land

Seychelles

1. RE sector Seychelles; https://www.investinseychelles.com/key-sectors/other/renewable-energy
2. RE policies analysis in Seychelles; https://fsr.eui.eu/how-are-islands-promoting-and-integrating-renewables/#:~:text=Mauritius%20and%20Seychelles%20have%20introduced,both%20residential%20and%20commercial%20sectors.&text=It%20was%20open%20to%20any,were%20fixed%20for%2015%20years.
3. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=SC
4. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SC
5. Power sector analysis; https://www.uni-flensburg.de/fileadmin/content/abteilungen/industrial/dokumente/downloads/veroeffentlichungen/diskussionsbeitraege/znes-discussionpapers-008-100ee-mahe.pdf
6. IMF article IV review; https://www.imf.org/en/Publications/CR/Issues/2019/12/23/Seychelles-Fourth-Review-Under-the-Policy-Coordination-Instrument-and-Request-for-48911
7. RE strategy Seychelles; https://www.greenclimate.fund/sites/default/files/document/19250-creating-enabling-environment-seychelles-100-renewable-energy-strategy-seyres-100.pdf
8. Seychelles economic outlook; https://www.afdb.org/en/countries/east-africa-seychelles/seychelles-economic-outlook
9. Seychelles country profile; https://www.africanbondmarkets.org/en/country-profiles/east-africa/seychelles/
10. African economic outlook; https://www.africanbondmarkets.org/fileadmin/uploads/afdb/Documents/2019/2019_African_Economic_Outlook_ENG.pdf
11. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
12. Country analysis; https://cadmus.eui.eu/bitstream/handle/1814/61249/190214_FSR_IOC_ComparativestudyonREandElectricityAccess.pdf?sequence=1
13. Tracking SDG7, Seychelles; https://trackingsdg7.esmap.org/countries
14. Global Solar Atlas; https://globalsolaratlas.info/map
15. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
16. Seychelles infrastructure action plan; https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Seychelles_-_Infrustructure_Action_Plan_Report.pdf

Somalia

1. Per capita electricity consumption, Our World in Data ; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. Somalia economic outlook, African Development Bank; https://www.afdb.org/en/countries-east-africa-somalia/somalia-economic-outlook
3. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=5.203675,46.2042,5&r=SOM
4. Somalia energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/time?country=Somalia
5. Somalia overview, World Bank https://www.worldbank.org/en/country/somalia/overview#2
6. Somalia electricity access project, World Bank http://documents1.worldbank.org/curated/en/618741539178189639/pdf/Project-Information-Document-Integrated-Safeguards-Data-Sheet-Somali-Electricity-Access-Project-P165497.pdf

7. Somalia Energy profile, UN environment programme https://wedocs.unep.org/bitstream/handle/20.500.11822/20514/Energy_profile_Somalia.pdf?sequence=1&isAllowed=y
8. Somalia Power Africa fact sheet, USAID https://www.usaid.gov/powerafrica/wherewework/somalia
9. Somalia energy profile, IRENA https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Somalia_Africa_RE_SP.pdf
10. Somalia energy for prosperity, Lighting Africa https://www.lightingafrica.org/country/somalia-2/

South Sudan

1. Global Solar Atlas; https://globalsolaratlas.info/map
2. Tracking SDG7, South Sudan; https://trackingsdg7.esmap.org/countries
3. IEA statistics South Sudan; https://www.iea.org/data-and-statistics
4. Eastern African Power Pool; https://pubs.naruc.org/pub.cfm?id=5388F6DB-2354-D714-516F-A8C30F137BA4
5. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
6. Rural area population %; https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=SS
7. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/PRY/SSD
8. Ease of doing business score 2020; https://www.doingbusiness.org/content/dam/doingBusiness/country/s/south-sudan/SSD.pdf
9. IMF data statistics; https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD/SSD
10. Per capita electricity consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
11. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
12. IMF article IV review; https://www.imf.org/en/Publications/CR/Issues/2019/06/04/South-Sudan-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-46965
13. South Sudan economic outlook; https://www.afdb.org/en/countries/east-africa/south-sudan/south-sudan-economic-outlook
14. UN news in South Sudan; https://news.un.org/en/story/2020/03/1058621
15. Country overview South Sudan; https://www.worldbank.org/en/country/southsudan/overview
16. Energy Ministry Presentation; https://aop-media-serv-eu-1.s3.eu-central-1.amazonaws.com/2017/10/Energy-Ministry-presentation_FIN.pdf
17. Renewable energy council South Sudan; https://isainfopedia.org/renewable-energy-council-south-sudan-recoss
18. South Sudan new infrastructure upgrade; https://www.afdb.org/en/success-stories/south-sudan-city-darkness-no-longer-african-development-bank-supported-electricity-project-lights-capital-35701
19. Energy Profile South Sudan; https://wedocs.unep.org/bitstream/handle/20.500.11822/20597/Energy_profile_SouthSudan.pdf?sequence=1&amp%3BisAllowed=
20. South Sudan infrastructure Action plan; https://www.afdb.org/sites/default/files/documents/projects-and-operations/south_sudan_infrastructure_action_plan_-_a_program_for_sustained_strong_economic_growth_-_full_report.pdf

Sri Lanka

1. Per capita electricity consumption, Our World in Data https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
2. GDP current, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=LK
3. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
4. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=7.879631,80.7,7&r=LKA
5. Sri Lanka energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/country/sri-lanka
6. Sri Lanka credit rating, Moody's https://www.moodys.com/credit-ratings/Sri-Lanka-Government-of-credit-rating-600023158
7. Economic indicators for Sri Lanka, Asian Development Bank https://www.adb.org/countries/sri-lanka/economy
8. Sri Lanka overview, World Bank https://www.worldbank.org/en/country/srilanka/overview
9. Sri Lanka Energy profile, IRENA https://www.irena.org/IRENADocuments/Statistical_Profiles/Asia/Sri%20Lanka_Asia_RE_SP.pdf
10. Assessment of Sri Lanka's power sector, Asian Development Bank https://www.adb.org/sites/default/files/publication/354591/sri-lanka-power-2050v2.pdf

Sudan

1. Sudan Power sector overview; https://www.iea.org/countries/sudan
2. Sudan electricity sector; https://rise.esmap.org/data/files/library/sudan/SUDAN%20Supporting%20Documents/EA/Kenta%20Usui/Sudan%20Electricity%20Diagnostics%20(preliminary).pptx
3. Diagnostic review of Sudan electricity sector; ttp://documents1.worldbank.org/curated/en/486961588608080192/pdf/From-Subsidy-to-Sustainability-Diagnostic-Review-of-Sudan-Electricity-Sector.pdf
4. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
5. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
6. Sudan economic outlook; https://www.afdb.org/en/countries/east-africa/sudan/sudan-economic-outlook
7. Sudan overview world bank; https://www.worldbank.org/en/country/sudan/overview
8. Sudan RE sector overview; https://projectsportal.afdb.org/dataportal/VProject/show/P-SD-FF0-001

9. Sudan RE sector overview; https://www.seforall.org/sites/default/files/South_Sudan_RAGA_EN_Released.pdf
10. Sudan Power sector review; https://unfccc.int/files/cooperation_support/nama/application/pdf/sudan_namaprofile.pdf
11. https://globalsolaratlas.info/map
12. https://trackingsdg7.esmap.org/countries

Suriname

1. Electricity system expansion funding; https://www.caribank.org/newsroom/news-and-events/electricity-system-upgrade-and-expansion-project-launched-suriname
2. % of agricultural land; https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?locations=SR
3. Suriname economic profile; https://import-export.societegenerale.fr/en/country/suriname/economy-country-risk#:~:text=The%20inflation%20rate%20closed%20at,the%20IMF%20(April%202020).&text=In%20general%2C%20Suriname's%20economy%20is,and%20a%20large%20public%20sector
4. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/Suriname-Power-Market-Outlook-to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
5. Consolidating a Sustainable Energy Sector; https://www.gtai.de/resource/blob/214890/2f586cfa4b68e93d6da57d4662d92688/pro202001295028-data.pdf
6. RE Policies; https://global-climatescope.org/policies/5427
7. RE Policies; https://global-climatescope.org/policies/5433
8. RE Policies; https://global-climatescope.org/policies/5429
9. Global Solar Atlas; https://globalsolaratlas.info/map
10. CARICOM energy policy; https://www.iea.org/policies/5889-caribbean-community-caricom-energy-policy
11. IMF Article IV review; https://www.imf.org/en/Publications/CR/Issues/2019/12/23/Suriname-2019-Article-IV-Consultation-Press-Release-Staff-Report-Informational-Annex-and-48916
12. Tracking SDG7, Suriname; https://trackingsdg7.esmap.org/countries
13. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
13. Suriname energy situation; https://energypedia.info/wiki/Suriname_Energy_Situation#cite_note-Cabr.C3.A9.2C_M.M._Lopez-Pe.C3.B1a.2C_A._Kieffer.2C_G._Khalid.2C_A._.26_Ferroukhi.2C_R._.282015.29._Renewable_Energy_Policy_Brief:_Suriname._Retrieved_from:_https:.2F.2Ftinyurl.com.2Fy2f7br9a-16
14. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=SR
15. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/W/SUR
16. Credit rating; https://www.moodys.com/research/Moodys-downgrades-Surinames-rating-to-Caa3-maintains-negative-outlook--PR_428021
17. IADB loan for power sector; https://www.iadb.org/en/news/suriname-increase-electricity-coverage-rural-areas-idb-support
18. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=SR

Togo

1. Solar irradiation, Global Solar Atlas https://globalsolaratlas.info/detail?c=8.635334,0.834961,7&r=TGO
2. Per capita electricity consumption, Our World in Data
3. https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
4. Togo Energy progress report, Tracking SDG7 https://trackingsdg7.esmap.org/time?country=Togo
5. Real GDP growth, IMF https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
6. GDP at current prices, World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=TG
7. Togo economic and political overview, Lloyds Bank https://www.lloydsbanktrade.com/en/market-potential/togo/economical-context
8. Togo economic outlook, African Development Bank Group https://www.afdb.org/en/countries-west-africa-togo/togo-economic-outlook
9. Togo overview, World Bank https://www.worldbank.org/en/country/togo/overview#1
10. Togo news, World Bank https://www.worldbank.org/en/news/press-release/2019/12/16/togo-150-million-to-promote-a-greener-and-more-resilient-future
11. Togo Power Africa fact sheet, USAID https://www.usaid.gov/powerafrica/togo
12. Togo electrification strategy, Lighting Global https://www.lightingglobal.org/wp-content/uploads/2018/12/Togo-Electrification-Strategy-Short-EN-Final.pdf
13. Renewable Energy gains transaction in Togo, Africa Oil & Power https://www.africaoilandpower.com/2019/01/15/renewable-energy-gains-traction-in-togo/
14. Renewable Energy project in Togo, Globeleq https://www.globeleq.com/globeleq-to-develop-renewable-energy-project-in-togo/
15. Togo joins scaling solar, Scaling Solar https://www.scalingsolar.org/1721-2/
16. Togo energy profile, IRENA https://www.irena.org/IRENADocuments/Statistical_Profiles/Africa/Togo_Africa_RE_SP.pdf
17. Togo country report, Sustainable Development https://sustainabledevelopment.un.org/content/documents/16305Togo_EN.pdf
18. Funding proposal, Green Climate Fund https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp105-boad-multiple-countries.pdf

Tonga

1. Real GDP Growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/W
2. International Monetary Fund; https://www.imf.org/~/media/Files/Publications/PP/2020/English/PPEA2020024.ashx
3. Asian Development Bank; https://www.adb.org/sites/default/files/linked-documents/49450-015-sd-04.pdf
4. GCF; https://www.greenclimate.fund/sites/default/files/document/funding-proposal-fp090-adb-tonga.pd

5. Global Solar Atlas; https://globalsolaratlas.info/map?r=TON&c=-18.992888,-174.975,7
6. United Nations; https://sustainabledevelopment.un.org/content/documents/1330tongaEnergy%20Strategy.pdf
7. Tracking SDG7; https://trackingsdg7.esmap.org/country/tonga
8. Tonga Power Limited; http://www.tongapower.to/Portals/2/English%20Annual%20Report%202019.pdf
9. Asian Development Bank; https://www.adb.org/results/power-good-how-adbs-climate-resilient-investment-boosting-tongas-energy-future
10. IRENA; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Renewable_Energy_Statistics_2020.pdf

Trinidad and Tobago

1. Feed in tariff; https://www.energy.gov.tt/our-business/alternative-energy/renewable-energy-electricity-generation-in-trinidad-and-tobago/#:~:text=%E2%80%9CFeed%20in%20Tariff%20(FIT),period%20of%2015%2D20%20years.
2. Economic outlook; https://import-export.societegenerale.fr/en/country/trinidad-and-tobago/economy-country-risk#:~:text=The%20country%20has%20also%20become,corruption%20have%20hampered%20economic%20development.
3. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/TTO
4. Power sector snapshot; https://www.nrel.gov/docs/fy15osti/64117.pdf
5. RE pilot projects; https://www.energy.gov.tt/our-business/alternative-energy/pilot-projects/
6. Renewable energy target; https://energynow.tt/blog/target-10-renewables-by-2021#:~:text=The%20government%20of%20Trinidad%20%26%20Tobago,generation%20from%20renewables%20by%202021.&text=Trinidad%20and%20Tobago%20currently%20uses,by%202021%20%E2%80%93%20an%20ambitious%20target.
7. RE incentives; http://www.energy.gov.tt/our-business/alternative-energy/renewable-energy-and-energy-efficiency-fiscal-incentives/
8. Country profile CIA; https://www.cia.gov/library/publications/the-world-factbook/geos/td.html
9. Economic outlook; https://theodora.com/wfbcurrent/trinidad_and_tobago/trinidad_and_tobago_economy.html
10. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=TT
11. RE policy framework; https://www.energy.gov.tt/wp-content/uploads/2014/01/Framework-for-the-development-of-a-renewable-energy-policy-for-TT-January-2011.pdf
12. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/Trinidad-and-Tobago-Power-Market-Outlook-to-2030--Update-2019-Market-Trends--Regulations--Electricity-Tariff-and-Key-Company-Profiles
13. Tracking SDG7, Trinidad and Tobago; https://trackingsdg7.esmap.org/countries
14. RE Policies; https://global-climatescope.org/policies/4615
15. IEA statistics Trinidad and Tobago; https://www.iea.org/data-and-statistics
16. Credit rating; https://www.moodys.com/research/Moodys-changes-the-outlook-on-Trinidad-and-Tobagos-ratings-to--PR_424055
17. IMF datasets; https://www.imf.org/external/datamapper/datasets
18. IMF article IV review; https://www.imf.org/en/Publications/CR/Issues/2018/09/25/Trinidad-and-Tobago-2018-Article-IV-Consultation-Press-Release-and-Staff-Report-46267
19. Country profile; https://www.wto.org/english/tratop_e/tpr_e/s260_sum_e.pdf
20. Energy report card Trinidad and Tobago; https://europa.eu/capacity4dev/file/88794/download?token=U6hVP1fQ
21. Utility scale RE project Trinidad and Tobago; https://www.energy.gov.tt/wp-content/uploads/2014/05/Utility-Scale-Renewable-Energy-Projects-Closing-March-8th-2018.pdf
22. Global Solar Atlas; https://globalsolaratlas.info/map
23. Power sector scenario; https://www.energy.gov.tt/wp-content/uploads/2016/08/A-Unique-Approach-for-Sustainable-Energy-in-Trinidad-and-Tobago.pdf

Tuvalu

1. World Bank; https://data.worldbank.org/country/TV
2. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. Asian Development Bank; https://www.adb.org/sites/default/files/linked-documents/49450-015-sd-04.pdf
4. Master Plan for Renewable Electricity; http://prdrse4all.spc.int/system/files/master_plan_for_renewable_electricity.pdf
5. Global Solar Atlas; https://globalsolaratlas.info/detail?r=DJI&c=11.813965,42.60415,9
6. Tracking SDG7; https://trackingsdg7.esmap.org/country/tuvalu
7. Path to Prosperity of Islands; https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_Path_to_Prosperity_Islands_2016.pdf

Uganda

1. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/UGA
2. Paris INDC; https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uganda%20First/INDC%20Uganda%20final%20%2014%20October%20%202015.pdf
3. Uganda Energy Report; https://d2ouvy59p0dg6k.cloudfront.net/downloads/energy_report_for_uganda_2015_1.pdf
4. Feed in tariff; https://www.era.go.ug/index.php/tariffs/generation-tariffs/feed-in-tariff
5. Uganda Energy Report; https://www.rvo.nl/sites/default/files/2019/02/Final-Energy-report-Uganda.pdf

6. Solar taxation Handbook; https://www.useaug.org/sites/default/files/resources/5.%20Solar%20Taxation%20Handbook_0.pdf
7. RE strategy plan; https://rise.esmap.org/data/files/library/uganda/Renewable%20Energy/REA,%20Strategy%20and%20Plan%202013-2022.pdf
8. Scaling up rural electrification plan; https://energyeconomicgrowth.org/sites/eeg.opml.co.uk/files/2019-04/Scaling%20up%20Rural%20Electrification%20in%20Uganda%20PDD10112.pdf
9. GET FiT program; https://collaboration.worldbank.org/content/sites/collaboration-for-development/en/groups/results-based-financing/groups/results-based-financing-for-climate/documents.entry.html/2017/02/14/global_energy_transf-pmkc.html
10. Uganda power sector profile; https://www.usaid.gov/powerafrica/uganda
11. % of rural population; https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=UG
12. Tracking SDG7, Uganda; https://trackingsdg7.esmap.org/countries
13. Energy purchase and losses statistics; https://www.era.go.ug/index.php/stats/transmission-stats/energy-purchases-sales-and-losses
14. Per capita electricity consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
15. Generation tariff; https://www.era.go.ug/index.php/tariffs/generation-tariffs/tariffs-for-generation-companies
16. % of agricultural land; https://data.worldbank.org/indicator/AG.LND.ARBL.ZS?locations=UG
17. Uganda factsheet; https://www.usaid.gov/sites/default/files/documents/1860/Uganda_-_November_2018_Country_Fact_Sheet.pdf
18. Generation statistics; https://www.era.go.ug/index.php/stats/generation-statistics/installed-capacity
19. Electricity distribution statistics; https://www.era.go.ug/index.php/electricity-distribution-statistics/energy-sales-by-customer-cateory
20. Global Solar Atlas; https://globalsolaratlas.info/map
21. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=UG
22. Credit rating; https://www.moodys.com/research/Moodys-announces-completion-of-a-periodic-review-of-ratings-of--PR_425970
23. IMF data sets; https://www.imf.org/external/datamapper/datasets
24. IMF article IV review; https://www.imf.org/en/Publications/CR/Issues/2019/05/07/Uganda-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-46875
25. Uganda Economic outlook; https://www.afdb.org/en/countries/east-africa/uganda/uganda-economic-outlook

United Arab Emirates

1. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
2. Credit Rating; https://www.moodys.com/credit-ratings/United-Arab-Emirates-Government-of-credit-rating-600018601
3. IMF article IV review; https://www.imf.org/en/Publications/CR/Issues/2019/02/01/United-Arab-Emirates-2018-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-46571
4. Per capita Electricity Consumption; https://ember.shinyapps.io/GlobalElectricityDashboard/
5. IEA statistics UAE; https://www.iea.org/data-and-statistics
6. RE Policies; https://global-climatescope.org/policies/5475
7. RE Policies; https://global-climatescope.org/policies/5228
8. Solar Park; https://www.dewa.gov.ae/en/about-us/media-publications/latest-news/2019/03/mohammed-bin-rashid-al-maktoum-solar-park
9. UAE energy strategy; https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/federal-governments-strategies-and-plans/uae-energy-strategy-2050
10. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=AE
11. UAE vision 2021; https://www.vision2021.ae/en/uae-vision
12. Ease of doing business score 2020; https://www.doingbusiness.org/content/dam/doingBusiness/country/u/united-arab-emirates/ARE.pdf
13. IFRS standards; https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/united-arab-emirates/
14. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/UAE-Power-Market-Outlook-to-2030--Update-2018---Market-Trends--Regulations--and-Competitive-Landscape
15. Dubai renewable energy standards; https://www.iea.org/policies/5664-dubai-renewables-standards?country=United%20Arab%20Emirates&qs=united
16. UAE economy; https://u.ae/en/about-the-uae/economy
17. Floating solar PV; https://www.bloomberg.com/news/articles/2020-02-13/abu-dhabi-island-to-host-nation-s-first-floating-solar-power
18. Floating Solar PV; https://www.dewa.gov.ae/en/about-us/media-publications/latest-news/2019/09/floating-photovoltaic-system
19. UAE National grid interconnection with neighbours; https://eda.ac.ae/docs/default-source/Publications/eda-insight_fret-iii_regional_electricity_coop_en.pdf?sfvrsn=2

United Republic of Tanzania

1. World Investment Report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
2. Credit Rating; https://www.moodys.com/credit-ratings/Tanzania-Government-of-credit-rating-600034704
3. Ease of doing business score 2020; doingbusiness.org/content/dam/doingBusiness/country/t/tanzania/TZA.pdf
4. IMF article IV review; https://www.imf.org/en/Publications/CR/Issues/2018/12/04/United-Republic-of-Tanzania-Financial-Sector-Assessment-Program-Press-Release-Staff-Report-46418
5. Tracking SDG7, Tanzania; https://trackingsdg7.esmap.org/countries
6. Percentage of Rural population; https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=TZ
7. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=TZ
8. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/TZA
9. IEA statistics Tanzania; https://www.iea.org/data-and-statistics
10. Power sector analysis; https://power.globaldata.com/Analysis/TableOfContents/Tanzania-Power-Market-Outlook-to-2030--Update-2018---Market-Trends--Regulations--and-Competitive-Landscape
11. Global Solar Atlas; https://globalsolaratlas.info/map
12. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=TZ
13. RE Policies; https://global-climatescope.org/policies/4944
14. RE Policies; https://global-climatescope.org/policies/3887
15. RE Policies; https://global-climatescope.org/policies/4219
16. Tanzania economic outlook; https://www.afdb.org/en/countries-east-africa-tanzania/tanzania-economic-outlook

Vanuatu

1. UNDP environment and energy report; http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/MDG%20Carbon%20Facility/NAMA%20Final%20Vanuatu.pdf
2. Country profile; https://www.climateinvestmentfunds.org/country/vanuatu
3. Economic outlook; https://www.cia.gov/library/publications/the-world-factbook/geos/nh.html
4. Real GDP growth; https://www.imf.org/en/Countries/VUT
5. Country economic profile; https://import-export.societegenerale.fr/en/country/vanuatu/economy-country-risk#:~:text=Estimated%20inflation%20for%202019%20was,tax%20haven%20by%20the%20OECD
6. Per capita electricity consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
7. Rural electrification program; https://www.worldbank.org/en/news/feature/2017/05/22/vanuatu-rural-electrification-program-benefits-remote-communities
8. Readiness assessment report Vanuatu; https://irena.org/publications/2015/Jul/Renewables-Readiness-Assessment-Vanuatu
9. National energy roadmap; https://www.iea.org/policies/5529-vanuatu-national-energy-road-map-nerm-2013-2020
10. World investment report 2020; https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf
11. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=VU
12. Global Solar Atlas; https://globalsolaratlas.info/map
13. Rural electrification project VREP II; https://doe.gov.vu/index.php/projects-2/item/2-off-grid/6-vanuatu-rural-electrification-project-vrep-ii
14. IMF datasets; https://www.imf.org/external/datamapper/datasets
15. Tracking SDG7, Vanuatu; https://trackingsdg7.esmap.org/countries
16. Electricity projection data; https://gggi.org/site/assets/uploads/2016/12/BAU-Energy-Projection-for-Vanuatu-GGGI-2016.pdf
17. RE fiscal incentives; https://www.usp.ac.fj/index.php?id=13093
18. Vanuatu World Bank overview; https://data.worldbank.org/country/VU
19. SREP investment plan; https://www.climateinvestmentfunds.org/sites/cif_enc/files/Vanuatu%20SREP%20Investment%20Plan_final_revised.pdf

Yemen

1. Yemen power sector overview; https://www.iea.org/countries/yemen
2. Yemen Power sector scenario; https://www.energycharter.org/fileadmin/DocumentsMedia/Occasional/2019-Yemen_paper_final.pdf
3. Yemen emergency electricity access project; http://documents1.worldbank.org/curated/fr/895191523306712217/pdf/Project-Information-Document-Integrated-Safeguards-Data-Sheet-Yemen-Emergency-Electricity-Access-Project-P163777.pdf
4. Yemen Investment Report; https://www.energycharter.org/fileadmin/DocumentsMedia/Occasional/Yemen_Investment_Report.pdf
5. Yemen Energy policy report; http://www.undp.org/content/dam/yemen/E&E/Docs/UNDP-YEM-Prospects%20of%20Solar%20Energy%20in%20Yemen-%20Policy%20Note.pdf
6. Yemen Solar PV scenario report; https://www.rcreee.org/sites/default/files/121707-wp-public-p158449-wb-rcreee-solar-pv-in-yemen-report-002.pdf
7. Yemen economic update; https://www.worldbank.org/en/country/yemen/publication/economic-update-april-2020
8. Yemen Solar report; https://eadp.eu/uploads/WP201902_Yemen_Solar_EN.pdf
9. IMF datasets; https://www.imf.org/external/datamapper/datasets/WEO
10. RE solutions in Yemen; https://www.ye.undp.org/content/yemen/en/home/presscenter/articles/2020/bottom-up-renewable-energy-solutions--gateway-for-resilient-comm.html
11. Per capita electricity consumption; https://ourworldindata.org/grapher/per-capita-electricity-consumption?tab=table&time=2019
12. IEA statistics Yemen; https://www.iea.org/data-and-statistics
13. Yemen economic outlook; https://import-export.societegenerale.fr/en/country/yemen/investment-indicators
14. Yemen power sector scenario; https://trackingsdg7.esmap.org/data/files/download-documents/chapter_2_electrification.pdf
15. GDP per capita; https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=YE
16. Global Solar Atlas; https://globalsolaratlas.info/map
17. Access to electricity; https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=YE

Zambia

1. Zambia country overview; https://www.worldbank.org/en/country/zambia/overview
2. Zambia economic outlook; https://import-export.societegenerale.fr/en/country/zambia/market-sectors#:~:text=Zimbabwe%20has%20abundant%20natural%20resources,lithium%2C%20tin%2C%20and%20platinum.&text=Zimbabwe's%20economy%20depends%20heavily%20on,industry%20dominates%20the%20industrial%20sector.
3. Zambia access to electricity; https://www.usaid.gov/powerafrica/zambia#:~:text=National%20access%20to%20electricity%20averages,for%20all%20Zambians%20by%202030
4. Zambia country note AFDB; https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/country_notes/Zambia_country_note.pdf
5. RE financing in Zambia; https://www.afdb.org/fileadmin/uploads/afdb/Documents/Environmental-and-Social-Assessments/Zambia_-_Zambia_Renewable_Energy_Financing_Framework_%E2%80%93_ESMF.pdf
6. Net metering Zambia; https://www.saaea.org/renewable-energy-news/category/net%20metering
7. Invest in Zambia; https://www.zambiainvest.com/energy#:~:text=There%20currently%20are%20three%20main,and%20the%20Lusemfwa%20Electricity%20Company
8. Zambia power sector scenario; https://www.theigc.org/blog/increasing-tariffs-to-prevent-another-electricity-crisis-in-zambia/#:~:text=Zambia's%20electricity%20outages%20in%202019,low%20rainfall%20in%202018%2F19.
9. Large scale solar PV in Zambia; https://www.worldbank.org/en/news/feature/2019/05/14/unlocking-low-cost-large-scale-solar-power-in-zambia
10. Energy crisis in Zambia; https://cuts-lusaka.org/pdf/Briefing_Paper-The_energy_crisis_and_its_impact_on_the_economy.pdf
11. RE sector scenario Zambia; https://www.mdpi.com/2075-5309/8/6/77/pdf
12. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
13. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
14. Off grid solar market trends report; https://www.lightingglobal.org/wp-content/uploads/2020/05/VIVID_OCA_2020_Off_Grid_Solar_Market_Trends_Report_Full_High-compressed.pdf
15. Africa energy infrastructure financing; https://mediamanager.sei.org/documents/Publications/SEI-WP-2017-03-Africa-energy-infrastructure-finance.pdf
16. Investment plan for Zambia; https://www.climateinvestmentfunds.org/sites/cif_enc/files/srep_invetment_plan_for_zambia.pdf
17. Global Solar Atlas; https://globalsolaratlas.info/map

Zimbabwe

1. Zimbabwe Infrastructure Report 2019; https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Zimbabwe_Infrastructure_Report_2019_-_AfDB.pdf
2. Zimbabwe Economic outlook; https://import-export.societegenerale.fr/en/country/zimbabwe/market-sectors#:~:text=Zimbabwe%20has%20abundant%20natural%20resources,lithium%2C%20tin%2C%20and%20platinum.&text=Zimbabwe's%20economy%20depends%20heavily%20on,industry%20dominates%20the%20industrial%20sector
3. Zimbabwe overview world bank; https://www.worldbank.org/en/country/zimbabwe/overview
4. RE tax incentives; https://www.iea.org/policies/6006-tax-incentives-for-renewable-energy
5. Real GDP growth; https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
6. GDP current; https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
7. Zimbabwe energy market study; https://www.rvo.nl/sites/default/files/2017/11/renewable-energy-market-study-zimbabwe-2017.pdf
8. Solar energy analysis Zimbabwe; https://www.weforum.org/agenda/2019/07/zimbabwe-solar-energy
9. Zimbabwe economic outlook; https://www.afdb.org/en/countries/southern-africa/zimbabwe/zimbabwe-economic-outlook
10. RE biofuel policy Zimbabwe; https://africa-energy-portal.org/news/zimbabwe-launches-renewable-energy-biofuels-policies
11. National RE policy; https://www.zera.co.zw/National_Renewable_Energy_Policy_Final.pdf
12. Global Solar Atlas; https://globalsolaratlas.info/map
13. Tracking SDG7; https://trackingsdg7.esmap.org/countries

Page 1 References:

1. Country Flag: https://www.un.org/en/member-states/
2. Installed Solar Capacity (2019): https://www.irena.org/Statistics/View-Data-by-Topic/Capacity-and-Generation/Statistics-Time-Series
3. Installed Off-Grid Solar Capacity (2019): https://www.irena.org/Statistics/View-Data-by-Topic/Capacity-and-Generation/Statistics-Time-Series
6. World Bank's Ease of Doing Business Score: https://www.doingbusiness.org/en/rankings
7. Cumulative Solar Installed Capacity: (2019): https://www.irena.org/Statistics/View-Data-by-Topic/Capacity-and-Generation/Statistics-Time-Series
8. Overall Electricity Consumption: http://data.un.org/Data.aspx?d=EDATA&f=cmID%3aEL%3btrID%3a12
9. Access to Electricity: https://trackingsdg7.esmap.org/countries

Disclaimer

This report has been prepared by Ernst & Young LLP (“EY” or “we”), in accordance with an engagement agreement with the International Solar Alliance. Ernst & Young LLP’s obligations to the [International Solar Alliance] are governed by that engagement agreement.

This disclaimer applies to all other parties (“third party”).

The ISA and EY have taken all reasonable steps to ensure that the information contained herein has been obtained from reliable sources. We have taken due care to validate the authenticity and correctness of sources used to obtain the information; however, neither the ISA, EY nor any of their respective partners, officers, employees, consultants or agents, provide any representations or warranties, expressed or implied, as to the authenticity, accuracy or completeness of the information, data or opinions that third parties or secondary sources provided to us.

The information and images (if any) provided or analysed in the Report have been collated from various industry sources, including web resources, public-domain information sources and our internal databases. We have ensured reasonable care to validate the data presented in the Report; however, we have not conducted an audit, due diligence or an independent verification of such information. It is also to be noted that the images presented (if any) are pictorial representations of the overall concept and are in no way intended to represent any concrete imagery for the proposed development

All qualitative and quantitative inputs and assumptions, used in the report, are derived from desktop research and/or industry interactions, inputs received from Member Countries, and subsequently submitted to National Focal Points and Contact Points of the ISA member countries for review and validation.

No third party should act on the basis of any information contained in this report without considering and, if necessary, taking appropriate advice upon their own particular circumstances

This report has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax, or other professional advice. Refer to your advisors for specific advice.

It is to be noted that maps and flags presented are for the purpose of pictorial representation only and are in no way intended to represent any concrete imagery, accurate territories or boundaries of the countries or regions and are not to be scaled.
All flags have been sourced from United Nations website (https://www.un.org/en/member-states/).

This report (and any extract from it) may not be copied, paraphrased, reproduced, or distributed in any manner or form, whether by photocopying, electronically, by internet, within another document or otherwise, without the ISA’s and EY’s prior written permission.

The Report or its contents shall not be referred to or quoted in any registration statement, prospectus, offering memorandum, annual report, any public communication, loan agreement or other agreement or document without the ISA’s and EY’s prior written consent.

The ISA and EY accept no responsibility to update this report in light of subsequent events or for any other reason.

The ISA, EY and their members, partners, employees and agents do not accept or assume any responsibility or liability in respect of this report, or decisions based on it, to any third party in relation to the content of report. Should such third party choose to rely on this report, then that third party do so at their own risk.

The Coronavirus is presenting potentially significant impacts upon economic activity and certain businesses. At the date of this report, the potential impacts of the coronavirus are unknown, and have not been considered in this report.