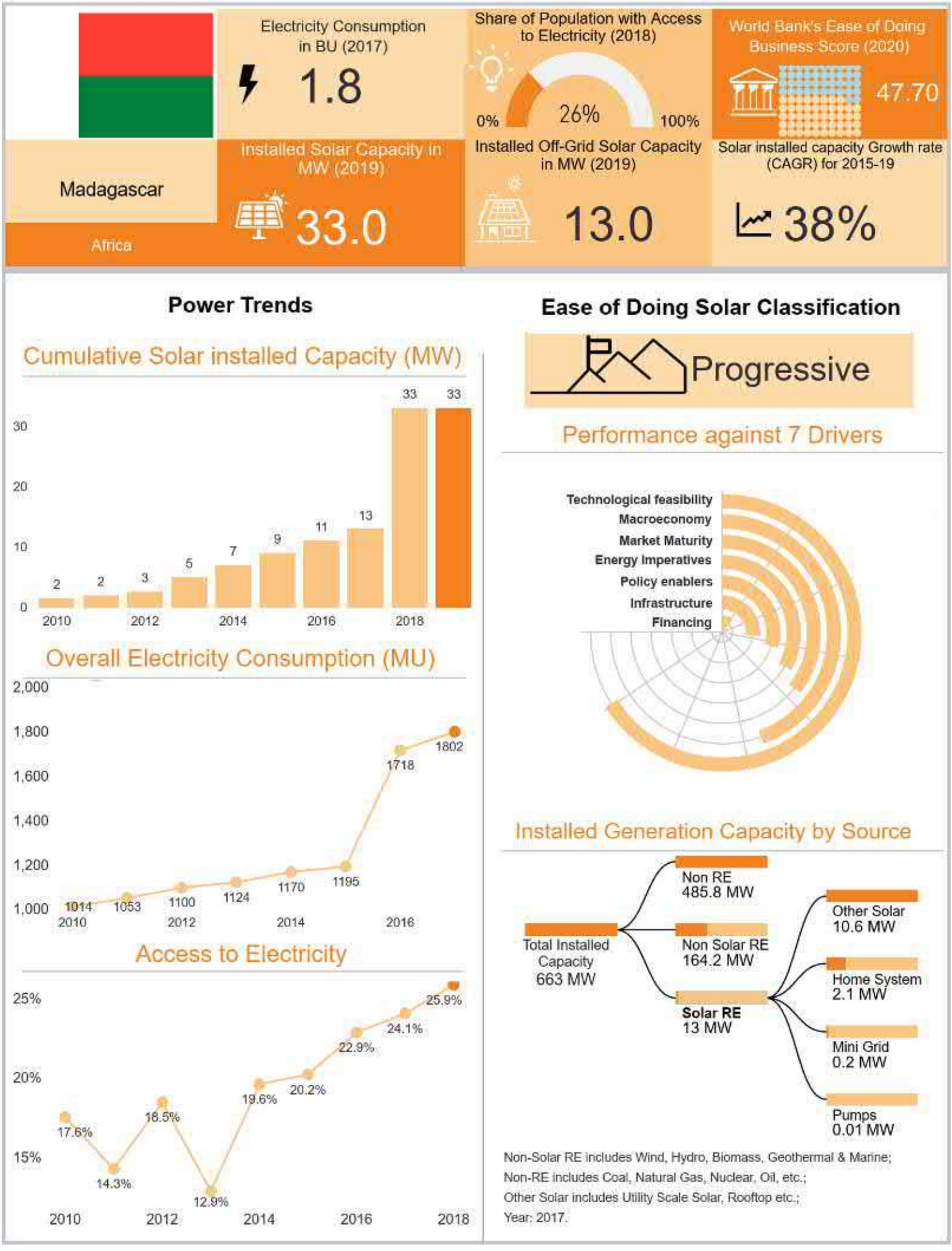
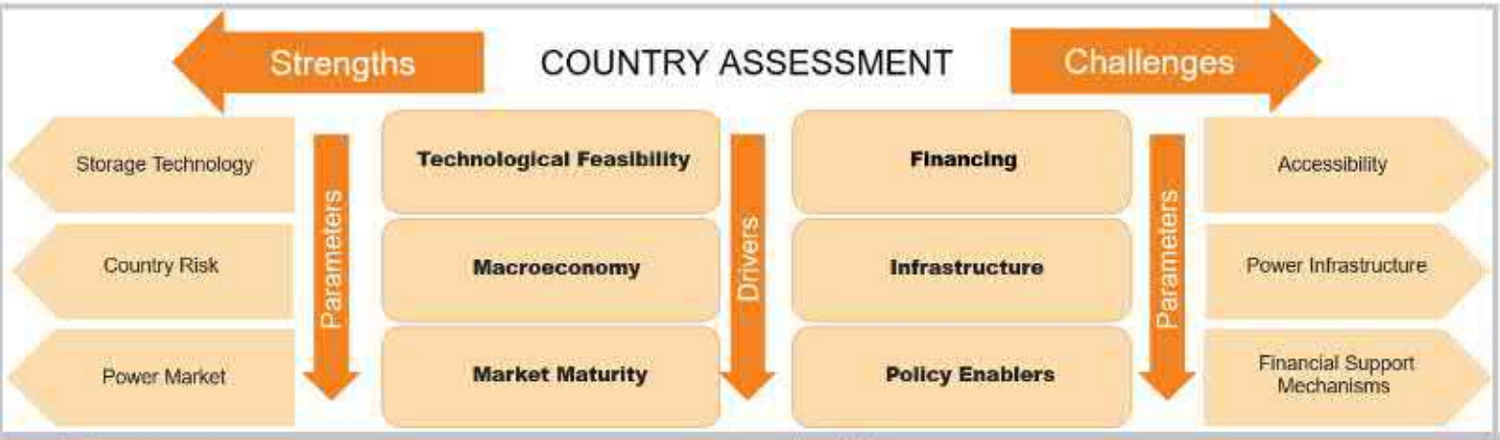

Madagascar
Africa
Electricity Consumption in BU (2017)
1.8
Share of Population with Access to Electricity (2018)
0%
26%
100%
World Bank's Ease of Doing Business Score (2020)
47.70
Installed Solar Capacity in MW (2019)
33.0
Installed Off-Grid Solar Capacity in MW (2019)
13.0
Solar installed capacity Growth rate (CAGR) for 2015-19
38%
Power Trends
Cumulative Solar installed Capacity (MW)
2 2 3 5 7 9 11 13 33 33
2010 2012 2014 2016 2018
Overall Electricity Consumption (MU)
1014 1053 1100 1124 1170 1195 1718 1802
2010 2012 2014 2016
Access to Electricity
17.6% 14.3% 18.5% 12.9% 19.6% 20.2% 22.9% 24.1% 25.9%
2010 2012 2014 2016 2018
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Technological feasibility
Macroeconomy
Market Maturity
Energy Imperatives
Policy enablers
Infrastructure
Financing
Installed Generation Capacity by Source
Total Installed Capacity 663 MW
Non RE 485.8 MW
Non Solar RE 164.2 MW
Solar RE 13 MW
Other Solar 10.6 MW
Home System 2.1 MW
Mini Grid 0.2 MW
Pumps 0.01 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	• 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

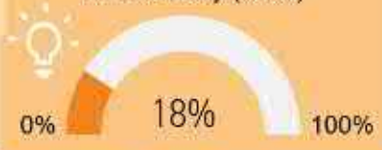
Electricity Consumption in BU (2017)

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)

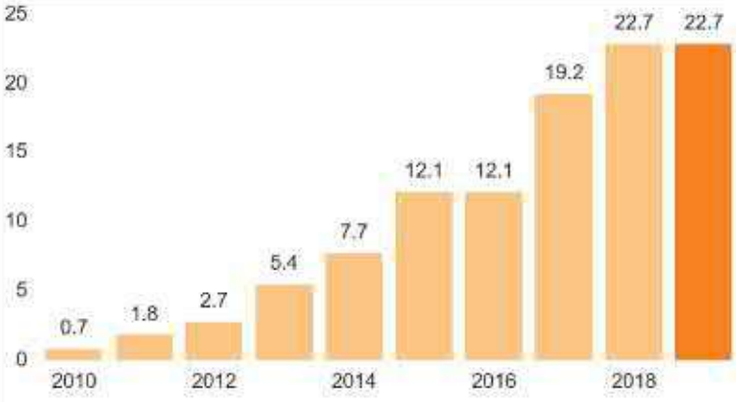
60.90

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

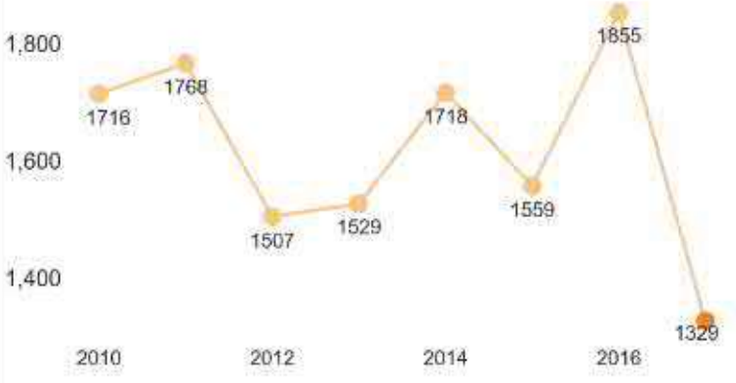
17%

Power Trends

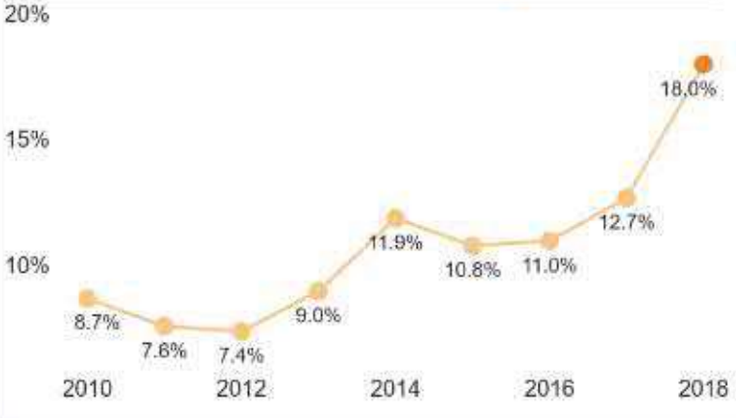
Cumulative Solar installed Capacity (MW)



Overall Electricity Consumption (MU)



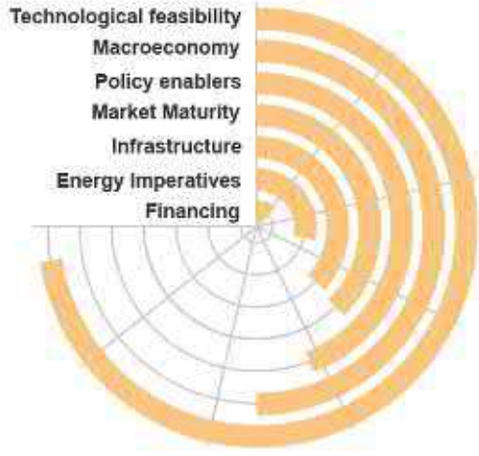
Access to Electricity



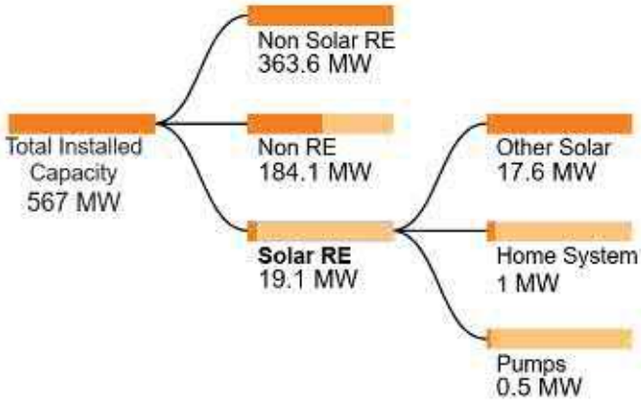
Ease of Doing Solar Classification

Progressive

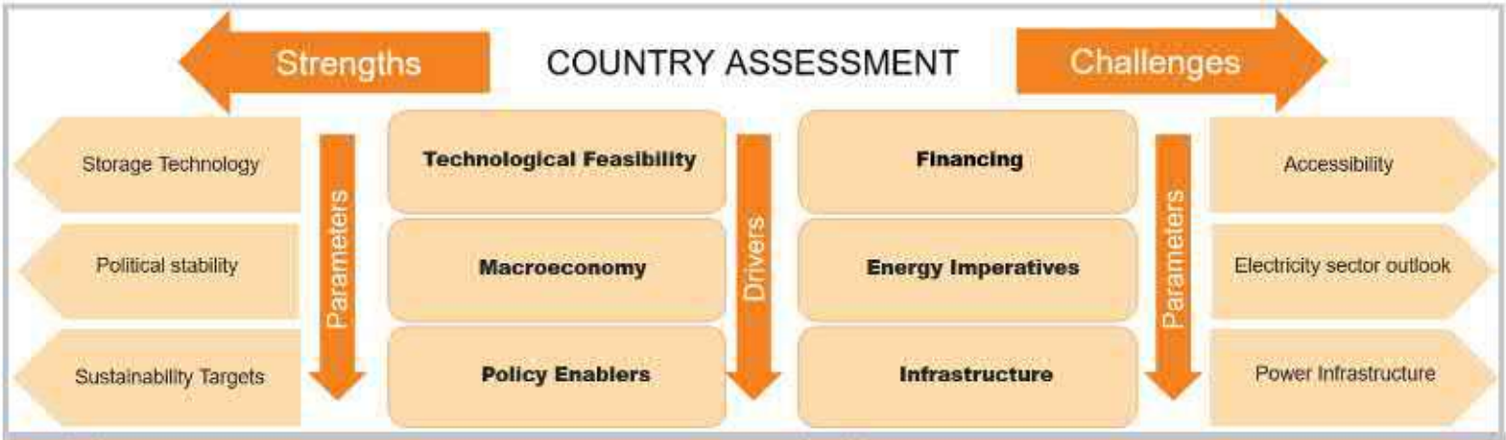
Performance against 7 Drivers



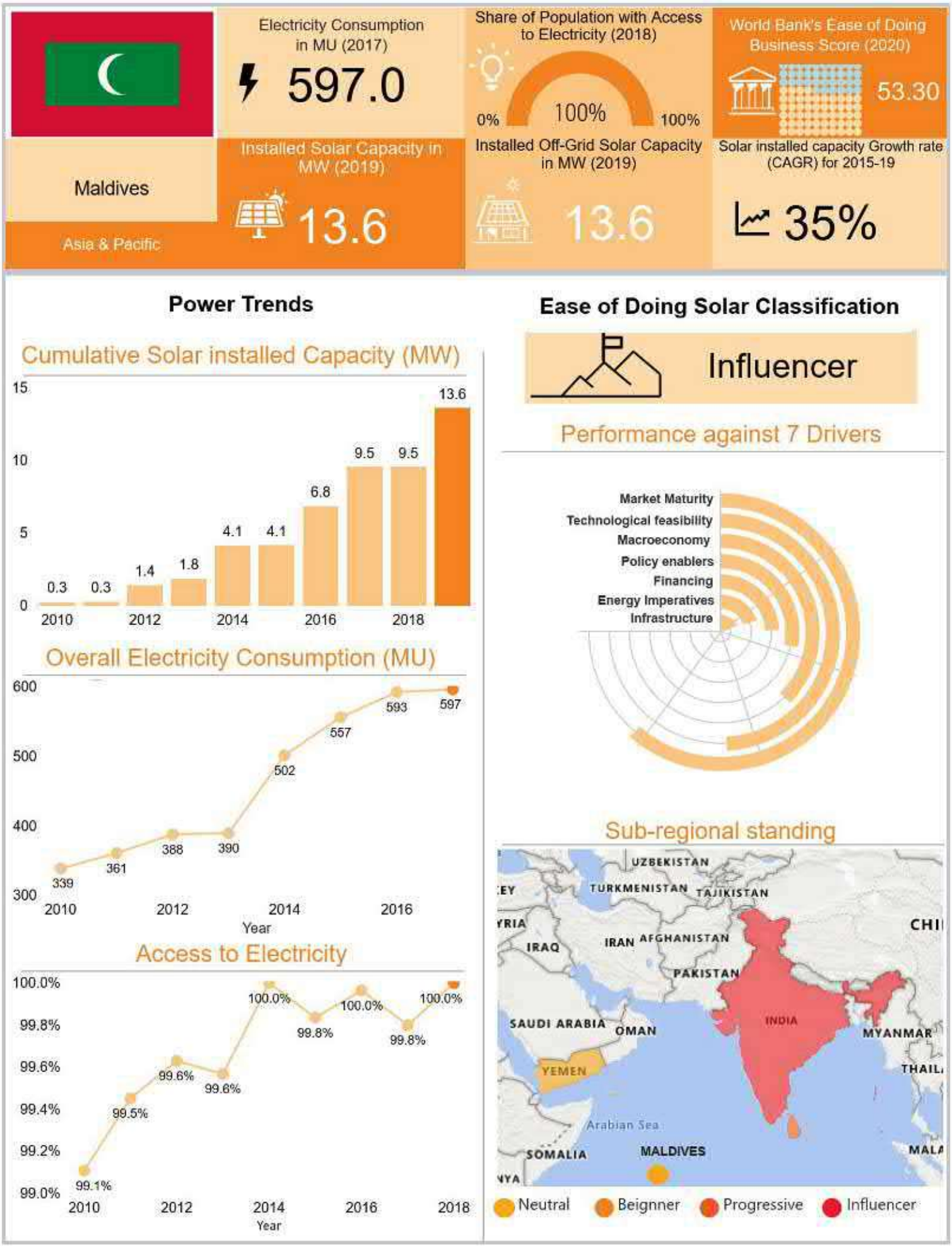
Installed Generation Capacity by Source

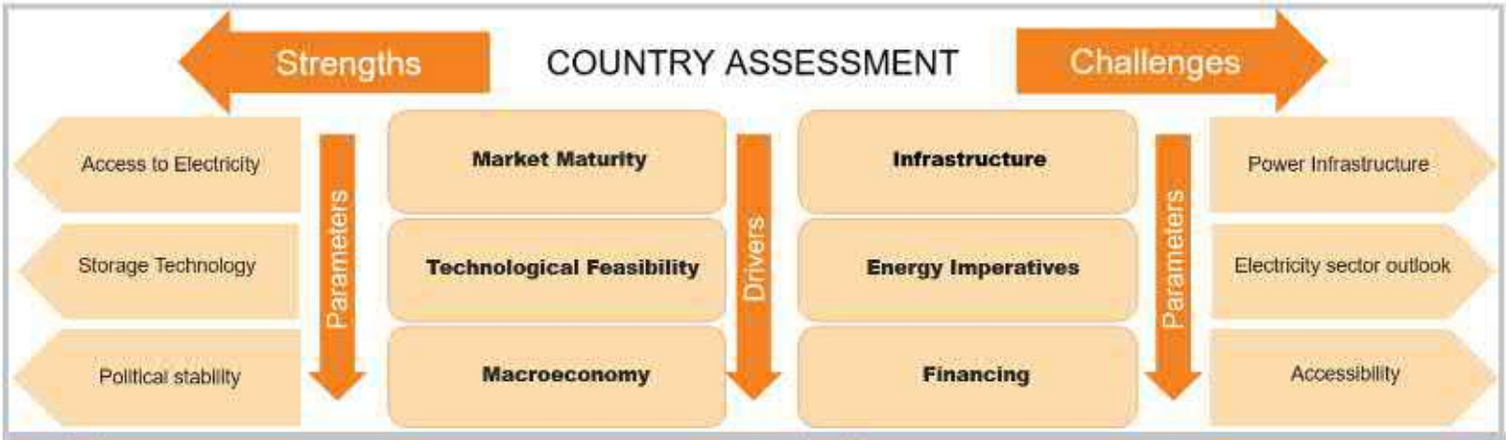


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.



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

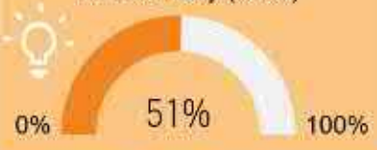
Electricity Consumption in BU (2017)

1.4

Installed Solar Capacity in MW (2019)

19.6

Share of Population with Access to Electricity (2018)



Installed Off-Grid Solar Capacity in MW (2019)

19.6

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

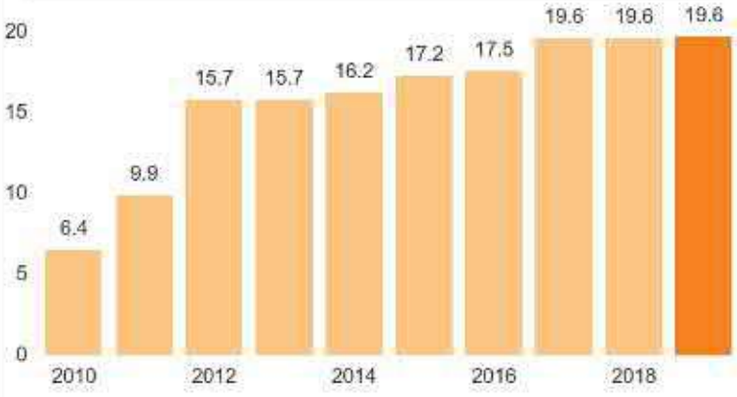
52.90

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

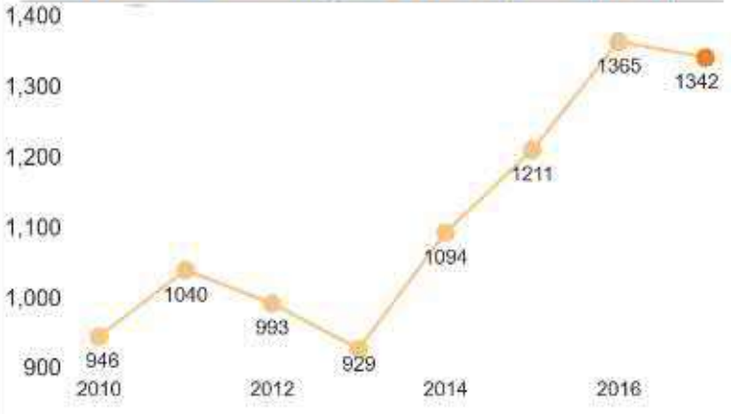
3%

Power Trends

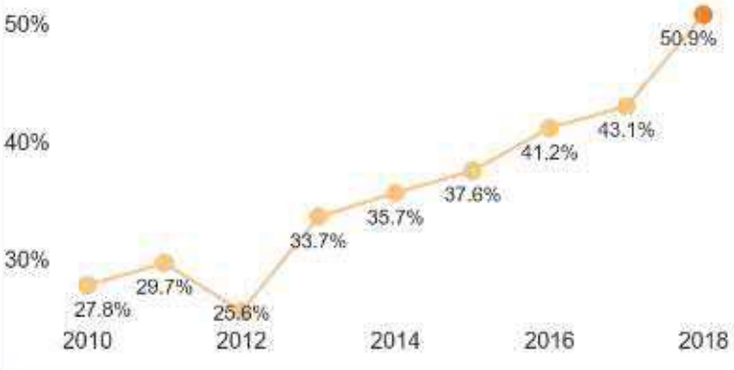
Cumulative Solar installed Capacity (MW)



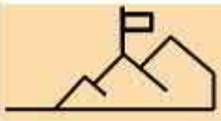
Overall Electricity Consumption (MU)



Access to Electricity

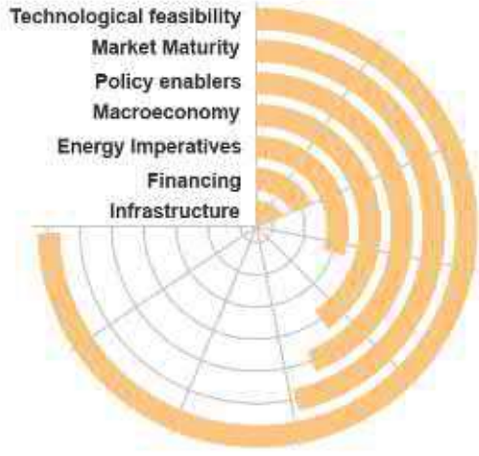


Ease of Doing Solar Classification

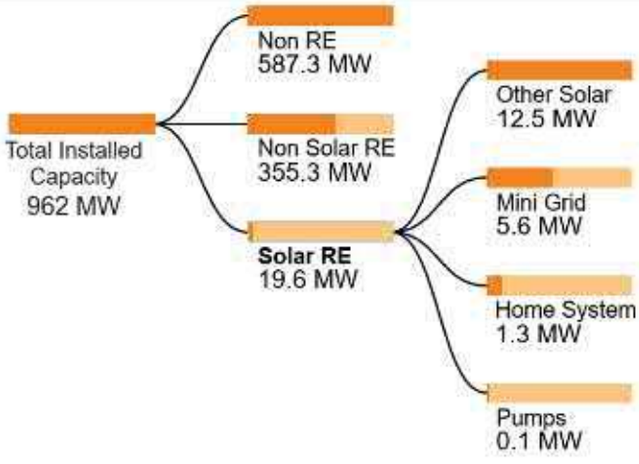


Influencer

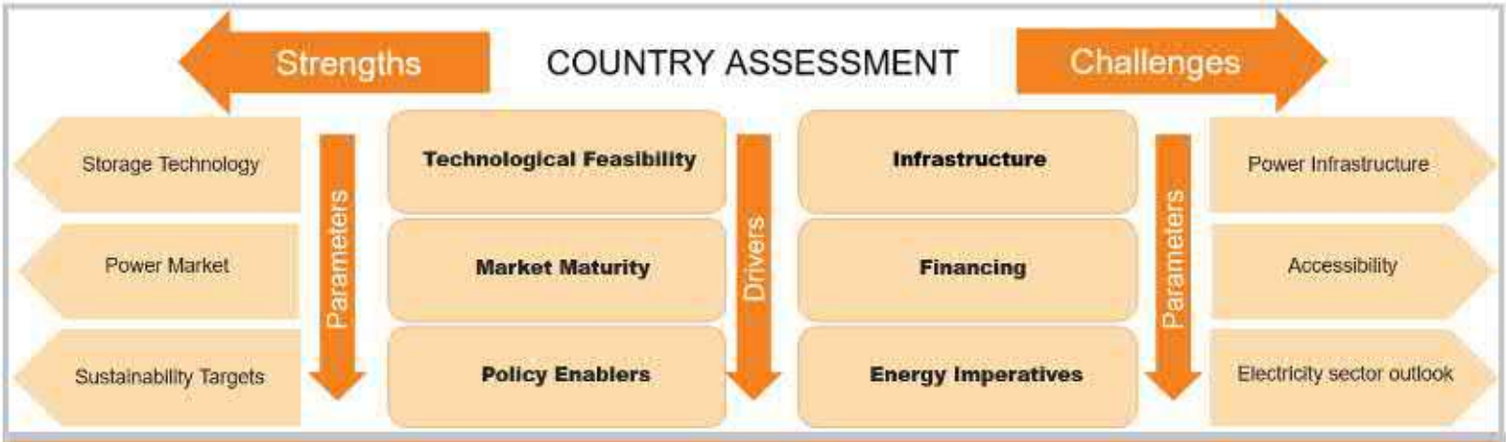
Performance against 7 Drivers



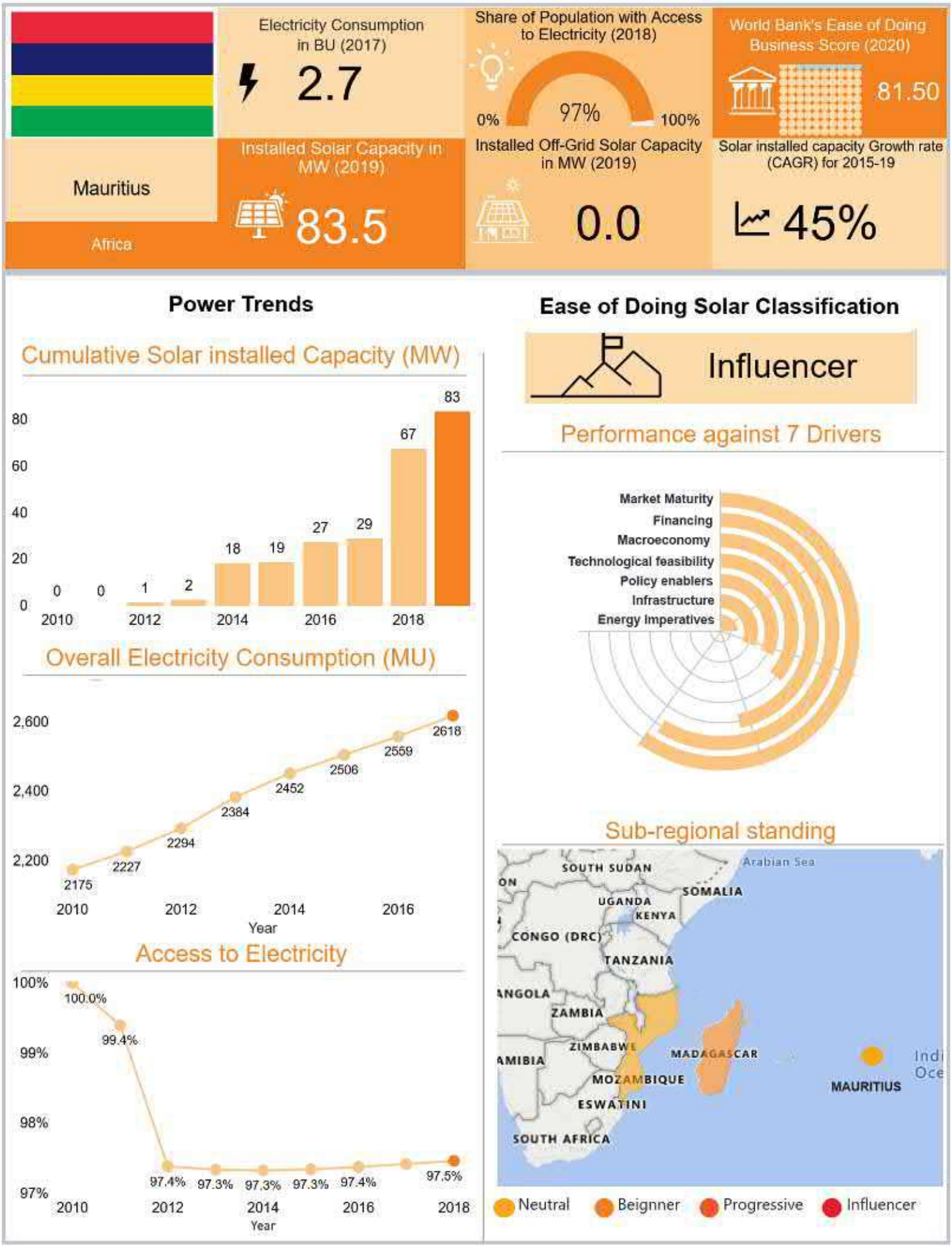
Installed Generation Capacity by Source

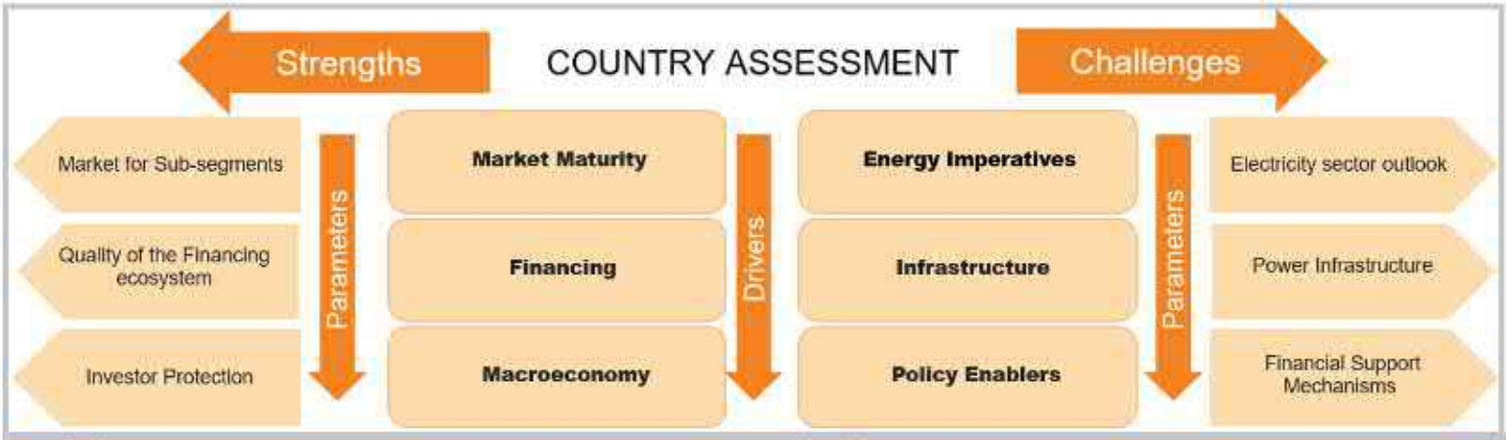


Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
Non-RE includes Coal, Natural Gas, Nuclear, Oil, etc.;
Other Solar includes Utility Scale Solar, Rooftop etc.;
Year: 2017.

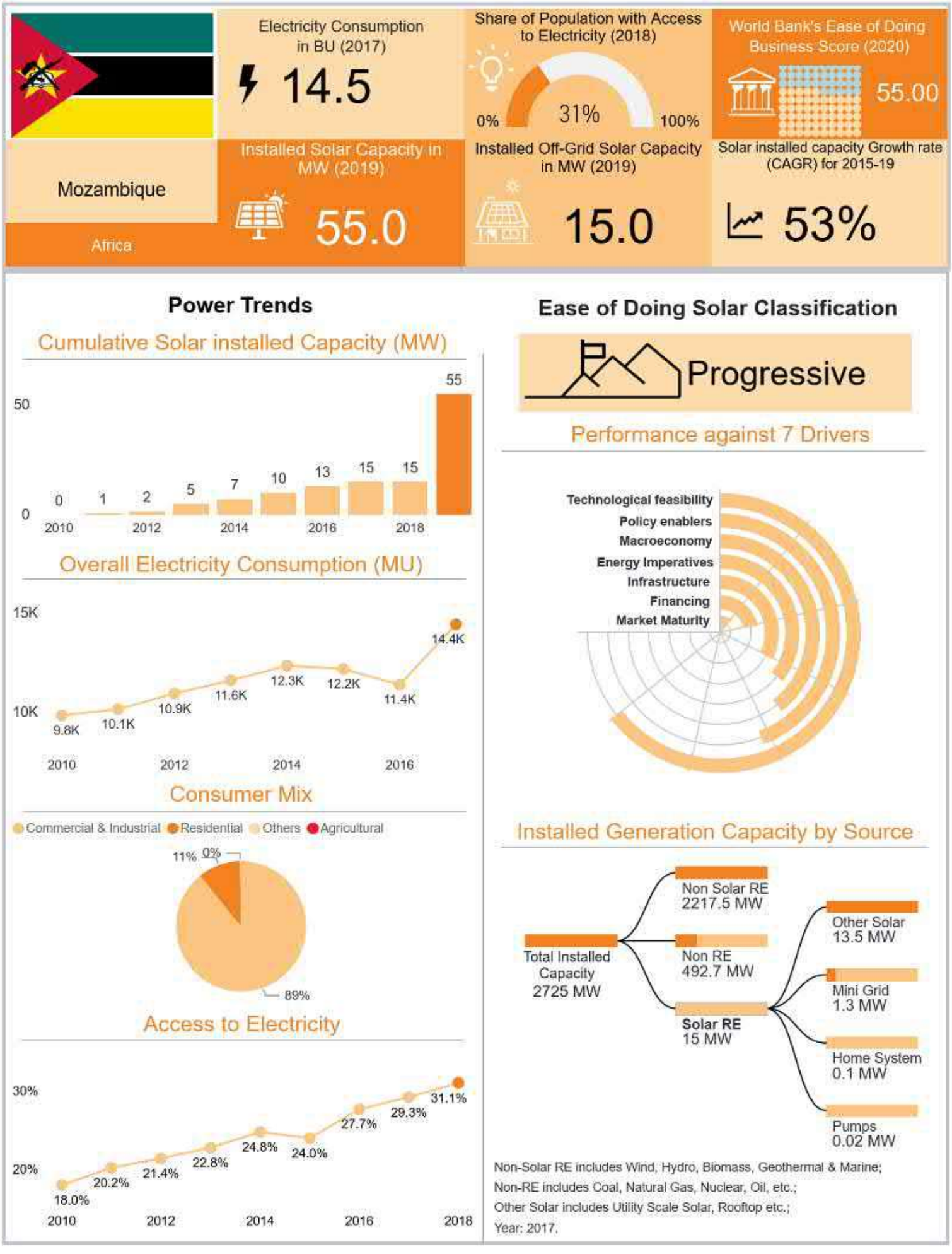


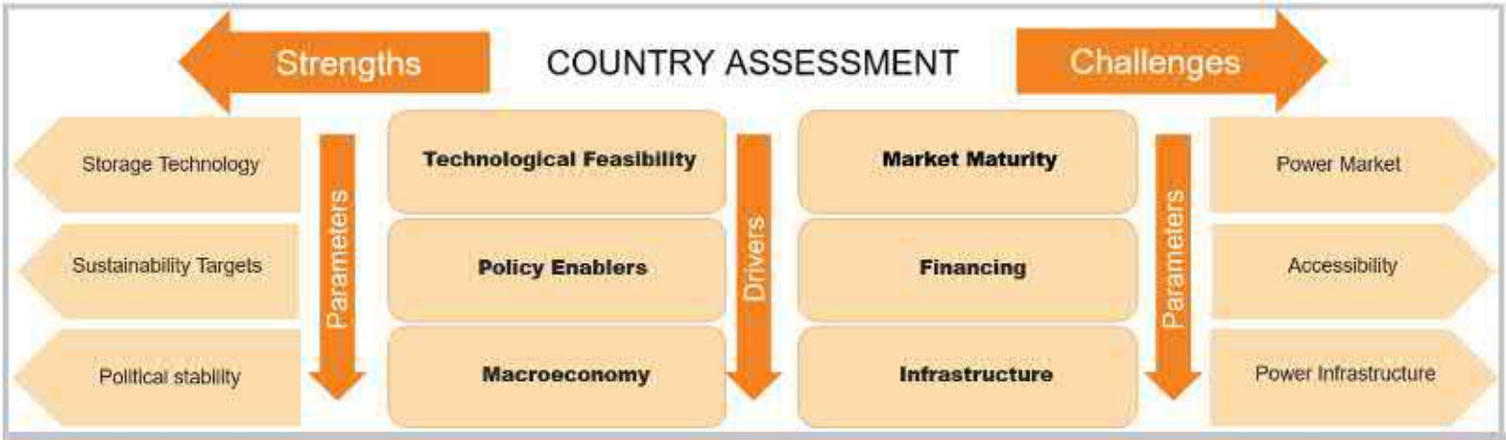
Drivers	Insights
Macro-economy	• Despite a negative GDP growth after 2012 crisis, Mali has shown signs of bouncing back with real GDP growth rate at 5% in 2019. It is further expected to grow at 4.9% in 2020 and 2021 by improving the political and security situation.[1] • GDP per capita (at current prices) 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)
0%
31%
100%
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)
50
0
0
1
2
5
7
10
13
15
15
55
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
15K
10K
9.8K
10.1K
10.9K
11.6K
12.3K
12.2K
11.4K
14.4K
2010
2012
2014
2016
Consumer Mix
Commercial & Industrial
Residential
Others
Agricultural
11%
0%
89%
Access to Electricity
30%
20%
18.0%
20.2%
21.4%
22.8%
24.8%
24.0%
27.7%
29.3%
31.1%
2010
2012
2014
2016
2018
Ease of Doing Solar Classification
Progressive
Performance against 7 Drivers
Technological feasibility
Policy enablers
Macroeconomy
Energy Imperatives
Infrastructure
Financing
Market Maturity
Installed Generation Capacity by Source
Total Installed Capacity 2725 MW
Non Solar RE 2217.5 MW
Non RE 492.7 MW
Solar RE 15 MW
Other Solar 13.5 MW
Mini Grid 1.3 MW
Home System 0.1 MW
Pumps 0.02 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	• 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)

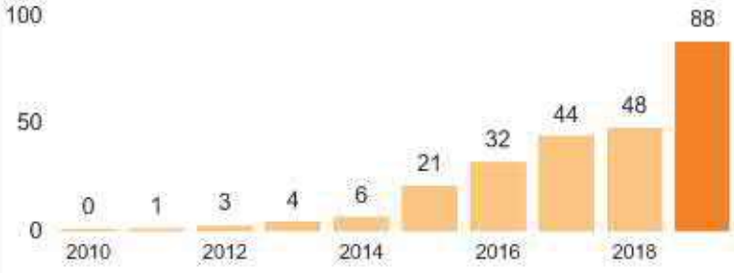
46.80

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

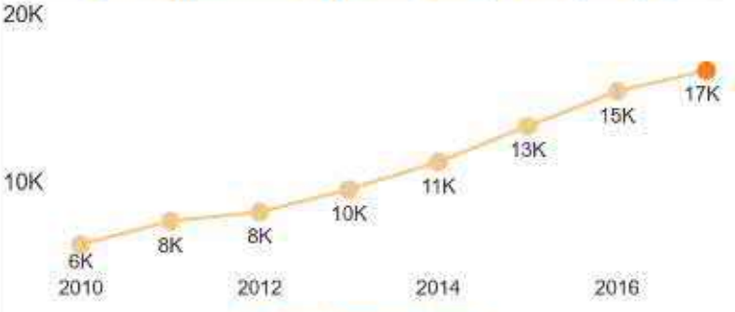
43%

Power Trends

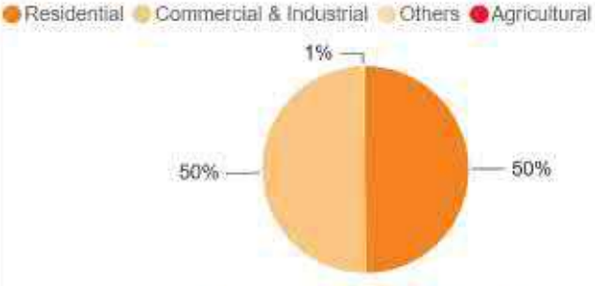
Cumulative Solar installed Capacity (MW)



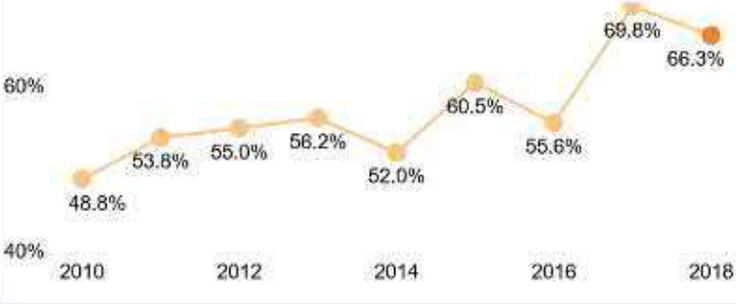
Overall Electricity Consumption (MU)



Consumer Mix



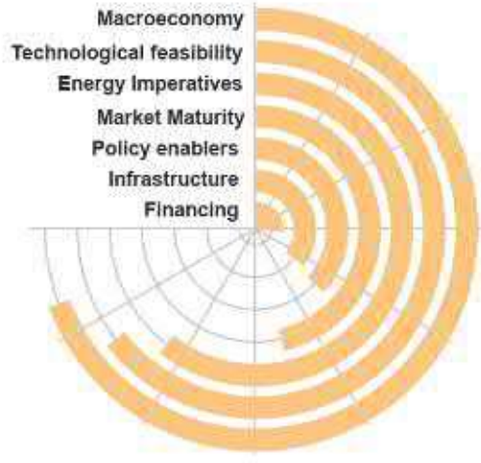
Access to Electricity



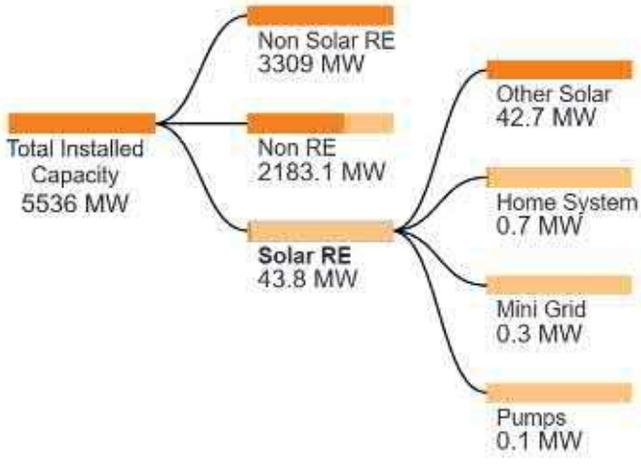
Ease of Doing Solar Classification

Potential

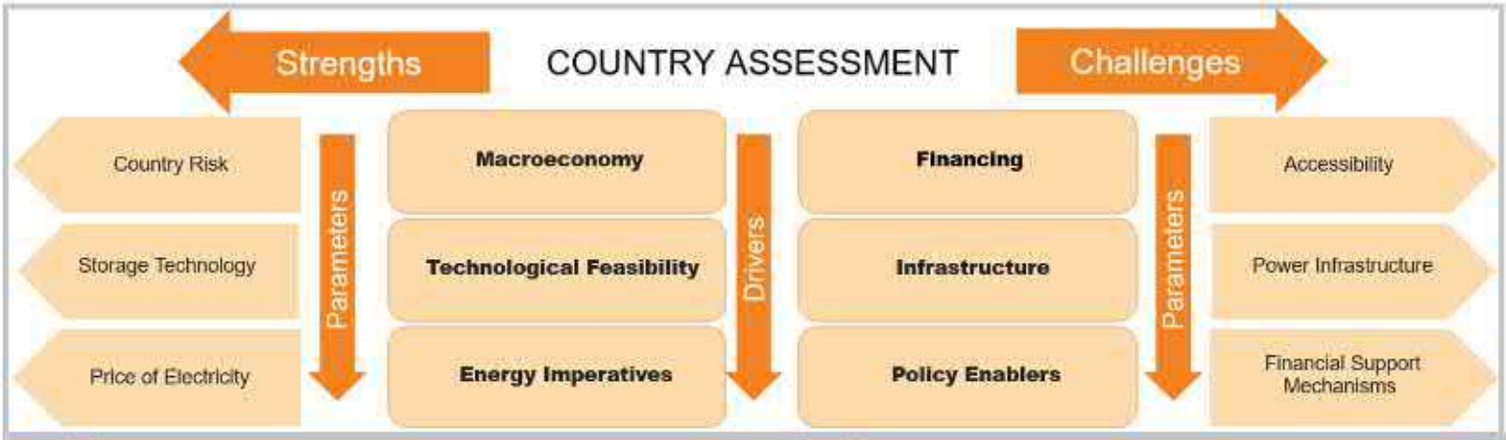
Performance against 7 Drivers



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
Installed Solar Capacity in MW (2019)
135.0
Share of Population with Access to Electricity (2018)
0%
54%
100%
Installed Off-Grid Solar Capacity in MW (2019)
22.0
World Bank's Ease of Doing Business Score (2020)
61.40
Solar installed capacity Growth rate (CAGR) for 2015-19
59%
Power Trends
Cumulative Solar installed Capacity (MW)
4
7
11
15
16
21
36
70
88
135
2010
2012
2014
2016
2018
Overall Electricity Consumption (MU)
3354
3467
3635
3772
3747
3782
3909
4057
Access to Electricity
44.4%
42.3%
46.5%
47.4%
48.7%
51.6%
49.7%
52.5%
53.9%
Ease of Doing Solar Classification
Influencer
Performance against 7 Drivers
Technological feasibility
Macroeconomy
Financing
Policy enablers
Infrastructure
Energy Imperatives
Market Maturity
Installed Generation Capacity by Source
Total Installed Capacity 494 MW
Non Solar RE 352.4 MW
Non RE 71.7 MW
Solar RE 69.8 MW
Other Solar 68.2 MW
Pumps 1 MW
Mini Grid 0.5 MW
Home System 0.1 MW
Non-Solar RE includes Wind, Hydro, Biomass, Geothermal & Marine;
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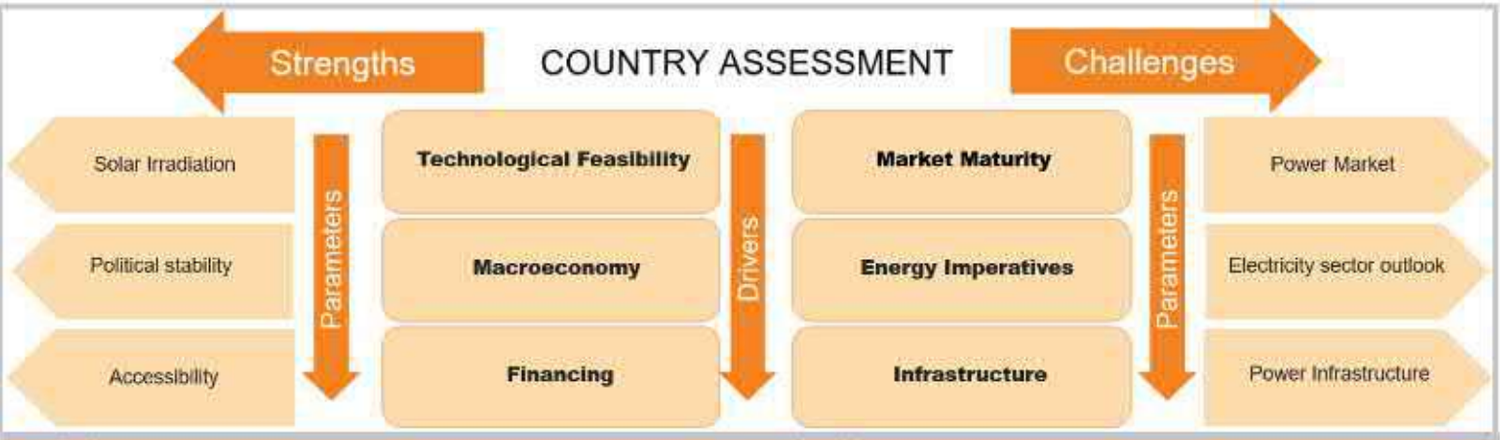
Year: 2017.



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]