

# Hydropower Annual Market Report

Annual Report 2020



**EKSPORTKREDITT**  
Export Credit Norway

*Report created in collaboration with*

Capgemini  invent

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**Foreword**

The following report was created by Capgemini Invent in collaboration with Norwegian Energy Partners (NORWEP) and Export Credit Norway. The report aims to provide the partners with a broad hydropower market overview for fourteen pre-defined target markets; Kenya, Malawi, Mozambique, Rwanda, South Africa, Tanzania, Uganda, Zambia, Indonesia, Philippines, Switzerland, Brazil, Chile, and Peru. Additionally, the report gives a brief summary of hydropower markets in nine other markets of interest: Angola, Balkan, China, Ghana, Laos, Malaysia, Myanmar, Nepal, and Vietnam.

The report starts with an overview of target markets with executive summaries, followed by target markets and other markets of interest organized by continent.

Important comments:

- The assessed markets were pre-selected based on results in a survey sent out to partners by NORWEP to determine which markets to include in this report. The markets that most partners selected were included.
- The installed and future capacities per target market is based a mapping of all existing and future hydropower plants. A complete overview of hydropower plants and projects can be found in the Hydropower Plants & Projects Overview, which accompanies this report. Overview found here: <https://www.norwep.com/Market-info/Hydropower>
- Additional information on selected priority projects can be found in the annual Hydropower Priority Projects. Priority projects were chosen by partners deemed to have most international activity, do not have a large market analysis unit, and who were actively involved in contributions to this report.

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# Global Hydropower Market

## Market Overview

According to the IEA's World Energy Outlook 2019, the world's total power generation capacity is around 7530 GW, where around 18% of this comes from hydropower generation:

Installed Power Generation Capacity Worldwide (GW)

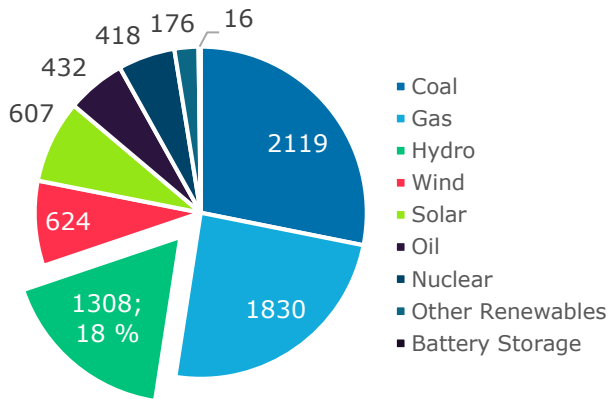


Figure 1 - Worldwide Installed Power Generation Capacity (GW) 01.01.2020

The fourteen target markets (Kenya, Malawi, Mozambique, Rwanda, South Africa, Tanzania, Uganda, Zambia, Indonesia, Philippines, Switzerland, Brazil, Chile, and Peru) have a combined installed hydropower capacity of around 163.5 GW, or 12% of the world's 1308 GW hydropower capacity:

Hydropower Installed Capacity Worldwide (GW)

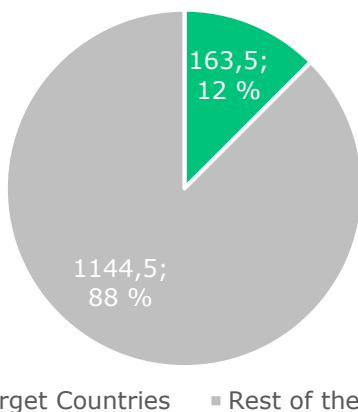


Figure 2 - Worldwide Hydropower Capacity (GW) 01.01.2020

In the short-term, as shown in Figure 3, the analysis shows that target markets will add almost 19 GW of hydropower capacity by 2024, but there is a potential of a further 124 GW to be added in the long-term. Note that much of long-term is represented by both potential sites, and planned projects.

Hydropower Capacity Forecast (MW)

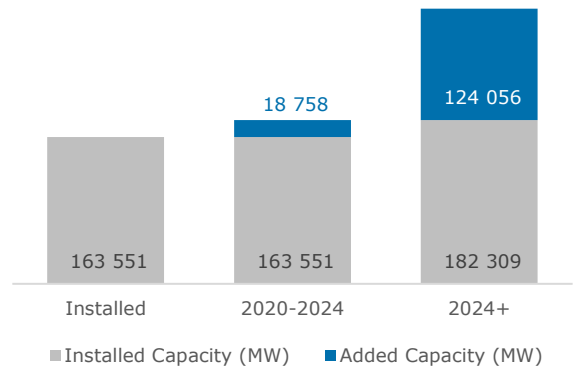


Figure 3 - Hydropower Capacity (MW) forecast 01.01.2020

The analysis of target markets shows that most of the installed and future capacity comes from hydropower plants with an installed capacity of more than 100 MW. However, there is a significant amount of small hydro development due to increased focus on environmental impact of development as well as a solution for off-grid electrification, as shown in Figure 4:

Distribution of Hydropower plant sizes

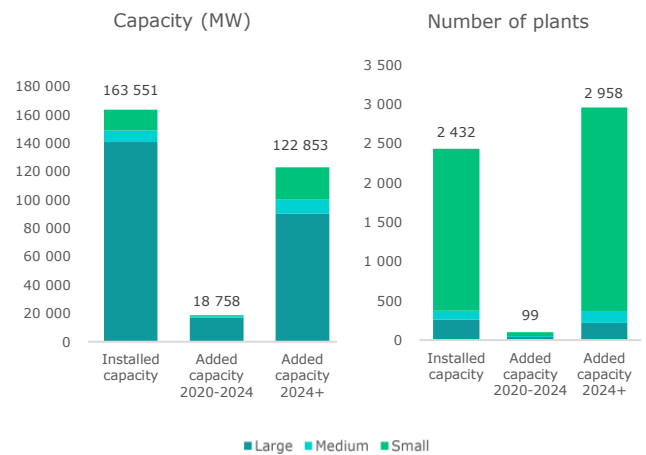
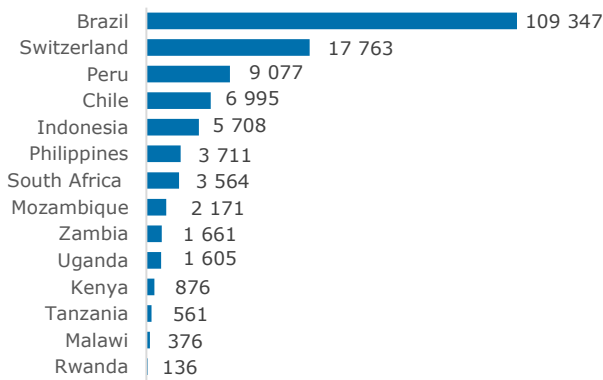


Figure 4 - Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Being the second largest hydropower nation in the world, Brazil is by far the largest market covered in this report with an installed capacity of approximately 110 GW, or around 63% of the South American capacity. Including the 9 GW and 7 GW from Peru and Chile, the target countries in South America represent around 73% of the continent's installed hydropower capacity. Figure 5 shows the current installed capacity in target markets:

*Installed Capacity in Target Markets (MW)*



*Potential Added Capacity in Target Markets after 2024 (MW)*

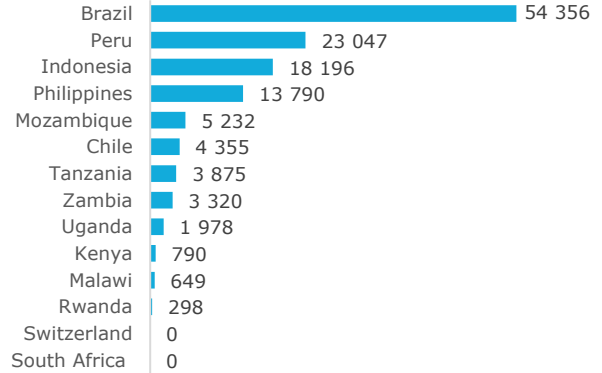


Figure 5 – Installed capacity in MW for target markets 01.01.2020

Figure 7 – Potential future added capacity (MW) in Target Markets after 2024

African countries covered in this report have the lowest installed capacity due to their relative hydropower immaturity and represent around 8% of the installed capacity in Africa. The Philippines and Indonesia only represent around 2% of the installed capacity in Asia mostly due to the Chinese dominance.

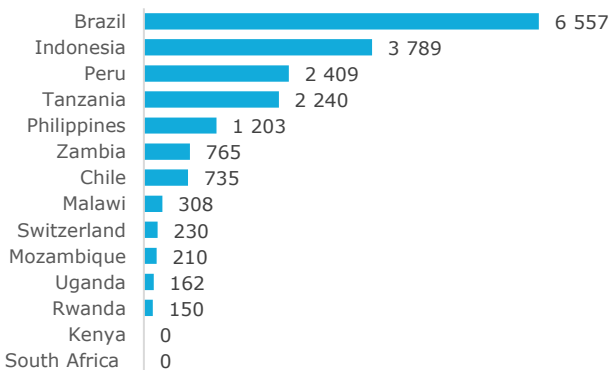
For the target markets, the analysis indicates that hydropower capacity will increase by around 11.5% in the short-term (2020 to 2024), increasing by approximately 19 GW. Various countries have performed comprehensive studies and mapped potential sites for hydropower development. Taking this into account, it is expected that over 120 GW of hydropower capacity could be installed in the coming decades.

In terms of future development, Brazil’s potential is still large, but the other South American markets Peru and Chile is lower compared to the South-East Asian and some African markets. Tanzania, Mozambique, and Zambia show great potential for further hydropower development in the coming decades. South Africa and Switzerland have no significant plans for further hydropower development.

**Significant Owners and Developers**

In general, international companies like Tractebel, Andritz Hydro, Stantec, Pöyry and Voith Hydro are present in most considered markets. On the financial side, the same is true for multilateral development banks like the World Bank and development funds such as the Green Climate Fund.

*Potential Added Capacity in Target Markets from 2020-2024 (MW)*



Additionally, some companies are more present in certain regions than others, therefore, a summary of active players in each region will follow.

*Active players in Africa*

SMEC, Pietrangeli and Multiconsult are active consulting firms in many of the eight African countries considered in this report. Chinese companies like SinoHydro and the Jiangxi Water & Hydropower Construction Company often are involved in the development of projects in the region.

Figure 6 – Potential future added capacity (MW) in target markets from 2020-2024

On the financial side, the Export Import Bank of China often invest in projects in these countries. Also, the African Development Bank represent a significant source of funding for the region.

*Active players in Asia*

In Indonesia and The Philippines, Chinese companies like POWERCHINA and China Gezhouba are particularly active. Also, on the financial side, Chinese banks are investing in hydropower projects in the region.



### Active players in South America

Enel Green Power is a major player in the South American market for renewables, including hydropower. Statkraft is also present in these markets.

### Overview of Project Portfolios in Target Markets

Within the fourteen target markets in this report, most countries do not have an annually updated database of ongoing or planned projects, published by the government. If a country has a published energy Masterplan, list of potential projects may be listed here, but annual updates are usually not made.

Country	Link	Link
Rwanda	Partly (list in Masterplan)	<a href="#">Link</a>
Kenya	Partly (list in Masterplan)	<a href="#">Link</a>
Uganda	Partly (list in Masterplan)	<a href="#">Link</a>
Zambia	Partly (Small hydro 2018)	<a href="#">Link</a>
Indonesia	Partly (list in Masterplan)	<a href="#">Link</a>
Philippines	Yes	<a href="#">Link</a>
Switzerland	Yes	<a href="#">Link</a>
Brazil	Yes (Portuguese)	<a href="#">Link</a>
Chile	Yes (Spanish)	<a href="#">Link</a>
Peru	Yes (Spanish)	<a href="#">Link</a>

For target countries not listed in the table below, no published list of plants and projects has been identified. See accompanied Hydropower Plants & Project Overview for plant/project information.

### Executive Summary of Target Markets

#### Kenya

Overall, a lack of planned hydropower projects makes Kenya a less attractive market for investment. In the short term, no new capacity will be added to the current 876 MW of installed hydropower capacity. In the long term, Kenya has the potential to add a further 790 MW of hydropower capacity.

Of the potential projects, two have been identified as especially interesting, including the 700 MW High Grand Falls Dam. When financing a potential project, the existence of standardized PPAs helps to mitigate the non-investment sovereign credit rating of the country. Also, several investment incentives exist, including feed-in tariffs, tax reductions and the possibility of attaining public funding. However, the prominent role the public company KenGen plays in the market along with the medium to high risk classification of investing in the country could limit the opportunities for foreign investors, who might consider the corruption risk to be too high. Still, the public promotion of renewables is

intriguing and some key takeaways from the country are:

- Standardized PPAs
- Public company prominent in market
- High corruption risk
- Non-investment grade credit rating

#### Malawi

Overall, Malawi's ambitious plans to expand their hydropower capacity makes the country attractive for investment. In the short term, 308 MW of capacity will be added to the current 376 MW of installed hydropower capacity. In the long term, Malawi has the potential to add a further 649 MW of hydropower capacity.

Of the potential projects, six have been identified as especially interesting, including 308 MW Mpatamang project. When financing a potential project, the existence of standardized PPAs helps to mitigate the non-investment sovereign credit rating of the country. Also, several investment incentives exist, including feed-in tariffs, tax reductions and the possibility of attaining public funding. However, the medium to high risk of investing in the country could limit the opportunities for foreign investors, who might consider the corruption risk to be too high. Some key takeaways are:

- Standardized PPAs
- Non-investment grade credit rating
- High corruption risk

#### Mozambique

Overall, Mozambique's political and economic issues make country less attractive for investments. In the short term, 210 MW of capacity will be added to the current 2171 MW of installed hydropower capacity. In the long term, Mozambique has the potential to add a further 5232 MW of hydropower capacity.

Of the potential projects, two have been identified as especially interesting, including the 1500 MW Mphanda Nkuwa project. When financing a potential project, the existence of standardized PPAs helps to mitigate the non-investment sovereign credit rating of the country. Also, several investment incentives exist, including feed-in tariffs, tax reductions and the possibility of attaining public funding. However, the high risk of investing in the country could limit the opportunities for foreign investors. Some key takeaways are:

- PPAs rewarded through tenders
- Non-investment grade credit rating

- High corruption risk

### Rwanda

Overall, Rwanda's ambitious promotion of renewables with emphasis on hydro power makes the country attractive for investment. In the short term, 150 MW of capacity will be added to the current 136 MW of installed hydropower capacity, marking significant growth. In the long term, Rwanda has the potential to add a further 298 MW of hydropower capacity.

Of the potential projects, four have been identified as especially interesting, including the 80 MW Rusomo project. Also, several investment incentives exist, including feed-in tariffs, tax reductions, tendering of contracts and the possibility of attaining public funding. A lack of standardized PPAs combined with a non-investment grade on sovereign credit makes the financial aspect investment complicated. Some key takeaways from the country are:

- PPAs not standardized
- Tenders to win contracts
- Low corruption risk
- Non-investment grade credit rating

### South Africa

South Africa has a well-developed financial, legal, and energy sector. Economic growth has decelerated in recent years, but the country still has the second largest economy in Africa, after Nigeria. With a current capacity of approximately 3500 MW, most of South Africa's feasible hydro power potential has already been exploited. Of the technical feasible potential, about 90 per cent has been developed so far (including pumped-storage) and close to all feasible large-scale hydro potential has now been tapped. This makes the country less attractive for hydropower investment. There are no indications that hydropower capacity will significantly expand in South Africa in the short-term, with no confirmed or planned projects. Nevertheless, future potential for small hydropower plants (<10 MW) does exist. Areas such as The Eastern Cape and KwaZulu-Natal are suitable locations for small hydropower plants where the plants can either be standalone or in a hybrid combination with other renewable energy sources. Some key takeaways from the country are:

- No planned hydropower projects
- Standardized PPAs
- Overall medium risk with investment grade credit rating

### Tanzania

Overall, Tanzania's ambitious promotion of renewables with emphasis on hydro power makes the country attractive for investment. In the short term, 2240 MW of capacity will be added to the current 561 MW of installed hydropower capacity, marking significant growth. In the long term, Tanzania has the potential to add a further 3275 MW of hydropower capacity.

Of the potential projects, four have been identified as especially interesting, including the 300 MW Kinonge project. When financing a potential project, the existence of standardized PPAs helps to mitigate the non-investment sovereign credit rating of the country. Also, several investment incentives exist, including feed-in tariffs and the possibility of attaining public funding. However, the medium to high risk of investing in the country could limit the opportunities for foreign investors. Some key takeaways from the country are:

- Standardized PPAs
- Relatively high political stability for the region
- Non-investment grade on sovereign debt

### Uganda

Overall, Uganda's promotion of renewables with emphasis on hydro power makes the country attractive for investment. In the short term, 162 MW of capacity will be added to the current 1605 MW of installed capacity. In the long term, Uganda has the potential to add a further 1978 MW of hydropower capacity.

Of the potential projects, three have been identified as especially interesting, including the 840 MW Ayogo project. When financing a potential project, the existence of standardized PPAs helps to mitigate the non-investment sovereign credit rating of the country. Also, several investment incentives exist, including feed-in tariffs, tax reductions and the possibility of attaining public funding. However, the high risk of investing in the country could limit the opportunities for foreign investors who might be concerned by the corruption risk. Some key takeaways from the country are:

- Standardized PPAs
- Political stability
- Non-investment grade on sovereign debt

## Zambia

Today, hydropower accounts for a large percent of Zambia's energy mix and exploiting the untapped potential for hydropower remains a priority for the government. In the short term, over 700 MW of capacity will be added to the current 1661 MW of installed capacity. In the long term, Zambia has the potential to add a further 3320 MW of hydropower capacity.

From these potential projects, seven have been identified as especially interesting, including the 1200 MW Batoka project. When financing a potential project, the existence of standardized PPAs helps to mitigate the non-investment sovereign credit rating of the country. Also, several investment incentives exist, including feed-in tariffs, tax reductions and the possibility of attaining public funding. However, the medium to high risk of investing in the country could limit the opportunities for foreign investors. Some key takeaways for Zambia are:

- Ambitious government goals for electricity access and hydropower development
- Progressing regulatory environment
- Low financing availability
- High corruption risk

## Indonesia

Overall, Indonesia's ambitious promotion of renewables with emphasis on hydro power makes the country attractive for investment. In short term, the currently installed capacity of 5708 MW is planned to be expanded by 3789 MW, and in the long term, the country has the potential to install a further 18 196 MW of capacity.

From these plans, eight projects have been identified as especially interesting, including the 9000 MW Kayan river project. The lower to medium sovereign credit rating and the presence of international commercial banks like Credit Suisse and Deutsche Bank makes the financial aspect of project investments less complicated. A new regulation, improving the structure of the standardized PPA frequently used in the country, reduces the risk of a potential project. Also, strong investment incentives offered by the state are supposed to attract foreign investors. Finally, the risk is viewed as medium to low with corruption being the most challenging factor when investing in the country. Some key takeaways are:

- Public company major player in the market
- Standardized PPAs

- Political stability
- High corruption risk

## The Philippines

Overall, The Philippines's ambitious promotion of renewables with emphasis on hydro power makes the country attractive for investment. In the short term the plan is to add 1200 MW of hydropower capacity through ten projects, while in the longer term, a further 13790 MW may potentially be added. With the current capacity at around 3700 MW, this would mark a significant growth in hydropower.

A low to medium sovereign credit rating makes financing of projects more difficult, but possible through local or international commercial banks. Several incentives exist for investments in renewables, including tax exemptions and a feed in tariff. The risk of investing in hydropower in the Philippines is assessed to range from medium to high, mostly because of the recent political turbulence and the high corruption risk. Some key takeaways are:

- A regulated market makes the use of PPAs less frequent
- Over 300 sites where small hydro potentially can be developed
- High corruption risk

## Switzerland

Overall, Switzerland's plan to reduce energy generation from nuclear sources and increase generation from renewable sources makes the country attractive, although new hydropower projects will focus on expanding, optimizing or renovating existing plants. Because of the maturity of the market, PPAs are used less frequently and few investment incentives exist. The decentralized management of water resources may complicate hydropower investments, on the other hand, the excellent credit worthiness, political stability and low risk makes investments in the country safe and attractive. Some key takeaways are:

- Focus on expansion, renovation and optimization of existing hydropower plants
- Few new hydropower plants planned in the short or long term
- Low risk investments

## Brazil

Overall, Because of the 110 GW installed capacity of hydropower and the 50 GW potential yet to be exploited, the high growth rates of wind, solar and bioenergy in Brazil does not make the country less



attractive for investments in hydropower. Additionally, the transparency of the market through public auctions and tenders combined with standardized PPAs makes it easier for foreign investors to operate in the market. Still, the non-investment grade on sovereign credit makes financing of projects more complicated. In terms of risk, the market is viewed as medium to high because of the recent political turbulence and the presence of corruption in the country. Some takeaways are:

- Several large plants with installed capacity over 1 GW
- Over 1700 sites identified for future hydropower development
- Public auctions, tenders and standardized PPAs
- Corruption risk

## Peru

Peru aims to become self-sufficient in energy and to meet the electricity demand in a reliable and efficient way. Over 130 hydropower plants are currently in operation with a total capacity of about 9 GW and the development of new hydropower plants are expected to continue with 2 GW in the short term. Standardized PPAs, obtained through auctions, are in place and the Peruvian Ministry of Energy has identified several locations feasible for hydropower development. Peru offers a favorable modern legal framework for foreign investment, where foreign investors receive the same treatment as local investors. Regarding risk for foreign investors, Peru can be viewed as a medium risk country. Specifically, Peru scores well on ease of doing business and financial availability (medium investment grade), but corruption represents a risk for foreign investors.

- Standardized PPAs, obtained through auctions
- Electricity generation from natural gas stations is growing
- A vast amount of locations identified for hydropower development
- Medium investment grade on sovereign credit

## Chile

Chile has 7000 MW installed capacity and over 4,000 MW of untapped potential remaining of which 700 MW is planned in the short term. Combined with growth in power demand in the years to come it makes Chile an attractive country for hydropower development. Furthermore, the country is a strong investment destination in South America with low risk and high financial availability. Some key takeaways are:

- Low risk of corruption and overall high political stability
- Upper medium investment grade (A+/A1)
- Environmental issues make hydropower development challenging
- Growth in other energy sources

### Summary of Market Risk Assessments

For each target market, four risks classification have been used to classify the market's overall risk:

1. Ease of Doing Business
2. Political Stability
3. Financial Availability
4. Risk of Corruption

Eleven of the markets have a risk level greater than Medium Risk due to a general high level of financial risk, high risk of corruption, and somewhat unstable short- and long-term political stability. In general, the markets score medium to good on ease of doing business and is not the main driver for the high risk received by many markets, especially in Africa.

#### Markets with High Risk

- Mozambique
- Uganda

#### Markets with Medium/High Risk

- Kenya
- Malawi
- Tanzania
- Zambia
- Philippines
- Brazil
- Peru





















































































#### Markets with Medium & Medium/Low Risk

- Rwanda
- South Africa
- Indonesia

#### Markets with Medium Low Risk

- Chile
- Switzerland

On the next page is an overview of the risk scores for each country. The circles represent increase level of risk, meaning the fuller it is, the higher the risk level is. The color indicates which percentile the country scores compared to rest of the world (1st quartile = Green, 2nd quartile = Yellow, 3rd quartile = Orange, 4th quartile = Red). More details around risks can be found in the detailed risk assessment per market.

		Overall Risk	Ease of Doing Business (of 100)	Political Stability (of 100)	Financial (of 7)	Risk of Corruption (of 100)
	<b>Kenya</b>	Medium/High Risk 	 71	 55.9	 6	 27
	<b>Malawi</b>	Medium/High Risk 	 60.4	 59	 7	 32
	<b>Mozambique</b>	High Risk 	 54.6	 52.2	 7	 23
	<b>Rwanda</b>	Medium Risk 	 75.4	 55.7	 7	 56
	<b>South Africa</b>	Medium Risk 	 66.7	 63	 4	 43
	<b>Tanzania</b>	Medium/High Risk 	 54.3	 64.1	 6	 36
	<b>Uganda</b>	High Risk 	 58.4	 56.1	 6	 26
	<b>Zambia</b>	Medium/High Risk 	 65.7	 53	 7	 35
	<b>Indonesia</b>	Medium/Low Risk 	 68.2	 66.9	 3	 38
	<b>Philippines</b>	Medium/High Risk 	 60.9	 63.6	 3	 36
	<b>Switzerland</b>	Low Risk 	 76.6	 92	 0	 85
	<b>Brazil</b>	Medium/High Risk 	 59	 60.9	 5	 35
	<b>Chile</b>	Low Risk 	 72.3	 79	 0	 67
	<b>Peru</b>	Medium/High Risk 	 68.3	 60.7	 3	 35

Risk overview target markets. The circles represent increase level of risk, meaning the fuller it is, the higher the risk level is. The color indicates which percentile the country scores compared to rest of the world (1st quartile = Green, 2nd quartile = Yellow, 3rd quartile = Orange, 4th quartile = Red).

## Target Markets

### AFRICA



KENYA

### Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	10	8% annually
Population in 2018 [Million]	51.1	1% annually
GDP per capita in 2018 [USD]	1865	5% annually
Share of Hydro in power mix [%]	40	No target
Power access in 2018 [%]	75	100% by 2022

Today, hydroelectric power in Kenya accounts for a large share of the country's energy mix. However, a shift towards alternative sources such as geothermal energy is ongoing, and the importance of hydropower is expected to decrease over the years. The current power demand in Kenya is expected to grow by 8% until country achieves 100% power access for its population. Also, a future growth in GDP is anticipated.

#### Hydropower Capacity Forecast

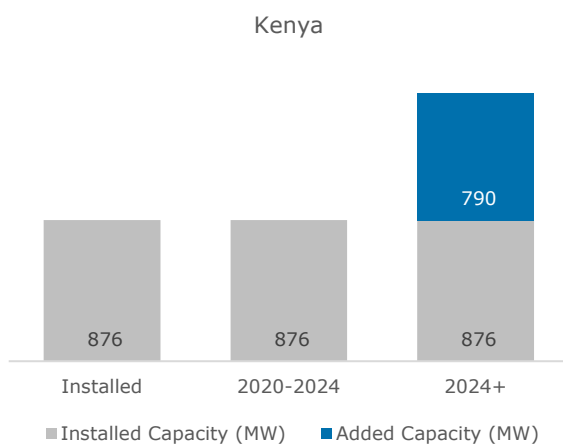


Figure 8 – Hydropower Capacity forecast 01.01.2020

In the next few years, there is no additional capacity planned in Kenya. After 2024, the total capacity is estimated to double. This is mainly due to the implementation of the 700 MW High Grand Falls (HGF) Dam which is expected to be operational by 2031.

#### Distribution of Hydropower plant sizes

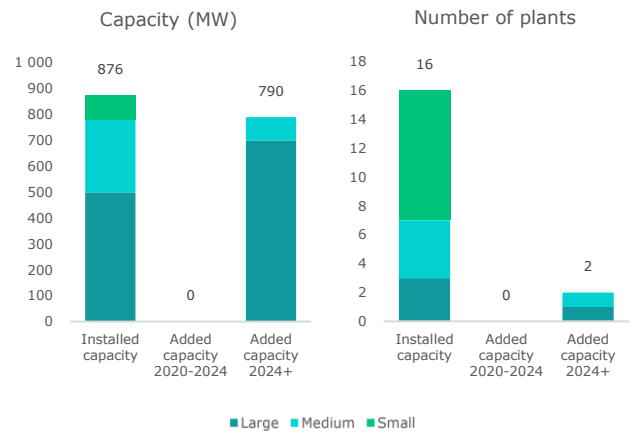


Figure 9 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

There are several small hydropower plants currently in operation. Still, most of the planned capacity comes from medium and large sized plants.

#### Priority projects

Two hydropower projects in Kenya have been identified as priority projects:

- The 700 MW High Grand Falls Dam is in a late planning phase and is expected to be operational by 2031. The project is contracted by GBM Engineering. Phase one of the dam project is expected to be operational by 2031 with a capacity of 495 MW. The second phase with a capacity of 198 MW will be finished a year later.
- The 90 MW Karura Dam project is in an early planning phase and is expected to be operational by 2025

#### Electricity grid considerations

Kenya's aging transmission and distribution networks is causing around 16% system loss per year. In order to combat this, Kenya Electricity Transmission Company (KETRACO) are in the process of doubling the transmission network capacity, including three major regional interconnectors to Ethiopia, Uganda, and Tanzania. Furthermore, KETRACO is planning to expand and strengthen the grid with a further 4200 km of lines while Kenya Power is building in redundancies, reducing losses and adding smart technologies to further strengthen the distribution grid.

More specifically, Kenya, together with Ethiopia, is in the final stages of completing the 500 kV interconnector which will be able to feed Kenya with up to 2000 MW of renewable energy from Ethiopia. This electricity highway will also continue through internal 400 kV Loiyangalani Suswa transmission line, and the 400 kV interconnection project between Kenya and Tanzania. Ethiopia has immense

hydropower potential with high growth from large projects expected in coming years. The country will play an increasingly important role in providing low-cost, renewable energy in the East African Power Pool and the Southern African Power Pool.

Overall, the state of the electricity grid is not expected to cause significant issues for hydropower expansion in Kenya.

## Market structure

### *Governing bodies and organizations*

- Ministry of Energy and Petroleum: Oversees policy and strategy development for the sector
- The Energy and Petroleum Regulatory Authority (EPRA): Drafts and carries out the licensing process for independent power producers looking to connect power plants to the national grid
- The Rural Electrification Authority (REA): Implements the Rural Electrification Program, which involves planning and commissioning power plants in off-grid areas.
- Kenya Electricity Generating Company (KenGen): Largest power producer and operates hydro-, geothermal, and gas- and diesel-fired power plants. KenGen is 70% state-owned, with the remaining 30% held by private investors.
- Kenya Power and Lighting Company (KPLC) Ltd: The main off-taker in the power sector. The publicly listed utility signs purchase power agreements (PPAs) with KenGen and all independent power producers looking to inject electricity into the national grid
- Kenya Electricity Transmission Company (KETRACO): A Government owned transmission company. Plans, designs, builds, operates and maintains all new transmission lines above 132 kV. Existing lines are operated and maintained by Kenya Power

### *Active private players*

Nippon Koei Co Ltd, Prosjekt Service Peters GmbH, SMEC Kenya, Heavy Engineering LTD and Mannvit Consulting Engineers deliver consulting services for hydropower projects. Some EPC contractors include Farab Co and Jiangxi Water and Hydropower Construction Kenya. Virunga Power and Kleen Hydro Limited are among the developers active in the country. ENEXIO Water Technologies, Chongqing Lisong Electromechanical Equipment and Wasserkraft Volk AG are examples of turbine suppliers. On the financial side, some private investors such as IberAfrica, Tsavo and Or-Power produce and sell electricity to KPLC. Additionally, Norfund has been investing in hydropower in Kenya. Also, several development funds, like the Green Climate Fund, the World Bank and the development

bank of several countries, are investing in renewable energy in Kenya.

## Governmental Requirements and Regulations

### *Relevant laws and regulations*

Some relevant laws and regulations are:

- The Energy Act: Outlines national policies and strategies for short- and long-term energy development. The broad objective of the new energy policy is to ensure the adequate, high-quality, cost-effective and affordable supply of energy while also protecting the environment. In relation to renewable energy, the Energy Act of 2019 was enacted to consolidate the laws relating to energy and promote investment in and utilization of renewable energy
- The Least Cost Power Development Plan: Kenya's generation and transmission system planning are based on a 20 year, rolling Least Cost Power Development Plan, which is updated every year. The plan involves a prioritizing resource that enable the power sector to grow as efficiently as possible

### *Power Purchasing Agreements*

An investor in Kenya can only sell energy to Kenya Power. The contract with Kenya Power is usually a PPA, which stipulates the price in USD, technical specifications, risk allocation, rights of obligations of the parties, etc. The EPRA are responsible for the contracts. The validity is 20 years, and the contracts are standardized, but negotiable. The ERPA states that the maximum processing time is 180 days waiting time and 90 days for negotiations. Requirements for investor inputs includes a land lease agreement, project proposal, financing plan and feasibility study. The Government rarely provides guarantees and prefers payments in local currency.

### *Investment considerations*

Several incentives exist for hydropower investments in Kenya:

*Feed-in tariff/premium payment:* Tariffs last for a period of 20 years. For small hydro plants (up to 10 MW), the rates are standardized

*Tax incentives:* Under the VAT Act 2013 and VAT (Amendment) Act 2014, Kenya offers an exemption from value added tax (VAT) and import duties for supplies imported or bought for the construction of a power generating plant. The power generating plant must aim to supply electricity to the national grid and the company must have an exploration license. Specific components related to hydropower such as

hydraulic turbines and water wheels are free from import duty but pay 16% VAT

*Energy production payment:* Exists for hydropower in some cases, meaning that in Kenya, an IPP can be paid for the electricity a hydropower station produces, instead of the electricity the station transmits into the grid

*Public investment, loans or grants:* Kenya's National Climate Fund will be the key mechanism for raising and allocating funding from development partners to go towards climate change activities

### Risk Assessment

The key development challenges of Kenya include poverty, inequality, climate change, continued weak private sector investment and the vulnerability of the economy to internal and external shocks. Investors should be aware of potential financial risk and corruption risk present in the country.

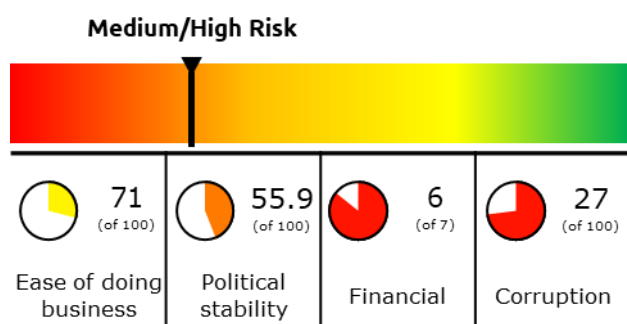


Figure 10 – Risk overview for Kenya

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Kenya can be viewed as a medium to high risk market for foreign investors. In the following, these risks will be explained more thoroughly.

#### Ease of doing business

The World Bank ease of doing business score for Kenya is 71 of 100, which reflects a relatively conducive regulatory environment and gives them a global rank of 56 out of 190 countries. Examples of factors influencing the score positively are getting electricity and paying taxes. Examples of factors influencing the score negatively are contracting with the government, registering property and resolving insolvency.

#### Political stability

Kenya's score on the Marsh's Political Risk Index 2019 is 55.9. After a period of political uncertainty in 2017 and a period of lower growth in the country, the GDP growth in the country increased to the long-term growth rate at approximately 6%. In the end of

2017, Kenyan President Uhuru Kenyatta was sworn in for a second and final five-year term. The political uncertainty has its roots from electoral credibility where the Supreme Court invalidated the original election in 2017.

#### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Kenya is classified in OECD country group 6. The score can be partly explained by a high and rising government debt, as well as a decrease in the government's revenue.

Kenya is classified as non-investment grade (B+) on sovereign credit ratings. The score can be explained by high and rising government debt, as well as decrease in government revenue. Other credit challenges include low institutional strength.

This rating will likely make it challenging to secure financing through commercial banks, especially international banks. Multilateral financing or export credit agencies may be more suitable.

#### Corruption risk

The Corruption Perception Index (CPI) for Kenya is 27 of 100 a decline from 28 points scored in 2017. The country ranks number 144 out of 180 countries assessed and scores below the average of 32 in the Sub-Saharan region. According to Transparency International, Kenya has anti-corruption initiatives in place, but they don't seem to be very effective. Integrity risks for businesses doing business in Kenya are high and stem from a long history of corruption and mismanagement in politics and government institutions. The level of risk varies significantly by sector and the extent of engagement by businesses with the government and state-owned enterprises.





MALAWI

Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	1.38	9% annually
Population in 2018 [Million]	19	3.5% annually
GDP per capita in 2018 [USD]	349	3% annually
Share of Hydro in power mix [%]	73%	No target
Power access in 2018 [%]	14.6	30% by 2030

Currently, 88% of Malawi’s electricity supply comes from hydropower. Of the 376 MW of installed hydropower capacity, 362 MW is installed on the Shire River, which is Malawi’s main source for renewable electrical power. The largest plant in the country is Nkula A (136 MW) and the Kapichira plant (128 MW). There is one mini hydro plant in operation in the north of the country, the 4.5 MW Wovwe plant, which on average generates about 8.5 MW. Finally, the power demand in Malawi is expected to grow by 9% until the country achieves 30% electricity access for its population by 2030.

Malawi’s power sector is one of the most constrained in sub-Saharan Africa – less than 10% of the population of 18 million is connected to the electrical grid. For the 80% of the people living in rural areas, access to electricity is less than 1%.

Plans are also underway to connect to Zambia and Tanzania at 400 kV. This will give Malawi alternative interconnection routes to both the South African Power Pool (SAPP) and the Eastern Africa Power Pool (EAPP), thereby offering investors in Malawi access to regional power markets.

Hydropower Capacity Forecast

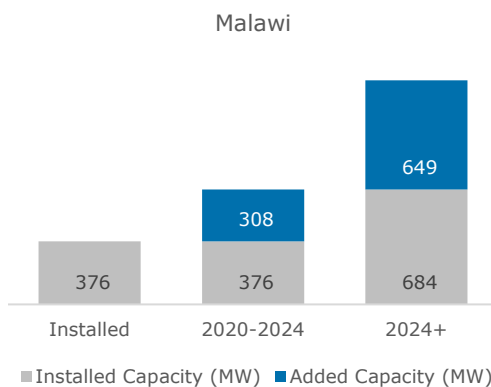


Figure 11 – Hydropower Capacity forecast 01.01.2020

As shown in Figure 11, Malawi has ambitious plans to make electricity more accessible for its population. A part of this plan is doubling the hydropower

capacity by 2024, with the development of the 200 MW Kholombidzo Hydroelectric Power Station as the main contribution to the capacity increase. After 2024, the capacity is expected to increase further with the 308 MW Mpatamanga Power Station expected to be operational by 2025.

Distribution of Hydropower plant sizes

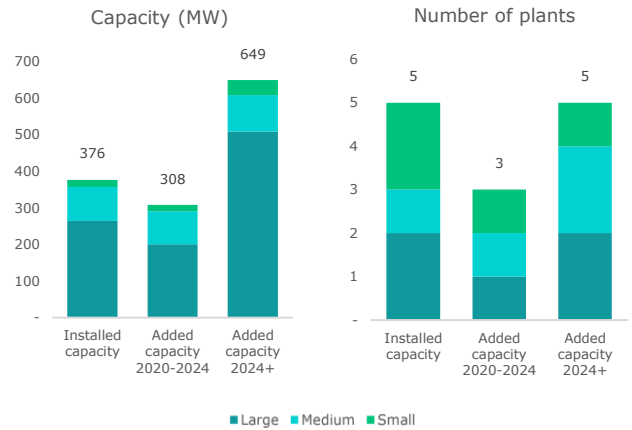


Figure 12 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Figure 11 shows that both the installed hydropower capacity and the planned capacity are mostly comprised of large and medium sized power plants.

Priority projects

Six hydropower projects in Malawi have been identified as priority projects:

- The 308 MW Mpatamang Power Station is in an early planning phase and is expected to be operational by 2025. A tender for one or more EPC contractors is expected to be held in 2020
- The 90 MW Songwe Power Station is in an early planning phase and is expected to be operational by 2022
- The 50 MW Chasombo Hydropower plant is in an early planning phase and construction is expected to begin in 2020
- The 50 MW Chizuma plant is in a late planning phase and construction is expected to start in 2020
- The 41 MW Mbongozi project is under consideration for development of two hydropower plants on the Bua river
- The 18 MW Tedzani IV project is under construction and expected to be operational by 2021. The contractor is Japan’s Mitsubishi Corporation

Electricity grid considerations

Efforts to improve the existing and future power supply in Malawi are being funded by the World Bank and USAID. This includes several grid expansion projects to increase robustness in the transmission

and distribution grids. Throughput capacity has more than doubled due to introduction of high voltage substations, a new 400 kV transmission line, and further upgrades to the distribution network. In order to further engage in bilateral and regional power trade through the Southern African Power Pool (SAPP), the World Bank and EU are also supporting Malawi and Mozambique in the construction of a 400 kV interconnection transmission line, grid connections, and associated infrastructure improvements. This project will mainly be for electricity imports from Mozambique to Malawi and is expected to be completed in 2022. Moreover, there are plans to construction 400 kV interconnections between Malawi to Zambia and Tanzania, also giving access to Eastern Africa Power Pool (EAPP).

Although Malawi is making strides to improve transmission and distribution networks, it must continue to upgrade the grid to enable the country's ambitious electrification targets.

### Market structure

The Ministry of Irrigation and Water Development oversees Malawi's water resources. The Ministry of Natural Resources, Energy and Mining oversees energy, and ESCOM is a parastatal organization responsible for the procurement, transmission and sale of electricity. Since January 2017, ESCOM was unbundled by carving out the generation function to form the Electricity Generation Company (EGENCO). The Malawi Energy Regulatory Authority was formed to regulate the energy sector and is responsible for tariff adjustments and licensing.

### Active Private Players

IFC Infrastructures is an active private developer in Malawi. Additionally, SMEC Malawi, Multiconsult and Studio Pietrangeli offers consulting services to developers, while the Turkish company Çalık Enerji competes for ETC contracts. On the financial side, in addition to SN Power, there are several multilateral development banks and development financial institutions investing in renewable energy:

- Green Climate Fund
- African Development Bank
- European Investment Bank (EIB)
- German GIZ
- IFC InfraVentures (World Bank)
- International Development Association
- Japan International Cooperation Agency (JICA)
- The Dutch development bank FMO
- United Nations Development Program (UNDP)
- Export Credit Norway

No large international commercial or investment banks are based in the country.

### Governmental Requirements and Regulations

The National Sustainable and Renewable Energy Program (NSREP) of 1999 tries to increase the sustainable use of energy in Malawi while connecting a larger part of their population to the grid. The Energy Regulation Act of 2004 governs the electricity sector and the Electricity Act of the same year regulates conditions for issuing licenses for engaging in the power sector of Malawi. To improve the access to electricity in rural areas, The Rural Electrification Act of 2004 was formed, which established Malawi Rural Electrification Fund. This fund is responsible for financing and managing rural electrification projects in the country.

### Power purchasing agreements

The government and other stakeholders developed an Independent Power Producer (IPP) Framework to provide interested parties with a clear understanding of how to invest in Malawi's power sector. A core component of the IPP Framework is a standardized PPA. The PPA currently being used in Malawi is flexible in terms of the currency of payments, the time frame, and the negotiable price offered by ESCOM. Payments are in USD, but the government has expressed a preference for local currency. From the date of signing the PPA, projects will have 24 months to complete the project.

### Investment considerations

Several incentives exist for hydropower investments in Malawi:

*Feed-in tariff/premium payment:* Malawi has a feed-in tariff policy for small-scale projects which do not exceed 10 MW and with a 20-year contract in place. For small hydro, tariffs apply to the first 150 MW of developed projects:

- < 1 MW: \$0.14/kWh
- 1-5 MW: \$0.12/kWh
- 5-10 MW: \$0.10/kWh

*Tax incentives:* The government offers a range of broad tax incentives which renewable energy producers and manufacturers can apply for. These include:

- Income tax deduction: New equipment can receive a 100% allowance against taxable income. For used equipment, the deduction is 40%
- An additional 15% allowance in designated areas
- Tax-deductible losses can be carried forward for a maximum of 6 years

- Import duty exemption: goods used in electricity generation and distribution qualify for duty free imports

*Public investment, loans or grants:* The Malawi Rural Electrification Fund provides grant funding for grid extension projects and mini-grids developed by private developers. For projects to receive a license to operate a mini-grid the project must have a capacity of less than 5 MW and a maximum internal rate of return (IRR) of 6% per annum.

### Risk Assessment

Malawi is eager to receive foreign investments and foreign investors are generally granted the same treatment as nationals, as the Malawian constitution protects investment irrespective of nationality. However, investments in the country involve multiple, and sometimes time-consuming, administrative procedures, which may include obtaining a business license, a tax registration number, and a land permit. The government is also trying to attract investments through bilateral cooperation, as shown by the Malawi-China Investment Forum and the Malawi-Japan Investment Forum held in 2018. On the other hand, Malawi's landlocked geographical location and the inadequate condition of its infrastructure are barriers to foreign direct investment.

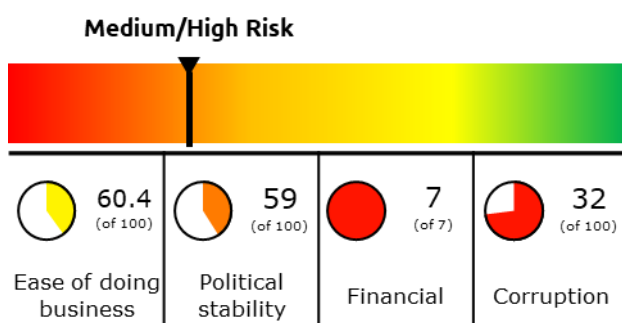


Figure 13 – Risk overview for Malawi

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Malawi can be viewed as a medium to high risk market for foreign investors. In the following, these risks will be explained more thoroughly.

#### *Ease of doing business*

The World Bank ease of doing business score for Malawi is 60.4 of 100, which reflects a relatively conducive regulatory environment. The country ranks 109 out of 190 countries assessed. Malawi scores high on the activities of starting a business and getting credit, while they receive a lower score on the activity of getting electricity, enforcing contracts and resolving insolvency.

#### *Political stability*

Malawi's score on the Marsh's Political Risk Index 2019 is 59. The score reflects several geopolitical conditions, including:

Corruption allegations against the government have undermined public and international donor support, which may cause some fiscal headwinds and risks of social unrest. In 2017, outbreaks of violence caused numerous deaths and caused some UN agencies to withdraw staff from parts of the country.

#### *Financing Availability*

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Malawi is classified in OECD country group 7.

Malawi is classified as non-investment grade (B-) on sovereign credit ratings. In turn, investments will be highly speculative where commercial banks are highly unlikely to finance projects. Multilateral or export credit agency financing may also be challenging depending on the project. Malawi's sovereign status remains firmly at a non-investment grade, due to high levels of public debt, a wide fiscal deficit and a recent increase in costly domestic borrowing.

#### *Corruption risk*

According to the Transparency International Corruption Perception Index (CPI) of 2018, Malawi scores 32 of 100, indicating a high degree of corruption in the country. Malawi is ranked 120 of 180 countries assessed. This is an improvement compared to last year's ranking at 122, but it can still be argued that the government has failed to translate its anti-corruption commitments into meaningful progress. Companies contend with corruption and bribery in almost all operations, from obtaining licenses to bidding on public contracts.



MOZAMBIQUE

Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	15	11% annually
Population in 2018 [Million]	31.4	1.2% annually
GDP per capita in 2018 [USD]	481	3.3% annually
Share of Hydro in power mix [%]	83	No target
Power access in 2018 [%]	29	100% by 2030

The power demand in Mozambique is expected to grow by 11% annually until the country reaches universal access for its population by 2030. Currently, hydropower accounts for 83% of the energy sources in the country, and the share is not expected to decline in the future.

The country has among the largest hydropower potential in Africa, estimated at around 12500 MW. Access to energy has been made a national priority in Mozambique’s development agenda, where it is viewed as a key driver for economic growth and poverty alleviation.

Today, the rural population is heavily dispersed and most of the population is still not connected to the main grid. There is an ambition to improve transmission infrastructure, but the country will likely be heavily dependent on development of off-grid solution such as small hydro in order to reach their targets. Currently, the 2075 MW Cahora Bassa plant constitutes for most of the existing capacity.

Hydropower Capacity Forecast

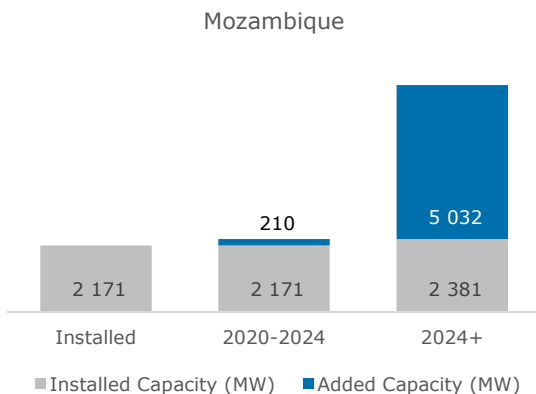


Figure 14 – Hydropower Capacity forecast 01.01.2020

Figure 14 shows that there are plans to expand the hydropower capacity. This is mostly due to exports, Mozambique has been identified as a key strategic supplier of power to South Africa. To fulfill this

growth in hydropower, Mozambique has plans for several new plants where three of them will have an installed capacity of over 1000 MW.

Distribution of Hydropower plant sizes

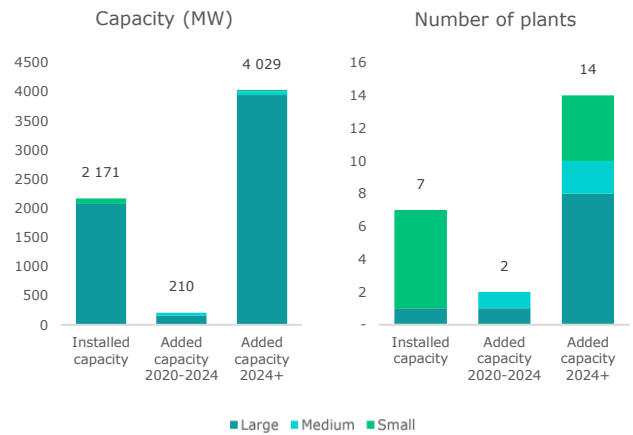


Figure 15 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

As displayed in Figure 15, there is potential for both grid expansions via large-scale projects, and smaller-scale developments servicing off-grid population centers.

The largest project planned, is the extension of the Cahora Bassa project. The extension is planned to add a capacity of 1245 MW and is scheduled for completion by 2025. Another large hydroelectric project is the 1000 MW Chemba plant. The project is in an early planning phase where pre-feasibility studies have been completed.

Priority projects

Two hydropower projects in Mozambique have been identified as priority projects:

- The 1500 MW Mphanda Nkuwa project is in an early planning stage and is expected to be operational by 2028. The project is in an early planning phase where pre-feasibility studies have been completed. Three companies are contractors for the project: Camargo Correa from Brazil, Insitec from Mozambique and EDM (electricidade de Mozambique)
- The 50 MW Tsate project is in a late planning phase and is expected to be operational by 2022

Electricity grid considerations

Mozambique’s distribution network will need significant investment to facilitate its export plans and to meet its universal electricity access goals by 2030. Currently, the plans are being funded by the World Bank and EU.

To meet its electrification targets, the country will likely need to look at off-grid solutions. Planned transmission and interconnector projects will reduce



the risk of overloading the grid with new hydropower capacity after 2024, but further distribution network upgrades will be needed.

In order to increase exports from Mozambique to Malawi, construction of a 400 kV interconnection transmission line, grid connections, and associated infrastructure improvements are planned. This is to further engage bilateral and regional power trade through the Southern African Power Pool (SAPP) and is due to be complete in 2022. To strengthen its position as a regional energy hub and offload future hydropower expansion, Mozambique is also constructing a 400 kV interconnector to Zambia from the future Cahora Bassa Hydroelectric Power Station. Furthermore, the CESUL Backbone project is a double transmission line project that will run from center to the south of the country to supply major consumption zones and link to the South African market.

## Market structure

### *Governing bodies and organizations*

The Ministry of Minerals Resources and Energy (MIREME) oversees the power sector and is tasked with national energy planning, policy formulation and overseeing operation and development. The newly formed Energy Regulatory Authority (ARENE) is the legal body responsible for regulating use of the connected grid. The National Fund for Rural Electrification (FUNAE) is responsible for implementing off-grid projects.

Mozambique has a vertically integrated, government owned utility company named Electricidade de Moçambique (EDM) which is responsible for generation, transmission, and distribution on the national grid.

### *Active private players*

Few new hydropower players have claimed a significant presence in the country. However, as with multiple African countries, Chinese state-owned players such as POWERCHINA have a long-standing position in the market with close ties to the government. However, there are been notable involvement some private players:

- Sweco has been involved as advisors to the refurbishment of the existing Cahora Bassa hydropower plant and technical scope for the Cahora Bassa North extension project
- Hidroeléctrica de Cahora Bassa (HCB) has one powerplant with a capacity of 1245 MW
- InfraCo Africa (majority shares) and Tora Holding (Tora) share a powerplant of 160 MW
- Nippon Koei Co Ltd offers consulting services to hydropower developers

On the financial side, several development funds and financial institutions are active in Mozambique, including the Green climate fund, the EU-Africa Infrastructure Trust, the African Development Bank, JICA, NORAD, SIDA, USAID, European Investment Bank, and the World Bank through IFC InfraVentures. Barclays and the International Commercial Bank represent the few international commercial banks that are present in the country, but they are not necessarily investing in hydropower.

## Governmental Requirements and Regulations

### *Relevant laws and regulations*

The Electricity Law (Law 21/1997 of 1 October) is the governing law for licensing of power projects in Mozambique. Hydropower projects are subject to concession rewards through competitive public tenders and are limited to 50 years. Most projects are built under the Public-private partnership (PPP) model. The implementation of hydropower projects is very dependent on the Land Law (Law 19/97 1<sup>st</sup> of October), which dictates that all land and associated resources are owned by the state and cannot be mortgaged.

Currently, The Electricity Law mainly regulates utility-scale projects for grid-connection but is under review to simplify the authorization procedures for small scale hydropower.

### *Power Purchasing Agreements*

For utility scale projects that deliver to the main grid, PPAs with EDM are required. Almost 80% of new electricity generation since 2014 has been development through independent power producers (IPP) models with PPAs signed with EDM. In order to stimulate private participation in rural electrification, mini grids are developed under PPPs where IPPs will usually invest, operate, and maintain facilities. Associated PPAs are often tendered competitively with EDM. However, concerns of conflicting clauses of the Electricity Act and the PPP law raises the question whether generation projects must be selected via a competitive tender process or if direct PPA negotiation is allowed.

### *Investment considerations*

Several incentives exist for hydropower investments in Mozambique:

*Feed-in tariff/premium payment:* Mozambique has a feed-in tariff which applies to biomass, wind, small hydro and solar projects from 10 kW to 10 MW. Relevant prices for small hydro:

- Capacity up to 10 kW - MZN 4.8/kWh
- Capacity up to 1 MW - MZN 3.4/kWh
- Capacity up to 5 MW - MZN 2.7/kWh



- Capacity up to 10 MW – MZN 2.3/kWh

*Tax incentives:* The benefits available to hydropower investors are as follows:

- *Corporate Income Tax (IRPC) reduction:* 80% reduction for the first 5 years, 60% reduction for years 6-10 and 25% reduction for years 11-15
- *Accelerated depreciation:* 50% on new immovable assets, rehabilitation of machinery and machinery and equipment used in the industrial sector
- *Tax deduction for modernization and introduction of new technology:* tax deduction of up to 15% of taxable income, which can be carried over for five years, for the amount invested in specialized equipment
- *VAT exemption:* certain sectors and investments are eligible for VAT (and import duty) exemptions on equipment, machinery and their ancillary goods for the first five years of project implementation, including large infrastructure projects and projects in rural areas and specific zones.

*Public investment, loans or grants:* The Mozambique Rural Electrification Fund is set up to provide financial aid, guarantees and loans for projects in rural areas which are aligned with the following objectives:

- Supply financial assistance to install power production and distribution equipment
- Assist enterprises whose objective is to generate power and disseminate knowledge
- Acquire equipment and machinery for power production and distribution

**Risk Assessment**

In the aftermath of the economic crisis in 2016, Mozambique sees a stable but weak macroeconomic environment, and there appears to be high-level political commitment to attracting large scale investments. However, the business climate is characterized by the recent turmoil and poses distinct challenges for investors.

risk in the country, Mozambique can be viewed as a high-risk market for foreign investors. In the following, these risks will be explained more thoroughly.

*Ease of doing business*

The World Bank ease of doing business score for Mozambique is 54.6 of 100, which reflects a relatively less conducive regulatory environment. The country ranks 138 out of 190 countries assessed. Mozambique scores high on the activities of starting a business, getting electricity and trading across borders, while they receive a lower score on the activity of getting credit, enforcing contracts and resolving insolvency.

*Political stability*

Mozambique’s score on the Marsh's Political Risk Index 2019 is 52.2. The score reflects several geopolitical conditions. Mainly, efforts to sustain improved relations and reach a lasting peace deal between Mozambique’s ruling Frente de Libertação de Moçambique (Frelimo) and the opposition Resistência Nacional Moçambicana (Renamo) parties will be crucial in maintaining stability in the aftermath of the October 2019 general elections.

*Financing Availability*

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Mozambique is classified in OECD country group 7.

With a C rating, Mozambique is classified as non-investment grade on sovereign credit ratings. Lack of transparency in foreign commercial loan acquisitions as well as the recent financial crisis cause rating agencies to downgrade Mozambique as credit-worthy. By default, this means that any off-taker will also not be credit-worthy at ratings C or below. This rating will present substantial investment risk where commercial bank financing will most likely not be possible. Multilateral and export credit agency financing will also be challenging, where private financing may be the only option for some projects.

*Corruption risk*

According to the Transparency International Corruption Perception Index (CPI) of 2018, Mozambique scores very low, 23 of 100, characterizing the country as corrupt (ranked 158 out of 180 countries assessed). The score is below the average of 32 in the Sub-Saharan region. Companies looking to operate in Mozambique face a very high risk of corruption in most sectors. Forms of corruption range from petty bribes to deeply entrenched clientelist and patronage systems, and donor countries have shown dissatisfaction over the

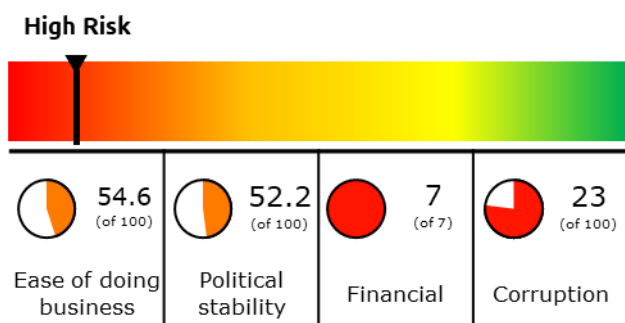


Figure 16 – Risk overview for Mozambique

By considering the ease of doing business, the political stability, the financial risk and the corruption

country's anti-corruption efforts. Corruption is particularly prominent in public procurement and the tax and customs administrations. Mozambique also sees the World's highest money laundering and terrorist financing risk out of 125 countries assessed, according to a report issued by the Basel Institute of Governance in August 2019.



RWANDA

Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	0.5	10% annually
Population in 2018 [Million]	12.3	2.8% annually
GDP per capita in 2018 [USD]	800	8.5% annually
Share of Hydro in power mix [%]	33	No target
Power access in 2018 [%]	49.1%	100% by 2030

In Rwanda, the government wants to go from being a developing country to become a middle-income country. In this relation, the power demand in Rwanda is expected to grow by 10% because of the government's target of universal electricity access for the population by 2024.

The currently installed capacity accounts for roughly one third of national electricity. In the past, Rwanda has faced issues with degradation of watersheds which resulted to several existing plants operating at part capacity. Following restoration measures, most existing plants are today operating at full capacity. Figure 17 below shows the installed capacity today and the forecast for future capacity.

Hydropower Capacity Forecast

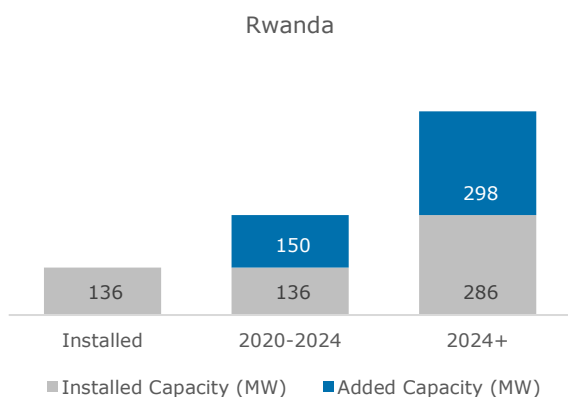


Figure 17 – Hydropower Capacity forecast 01.01.2020

The two largest projects planned completed before 2024 are the Ruzizi III and the Nyabarongo II schemes. The arrangements to construct and operate Ruzizi III are signed by *Energie des Grands Lacs* (Co-owned by the Governments of Burundi,

Rwanda and the Democratic Republic of Congo) and a consortium of IPS and SN Power. The plant is estimated to have a capacity between 147 and 230 MW, where Rwanda's plan to import a third of the total capacity through a power purchase agreement.

Distribution of Hydropower plant sizes

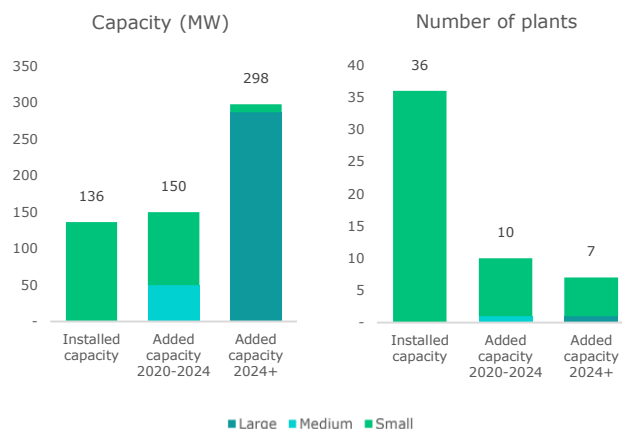


Figure 18 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Today's installed capacity is from small hydropower plants, less than 50 MW. After 2024, a planned expansion of the Ruzizi Power Station, Ruzizi IV, could potentially increase the country's capacity by over 200 MW. Other than this, the potential additional capacity will be achieved by building more small hydropower plants.

Priority projects

Four hydropower projects in Rwanda have been identified as priority projects:

- The 80 MW Rusumo project is a joint development project with Burundi, Rwanda and Tanzania involved. The project is under construction and is expected operational by 2021. The project is contracted by the joint venture of the CGCOC Group and Jiangxi Water & Hydropower Construction Company
- The 43.5 MW Nyabarongo II project is in a late planning stage and expected operational by 2025. The contractor is SynoHydro Limited
- The 6.7 MW Rukarara VI project is in a EPC stage and is expected operational by 2020. Prime Energy Ltd. Rwanda is the contractor
- The 5 MW Rukarara V project is under construction by private developers and is expected operational by 2020

Electricity grid considerations

Rwanda is planning on securing 52% of 100% electrification through grid expansion and the remaining 48% with off-grid solutions. Currently, there is misalignment between the power demand and supply in the country, and this will continue to

be a challenging with the planned hydropower expansion in the coming years. The government is now shifting focus to counteract oversupply by investing in reducing system losses as well as interconnectors to neighboring countries.

## Market structure

### *Governing bodies and organizations*

The Energy Division within the Ministry of Infrastructure of Rwanda is responsible for the energy and water sectors. The Rwanda Energy Group (REG) was incorporated by the Government in 2014 to expand, maintain and operate the energy infrastructure in the country through its two subsidiaries the Energy Utility Corporation Limited (EUCL) and the Energy Development Corporation Limited (EDCL).

### *Active private players*

Over the last decade, Rwanda's hydropower sector has been growing steadily. Part of the growth can be explained by involving private investors in the energy sector. An organization called Energy Private Developer's association (EPD) helps to facilitate the involvement of private investors in the energy sector in Rwanda. For potential investors, EPDs' purpose is to assist organizations interested in investing in the future of Rwanda Energy sector by providing market orientation and organizing the connection with all stakeholders.

Another organization which assists the growth in the energy sector in Rwanda is Power Africa. The organization is supporting Rwanda's energy sector development through wide-ranging technical assistance, in cooperation with the Government of Rwanda, international finance institutions, development agencies, and private sector partners.

These schemes have resulted in projects for the following IPPs:

- Sithe Global are planning to build the Ruzizi III Power Station, with a capacity of 50 MW.
- Angelique International Limited operates the Nyabarongo I, a 29 MW powerplant.
- Societe Nationale d'Electricite operates the Ruzizi I, a 28.5 MW powerplant.
- Rusumo Power Company Limited (RPCL) operates Rusumo, a 27 MW powerplant.

Additional developers that are active in the country are the CGCOG Group, Jiangxi Water & Hydropower Construction Company, Adre Hydropower, Prime Energy and Kochendorefer. SinoHydro is competing for EPC contracts, and SMEC Rwanda, EPC Africa and the Artelia Group are offering consulting services for hydro developers.

On the financial side, several development funds and banks are active in Rwanda, including the Green Climate Fund, the African Development Bank and the World Bank.

## Governmental Requirements and Regulations

### *Relevant laws and regulations*

Rwanda has developed the Electricity Sector Strategic Plan (ESSP) associated with the National Strategic Transformation (NST1) which sets out how to achieve the 2024 goal of universal electricity access for the population. The National Electrification Plan 2018-2024 guides investments in electrification and determines the access targets within the framework defined by NST1 and ESSP.

The Economic Development and Poverty Reduction Strategy 2013-2018 (EDPRS 2) outlines the importance of access to electricity to move the country out of poverty. Emphasis is put on off-grid production and small hydropower plants.

The Electricity Law 2011 governs electric power production, transmission, distribution and trading within or outside the national territory of Rwanda.

### *Power Purchasing Agreements*

A part of Rwanda's national strategy for renewable energy is to offer standardized and bankable PPAs to attract foreign investments. There are no indications that the plan of standardizing PPAs has been realized, but PPAs are available in the country. The common time frame of the PPAs varies from 20 to 25 years. The payment is usually denoted in USD but is preferred to be paid in RWF.

REG is responsible for transmission and distribution of electric power on the national grid. Hence, will purchase power from all independent power producers (IPP) which are providing electricity to the national grid. PPA prices will be negotiated between REG and IPP. If an IPP provides electricity through an off-grid solution, the IPP will sell the electricity to the end user. For an IPP, the time frame of the application process for contracts is uncertain. For instance, the company DC Hydropower have for two years worked on its project to develop two hydropower sites in Rwanda. Yet, DC Hydropower haven't been able to sign all necessary contracts with the government. This means that significant investment needs to be done even before the investors know if they will get a bankable PPA.

### *Investment considerations*

Several incentives exist for hydropower investments in Rwanda:

*Feed-in tariff/premium payment:* Rwanda's feed-in tariff has been replaced by renewable energy tenders. However, small scale and unsolicited projects can enter negotiations with the Investment Promotion Department of the Rwanda Development Board to enter negotiations on long term fixed tariff agreements. This feed-in tariff is paid in USD. The duration of the feed-in tariff is three years. To obtain a feed-in tariff, the generator must first apply for an electricity production license from RURA and then apply for feed-in tariff from the authority.

*Tax incentives:* Rwanda has an import duty at 30% of cost, insurance and freight (CIF), a 5% withholding tax and 18% value added tax. The government grants some exemptions to these duties.

There is also a policy that grants an investment allowance, meaning a share of the investment value may be depreciated and is deductible in the first tax period. The reduction is 40% of the investment if it takes place within the capital, Kigali, and 50% if outside the capital. This applies to new investments over RWF 30m (\$45,000). Acquisition or construction cost is included. It applies to any asset-based investment, so new power or clean energy assets are eligible.

*Tendering:* Since 2015, the government has announced that tenders would be the preferred approach for contracting new renewable capacity instead of feed-in tariffs. Consequently, the government has also committed to streamline the tendering procedure to award contract quicker than in the past. The contracts awarded in the tenders are 20 to 25 years PPAs with a 'take-or-pay' clause.

*Public investment, loans or grants:* Rwanda is planning to set up a fund to support local lending, co-finance renewable energy projects and improve consumer affordability in the country. The fund is set to go live in 2018 and is expecting to mobilize \$180m by then.

## Risk Assessment

Rwanda is among the world's poorest nations, and it faces challenges in leveraging foreign investments for development. Rwanda has nevertheless achieved remarkable political and social progress since 1994. It has become one Africa's countries with the highest degree of personal safety and lowest incidence of corruption. It has also started to rebuild its economy, and the government is fully committed to building a peaceful, stable and prosperous nation through sustainable private sector led development.

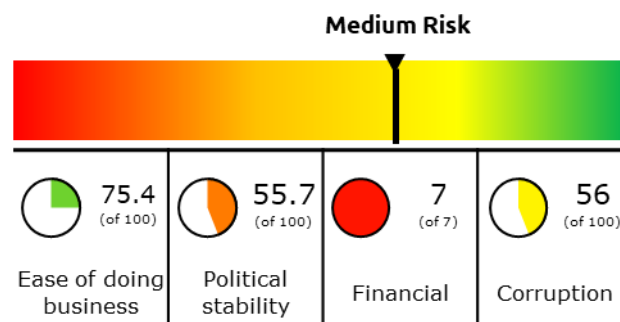


Figure 19 – Risk overview for Rwanda

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Rwanda can be viewed as a medium to high risk market for foreign investors. In the following, these risks will be explained more thoroughly.

### Ease of doing business

The World Bank ease of doing business score for Rwanda is 75.4 of 100, which is in the top quantile and reflects a conducive regulatory environment. The country ranks 38 out of 190 countries assessed. Rwanda scores high on the activities of starting a business, registering property, getting credit, and paying taxes. On the other hand, Rwanda scores lower on activities such as contracting with the government, dealing with construction permits, and resolving insolvency.

### Political stability

Rwanda's score on the Marsh's Political Risk Index 2019 is 55.7. The score reflects the several geopolitical conditions. Firstly, Rwanda has achieved a rare degree of political stability, public safety, and economic growth in a sub-region plagued by armed conflicts and humanitarian crises. Secondly, government programs to improve health, agricultural output, private investment, and gender equality have received international plaudits and donor support. Finally, President Paul Kagame has been widely viewed as the architect of Rwanda's development "miracle" and of its autocratic political model. He has repeatedly won reelection by wide margins, most recently re-elected to his third seven-term in 2017.

### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Rwanda is classified in OECD country group 6.

Rwanda is classified as non-investment grade (B+) on sovereign credit ratings. The score is weighed down by a low income per capita, and a persistent and large current account deficit. Implicitly, any off-



taker will have credit rating equal to or below the sovereign credit rating. In turn, investments will be highly speculative where commercial banks are highly unlikely to finance projects. Multilateral or export credit agency financing may also be challenging depending on the project.

**Corruption risk**

The Corruption Perception Index (CPI) for Rwanda is 56 of 100, which is way above the average of 32 in the Sub-Saharan region. The country ranks number 48 out of 180 countries assessed. The score makes Rwanda one of the five least corrupt countries in the Sub-Saharan Africa and the least corrupt country in East Africa. According to the Chairperson of Transparency International Rwanda, the areas which are more prone to corruption include banking especially during the process of loan applications, as well as implementation of mega infrastructure projects, among others.

**Hydropower Capacity Forecast**

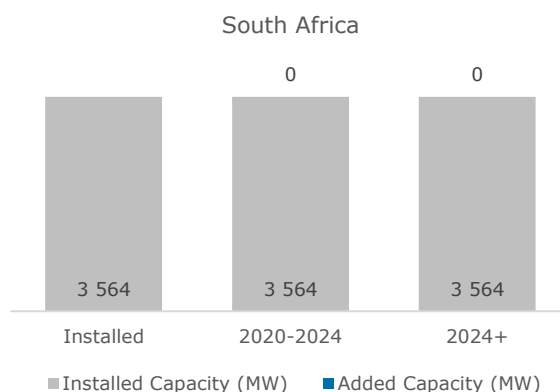


Figure 20 – Hydropower Capacity forecast 01.01.2020

There are no indications suggesting that South Africa is going to install new hydropower capacity in the near future, as displayed in Figure 20.



**SOUTH AFRICA**

**Market Overview**

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	233	2% annually
Population in 2018 [Million]	57	2.5% annually
GDP per capita in 2018 [USD]	6560	0.7% annually
Share of Hydro in power mix [%]	1.2	No target
Power access in 2018 [%]	94.9	100% by 2030

The power demand in South Africa is expected to grow by 2% until the target of universal electricity access for the country is reached. Only 1.2% of the power supply in South Africa comes from hydropower, and there are few indications that this will change in the future. Currently, the country has a hydropower potential estimated at around 3500 MW.

The governmental company Eskom owns four large hydro plants, the two most significant being Gariep (360 MW) and Vanderkloof (240 MW). In recent years dam construction has slowed down in South Africa, with emphasis changing to optimizing the existing resources. About 90% of the technically feasible potential has already been developed. Almost all feasible large-scale hydro potential has now been tapped.

**Distribution of Hydropower plant sizes**

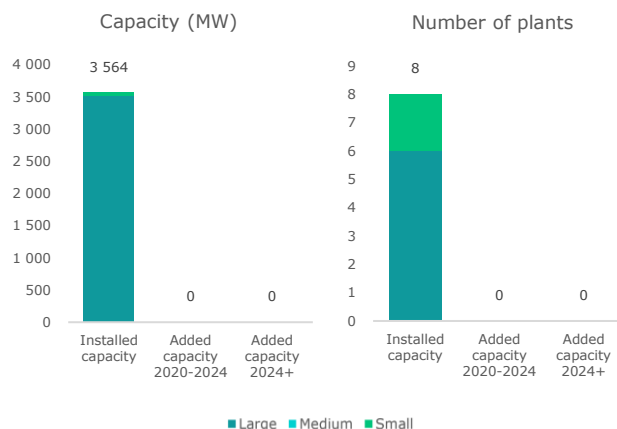


Figure 21 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Figure 21 shows that the installed hydropower capacity in South Africa is mainly made up of large power plants.

**Electricity grid considerations**

South Africa has an aging transmission and distribution system but has relatively few system losses. Eskom has been focusing on maintenance and refurbishment of the aging system in order to minimize power outages. Further, South Africa, is enhancing its transmission network with neighboring countries through the implementation of the Mozambique-Zimbabwe-South Africa (MOZISA) transmission project. This will encourage bilateral power trading and imports to South Africa through SAPP.

**Market structure**

**Governing bodies and organizations**

The National Government Department of Water Affairs and Sanitation (DWS) is responsible for



administering all aspects of the law relating to water resources. Eskom is the national utility responsible for electricity generation.

*Active private players*

While most hydropower plants in South Africa are operated by governmental companies, IPPs can invest in hydro. For instance, the 10 MW Neusberg plant is operated by the Kakamas Hydro Electric Power Company.

Active Spillway is a supplier to hydropower projects, and Andritz Hydro, James Walker, Tractebel, and Voith Hydro all have offices in South Africa.

On the financial side, several development funds and banks are active in the country, like the Green Climate Fund, the African Development Bank and the World Bank.

On the financial side, international commercial and investment banks like J.P Morgan Chase, Deutsche Bank, Morgan Stanley and Standard Chartered are investing in the country, but not necessarily in hydropower.

**Governmental Requirements and Regulations**

*Relevant laws and regulations*

In South Africa, the electricity sector is governed by robust legislation such as the National Electricity Regulation Act (Act No. 4 of 2006) and by policies such as the White Paper on Renewable Energy and the free basic electricity support tariff policy (2003). In addition to complying with the requirements of the Electricity Regulation Act, projects towards non-grid rural electrification will need to comply with the requirements of the South Africa National Environmental Management Act (NEMA) and the National Water Act (NWA).

*Power Purchasing Agreements*

South Africa’s Renewable Energy Independent Power Producer Procurement Program consists of several technology specific tenders for renewable energy. The bidders offer prices for 20-year Power Purchase Agreements (PPA) with Eskom with governmental guarantees. Specific rules for the renewable energy IPP program are:

- 30 % of total bid value must be attributed to non-financial indicators such as economic development
- At least 40% of each project must be owned by a South African entity with Level 5 contributor status
- A minimum ownership of 2.5% by local communities is required as procurement condition

- No more than 60 percent of project capital investment can consist of foreign currency

*Investment considerations*

Several incentives exist for hydropower investments in South Africa:

*Tax incentives:* As from 1 January 2016 Section 12b of the Income Tax act was amended from a three-year (50% – 30% – 20%) accelerated depreciation allowance on renewable energy to an even quicker depreciation allowance of one year (100%).

*Tendering:* In 2011, the South African government began holding reverse auctions with the aim of procuring 13 GW of renewable energy.

*Public investment, loans or grants:* The Green Fund is a unique national fund that seek to support green initiatives to assist South Africa's transition to a low carbon development path delivering high impact benefits. The Fund is managed by the Development of Bank of South Africa (DBSA) on behalf of Department of Environmental Affairs. As of June 2017, the Green Fund had committed its full funding allocation.

**Risk Assessment**

In South Africa, there is a growing concern about a host of political, economic, and regulatory factors that affect foreign businesses adversely. The volatile rand-dollar exchange rate can complicate planning, especially for smaller or new-to-market firms. Since 2012, the South African Government has continued to tighten labor and foreign ownership laws and mandated industrial localization.

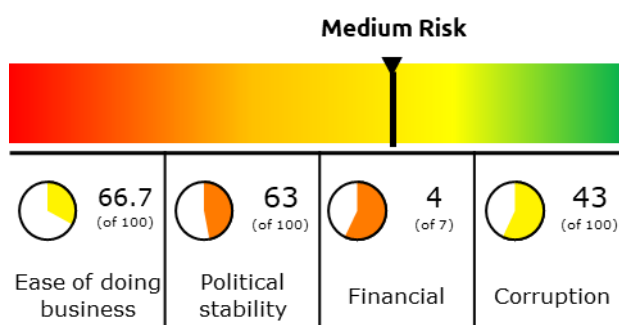


Figure 22 – Risk overview for South Africa

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, South Africa can be viewed as a medium risk market for foreign investors. In the following, these risks will be explained more thoroughly.

*Ease of doing business*

The World Bank ease of doing business score for South Africa is 66.7 of 100, which reflects a relatively

conducive regulatory environment. The country ranks 84 out of 190 countries assessed. South Africa scores high on the activities of starting a business, getting credit and paying taxes, while they receive a lower score on the activity of registering property, enforcing contracts and resolving insolvency.

#### Political stability

South Africa's score on the Marsh's Political Risk Index 2019 is 53.2. The score reflects several geopolitical conditions. Mainly, South Africa has one of the more competitive political systems in southern Africa, with the August 2016 presidential elections being particularly closely fought. However, efforts by President Edgar Lungu to consolidate power have begun to threaten the country's democratic norms, and frustration could develop into violence at any time, given widespread concerns about worsening corruption and increasing autocracy, combined with high levels of unemployment and fragile public-sector finances. A ruling by the Constitutional Court on Lungu's eligibility to stand for another term in the 2021 election could act as a trigger for unrest.

#### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), South Africa is classified in OECD country group 4.

South Africa is classified as lower investment grade by Moody's but non-investment grade by Fitch and S&P. Factors supporting a non-investment grade rating includes weak economic growth, historically high and rising debt levels and high unemployment. Implicitly, off-taker will have credit rating equal to or below the sovereign credit rating. A lower investment grade opens for commercial bank financing on most projects but may be challenging. Export credit agency financing should be possible for most projects.

#### Corruption risk

According to the Transparency International Corruption Perception Index (CPI) of 2018, South Africa scores low, 35 of 100, indicating the existence of corruption in the country (ranked 105 out of 180 countries assessed). Still, the country scores above the average of 32 in the Sub-Saharan region. The country has simpler procedures, smoother interactions with tax officials and easier enforcement of commercial contracts than comparable regional countries. The corruption risk in South Africa is not evaluated by the by the Basel Institute of Governance in August 2019.



## TANZANIA

### Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	7	10% annually
Population in 2018 [Million]	59	3% annually
GDP per capita in 2018 [USD]	1090	6.5% annually
Share of Hydro in power mix [%]	31.9	No target
Power access in 2018 [%]	36.7%	100% by 2030

Hydropower constitutes over 30% of the total energy capacity in Tanzania. This share is not expected to decline in the future with the government planning to add even more hydropower capacity in the future. Added capacity is needed because the power demand in Tanzania is expected to grow by 10% until the target of universal electricity access for the population is reached in 2030.

To increase the current levels of rural electricity access, the government is adopting targeted policies to develop off-grid schemes. To achieve the ambitious goal of universal access to electricity by 2030, the Ministry for Energy and Minerals has established legal and regulatory frameworks for the development of power generation projects. A shortfall in generating capacity, the need to boost the economy, and to expand rural electrification has led to increased investment and expected installed capacity is set to increase in the years to come.

#### Hydropower Capacity Forecast

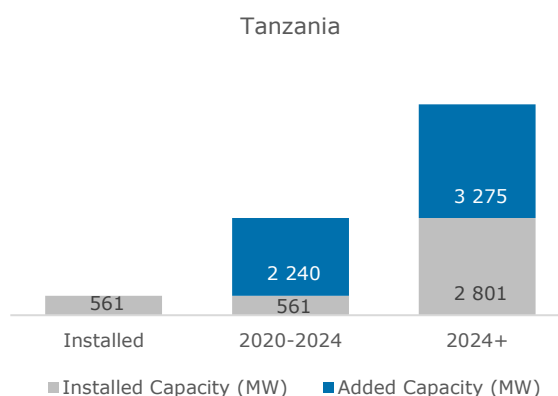


Figure 23 – Hydropower Capacity forecast 01.01.2020

Most today's operational plants are owned by TANESCO. The larger plants include Kikonge Power Station (300 MW), Kidatu Power Station (204 MW), and Kihansi Power Station (180 MW). As displayed in Figure 23, Tanzania plans to greatly expand its total capacity both in the next few years and after 2024. A major project currently under construction is the

Rufiji Hydropower Project (RHPP) at Stiegler's Gorge. The project is planned to add a total of 2115 MW and is constructed by the Egyptian company Arab Contractors Company which signed an EPC in December 2018. After 2024, Tanzania continues its plans to increase total capacity in the country.

#### Distribution of Hydropower plant sizes

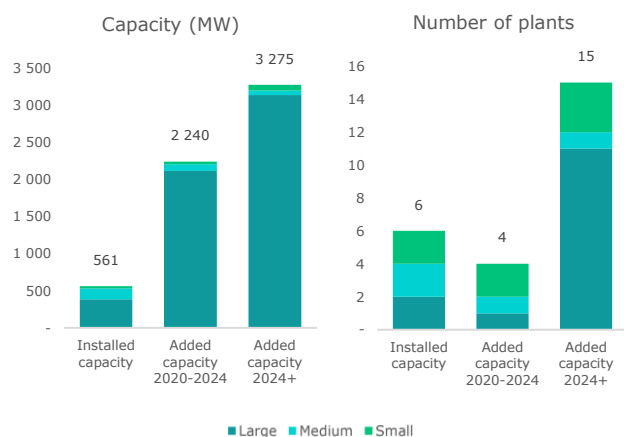


Figure 24 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

The country still has abundant energy sources, many of which remain unexploited. Hence, the potential to develop large plants are present. This is reflected in Figure 24, where the country's plan of constructing additional large plants over 100 MW is shown. The total generation capacity in Tanzania is expected to greatly increase. The largest potential future plants include, Rumakali (525 MW), and Shuguri falls (460 MW). For smaller plants, Upper Kihansi (47 MW) and Malagarasi (20 MW) are potential future plants and Kikagati-Murongo (8 MW) is currently under construction with expected completion in 2022.

#### Priority projects

Four hydropower projects in Tanzania have been identified as priority projects:

- The 300 MW Kikonge Power Station is in a late planning phase and is expected operational by 2025. The contractor is Studio Pietrangeli
- The 145 MW Taveta project is in an early planning phase with a tender deadline for pre-feasibility study by 01.06.2021
- The 118 MW Masigira project is in an early planning phase and is expected operational by 2024. SinoHydro Resources Ltd and Mkonge Energy Systems are the contractors
- The 90 MW Songwe Power Station is in an early planning phase and is expected to be operational by 2022

#### Electricity grid considerations

Tanzania is the only country in the EAPP which is also part of the SAPP, giving it access to power demand

and infrastructure in large parts of the continent. This unique position is already being demonstrated by the development of both the Kenya-Tanzania 400 kV interconnector in the north as part of the electricity highway from Ethiopia, as well as the interconnector with Mozambique in the south. This gives Tanzania more flexibility in balancing new hydropower production in coming years. However, despite the push for investments in transmission interconnectors, Tanzania, like many other African countries, are struggling with poor distribution quality. The distribution network quality needs to be improved if have universal access by 2030, supplied mostly with Tanzanian power.

#### Market structure

##### Governing bodies and organizations

- The Ministry of Energy and Minerals (MEM): Responsible for the national energy policy and coordination of the activities in the sector
- The Energy and Water Utilities Regulatory Authority (EWURA): Responsible for technical and economic regulation of the energy sectors in the country
- Tanzania Electric Supply Company Limited (TANESCO) is a public organization under the Ministry of Energy and Minerals. The company generates, transmits, distributes and sells electricity
- Rural Energy Agency (REA): Owns the largest share of power generation capacity and the entire transmission and distribution system. The company is a vertically integrated state-owned company

##### Active private players

Examples of smaller private energy companies are Mwenga Hydropower and TANWATT. Another firm involved in hydropower development in Tanzania is Tractebel which delivers engineering and consulting services. Other consulting firms include Pietrangeli, SMEC Tanzania, the Artelia Group and ENCO. Elsewedy Electric and Osman Ahmed Osman & Co has formed a joint venture that both invest, compete for EPC contracts and develop hydropower projects. Virunga Power is another example of a developer active in the country.

On the financial side, several development funds, banks and institutions are supporting investments in renewables in the country, including the Green Climate Fund, the African Development Bank, and the World Bank through the IFC InfraVentures. The International Commercial Bank, Standard Chartered Bank and Barclays represent the international commercial banks present in the country, but they are not necessarily investing in hydropower.

## Governmental Requirements and Regulations

### Relevant laws and regulations

Development in the country is guided by frameworks such as Tanzania's Development Vision (TDV), National Strategy for Growth and Reduction of Poverty (NSGRP II), and the National Five-Year Development Plan.

The National Energy Policy of 1992, revised in 2003, is the foundation for regulations in the energy sector in Tanzania. To promote improved access to modern energy services in rural areas, the Rural Energy Act was established in 2005. A few years later, the Electricity Act was introduced to liberalize the production and distribution of electricity in Tanzania, which was previously reserved for TANESCO. To reduce short-term emergency generation plants, short- and medium-term projects were identified in the Ministry's Power System Master Plan (PSMP) for the first time in 2007 with a time frame until 2035.

### Power Purchasing Agreements

Tanzania has standardized PPAs that provide a fixed tariff in US dollars based on the size for of the hydropower plant regardless of the location and the duration increased to up to 25 years.

### Investment considerations:

Several incentives exist for hydropower investments in Tanzania:

**Feed-in tariff/premium payment:** Under the second-generation SPPA framework, projects receive a fixed feed-in tariff allocated based on an administrative process. Small hydro projects of between 100kW and 10 MW will now receive a fixed feed-in tariff for the lifetime of the PPA (subject to limited indexation). They will be chosen based on technology-specific costs. The feed-in tariffs will no longer distinguish between projects on the main grid and those on isolated mini-grids. As such, the rates for an off-grid project will be constant throughout the lifetime of the PPA even if the main grid reaches its location.

**Public investment, loans or grants:** The Rural Energy Fund (REF) makes grants and loans and is administered by the Rural Energy Agency (REA). Tools used by REA, available through REF:

- Grants for pre-/feasibility studies: up to \$100,000 or 80% of study cost
- Grants for customer connection to grid or mini-grid: \$500 per connection – max 80% of T&D costs of a project
- Construction loans: up to 70% of project cost (up to 85% for projects < 3MW) – term is 15 years with 5-year grace

## Risk Assessment

Over the past 20 years, the Tanzanian Government has implemented major economic reforms to liberalize trade, including enhancing the role of the private sector and creating the Tanzania Investment Centre (TIC) to promote, facilitate and reduce restrictions on investments. This new institutional and legal framework has generated a steady growth in GDP and resulted in an increased inflow of foreign direct investment.

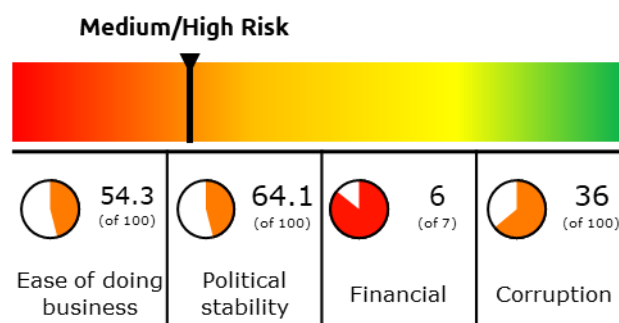


Figure 25 – Risk overview for Tanzania

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Tanzania can be viewed as a medium to high risk market for foreign investors. In the following, these risks will be explained more thoroughly.

### Ease of doing business

The World Bank ease of doing business score for Tanzania is 54.3 of 100, which makes Tanzania close to be included in the bottom quartile of the countries evaluated. The country ranks 141 out of 190 countries assessed. Tanzania scores high on the activities of starting a business and getting electricity, while they receive a lower score on the activity of trading across borders and resolving insolvency.

### Political stability

Tanzania's score on the Marsh's Political Risk Index 2019 is 64.1. The score reflects several geopolitical conditions. Firstly, Tanzania remains one of the most politically stable countries in East Africa and the wider continent. Secondly, as part of his popular reform agenda, President John Magufuli has targeted corruption in the public sector and, in October 2018, charged major firm Acacia Mining with tax evasion. This has helped affirm the ruling Chama Cha Mapinduzi (CCM) party's strong political position. However, the government has increasingly curbed freedom of expression, especially through new regulations in March 2018 that limit online content and radio and television streaming services. In the longer term, these developments could negatively



affect the government's popularity, international aid flows, and political stability. Finally, potentially escalating disputes over Lake Malawi ahead of Malawi's elections in May 2019, as well as the re-emergence of an Islamist militant group in Northern Mozambique, pose rising risks to Tanzania's security.

#### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Tanzania is classified in OECD country group 6.

The country is classified as non-investment grade on sovereign credit ratings. Tanzania's credit profile, B1 Negative, reflects its high growth potential and moderate government debt, set against its very low per capita income, a relatively weak institutional framework and vulnerability to exchange-rate volatility. Further, the credit rating agency Moody's states that unpredictable policymaking could affect economic growth and the ability to attract foreign investments.

Implicitly, off-taker will have credit rating equal to or below the sovereign credit rating. In turn, investments will be highly speculative where commercial banks are highly unlikely to finance projects. Multilateral or export credit agency financing may also be challenging depending on the project.

#### Corruption risk

The Corruption Perception Index (CPI) for Tanzania is 36 out of 100. The country ranks number 99 out of 180 countries assessed. The average in the Sub-Saharan region is 32 and is the lowest scoring region on the index. The most affected sectors are government procurement, land administration, taxation, and customs. Corruption is criminalized under the Prevention and Combating of Corruption Act (PCCA), but anti-corruption laws are applied inconsistently and are poorly enforced. Gift-giving and the use of facilitation payments for the purpose of inducing corrupt behavior are illegal under the PCCA. However, companies should note these practices can be commonly encountered when doing business in Tanzania.



## UGANDA

### Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	6	10% annually
Population in 2018 [Million]	44.2	2.3% annually
GDP per capita in 2018 [USD]	717	6% annually
Share of Hydro in power mix [%]	77	No target
Power access in 2018 [%]	23.2	98% by 2030

The power demand in Uganda is expected to grow in the following years, and a national target is to connect 1.5 million new households to the grid by 2020. The power demand has been rising by 10% in the past few years and the growth is expected to continue. Hydropower constitutes a large share of the total energy capacity in the country, with almost 80% of the power supply coming from hydro. This share is not expected to decline in the future.

Uganda is the home to Lake Victoria, the largest lake in Africa which is the main reservoir maintaining the flow of the Nile river. The river is the basis of both existing and future major hydro schemes in Uganda. Uganda Vision 2040 identifies electricity generation as one of the key strategic interventions for social-economic transformation of the country. The government is preparing for a rising demand of electricity by extending the transmission networks and facilitating for increase investment in the sector from both domestic and foreign investors.

#### Hydropower Capacity Forecast

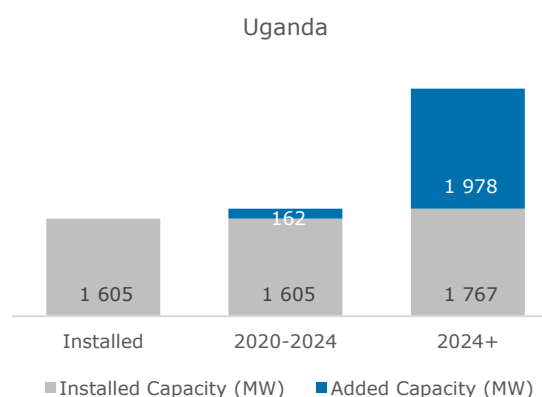


Figure 26 – Hydropower Capacity forecast 01.01.2020

Figure 26 shows that plans to add hydropower capacity are expected to be more prominent after 2024. Currently, the majority of today's operational plants are owned by Uganda Electricity Generation Company Limited. The largest plants are Karuma Hydropower Plant (600 MW), Bujagali Hydroelectric



Power Station (250 MW), Kiira Power Station (200 MW), Isimba Hydropower Station (183 MW), and Nalubaale Power Station (180 MW).

### Distribution of Hydropower plant sizes

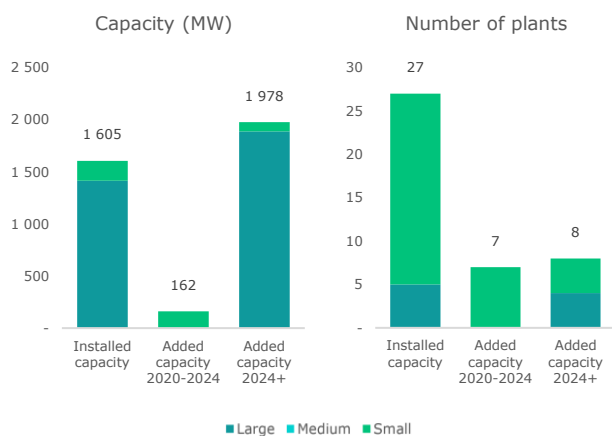


Figure 27 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Figure 27 shows that the government of Uganda has concrete plans to increase the country’s total capacity through the construction of three new large grid-connected plants and several small off-grid plants. The largest planned projects are the Ayago Hydroelectric Power Station (840 MW), Oriang (392 MW), and Kiba (295 MW). Most of the smaller projects scheduled to be completed before 2024 are currently under construction.

### Priority projects

Three hydropower projects in Uganda have been identified as priority projects:

- The 840 MW Ayago project is in an early planning phase and is expected operational by 2025
- The 295 MW Kiba project is in an early planning phase and the status is unknown due to the termination of a critical memorandum of understanding between Government of Uganda and the China Africa Investment and Development Company (CAIDC)
- The 10 MW Achwa 3 project is in an early planning phase and is expected operational by 2020

### Electricity grid considerations

As with the other Eastern and Southern African countries, Uganda is also investing in transmission interconnectors with its neighbors, Kenya (400 kV) and Rwanda (220 kV), in aim of increasing the general robustness of the regional power markets. Additionally, there has been focus on expanding national transmission lines which has increased general power supply and reliability. Umeme, largest power distributor in Uganda, has made significant investments to the distribution grid, doubling the size

of the network in the last decade. This has helped reduce system loss to around 16% from 35% in 2005. However, the consortium recognizes the urgency of additional investment requirements on the network in order to account for increase generation capacity and improve last mile connections.

### Market structure

#### Governing bodies and organizations

- Ministry of Energy and Mineral Development (MEMD): Responsible for the national energy policy and coordination of the activities in the sector
- Electricity Regulatory Authority (ERA): Regulates the generation, transmission, distribution, sale, export and import of electricity in Uganda.
- Rural Electrification Agency (REA): Mission to implement rural electricity under PPPs
- Uganda Electricity Generation Company Limited (UEGCL): A government owned company that builds, operates and maintain electricity generation plants
- Uganda Electricity Transmission Company Limited (UETCL): The single operator of the transmission system. It is the counterparty to power purchase agreements and sells purchased power to the distribution network companies

#### Active private players

Some local IPPs are the West Nile Rural Electrification Company, Ferdult Engineering Services, Kilembe Investments, Bundibugyo Electricity Cooperative Society, Pader Abim Community Multipurpose Electricity Cooperative Society and Kyegegwa Rural Electricity Cooperative Society.

SMEC Uganda, Energy Infratech, ILF Consulting Engineers Austria GmbH and AF-Consult Switzerland represent some of the companies offering consulting services to hydropower developers in Uganda. Salini Costruttori, China International Water & Electric Corporation, Zhejiang Hydropower Construction & Installation Company Ltd and SinoHydro are some of the companies competing for EPC contracts, while Multiconsult and Scott Wilson Limited are developers that are present in the country. Finally, GE Renewable Energy supplies turbines to the market.

Several developments banks, funds, and institutions are investing in the country, including the World Bank, the African Development Bank and the Green Climate Fund. Also, both Norfund and the Export Import Bank of China have been investing in hydropower in Uganda. International commercial banks like Barclays and Standard Chartered are active in the country, but not necessarily investing in hydropower.

## Governmental Requirements and Regulations

### Relevant laws and regulations

- The Electricity Act of 1999 defines the authorities and their funding for the electricity sector.
- The Energy Policy 2002 was developed with the objective to meet the energy needs of the population for social and economic development in an environmentally sustainable way
- The Renewable Energy Policy 2007 aims to provide a framework to expand the contribution of renewable energy in the energy mix.

### Power Purchasing Agreements

A Standardized Implementation Agreement and a Standardized Power Purchase Agreement for the energy sector are supposed to significantly reduce transaction costs while providing a security to investors in Uganda. Usually, the UETCL issues the standardized PPA. The agreements are secured and paid in USD. In addition, guarantees are often provided by the government and the hydrology risk is often taken by the government as well by paying PPAs based on available capacity and not the actual power supply.

### Investment considerations:

Several incentives exist for hydropower investments in Uganda:

**Feed-in tariff/premium payment:** Uganda's renewable energy feed-in-tariff (REFIT) provides payments to eligible renewable power projects. All producers are eligible to submit a bid between the threshold capacities. The FiT is dollar denominated, and payments are guaranteed for 20 years. For Hydro, the maximum tariffs available at auctions are:

- 11-20 MW: \$0.094/kWh
- 5-10 MW: linear tariff
- 500 kW- 5MW: \$0.107/kWh

**Tax incentives:** The following reductions are available:

- An initial capital allowance on plant and machinery of 50% for investments in Kampala, Entebbe, Jinja, Namanve and Njeru
- Outside these areas, the rate is 75%, this allowance only applies for the first year
- Industrial (but not approved commercial) buildings qualify for an initial allowance of 20% if construction began on or after 1 July 2000
- Under the VAT Act 1996, plant and machinery from licensed manufacturers may be imported duty- and tax-free.

**Public investment, loans or grants:** Under the Rural Electrification Strategy and Plan covering 2013-22, the Uganda Rural Electrification Fund aims to increase electricity access in rural areas of Uganda, with the goal of reaching universal access by 2035.

## Risk Assessment

Uganda has been consistently attracting the highest foreign direct investment (FDI) in East Africa and the Red Sea region by attracting between \$250 – 300m in FDI annually over the past five years – largely due to its stable and consistent macro-economic policies, liberalized business environment, proximity as a logistics hub within the Great Lakes region and increasing regional trade.

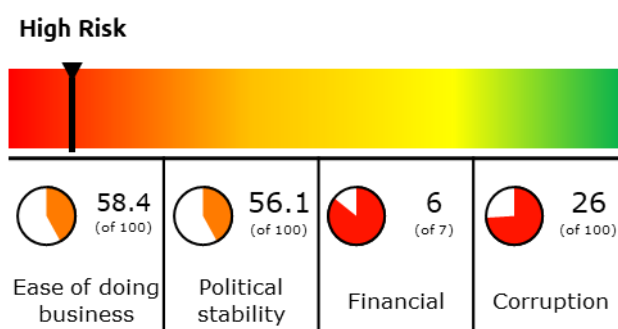


Figure 28 – Risk overview for Uganda

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Uganda can be viewed as a high-risk market for foreign investors. In the following, these risks will be explained more thoroughly.

### Ease of doing business

The World Bank ease of doing business score for Uganda is 58.4 of 100 and the rank is 116 of 190 countries evaluated. The country ranks 116 out of 190 countries assessed. The main activities influencing the score in a negative way are getting electricity, contracting with the Government, and resolving insolvency. Activities that scores above the country's overall score includes enforcing contracts, starting a business, and paying taxes.

### Political stability

Uganda's score on the Marsh's Political Risk Index 2019 is 56.1. The score reflects several geopolitical conditions. Firstly, President Yoweri Museveni and his ruling National Resistance Movement (NRM), in power since 1986, retain their dominance over Uganda's political landscape and policy formation. Museveni's removal of the presidential age limit in 2016 paves the way for him to seek re-election in 2021 and maintain policy continuity. However, rising negative sentiment towards the 74-year-old president and his government over the age limit

removal, and a heavy-handed approach in dealing with political dissent, have triggered protests, with some becoming violent. Secondly, Uganda faces additional risks from the neighboring Democratic Republic of the Congo. Finally, on the external front, Uganda's military presence in Somalia (which is being reduced) exposes it to attacks by the latter country's al-Shabaab Islamist group.

#### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Uganda is classified in OECD country group 6.

The country is classified as non-investment grade (B/B+) on sovereign credit ratings. The rating is constrained by low per capita income, some governance challenges, as well as widening current account deficits. These structural weaknesses pose challenges to policy formulation and implementation.

Implicitly, off-taker will have credit rating equal to or below the sovereign credit rating. In turn, investments will be highly speculative where commercial banks are highly unlikely to finance projects. Multilateral or export credit agency financing may also be challenging depending on the project.

#### Corruption risk

The Corruption Perception Index (CPI) for Uganda is 26 out of 100, which is below the average of 32 in the Sub-Saharan region. The country made no progress since last year's rankings and ranks number 149 out of 180 countries assessed. The country ranks well below the average in the Sub-Saharan region of 32 and are the third most corrupt country in East Africa according to the index. Uganda has developed both anti-corruption institutions and legislations to fight corruption, but lack in political will is viewed as the main reason for little progress.



### Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	15.5	10% annually
Population in 2018 [Million]	17.6	2.7% annually
GDP per capita in 2018 [USD]	1450	3.4% annually
Share of Hydro in power mix [%]	87	No target
Power access in 2018 [%]	36.8	100% by 2030

Zambia has a goal of increasing power access from 31 percent to 100 percent by 2030. Currently, there is 1661 MW of hydropower in operation and another 765 MW under construction. Additionally, a potential of 3320 MW of hydropower is identified in the country.

The Government plans to focus on more hydropower development, especially in the north of the country, where the rainfall pattern is favorable. Small hydro and solar plants are also going ahead with the support of international organizations, as part of the move to develop more renewable energy. Finally, the country is encouraging private investment in hydropower development.

#### Hydropower Capacity Forecast

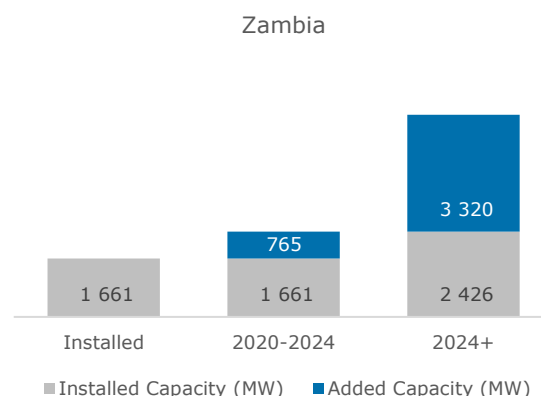


Figure 29 – Hydropower Capacity forecast 01.01.2020

As Figure 29 shows, the installed capacity in Zambia is expected to grow in the following years. The next major project is the 750 MW Kafue Gorge Lower Power Station which was expected to be operational by 2020. However, in September 2019 the construction was put on hold by the Chinese state-owned company Sinohydro. The company has not officially stated the reason for the halt, but according to the Zambian press, the Chinese company's services since construction started in 2015 was not paid for as agreed. Other major projects include the

1200 MW Batoka Gorge, Mambilima V (372 MW) and Mombututo CX (300 MW).

### Distribution of Hydropower plant sizes

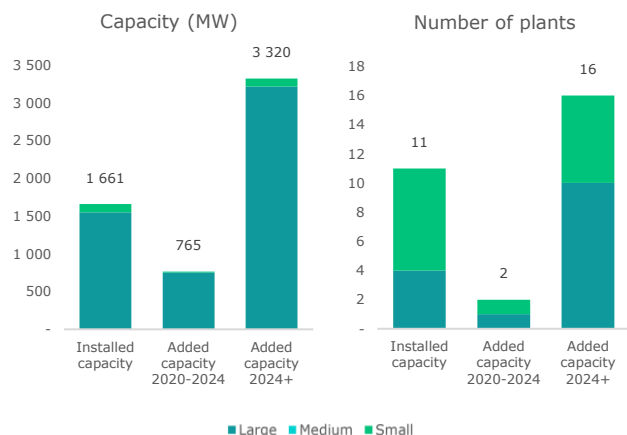


Figure 30 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Interestingly, found in *Figure 30*, while large plants make up most of the installed capacity, 7 small plants exist with six more potentially being installed in the future. There are also several small schemes planned, notably at West Lunga, and the Chikata scheme in northwestern Zambia. A total of 50 MW of small hydro is at the prefeasibility study stage.

### Priority projects

Seven hydropower projects in Zambia have been identified as priority projects:

- The 1200 MW Batoka Gorge project is in a late planning phase and is expected operational by 2024. The plant is shared between Zambia and Zimbabwe. Potential developers include a consortium of China Power and General Electric, a joint venture of China Three Gorges Corporation, China International and Water Electric Corporation and China Gezhouba Group Company, and Salini Impregilo of Italy.
- The 372 MW Mambilima V project is in an early planning stage and implementation is planned to start within the next five years. EDF is the main contractor
- The 300 MW Mombutoto CX project is in an early planning phase and the later development contract will be awarded in 2021. EDF is the main contractor
- The 247 MW Kalungwishi project is in a late planning phase, but the implementation has been delayed for several years now.
- The 202 MW Mambilima II project is in an early planning phase and the later development contract will be awarded in 2021. EDF is the main contractor
- The 300 MW Mombutoto M project is in an early planning phase and the later development

contract will be awarded in 2021. EDF is the main contractor

- The 190 MW Mambilima I project is in an early planning phase and the later development contract will be awarded in 2021.

### Electricity grid considerations

As part of the Ethiopia-Kenya-Tanzania-Zambia interconnector project, Zambia is constructing the last leg in the transmission corridor which allows regional power trade between SAPP and EAPP. Additionally, to the south, the Mozambique-Zambia 400 kV interconnection is being constructed. In conjunction with the interconnectors, Zambia will also construct national transmission lines to link the two. This will also help national distribution on power in addition to improve supply and demand balancing robustness.

Unfortunately, the distribution network also needs a significant overhaul and expansion and current system losses are high. Work is ongoing to further expand and improve the low voltage distribution network with grants from funds such as EU and AFD. Significant further investment will be needed to secure universal power access by 2030, and ensure that additional generation capacity, including hydropower, does not cause over-supply.

### Market structure

#### Governing bodies and organizations

The Energy Regulatory Board (ERB) is responsible for the regulation of the energy sector.

The Rural Electrification Authority (REA) was established in 2003. It carries out all public activities in connection with rural electrification and revision of the Rural Electrification Master Plan (REMP). Established in 2006, the Zambia Development Agency is an important contact point for foreign investors. Its mandate includes the promotion of trade and investments, and the agency acts as a platform connecting investors with information and services supporting market entry.

#### Active private players

Governmental companies operate most of the hydropower stations in Zambia, but there are some examples of IPPs, like the Lunsemfwa Hydropower Company Limited (LHPC), and SPV Western Power Company (WPC). Another firm involved in hydropower in Zambia is Tractebel which deliver Engineering and consulting services. Other consulting firms include Pietrangeli and HNAC.

Infraco Africa is trying to develop hydropower projects in the country, while both SinoHydro and



The China National Electrical Equipment Corp are trying to win EPC contracts.

On the financial side, private investors include the Western Power Company, Norfund, responsibility and Vineyard Investment Holdings. The Green Climate Fund, The African Development Bank, EU, GIZ, JICA, USAID, and the World Bank through IFC InfraVentures are examples of development banks, funds, and institutions investing or donating in renewables in Zambia. Standard Chartered is one international commercial bank present in the country, but it is not necessarily investing in hydropower.

### Governmental Requirements and Regulations

#### Relevant laws and regulations

The Energy Regulation Act of 1995 formally established the ERB and defined its functions. The Rural Electrification Authority (REA) is responsible for implementing the Rural Electrification Master Plan (REMP), In 2004 the National Energy Policy was implemented which liberalized the electricity sector by opening all market segments to private operators.

The Zambia Grid Code was introduced in 2013, with the objective of facilitating open and non-discriminatory access to the transmission system.

Together with the Japanese government, the Rural Electrification Authority has developed a Rural Electrification Master Plan for the term 2008 – 2030. The plan clusters 1217 un-electrified Rural Growth Centers into 180 project packages, estimating that over \$1.1 billion (or \$50 million per year) is required to electrify all packages by 2030.

#### Power Purchasing Agreements

Standardized Power Purchase Agreements (PPAs), grid connection guidelines, generation license, and grid connection agreement documents have been developed and are available in draft from the ERB website. The standardized PPA allows the use of USD for payment and the ERB should give a response on an application within 10 days. In general, the standardized PPAs in Zambia are considered bankable.

#### Investment considerations

Several incentives exist for hydropower investments in Zambia:

**Feed-in tariff/premium payment:** Zambia has a program called GET FiT, which aims to procure and support Independent Power Producer (IPP) projects up to 20 MW. The GET FiT Program is executed by the Zambian Ministry of Energy and implemented by the German development bank KfW. Program

funding is provided by the German government. In addition, a multitude of Zambian stakeholders is involved, such as ERB, ZESCO and OPPPI. Other cooperating international organizations include the African Development Bank, and Africa Trade Insurance. The program provides an allocation for 200 MW of electricity capacity from small to medium-scale hydro, PV, geothermal, biomass, waste energy and wind. The capacity for each project must be below the 20 MW threshold. The proposed PPAs guarantees tariffs in US dollars for 20 years and is inflation indexed

**Tax incentives:** Investors in designated areas can receive favorable rates of tax and import duty. The policy allows for developers who develop small-hydro plants to claim tax exemption status for the first five years of the projects lifetime. It sets the tax rate on dividends and profits to zero percent for the first five years and excludes capital goods and machinery from import duty. Projects also receive non-fiscal incentives: investment guarantees and protection against nationalization and facilitation of immigration permits and land acquisition. The minimum qualifying threshold is \$500,000. Projects \$250,000-500,000 still receive the non-fiscal incentives, but not the tax breaks.

**Public investment, loans or grants:** The mandate of the Zambia Rural Electrification Fund is to increase electricity access to rural areas through grid extension, small hydro, PV and biomass projects by assist in funding of projects.

### Risk Assessment

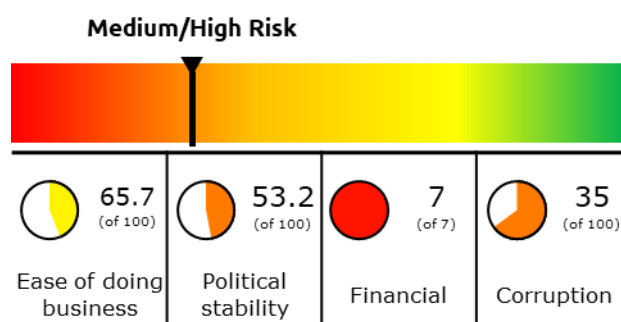


Figure 31 – Risk overview for Zambia

Zambia is open to foreign trade, which represents 71.5% of the country's GDP. The trade policy of Zambia aims to diversify its economy through privatization programs and the expansion of its export base. The country is a member of COMESA and has signed interim economic partnership agreements (IEPA) with the European Commission. The country became part of the WTO in 1995.

By considering the ease of doing business, the political stability, the financial risk and the corruption



risk in the country, Zambia can be viewed as a medium to high risk market for foreign investors.

#### *Ease of doing business*

The World Bank ease of doing business score for Zambia is 65.7 of 100, which reflects a relatively conducive regulatory environment. The country ranks 85 out of 190 countries assessed. Zambia scores high on the activities of starting a business, getting credit and paying taxes while they receive a lower score on the activity of registering property, enforcing contracts and resolving insolvency.

#### *Political stability*

Zambia's score on the Marsh's Political Risk Index 2019 is 53.2. The score reflects several geopolitical conditions. Mainly, the country has one of the more competitive political systems in southern Africa, with the August 2016 presidential elections being particularly closely fought. However, efforts by President Edgar Lungu to consolidate power have begun to threaten the country's democratic norms, and pent-up frustration could develop into violence at any time, given widespread concerns about worsening corruption and increasing autocracy, combined with high levels of unemployment and fragile public-sector finances. A ruling by the Constitutional Court on Lungu's eligibility to stand for another term in the 2021 election could act as a trigger for unrest.

#### *Financing Availability*

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Zambia is classified in OECD country group 7.

The country is classified as non-investment grade (CCC/CCC+) on sovereign credit ratings. The rating agency Moody's moved the credit rating from Caa1 to Caa2 and the agency says this is due to external and liquidity pressures impairing the government's ability to service debt over medium-term, raising the probability of default. Implicitly, any off-taker will have credit rating equal to or below the sovereign credit rating. This rating will present substantial investment risk where commercial bank financing will most likely not be possible. Multilateral and export credit agency financing will also be challenging, where private financing may be the only option for some projects.

#### *Corruption risk*

According to the Transparency International Corruption Perception Index (CPI) of 2018, Zambia scores low, 35 of 100, indicating the existence of corruption in the country (ranked 105 out of 180 countries assessed). Still, the country scores above

the average of 32 in the Sub-Saharan region. These scores reflect an inefficient and corrupt judicial system where foreign investors' property rights are not accurately protected nor enforced.

## ASIA



### INDONESIA

#### Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	268	3.5% annually
Population in 2018 [Million]	266	2.2% annually
GDP per capita in 2018 [USD]	3789	5.2% annually
Share of Hydro in power mix [%]	8.8	No target
Power access in 2018 [%]	98.3%	No target

Power demand in Indonesia is expected to grow steadily in the next few years. Currently, hydropower only makes up about 9% of the utilized energy sources in the country, but the government is planning to add hydropower capacity in the future.

Indonesia has a hydropower potential estimated at around 5700 MW. State-owned PT Perusahaan Listrik Negara (PLN) is a major player in the market. For hydropower, the company provides 10729 GWh of the 21637 GWh capacity in the country. Indonesia has a technically feasible potential of 45000 MW and an economically feasible potential at around 26000 MW.

#### *Hydropower Capacity Forecast*

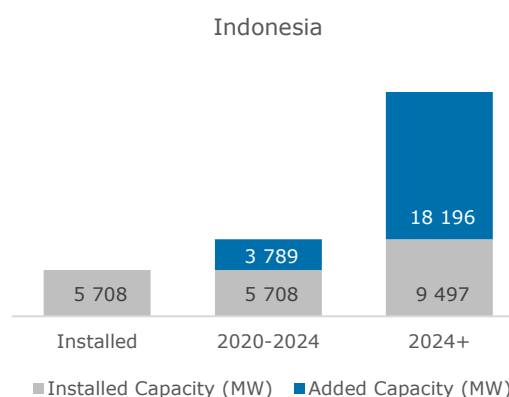


Figure 32 – Hydropower Capacity forecast 01.01.2020

As displayed in Figure 32, Indonesia plan to significantly increase their installed hydropower capacity, with almost 4000 MW expected to be operational by 2024. After 2024, the potential of 18196 MW of hydropower development is identified,

including the 9000 MW Kayan River cascade hydropower project expected to be fully operational by 2039.

### Distribution of Hydropower plant sizes

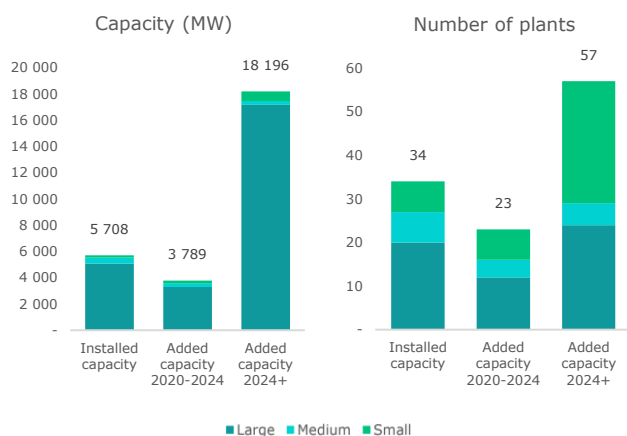


Figure 33 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Figure 33 shows that large hydropower plants make up most of the installed and planned added capacity in Indonesia. Indonesia has 70 MW of small and medium plants with capacity up to 1000 MW operation and around 5 GW capacity from large power plants larger than 100 MW. To increase rural electrification and the share of renewable energy in the country's power generation mix, the government has plans to increase the share of smaller power plants moving forward.

### Priority projects

Eight hydropower projects in Indonesia have been identified as priority projects:

- The 9000 MW Kayan River project, currently at EPC stage. The project is expected to be finished in 2039, with the first 900 MW expected to be operational by 2023. The main contractor is the Power Construction Corporation of China through its subsidiary Sinohydro Corporation
- The 400 MW Masuni project, currently in procurement stage. The plant is expected to be operational by 2023
- The 350 MW Merangin-2 project, currently in an early planning phase. The plant is expected to be operational by 2023 and is contracted by PT Kerinci Merangin Hidro
- The 256 MW Mong project is in an early planning phase. Construction is planned from 2020 to 2024.
- The 209 MW Lariang-6 project is in an early planning phase and construction is planned from 2020 to 2024
- The 185 MW Teripa-4 project is in an early planning phase and construction is planned from 2020 to 2024

- The 180 MW Kluet-1 project is in a late planning phase and is expected to be operational by 2025
- The 119 MW Ramasan-1 project is in an early planning phase and construction is planned from 2020 to 2024

### Electricity grid considerations

Indonesia has an expansive power grid with access to electricity for over 98% of the population but it is faced with reliability issues. This is partly due to its challenging archipelago geography. In order to be able to offload the increased power generation, especially from variable sources such as solar and wind, Indonesia needs to strengthen its transmission and low voltage distribution networks. These transmission issues across the archipelago may continue to be highlighted as generation capacity is added as seen in the Philippines. However, this may present an opportunity for hydropower to act as dependable, extra power supply at a premium.

### Market structure

#### Governing bodies and organizations

The ministry of Energy and Mineral Resources implements state power sector policy. State-owned PT Perusahaan Listrik Negara (PLN) holds a dominant position in the generation market and has monopoly control of the transmission and distribution sub-sectors. Power production is carried out predominantly by two subsidiaries of PT PLN, Indonesia Power and PT Pembangkitan Jawa Bali, and by the private sector through IPPs.

#### Active private players

While PT Perusahaan Listrik Negara (PLN) has a large market share, there are several examples of IPPs, including:

- Korea Midland Power (KOMIPO): 57 MW Semangka run-of-river plant on Sumatra
- Kansai Electric Power Company (KEPCO): 46.6 MW Rajamandala hydropower plant on West Java
- Hyundai Engineering: Three projects starting in 2019
- Medco Power Indonesia (MPI): Permits to build 17 projects with a combined capacity of 98.3 MW in West Java
- PT Inti Duta Energi (IDE): Developing a 50 MW portfolio of mini hydro plants
- Roal Haskoning DHV of The Netherlands: Developing up to 100 MW of small hydro

On the financial side, several development funds like the Green Climate Fund are supporting investments in Indonesia. Indonesia has a low to medium sovereign credit rating, which often indicates the presence of international commercial banks. Therefore, in addition to banks like Credit Suisse and

Deutsche Bank, other international banks most likely operate in the market. Also, China also has a strong presence in Indonesia on the financing side, exemplified by the presence of the Bank of China.

## Governmental Requirements and Regulations

### *Relevant laws and regulations*

The involvement of independent power producers is regulated in accordance with the 2009 Electricity Law, which maintains PLN's exclusive rights over the transmission, distribution and selling of electricity. The law established that PLN would remain vertically integrated and control the national transmission network, such that it is the main provider of generation and the sole provider of transmission and distribution networks. A license to provide electricity for public use (IUPTL) may be granted to privately owned businesses, although in practice PLN has the "right of first priority" to supply electricity to customers and generally exercises this right.

### *Power Purchasing Agreements*

To achieve the targeted electrification ratio and to encourage efficient, fair and transparent electricity supply, Indonesia's Ministry of Energy and Mineral Resources (MEMR) issued three regulations in early 2017. Among them was regulation No. 10 on Power Purchase Agreement Principles (Regulation 10). The regulation intends to regulate certain provisions in a power purchase agreement (PPA) between the state electricity company PT PLN (Persero) (PLN) as the off-taker, and independent power producers (IPPs).

The regulation applies to all power projects, excluding intermittent power projects such as mini-hydropower plants, which are subject to separate regulations. Regulation 10 requires that a PPA between PLN and an IPP should include at least:

- PPA term
- Dispatcher
- Rights and obligations of seller and buyer
- Penalties on plant performance
- Risk allocation
- Termination of PPA
- Security for project performance
- Assignment of rights
- Commissioning and commercial operation date (COD)
- Requirements for price adjustments
- Fuel supply
- How to resolve disputes
- How to do transaction
- How to treat force majeure

With Regulation 10, hydropower projects are awarded in a Build, Own, Operate, Transfer (BOOT) scheme instead of a Build, Own, Operate Scheme

(BOO). Additionally, PLN is not obliged to pay deemed dispatch if it arises from a force majeure event. Also, the take-or-pay commitment of PLN may be limited to the duration of the financing repayment term, as opposed to the duration of the PPA. Furthermore, the regulation adds a penalty for failing to meet PLN dispatch center instructions to ramp up or ramp down. Other changes to the PPA-scheme include permission of transferring shares in the IPP company and that the responsibility for risk of government force majeure is now shared between PLN and the IPP.

Some other provisions of regulation 10 can also be noted:

- The PPA term must not exceed 30 years from the project's COD
- The calculation of the capacity fee on the electricity sale is based on the investment value having depreciated for at least 20 years
- Where a change in law results in a higher cost impact to the developer, the tariff will be adjusted to compensate
- PLN may request the IPP to accelerate the COD in return for incentives
- If PLN is unable to purchase the electricity produced under the PPA, PLN must pay the IPP a penalty in proportion to the investment component

### *Investment considerations*

Several incentives exist for hydropower investments in Indonesia:

*Feed-in tariff/premium payment:* Indonesia revised its small hydro feed-in tariff policy in 2014 with a two-phase tariff mechanism and expanded it to cover small hydro projects utilizing multipurpose dams and/or irrigation channel water resources. A regulation published in June 2015 sets out new tariffs denominated in USD, but is subject to updates:

- Small hydro (up to 10 MW): \$12 cents/kWh (1-8 years:); \$7.50 cents/kWh (9-20 years)
- Mini hydro (up to 250 kW): \$14.4 cents/kWh (1-8 years:); \$9 cents/kWh (9-20 years)

*Tax incentives:* The fiscal facilities provided by the GoI for renewable energy business are income tax facilities (a reduction of 30 per cent of net income for six years, escalated depreciation and amortization, compensation for loss occurring for more than five years but not more than 10 years' tax holiday), tax holiday (eg, exemption from tax from five to 10 years as of the commercial production and 50 per cent reduction of tax from outstanding income tax for two years), VAT exemption and exemption of import duty.

Exemption on import duty for machinery and capital for renewable energy exists. There is VAT exemption on taxable goods imported in the use of renewable energy development, if there are no substitutes produced in Indonesia. While it is focused on renewable energy, this policy also applies to power plants generally.

### Risk Assessment

There are several reasons to invest in Indonesia, including the sound economy, political stability, investment climate and access to natural resources. However, concerns for foreign investors looking for opportunities in Indonesia are also present. Additionally, recruiting local talent could be difficult, infrastructure issues causing high logistic costs, and bankruptcy laws are inconsistent.

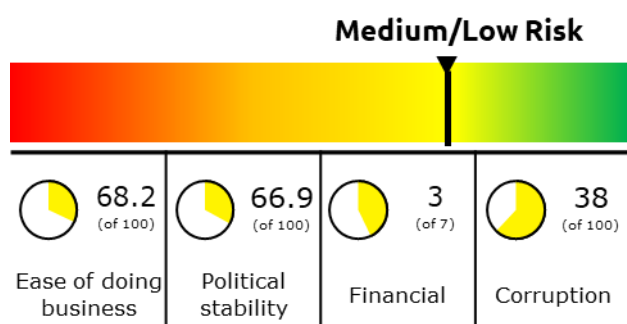


Figure 34 – Risk overview for Indonesia

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Indonesia can be viewed as a low to medium risk market for foreign investors. In the following, these risks will be explained more thoroughly.

#### Ease of doing business

The World Bank ease of doing business score for Indonesia is 68.2 of 100, which reflects a relatively conducive regulatory environment. The country ranks 73 out of 190 countries assessed. Indonesia scores high on the activities of getting electricity and paying taxes while enforcing contracts and registering property gets a lower score.

#### Political stability

Indonesia's score on the Marsh's Political Risk Index 2019 is 66.9. The score reflects several geopolitical conditions:

Indonesia is still a relatively new democracy struggling to reduce corruption and implement economic reforms. Residual separatist sentiment in parts of the country is largely contained, although Indonesia continues to face the risk of extremist attacks due to religious tensions. However, the recent presidential elections there have been

prospect of political Islam and identity politics gaining traction in the country. Economic nationalism could also feature more prominently.

#### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Indonesia is classified in OECD country group 3.

The country is classified as lower/medium investment grade (BBB) on sovereign credit ratings. Strong economic prospects caused rating agencies to upgrade Indonesia to a BBB credit rating in 2019. Implicitly, off-taker will have credit rating equal to or below the sovereign credit rating. A lower investment grade opens for commercial bank financing on most projects but may at times be challenging. Export credit agency financing should be possible for most projects.

#### Corruption risk

According to the Transparency International Corruption Perception Index (CPI) of 2018, Indonesia scores 38 of 100, which is below the Asian Pacific region average of 44. The country is rising slowly, yet continuously and were in 2019 ranked 4<sup>th</sup> in Southeast Asia and ranked 89 out of 180 countries assessed globally.

The ranking indicates that the country is perceived to have a high degree of corruption in the public sector. The efficiency of business operations is restricted by a corrupt judiciary, complicating the process of dispute settlement and weakening property rights protections. Bribery in Indonesia's public service is a reason for concern for foreign investors. Corruption at the borders is cited by companies as a problem, and public officials often exploit ambiguous legislation to extort informal payments and bribes from companies in the process of registering a business, filing tax reports or obtaining permits and licenses. Corruption is also rampant in the natural resources sector owing to weak oversight. The Law criminalizes major acts of corruption including active and passive bribery, abuse of office, and extortion, and forbids embezzlement and gifts to public officials. Unfortunately, corruption legislation is poorly enforced and does not address facilitation payments.





PHILIPPINES

Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	82.6	0
Population in 2018 [Million]	106	2.6% annually
GDP per capita in 2018 [USD]	3099	6.2% annually
Share of Hydro in power mix [%]	15.5	No target
Power access in 2018 [%]	95.3	No target

There are few concrete signals that the power demand in the Philippines will grow significantly outside industry demand in the following years, still with the growth in population and GDP, a stable but small growth may be expected. Currently, hydropower makes up around 15% of the total installed energy capacity of the country, with several hydro projects in the pipeline, this share is not expected to decline.

Estimated installed hydropower capacity totaled 3711 MW, as shown in Figure 35. About 275 MW of the existing hydro capacity is at units more than 40 years old.

Moreover, the country has several new pumped-storage schemes are at various stages of development, and the country has significant small hydropower potential.

Hydropower Capacity Forecast

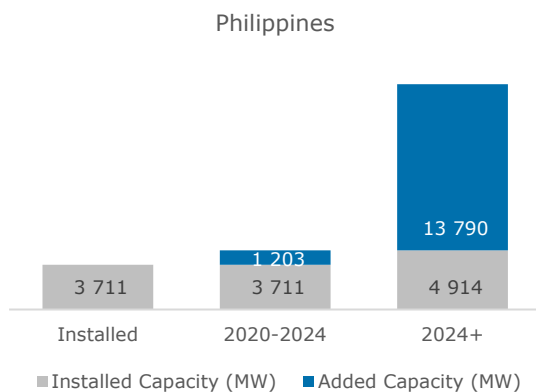


Figure 35 – Hydropower Capacity forecast 01.01.2020

In the short-term, The Philippines plan add around 1.2 GW of hydropower, with majority coming from the 600 MW Gened 1 Hydroelectric Power Project expected to be fully operational by 2023. The Philippines have done an extensive mapping of potential hydropower plant sites beyond 2024. It is estimated that over 13 000 MW of added capacity could be installed, with the Kibungan, Balintongan,

and Dambo being the largest projects adding a total capacity of 2700 MW.

Distribution of Hydropower plant sizes

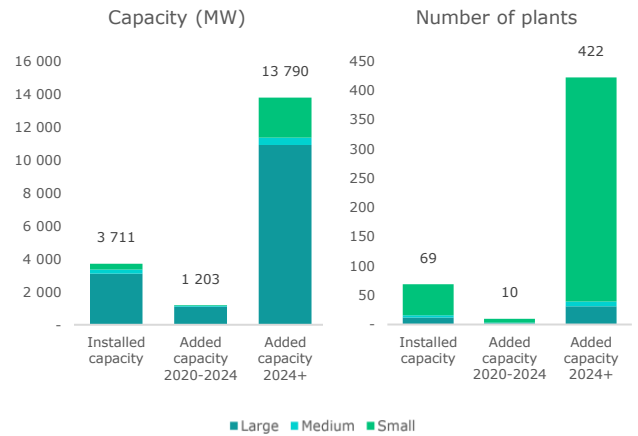


Figure 36 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Interestingly, over 300 sites where small hydro plants potentially can be developed exist, but the large sized plants still make up most of the expected 13 790 MW added capacity in the future.

Electricity grid considerations

Inadequate transmission capacity is a persistent issue in the Philippines, with common brownout and drops in voltages. The grid as many weaknesses and bottlenecks, which has resulted in many plants being named “must-run” to maintain security of supply. The fact that the three main grids are not connected is a large part of the issue. This gives hydropower plants an opportunity to sell power at a premium at the promise of delivering reliable power. However, NGCP have recently announced a P463 billion investment in the next decade in order to significantly improve grid reliability, including the long overdue interconnections such Mindanao-Visayas interconnection, largest energy infrastructure project in the nation’s history. In NGCP’s plan there are several further projects that will improve the transmission backbones and provide alternative transmission corridors to increase resilience.

Market structure

The Department of Energy (DOE) is the lead government agency for overall power and energy policy directions and granting to certificate of eligibility (COE). The Energy Regulatory Commission (ERC) is the government’s independent regulator for electricity rates and tariff. The Department of Environment and Natural Resources (DENR) grants environmental clearance certificates. The National Water Resources Board (NWRB), under the Department of Environment and Natural Resources, is the national authority in charge of the water



sector. The National Grid Corporation of the Philippines (NGCP) is the transmission system operator on behalf of the state-owned National Transmission Corporation (TransCo). Power generation is regulated by the Energy Regulatory Commission (ERC). The Department of Energy (DoE) is responsible for the implementation and supervision of the energy policy. The state-owned National Power Corporation (NPC) is responsible for expanding electrification throughout the Philippine archipelago.

#### *Active private players*

Several private companies operate hydropower plants in the Philippines

- First Gen Luzon Power Corporation operates the 900 MW Balintingon plant
- J Power and Sumitomo Corporation cooperates on two powerplants with a total capacity of 780 MW
- Pan Pacific Renewable Power Philippine Corp plans the 600 MW Gened 1 Hydroelectric Power Project
- Olympia Violago Water and Power, Inc plans the 500 MW Wawa Dam
- San Roque Power Corporation operates the 435 MW San Roque plant

Other companies working with renewables in the country include Andritz, Voith and Tractebel.

On the financial side, the Green Development Fund support investments in renewables in the Philippines. Previously, International development banks such as the World Bank was financing hydropower development in the Philippines. Today, local banks and international investment and commercial banks like Deutsche, JP Morgan Chase and Standard Chartered are present in the country, but not necessarily to invest in hydropower. The country is open to Chinese investments.

### **Governmental Requirements and Regulations**

#### *Relevant laws and regulations*

The Electric Industry Reform Act (EPIRA, Act 9136 of 2001) liberalized the power industry and restructured the vertically integrated National Power Corporation (NPC) by allowing for a new grid management concessionaire, separating power generation from transmission, forming a power market and mandating the privatization of power assets to encourage competition. The Renewable Energy Act (Act 2046 of 2008) provides the legal and institutional framework necessary for harmonizing policies on the development of renewable energy technologies. The main features of the act are:

- Renewable Portfolio Standards (RPS) requires suppliers of energy to get a given portion of their energy from renewable energy
- Renewable Energy Market (REM): The venue for the trading of RE certificates
- Green Energy Option (GEO) gives end-users the option to select their electricity requirements sourced from RE firms
- Transmission and distribution developments aims to level the opportunity between renewables and non-renewables
- RE generation in missionary and off-grid missionary areas shall be eligible for the provision of RE certificates
- Reduction of government share from proceeds of RE development
- Preferential dispatch for intermittent and FIT-qualified resources

The Philippine Energy Plan (PEP) is a 2017-2040 blueprint that aims to ensure security of supply and increase access to energy through greater development of indigenous resources. To reduce its heavy reliance fossil fuel imports, the Government has set an ambitious target of increasing installed renewable energy capacity to at least 20 GW by 2040, where hydropower will play an active role.

To complement this, The Department of Energy issued the draft RPS rules which require all electric power distributors and generators to ensure a minimum share of renewable energy in their power portfolios. Entities covered by the RPS would be required to have their renewable energy portion of annual incremental electricity sales/generation equivalent to a minimum 2.15% of their total electricity sales/generation in the previous year.

#### *Power Purchasing Agreements*

The Power Sector Assets and Liabilities Management Corporation both sells government-owned power sector assets and controls the capacity contracted to the government by the private sector under long-term power purchase agreements (PPAs). The PPAs are bankable and usually payed in local currency. However, PPAs are not common in the Philippines, as the market is well-established and a PPA is viewed unnecessary for most players involved. Power producers are payed for the effect they contribute to the networks and are often paid well for delivering reserve capacity.

#### *Investment considerations*

Several incentives exist for hydropower investments in The Philippines:

*Feed-in tariff/premium payment:* A policy that offers feed-in tariffs to solar, wind, biomass and hydro

energy for 20 years. FIT rates are PHP 5.8 for small hydro (run of the river).

**Tax incentives:** The mini-hydro law (Act 7156 of 1991) gives developers of mini-hydro plants special privilege tax rates, income tax holiday for seven years from start of commercial operations, tax- and duty-free importation of machinery, tax credit on domestic capital equipment

**Tendering:** The Department of Energy is planning to auction off renewable energy capacity to encourage developers to put up renewable energy projects.

**Public investment, loans or grants:** The Renewable Energy Act (2008) encourages the involvement of the private sector in renewable energy production through fiscal and non-fiscal incentives, including funding assistance from both government and third parties.

### Risk Assessment

The Philippines is an attractive destination for foreign investors due to its young work force, its central geographical location in Asia, its continuing process of economic liberalization and deregulation, and its membership in the ASEAN Economic Community. Despite its attractiveness, bureaucracy and corruption remains challenges for foreign investors along with non-competitive tax rates, multiple taxation and mandatory contributions. Finally, the country has the highest prices of electricity in the ASEAN.

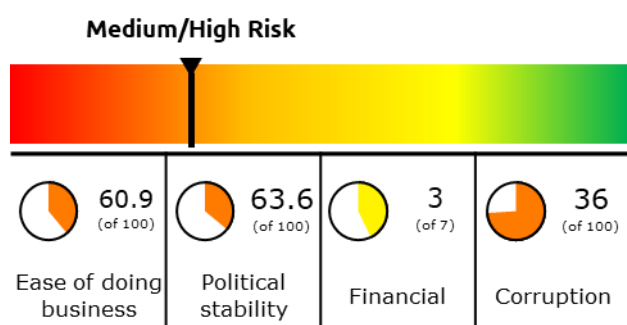


Figure 37 – Risk overview for Philippines

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, the Philippines can be viewed as a medium to high risk market for foreign investors. In the following, these risks will be explained more thoroughly.

#### Ease of doing business

The World Bank ease of doing business score for Philippines is 60.9 of 100, which reflects a relatively conducive regulatory environment. The country ranks 95 out of 190 countries assessed. Philippines scores relatively high on the activities of starting a

business, dealing with construction permits, getting electricity and paying taxes, while they receive a lower score on the activity of getting credit, enforcing contracts and resolving insolvency.

#### Political stability

The score of the Philippines on the Marsh's Political Risk Index 2019 is 63.6. The score reflects several geopolitical conditions. Firstly, the business environment has been deteriorating, and the president's public outbursts on various topics have strained political certainty. Secondly, the administration is attempting to introduce federalism and a victory during the mid-term election in May 2019 would bode well for these attempts. The system of checks and balances in the country, however, would increasingly be at risk. Thirdly, the separatist movement in the Southern Philippines led by the Moro Islamic Liberation Front (MILF) still merits attention. Finally, although a more friendly postures has been adopted towards Beijing, the Philippines still faces tensions with China over maritime disputes in the South China Sea and could therefore get caught up in a regional conflict.

#### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Philippines is classified in OECD country group 3. The country is classified as lower medium grade on sovereign credit ratings. Standard & Poor, Moody and Fitch all give Philippines a BBB rating of credit worthiness. Implicitly, off-taker will have credit rating equal to or below the sovereign credit rating. A lower investment grade opens for commercial bank financing on most projects but may at times be challenging. Export credit agency financing should be possible for most projects.

#### Corruption risk

According to the Transparency International Corruption Perception Index (CPI) of 2018, The Philippines scores low, 36 of 100, indicating the presence of corruption in the country (ranked 99 out of 180 countries assessed). The score is below the average of 44 in the Asia Pacific region. Additionally, The Philippines scores high in money laundering and terrorist financing risk (ranked 43 out of 125 countries), according to a report issued by the Basel Institute of Governance in August 2019.

EUROPE



SWITZERLAND

Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	62	NA
Population in 2018 [Million]	8.5	0.9% annually
GDP per capita in 2018 [USD]	83583	2.5% annually
Share of Hydro in power mix [%]	52.6	No target
Power access in 2018 [%]	100	No target

There are no signs that the power demand in Switzerland will grow significantly in the following years due to the universal access to electricity and a relatively low GDP growth. Currently, the 17 763 MW of installed hydropower capacity generates over 50% of the total energy in Switzerland. There is a plan to reduce production from nuclear energy which may see hydropower share increase in the long term. The country aims to increase average hydropower production to 37400 GWh by 2035 and to 38600 GWh by 2050 through the renovation and expansion of existing plants and the installation of new capacity where environmentally feasible. The development of small hydro will be supported with a raft of measures such as higher offtake prices, simplified permitting procedures and their integration into the plan for the promotion of renewable energy.

Hydropower Capacity Forecast

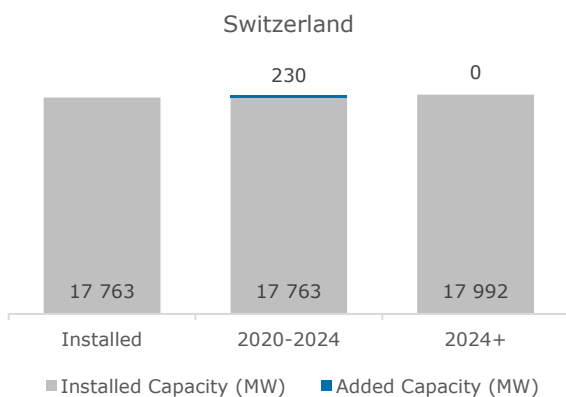


Figure 38 – Hydropower Capacity forecast 01.01.2020

Figure 38 shows that the total installed hydropower capacity in Switzerland is expected to remain steady in the short and long term, with only 230 MW of capacity being planned to be added to the current 17 763 MW.

Distribution of Hydropower plant sizes

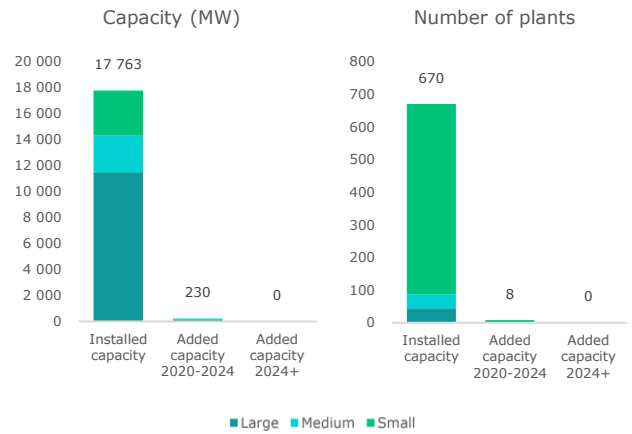


Figure 39 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

As displayed in Figure 39, large sized plants make up most of the installed capacity in Switzerland, which also has over 500 operational small hydro plants.

Electricity grid considerations

There are no significant transmission or distribution issues that will greatly affect the planned hydropower generation increase in Switzerland.

Market structure

Governing bodies and organizations

The Swiss Federal Office of Energy (SFOE) is the national authority responsible for issues related to energy supply and energy use at the Federal Department of the Environment, Transport, Energy and Communications (DETEC).

The Swiss Federal Electricity Commission (EiCom) is Switzerland’s independent regulatory authority in the electricity sector. Swissgrid is the transmission grid operator. Axpo Power is the single largest power producer.

The main regulatory authorities are the Swiss Federal Office of Energy (BFE), the Federal Electricity Commission (EiCom), the Federal Inspectorate for Heavy Current Installations (ESTI), the Competition Commission and the Federal Office for the Environment.

The BFE is a competence center for issues relating to energy supply and energy use. They are responsible for creating the prerequisites for energy supply, ensure safety standards related to energy production, creating conditions for an efficient market and an adapted infrastructure, increasing share of renewable energy use and promoting national energy research.

### Active private players

The six major Swiss electricity companies ATEL, BKW, CKW, EGL, EOS and NOK are joining forces in the organization of the Swiss electricity companies (swisselectric) based in Bern. Swisselectric is committed to the Electricity Market Act (EMG) and its optimal implementation is in the interest of a secure and competitive electricity supply in Switzerland.

### Governmental Requirements and Regulations

#### Relevant laws and regulations

The main legislation for electricity is the Electricity Supply Act together with the Electricity Supply Ordinance. These two pieces of legislation partly introduce liberalization of the electricity market in Switzerland.

The Energy Act sets out the requirements and provisions on the economical and rational use of energy and the promotion of renewable energies. The Electricity Act is mainly relevant to grid construction.

Depending on the size of the hydroelectric power station, different permits from different authorities are needed. Hydropower plants with an installed generator power of 10 MW are considered large-scale. Because the cantons and municipalities own public waters, the legal regime for hydropower is predominantly found on the cantonal and municipal level. Generally, a cantonal construction permit and a concession for water use are needed.

In general, there are no restrictions on foreign ownership of electricity companies or assets. However, around 88% of the capital of Swiss electricity companies is state-owned, 7.8% belongs to private Swiss investors and only 4.2% of the capital is held by foreign investors. By contrast, Swissgrid, the Swiss national grid company, is subject to restrictions on foreign ownership. Swissgrid must ensure most of its capital and related voting rights belong to the cantons and communities.

#### Power Purchasing Agreements

As most established markets, Switzerland has a deregulated market where PPAs are uncommon and electricity is usually sold at spot price.

#### Investment considerations

The main incentive for investments in hydro power is the feed-in tariff: Since May 2008, the EnG grants producers of electricity generated from renewable energy sources a feed-in tariff for a period of up to 25 years. The prices are as following:

- < 30 kW – 0.062 CHF/kWh
- < 100 kW – 0.045 CHF/kWh

- < 300 kW – 0.029 CHF/kWh
- > 300 kW – 0.016 CHF/kWh

Also, tradable RECs are Available in Switzerland.

### Risk Assessment

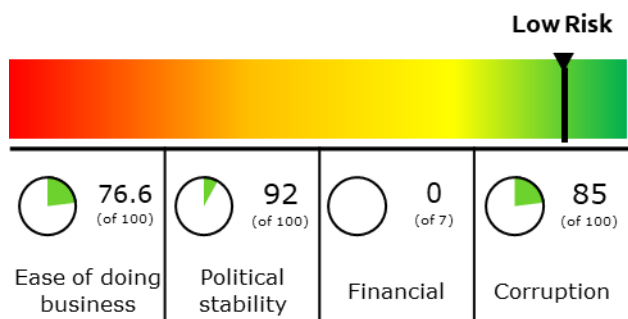


Figure 40 – Risk overview for Switzerland

Switzerland is an attractive destination for foreign investors because of its economic and political stability, transparent and fair legal system, reliable and extensive infrastructure and efficient capital markets. Despite its attractiveness, FDI flows to Switzerland remain highly volatile due to the country's large exposure to international trade dynamics and political stability.

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Switzerland can be viewed as a low risk market for foreign investors. In the following, these risks will be explained more thoroughly.

#### Ease of doing business

The World Bank ease of doing business score for Switzerland is 77.6 of 100, which reflects a strong regulatory environment. The country ranks 36 out of 190 countries assessed. Switzerland scores high on the activities of starting a business, registering property, paying taxes and trading across borders, while they receive a lower score on the activity of getting credit, protecting minority investors, enforcing contracts and resolving insolvency.

#### Political stability

Switzerland's high short- and long-term political risk index score of 76.6 reflects broad political consensus within the country, ensuring a high degree of stability. A system of referenda ensures a high degree of civic involvement, although at times poses risks to the economy.

#### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Switzerland is classified in OECD country group 0. Standard & Poor, Moody and



Fitch all give Switzerland a AAA, prime investment grade, rating of credit worthiness. Commercial financing of projects will not be an issue.

*Corruption risk*

According to the Transparency International Corruption Perception Index (CPI) of 2018, Switzerland scores high, 85 of 100, indicating minimal presence of corruption in the country (ranked third out of 180 countries assessed). The score is above the regional average of 66 in Western Europe. Additionally, Switzerland ranks among other European countries in money laundering and terrorist financing risk (ranked 78 out of 125 countries), according to a report issued by the Basel Institute of Governance in August 2019. Corruption does not impede business in Switzerland. Interactions with public officials are transparent, and corruption is not common to any public sector. Bribery in the private sector is a concern given the sensitivity to bribery of some industries which are well represented in the country and the importance of Swiss financial institutions for the international financial system.

**South America**



BRAZIL

**Market Overview**

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	530	2.3% annually
Population in 2018 [Million]	210	2.5% annually
GDP per capita in 2018 [USD]	9127	2.9% annually
Share of Hydro in power mix [%]	66	No target
Power access in 2018 [%]	~100%	No target

The power demand in Brazil is expected to grow by 2.3% in the next years. Currently, power from hydro plants make up around two thirds of the total power production in the country. Hydroelectric power will remain dominant in future electric supply in Brazil but is expected to somewhat decline because of the high growth-rates in wind, solar and bio-energy. In 2027, renewable sources are expected to reach 86.5% of the total electrical supply in the country.

Brazil is the world's third largest country in hydropower capacity after China and Canada. The country has a long history with hydropower and are still expanding their capacity. The country has built several large facilities with several GW capacity. The

largest plants include Belo Monte (11233 MW) at the river called Rio Xingú, Tucuruí (8535 MW) at the river Rio Tocantins, and Itaipu (7000 MW) in Paraná.

Currently, the installed capacity is around 110 GW as shown in Figure 41 below:

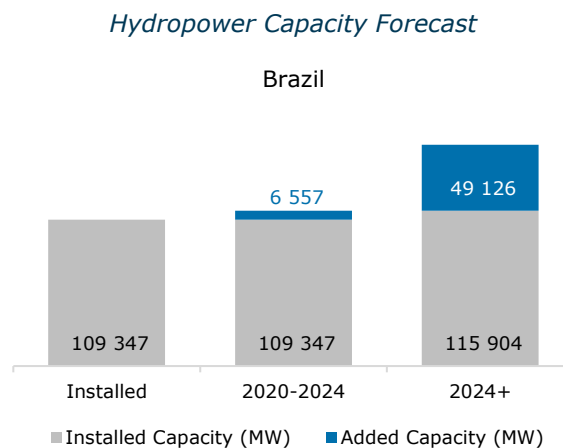


Figure 41 – Hydropower Capacity forecast 01.01.2020. Note: The Government of Brazil has mapped locations suitable for hydropower development. If the identified potential will ever be developed is highly uncertain.

In the short-term (2020-2024), Brazil is planning on adding around 6.5 GW of capacity. In the long-term Brazil have the potential to add over 50 GW of hydropower capacity. The majority of the potential new capacity after 2024 will continue to come from +100 MW plants as today:

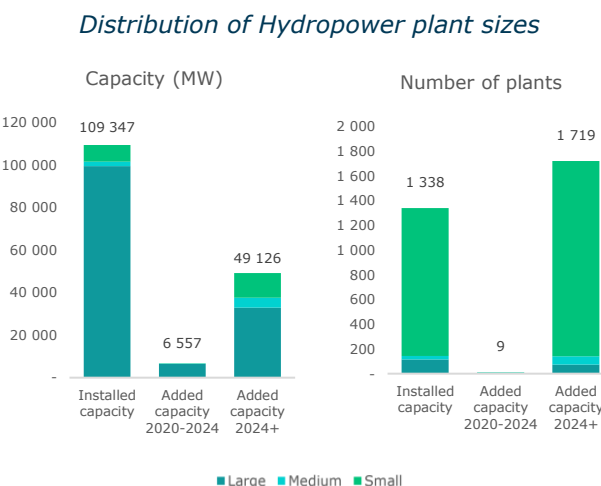


Figure 42 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

Currently, only thirty plants account for around 100 GW of the total capacity. There is a low number of medium sized plants between 50 and 100 MW, where small plants represented the majority at over 1200.

*Priority projects*

No hydropower projects in Brazil have been identified as priority projects.



### *Electricity grid considerations*

Due to the vast energy reserves in Brazil, the transmission system has at times been inadequate, delaying several projects. To counteract this, Brazil now requires projects involved in auctions prove that transmission lines are already secured before participation. However, Brazil continues to struggle with energy loss (around 15%) partly due to aging long-distance transmission lines. To combat this, Brazil is continuously providing significant investment into grid rehabilitation and expansion, both through private concessions and government funding. Current issues are not likely to cause immediate issues for hydropower expansion and megaprojects will continue to package transmission connection together with hydropower plant development.

### **Market structure**

The Ministry of Mines and Energy (MME) is responsible for formulating and implementing national policies on the energy sector. The ANEEL is a special independent body linked to the MME. It has technical and political autonomy to regulate, supervise and monitor activities related to the energy sector. The National Energy Policy Council (CNPE) is a governmental body that advises the President. The Monitoring Committee for the Electric Sector monitors the continuity and security of electricity, natural gas and oil supply, identifying risks and developing proposals to predict and solve risk situations. The Operator of the National Electricity System (ONS) is a non-profit private entity that manages the national interconnected transmission system (SIN). The ONS is made up of all the agents connected to the basic grid. The Energy Research Company (EPE) is a state-owned company that conducts studies and research to provide technical support for presenting long-term power planning in Brazil. The Electric Power Commercialization Chamber (CCEE) is a non-profit private entity regulated and supervised by ANEEL. It is responsible for registering and processing the volume of all the energy contracted in the electricity power market.

### *Active private players*

Several private companies operate hydropower plants in Brazil, including:

- Companhia Hidro Elétrica do São Francisco operates 38 plants with a total capacity of 10000 MW
- Furnas Centrais Elétricas S.A. operates 24 plants with a total capacity of 10800 MW
- Centrais Elétricas do Norte do Brasil S.A. operates 12 plants with a total capacity of 22500 MW

- Empresa de Pesquisa Energética operates 24 plants with a total capacity of 9600 MW
- Copel Geração e Transmissão S.A. operates 30 plants with a total capacity of 8200 MW

Other companies operating in the renewable energy sector include Enel Green Power, Andritz Hydro, James Walker, Tractebel, Voith Hydro and Statkraft.

### **Governmental Requirements and Regulations**

#### *Relevant laws and regulations*

In accordance to the latest Decennial Plan for Energy Expansion, Brazil expects to reduce up to 37% in greenhouse gas emissions by 2025, by making a commitment to have 91% of all energy generation be of renewable sources at that time.

Over the last 20 years, the energy sector has been restructured and opened to foreign investment in power generation. In this context, the government passed two laws that reshaped the electricity market by establishing that all concessions for major energy services must be granted through a public bidding process. This developed a free energy market, which has become more competitive once some power consumers could purchase energy directly from suppliers. To regulate and supervise this new dynamic, the government passed a new law (No 9.427/1996), creating the National Electric Energy Agency (ANEEL).

Regulation of the electricity sector is based on the Constitution, which sets out the general principles for the use and commercial exploitation of natural resources used in electricity generation. Other laws and rules are created and interpreted in accordance with Constitution.

#### *Power Purchasing Agreements*

Power Purchase Agreements (PPAs) have been procured in Brazil through three different business models:

1. National Tender Model (Regulated Expansion Auction - ACR): Low prices and demand due to economical struggles and high competition are still in question about this model. Prices in 2019 were in the range of 60 – 90 BRL/MWh for 20 years contracts. PPAs awarded are considered risk-free and present high bankability and financial leverage from local development banks.
2. Corporate PPA Model (Free-Market Contracts - ACL): High spot prices and volatility have made the corporate PPA a promising market for the expansion of renewables. Prices in 2019 were in the range of 120 – 145 BRL/MWh for 10 years contracts. PPAs awarded are considered high-risk and present low bankability and financial leverage from local banks.

3. Auto-production Model (Private Wire Arrangements - AP): High spot prices and volatility have made the corporate PPA a promising market for the expansion of renewables. Prices in 2019 were in the range of 120 – 145 BRL/MWh for 10 years contracts. PPAs awarded are considered high-risk and present low bankability and financial leverage from local banks.

#### Investment considerations

Several incentives exist for hydropower investments in Brazil:

**Tax incentives:** The Brazilian government established a package of tax incentives aimed at reducing development costs for large infrastructure projects. All infrastructure projects are eligible for REIDI tax incentives. The key aim of this policy is to reduce development capex for large infrastructure projects. REIDI grants project developers PIS and COFINS taxes exemption, around 9.25%, for the first 24 months of the project's development phase.

Furthermore, the Brazilian government offers exemptions from the ICMS tax for small hydro equipment, so long as it gets used in one of three states: Rio Grande do Sul, Parana and Minas Gerais. The ICMS is a value-added tax on services and circulation of goods that varies by state. The ICMS tax is set at 17% for imported goods. The government defines small hydro as 1-30 MW in size but projects smaller than 1 MW can also qualify for the incentive. The imported goods ICMS exemption is only valid if no similar product is available in the national market.

Lastly, electricity produced from renewable sources with capacity less or equal to 30 MW receives reduction of 50% in the electricity transmission and distribution tariffs. The policy's key aim is to establish incentives for the use of renewable energy generation.

**Tendering:** The Brazilian government contracts renewable energy and renewable capacity through reverse auctions. Contracted renewable energy and renewable capacity will supply the regulated market or 'mercado de contratação regulada' (ACR). The Ministry of Mines and Energy (MME) is responsible for planning and holding the renewable reverse auctions. There are two types of renewable reverse auctions in Brazil:

- Auctions for renewable energy - Serve to meet demand of distribution companies
- Renewable capacity auction - Serve to ensure grid reliability

**Public investment, loans or grants:** The National Bank for Economic and Social Development (Banco Nacional do Desenvolvimento Econômico Social or BNDES) provides a variety of financial programs to stimulate the production of renewable energy. The development of the renewable energies in Brazil is increasing, and almost half of the energy consumed in Brazil is now generated by renewable sources.

#### Risk Assessment

As a result of globalization in Latin America, capital flow has been easier to obtain, and investments have increased in Brazil. Currently, Brazil is competing for foreign investments with other emerging economies, such as India, China and South Africa.

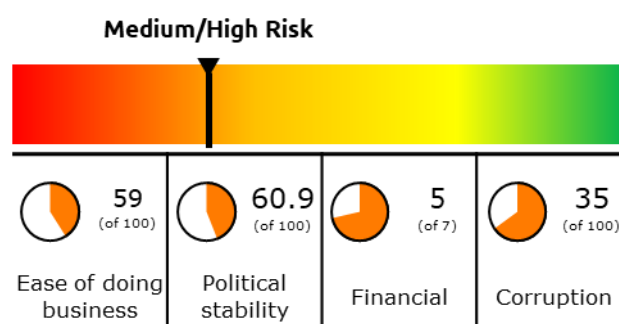


Figure 43 – Risk overview for Brazil

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Brazil can be viewed as a medium to high risk market for foreign investors. In the following, these risks will be explained more thoroughly.

#### Ease of business

The World Bank ease of doing business score for Brazil is 58.6 of 100, which reflects a relatively conducive regulatory environment. The country ranks 124 out of 190 countries assessed. Brazil scores high on the activities of starting a business, getting electricity and trading across borders, while they receive a lower score on the activity of dealing with construction permits, paying taxes and resolving insolvency.

#### Political stability

Brazil's score on the Marsh's Political Risk Index 2019 is 60.9. The score reflects several geopolitical tensions. The election of right-wing populist Jair Bolsonaro in the October 2018 general election broadly supports policy continuity in Brazil. President Bolsonaro is assembling a cabinet committed to pursuing orthodox economic reforms and will likely be able to leverage his popularity to secure a legislative majority in the early part of his administration. However, President Bolsonaro is likely to struggle to deliver reforms significant

enough to satisfy market expectations. A pension reform is likely to provoke significant public pushback, and President Bolsonaro may struggle to maintain a durable legislative coalition. Meanwhile, concerns about President Bolsonaro's perceived authoritarian leanings and illiberal social views could lead to public discontent, if he fails to boost the economy or reduce gang violence.

#### Financing Availability

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Brazil is classified in OECD country group 5.

The country is classified as non-investment grade on sovereign credit ratings. The rating is currently Ba2/BB and the outlooks are stable. Implicitly, off-taker will have credit rating equal to or below the sovereign credit rating. This rating will likely make it challenging to secure financing through commercial banks, especially international banks. Multilateral financing or export credit agencies may be more suitable.

The main cause of the rating is a persistently weak economic growth which limits the upside potential for Brazil's credit profile.

#### Corruption risk

According to the Transparency International Corruption Perception Index (CPI) of 2018, Brazil scores low, 35 of 100, indicating the presence of corruption in the country. The country fell on the rankings and ended at 105 out of 180 countries assessed. However, since the enactment of Brazil's anticorruption law, the country has finally started to speak publicly about corruption. This represents a solid step in the right direction, but unfortunately it also revealed the issue to be systemic, with roots at all levels of government and private enterprise.



### Market Overview

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	60	6.3% annually
Population in 2018 [Million]	18.2	0.9% annually
GDP per capita in 2018 [USD]	16143	4% annually
Share of Hydro in power mix [%]	40 %	48% by 2024
Power access in 2018 [%]	100 %	NA

In Chile, hydro plants contribute to about 40 percent, on average, of national power production. By 2024, the government targets to increase this number to 48%. The power demand in Chile is expected to grow with approximately 6% annually in the next years. A shortage of energy has motivated the inclusion of Aysen province for power production. The development in the region will reduce Chile's reliance on importation of fossil fuel. San Pedro (144 MW), La Punilla (100 MW), Los Lagos (52 MW), Frontera (109 MW) and El Canelo (16 MW) will contribute to reaching the target of 48% of power being produced by hydro plants.

The overall installed capacity from renewables is expected to increase, where there is currently around 7 GW installed hydropower capacity. However, environmental restriction and water shortages will affect future hydro development. In *Figure 44* the forecast of hydropower capacity is displayed:

#### Hydropower Capacity Forecast

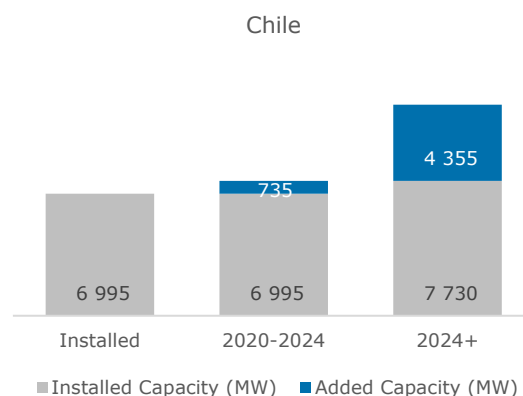


Figure 44 – Hydropower Capacity forecast 01.01.2020.

The completion of the 531 MW Alto Maipo in 2020 will support Chile's plans to increase their installed hydropower capacity. Other projects planned to become operational before 2024 includes Los Lagos (52 MW) and Nido de Aguila (125 MW) that are a part of a total of six projects planned in Cachapoal Valley.

After 2024, The 580 MW Neltume and Choshuenco Hydropower Plant, the 300 MW Espejo de Tarapacá project, 300 MW Condor project, and the 200 MW Teno project will be the largest contributors to the 4355 MW of added capacity planned to be developed after 2024.

### Distribution of Hydropower plant sizes

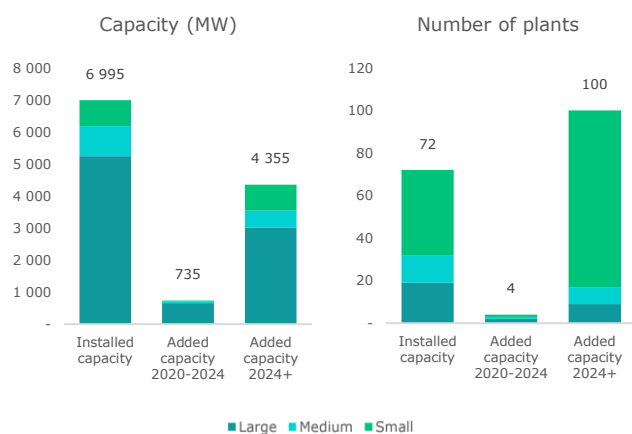


Figure 45 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

As shown in *Figure 45* large hydropower plant accounts for most of the total capacity, both for plants in operation and future plants. The three largest plants in operation is Ralco Hydroelectric Power Plant (690 MW), Pehuenche Hydroelectric Power Plant (570 MW), and Pangué Hydroelectric Power Plant (467 MW).

Beyond 2024, over 80 locations for small hydro plants, 8 locations for medium sized plants, and 9 potential sites for developing large hydropower plants have been identified.

### Priority projects

Four hydropower projects in Chile have been identified as priority projects:

- The 580 MW Neltume and Choshuenco Hydropower Plant, contracted by Endesa, is still in an early development phase
- The 125 MW Nido de Aguila project in the Cachapoal Valley is under construction by the Astakdu Group
- The 109 MW Frontera Hydropower plant is still in early planning
- The 58 MW Osorno plant by Statkraft is in a late planning phase

### Electricity grid considerations

Due to Chile's extreme north-to-south length, national transmission has previously been somewhat restricted, causing project bottlenecks. In the last few years, Chile has reformed its transmission system/structure and provided significant investments to be able to handle expected future

generation capacity. It is not expected that hydropower expansion will be significantly restricted by transmission or distribution grids.

### Market structure

The Ministry of Energy is the governmental entity in charge of the preparation and coordination of national plans, policies and regulations for the development of the energy sector. The National Energy Commission is a governmental entity in charge of analyzing prices, tariffs and technical norms that must observe the companies that produce, generate, transport and distribute energy. The Superintendency of Electricity and Fuels is the governmental entity in charge of supervising compliance with legal provisions on generation, transmission, distribution, storage of liquid fuels, gas and electricity, including quality of services and safety of activities. The Independent Coordinator of the National Electricity System is not a governmental entity, but an independent legal entity established by law with the main purpose of coordinating the operation of all national electricity system facilities in an efficient and safe way.

### Active private players

- AES Gener develops two plants at Alto Maipo (531 MW) – Alfalfal II (264 MW) that are expected to be completed in 2020
- SN Power together with Centila G. Pavez develops the Neltume and Choshuenco (580 MW)
- Energia Austral develops Cuervo (640 MW)
- Pacific Hydro are involved in the development of the hydropower plants develops the Alto Cachapoal Valley

### Governmental Requirements and Regulations

#### Relevant laws and regulations

The energy sector in Chile was privatized in the late 1980s. The Electricity Law is the main body of law that regulates the electricity market in Chile. It restricts the degree to which a company can engage in vertical integration within the generation, transportation and distribution segments of the energy sector. If a generation facility is connected to the national grid, the owner or operator of it is subject to the instructions of a corporation called the Independent Coordinator of the National Electricity System (ICNES).

In 2007, a reform to the Electric Law, aimed at promoting the use of non-conventional renewable energies (NCRE) was approved. On that occasion it was established as a goal that by 2024 10% of the energy used in Chile would come from NCRE sources. In 2013, Article 150bis was amended and a new target set so that by 2025, at least 20% of energy



was injected from non-conventional renewable energy. Moreover, there are no restrictions on foreign ownership of electricity companies or assets. However, generation companies must be established under Chilean law.

*Power Purchasing Agreements*

Private companies may enter into power purchase agreements (PPAs) with NCRE generators, without the intervention of the authority. Additionally, the Ministry of Energy has enabled public biddings organized by private companies, qualified as free clients, to satisfy their energy demand.

The Chilean energy sector is lightly regulated, and energy producers are to sell 'blocks' of power to the spot and others under the contract model of their preference. The PPAs for supplying energy to regulated customers are usually preceded by public tender procedures. Generally, there is a lack of private PPAs from the government. On the other hand, generally, non-regulated customers call for public or private bidding processes, whether they are in need or excess of power, and subsequently enter PPAs with the successful bidders from such processes.

In current market conditions, one of the challenges NCRE projects face is to secure a long-term PPA with creditworthy companies that will enable a project finance structure. Consequently, the industry has adopted an alternative hedge mechanism with contracts for difference (CfD). A CfD, is a financial contract that works as an insurance for the buyer and seller where one of the parties agrees to cover the difference between the marginal cost of electricity and the strike price initially agreed upon.

*Investment considerations*

Since 2005 the Invest Chile Project partially subsidizes pre-feasibility and pre-investment studies (support capped at USD 160,000 per project). The Invest Chile Project was continued in 2012 by the Support for Non-Conventional Renewable Energy Development Program, with a USD 85 million budget. The 2014-2018 Energy Program aims at strengthening support schemes for pre-investment in renewable electricity generation. The electricity generated by hydropower projects under 20 MW are eligible for Chile's quota obligation. Hydropower projects between 20 MW and 40 MW are partially eligible.

Several other incentives exist for hydropower investments in Chile:

*Tax incentives:* 100% transmission charge exemption for renewable energy projects smaller than 9 MW. Partial exemption granted to projects

between 9 and 20 MW capacity. The non-conventional renewable energy (NCRE) sources are: wind, biomass, tidal, small hydro, solar and geothermal. The partial exemption is calculated as proportional adjustment from 100% for 9 MW and 0% for 20 MW or more.

*Tradable REC:* Chile is the only country in the region with a pure renewable energy certificate system. Under the current support regime, parties who are subject to the renewable's obligation can comply by collecting green certificates, either issued to them or purchased from the market.

*Tendering:* Auctions and tendering schemes for renewable energy sources (RES) are competitive mechanisms for allocating financial support to RES projects, usually based on the cost of electricity production. In auctions, the price is the only criterion to be evaluated, while tenders may include additional criteria.

*Public investment, loans or grants:* To address key finance barriers to renewable energy and energy efficiency deployment in Chile, the Chilean Economic Development Agency (CORFO) implemented a concessional loan program to support commercial banks in providing low interest loans for renewable energy and energy efficiency technologies.

**Risk Assessment**

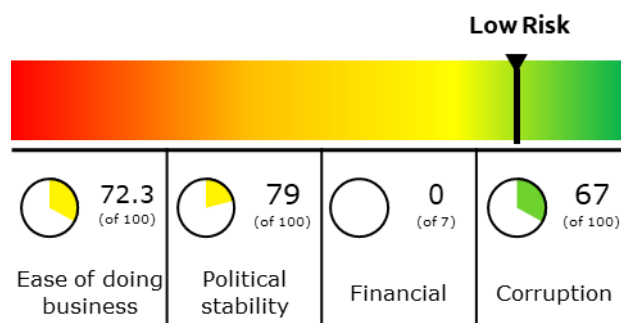


Figure 46 – Risk overview for Chile

Chile is regarded as a strong investment destination in South America. Some benefits of investing in the country includes their recent strong economic performance, the vast amount of natural resources and the friendly government. On the other hand, some risks are present for example the country's reliance on exports, moderate geopolitical risk and the corporate policies.

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Chile can be viewed as a low risk market for foreign investors. In the following, these risks will be explained more thoroughly.



### *Ease of doing business*

The World Bank ease of doing business score for Chile is 72.6 of 100, which reflects a relatively conducive regulatory environment. Of 190 countries assessed, Chile is ranked as 59. The country scores high on the activities of starting a business, getting electricity, and trading across borders, while they receive a lower score on the activity of getting credit, enforcing contracts, and resolving insolvency.

### *Political stability*

Chile's score on the Marsh's Political Risk Index 2019 is 79. In general, Chile is one of the most stable countries in South America. However, with the end of the 2000s commodities boom, economic growth has slowed, bringing inequality and the perceived shortcomings of the social safety net to the center of national political discourse. This has led to a student protest movement, fracturing Chile's traditionally pro-free market consensus. The protests in 2019 raised concerns about the country's political stability, especially the associated acts of violence that have led to multiple deaths and thousands of injuries.

While current President Sebastián Piñera's pro-investment policy preferences are broadly positive for economic growth, he faces a highly divided policymaking environment that will limit his ability to enact policy changes. Fitch Solutions expects that debates over reforms to Chile's pension, taxation, healthcare and education systems will dominate the country's political scene during 2020 and beyond.

### *Financing Availability*

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Chile is classified in OECD country group 0, together with most western countries. The country is classified as high investment grade (A/A+) on sovereign credit ratings. Implicitly, this means off-taker credit rating will be equal or lower than sovereign credit rating. Commercial financing should be possible on most projects, if not export credit agency financing will also be a possibility. The credit profile of Chile is supported by the country's high economic strength, which balances strong macroeconomic fundamentals and growth rates like peers with comparatively low-income levels and commodity dependence.

### *Corruption risk*

According to the Transparency International Corruption Perception Index (CPI) of 2018, Chile scores 67 of 100, indicating that the existence of corruption in the country is relatively low (ranked 67 out of 180 countries assessed). However, 2019 was a turbulent year in Chile where several protests were

held. An important cause of the unrest is Chileans' anger at corruption and impunity. In addition, victims and witnesses of corruption, as well as whistleblowers have no legal protection in Chile. Important steps forward include ending impunity and rigorously prosecuting corruption crimes and ensuring that anti-corruption measures are effective in the long term by protecting those who witness and report corruption.



### **Market Overview**

Macro-Economic Figures	Current	Estimated growth
Power demand [TWh]	44.8	5.8% annually
Population in 2018 [Million]	32	0.2 annually
GDP per capita in 2018 [USD]	7118	3.9% annually
Share of Hydro in power mix [%]	55.2	No target
Power access in 2018 [%]	96.4%	NA

The energy mix in Peru has for long been divided between hydropower and thermal energy. To reduce the country's reliance upon hydroelectricity the Peruvian government has encouraged greater investment in gas-fired power plants in the recent years. Increasing use of gas in electricity generation poses a threat for hydropower development, but the country has still great potential for utilizing its natural resources to generate power from hydroelectric plants.

Currently, about 10% of the installed hydropower capacity is in the north, 75% is in the center and 15% is in the south of the country. The power demand in Peru is expected to grow by approximately 6% annually in the next years and the government's overall aim is to become self-sufficient in energy and to meet Peru's current and future demand in a reliable and efficient way, based on planning and diversifying the power supply. Several hydropower projects are under construction today and the potential for developing more plants after 2024 is present. The Peruvian ministry of energy and mines has identified eight prioritized locations for further hydropower development. In addition, the ministry has identified over 500 potential hydropower sites with a total capacity of over 20000 MW. In *Figure 47*, the forecast of hydropower capacity is displayed:

### Hydropower Capacity Forecast

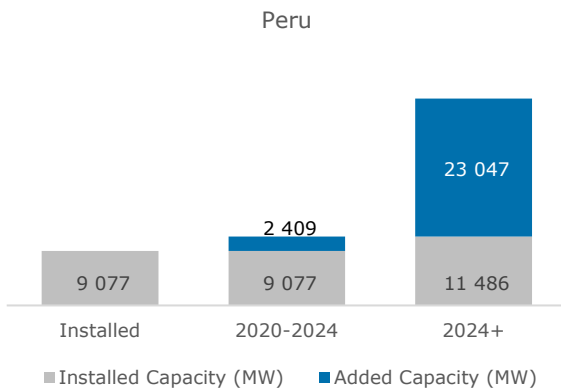


Figure 47 – Hydropower capacity forecast 01.01.2020.

Hydropower projects in late planning or under construction accounts for the planned added capacity before 2024, a total capacity of 2409 MW as shown in Figure 47. After 2024, plants in the early planning stages or hydropower sites prioritized by the Government accounts for approximately 5000 MW of added capacity. The remaining potential of 18000 MW is hydropower sites identified by the Peruvian Government, but not prioritized in the nation’s plans of hydropower development as of now. See Figure 48 below for the distribution of current and future potential hydropower plants:

### Distribution of Hydropower plant sizes

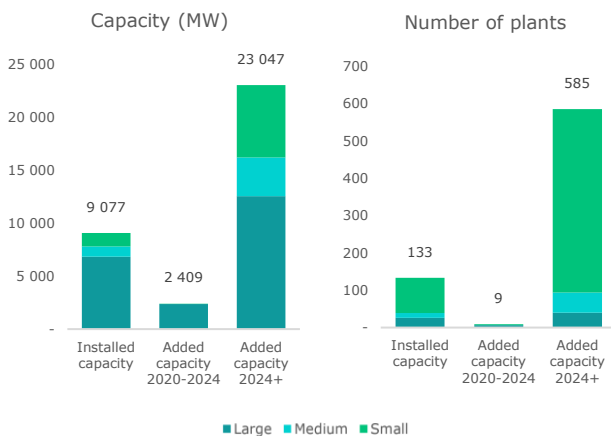


Figure 48 – Distribution of hydropower plant sizes. Small (0-50 MW), Medium (50-100 MW), Large (+100 MW).

As shown in Figure 48, large plants accounts for most of the country’s current and future hydropower capacity. Most of the identified hydropower sites after 2024 are below 50 MW. Projects currently under construction includes Mages Siguas II (480 MW), Anto Ruiz Complex (240 MW), and Pucara-Acco (180 MW). Other major projects in the late planning phase includes Veracruz (635 MW), Chadin II (600 MW), and Santa Teresa II (280 MW).

### Priority projects

No hydropower projects in Peru have been identified as priority projects.

### Electricity grid considerations

There two main power transmission grids in Peru, one covering the center and north which is interconnected to the southern grid. With near universal access to electricity and low population growth, there has been issues with oversupply of power due to lack of industry growth. In order to provide more flexibility in balancing loads, Peru has added interconnections with Chile and have initiated plans to create interconnections with Colombia as well. The country will need to continue to invest in grid, both transmission and distribution, in order to make sure it will not restrict further hydropower generation.

### Market structure

The Ministry of Agriculture is responsible for the country’s water resource policy, while water management is under the Intendencia de Recursos Hidricos, planning is under INADE (Instituto Nacional de Desarrollo), and supervision is under INADE and SUNASS (Superintendencia Nacional de Saneamiento). Generation, transmission and distribution functions are separated. Policy and guidelines are established by the Ministry of Energy and Mines (MINEM).

### Active private players

Several private companies operate hydropower plants in Peru, including:

- Cerro Del Aguila S.A. operates the Huancavelica, Tayacaja, Colcabamba a Surcubamba plants, with a total capacity of 513 MW
- Empresa de Generacion Huallaga S.a. operates the 456 MW Huánuco, Huánuco y Pachitea, Chinchao, Chaglla y Umari plants, with a total capacity of 456 MW
- Enel Generacion Peru S.A.A. 5 plants with a total capacity of 701 MW
- Statkraft Peru S.A operates five plants with a total capacity of 410 MW

Other global energy companies such as Enel Green Power, Tractebel and Voith Hydro are present in the country.

### Governmental Requirements and Regulations

#### Relevant laws and regulations

The Electric Concession Law (Decree-Law 25844 of 1993) provides the legal framework for the electric sector in Peru. The law states that a definitive

concession is required for the development of electric generation energy that uses hydraulic and other renewable resources (for installed power over 500 KW). The Law on the Regulatory Framework on Investment in Public Services (Law No 27332) sets the conditions were set for further investment into electricity generation and transmission.

From According to the national energy policy, one of the main objectives is to have a diversified energy mix, with emphasis on renewable energy and energy efficiency. In order to expand coverage, the Government of Peru has implemented a national energy plan (NEP) whose objective is to increase the national electrification rate. The plan is backed by the Rural Electrification Law (No.27744), which states that electrification of rural areas, and isolated localities in the country are a national need and are publicly required. The Law also enforces the use of renewable sources for rural electrification such as: wind, geothermal, solar, water and biomass sources.

**Power Purchasing Agreements**

The country has access to cheap energy from natural gas and a PPA is often viewed as a necessity for hydropower investors to secure viable prices. Peru sells hydropower projects through auctions. To participate in the auction process, bidders must comply with strict technical requirements. These range from providing evidence of renewable resource investigations lasting at least one year, compliance with COES standards and equipment specifications and pre-feasibility studies. Bidders are also required to submit various financial guarantees. They include a bid and a performance bond calculated per MW of capacity contracted and installed. This is to ensure that successful bidders sign the PPA, as well as installing the capacity in line with the agreed time schedule. The PPAs are standardized and typically covers 20 years. There are mechanisms that guarantees the investor an energy price in US\$/MWh for the timeframe of the PPA. A differentiation in price of electricity delivered outside peak hours compared to during peak hours is normal.

**Investment considerations**

Several incentives exist for hydropower investments in Peru:

**Feed-in tariff/premium payment:** A regulatory framework is in place to facilitate for long-term guaranteed tariffs for electricity from renewable energy sources. Contacts are auctioned biannually, with a timeframe between 20-30 years, and denominated in USD. Guarantees are met through electricity sales in the spot market (and the capacity market if applicable) complemented, as needed, by a premium.

**Tax incentives:** A decree that allows for accelerated depreciation of up to 20% of investments in machinery, equipment, and civil construction used for renewable energy generation incurred as Income Tax (*Impuesto a la Renda*).

**Tendering:** The current auction system for contracting electricity generated from renewable sources was established in 2008 to increase the share of renewable energy generation in the country’s energy mix. Contracts are awarded to the renewable energy developers who offer the lowest tariff per kWh for a given technology. Every two years in August, the Ministry of Energy and Mines (MEM) evaluates the necessity to call for auctions.

**Risk Assessment**

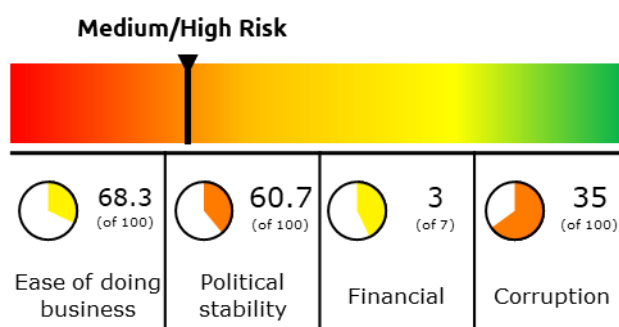


Figure 49 – Risk overview for Peru

Peru is one of the fastest growing economies in the world. Private investment and rising exports have played a key role in the growth and the performance is expected to continue to grow in the following years. Peru offers a favorable modern legal framework for foreign investment, meaning that foreign investors receive the same treatment as local investors.

By considering the ease of doing business, the political stability, the financial risk and the corruption risk in the country, Peru can be viewed as a medium risky country for foreign investors. In the following, these risks will be explained more thoroughly.

**Ease of doing business**

The World Bank ease of doing business score for Peru is 68.3 of 100, which reflects a relatively conducive regulatory environment. The country ranks 76 out of 190 countries assessed. Peru scores high on the activities of starting a business, getting electricity and getting credit, while they receive a lower score on the activity of paying taxes, enforcing contracts and resolving insolvency.

**Political stability**

Peru’s score on the Marsh's Political Risk Index 2019 is 60.7. The score reflects several geopolitical conditions.

Peru's judicial crisis and an escalating battle between the executive and legislative branches of government will elevate political risks. President Martín Vizcarra's position is strengthening amid waning support for the opposition Fuerza Popular (FP) and its embattled leader Keiko Fujimori (FP lost majority in Congress due to the crisis that came after Keiko Fujimori was arrested for corruption charges). In contrast to Fujimori, Vizcarra's popularity has been on the rise, as Peruvians respond positively to his calls for reform. In late 2018, Vizcarra used special powers granted to him by Congress to pass anti-corruption and tax reforms. These are popular with the public, and we expect they will be made permanent by Congress despite tensions with the FP. However, the structural changes the President aims for still face many challenges.

#### *Financing Availability*

On OECDs risk classification ranging from 0 (high-income countries) to 7 (countries with the highest credit and payment risk), Peru is classified in OECD country group 3.

Further, Peru is classified as upper medium investment grade (BBB+) on sovereign credit ratings with a stable outlook. Implicitly, off-taker will have credit rating equal to or below the sovereign credit rating. A lower investment grade opens for commercial bank financing on most projects but may at times be challenging. Export credit agency financing should be possible for most projects.

#### *Corruption risk*

According to the Transparency International Corruption Perception Index (CPI) of 2018, Peru scores low, 35 of 100, indicating the presence of corruption in the country (ranked 105 out of 180 countries assessed).

Corruption is a serious problem for businesses in Peru, with the occurrence of irregular payments, bribes, and favoritism of government officials in awarding contracts. A weak judiciary, inefficient government bureaucracy, and high levels of favoritism have culminated in high corruption levels in most sectors of the Peruvian economy. Although Anti-corruption laws are in place, they are poorly enforced by the government. In addition, the procedure of accepting gifts and small courtesies is not specified in the penal code, thus also representing a risk for companies.



## Other Markets of Interest



### Angola

#### Market Overview

Angola is one of the fastest growing economies in the world and is heavily reliant on foreign infrastructure and power investment. The total installed capacity remains relatively small at around 3.4 GW but is rising quickly with more than 1 GW being added in the last three years. The current installed capacity comes mainly from the country's three largest projects; Lauca (2070 MW when 100% online), Cambambe (960 MW) and Capanda (520 MW). There is a lot of untapped potential in the three main river basins, Kwanza, Catumbela and Cunene, which combined have a potential of around 18 GW, among Africa's highest. In order to meet the government's electrification targets, these will be the key areas for hydropower development moving forward.

*Hydropower Capacity Forecast*

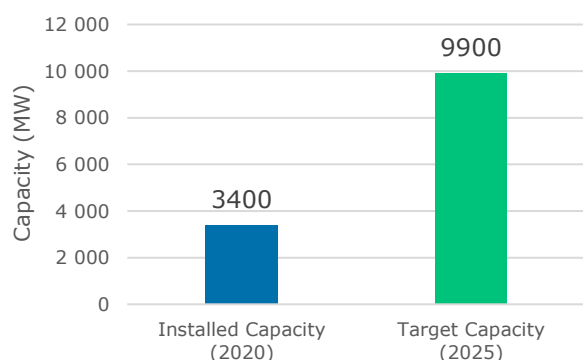


Figure 50 – Angola hydropower capacity outlook

#### Key trends

In an aim to provide access to electricity to 60% of the population by 2025, Angola has in recent years ramped up development of hydropower plants. Since 2017, the country has increased its hydropower capacity by over 55% from around 2.2 GW to 3.4 GW. This is mainly due to the large Lauca hydropower plant bringing its 5<sup>th</sup> 334 MW turbine into production this year, with the last scheduled to come online H1 2020. The country aims to increase installed capacity to over 6.5 GW by 2025, as well as rehabilitating and uprating existing hydropower plants.

There are 20 large and medium-sized hydropower plants currently prioritized for development in

Angola. Under the country's power sector strategy, these projects will add a combined 4 GW hydropower capacity by 2025. Additionally, almost 2 GW pumped storage is planned in the Kwanza river basin. Furthermore, there are around 100 sites that have been studied for potential development of small hydropower with a total of around 600 MW. It is expected that small hydro will play a greater role moving forward with 46 new schemes being developed in the next 5 years. This will mainly be to electrify rural, off-grid areas, essential for reaching the government's electrification goals.

Notable projects under development in Angola include:

- Kwanza River Basin
  - Caculo-Cabaca: 2170 MW (under construction, scheduled to be complete 2024)
  - Zenzo I & II: 460 MW & 114 MW
  - Tumulo do Cacador: 453 MW
  - Quissonde: 120 MW
- Luando River
  - Salamba: 48 MW
- Lucala river
  - Bembeze: 260 MW
  - Utiundumbo: 169 MW
- Catumbela River Basin
  - Calengue: 190 MW
  - Calindo: 58 MW
  - Capitongo: 41 MW
- Longa Basin
  - Cuteca: 203 MW
  - Quissanca: 121 MW
- Cubango Basin
  - Mucundi: 73.5 MW
- Cunene River Basin
  - Baynes scheme (jointly with Namibia): 400-600 MW
  - Jamba Ya Mina: 180 MW
  - Jamba Ya Onma: 75 MW
- Reve Phase I: 400 MW



### Ghana

#### Market Overview

Ghana has an installed hydropower capacity of 1584 MW, which represents around 50% of the technically feasible capacity. This represents around 36% of Ghana's total installed power capacity. However, hydropower production contributed almost 40% on national electricity in 2018. Unfortunately, due to a decline in reservoir levels over the recent years, only about 50% of the installed capacity is available.

(IHA). However, Ghana is not planning on significant expansion in its hydropower capacity soon:

*Hydropower Capacity Forecast*

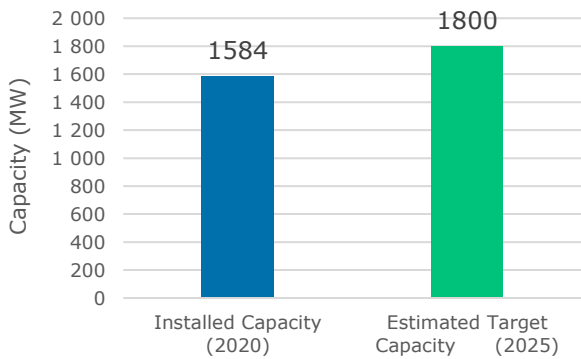


Figure 51 – Ghana’s hydropower capacity outlook

**Key trends**

In recent years, Ghana has struggled with a power deficit due to a rapid increase in power demand over the last decade and decline hydropower reservoir levels. In addition, there are high losses within the electricity distribution system. (IHA).

In order to deal with power deficit issues, Ghana is focusing diversifying its generation mix through other renewables such as wind, solar, biomass, and small-scale hydropower. The government is planning a major overhaul of its power sector and transmission system to deal with this issue.

There is current refurbishment work on two of the 3 major hydropower plants; Kpong & Akasombo. Only three hydropower projects have been planned totaling to 179 MW, but nearly 1700 MW of hydropower capacity is under study. It is expected that most the focus will be on building out small hydropower to ensure more reliable power for smaller communities, especially during national grid outages.



China

**Market Overview**

Since the historic economic reform program over 40 years ago, Chinese hydropower development has seen massive growth, increasing more than twenty-fold, making it the largest hydropower producer in the world.

It is estimated that China has a technically feasible potential of around 2474 TWh/year (542 GW), around 17% of the worlds technically feasible capacity. At over 352 GW installed hydropower

capacity, more than 65% of this has been developed, representing over a quarter of the world’s hydropower capacity. Hydropower accounts for just under 20% of the country’s installed grid-connected power capacity. Around 30 GW of the installed capacity is from pumped storage.

Moreover, China’s small hydropower potential is (less than 10 MW installed capacity) about 128 GW. Around 60%, or 81 GW, of this has been developed, which accounts more than 50% of the world’s total small hydropower capacity.

*Hydropower Capacity Forecast*

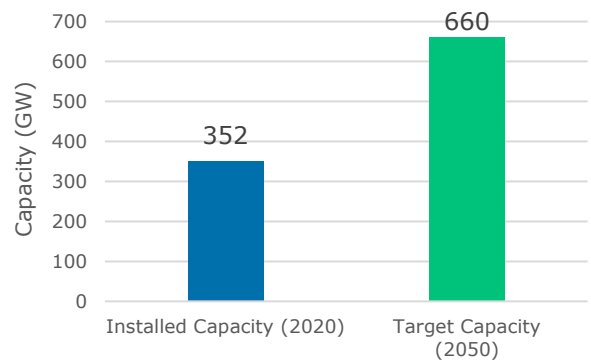


Figure 52 – China’s hydropower capacity outlook

**Key trends**

Despite China’s ambitious plans to develop more than 80% of the technically feasible capacity by 2050, the development has somewhat slowed down during recent years. This amounts to 660 GW planned to be added, where 510 GW is conventional hydropower and 150 GW is pumped storage. The slowdown in development is due to lower economic growth and power demand, resulting in overcapacity, especially in Southern regions where hydropower resources are rich but economic levels are lower. The lacking transmission infrastructure between regions has caused rising energy abandonment, particularly to the Sichuan region. The government launched the “Clean Energy Consumption Action Plan 2018–2020” in order to eliminate curtailment by 2020, mainly by accelerating development of national transmission lines and setting up direct power purchase and dedicated lines to industrial users. Despite the curtailment challenges, near term development is still focused on the southwest region and large reservoirs.

Furthermore, with solar and wind rising, pumped storage is becoming as increasingly important element for flexibility in the energy transition. China has plans to significantly scale pumped storage capacity in the coming years, increasing by 5-fold to 150 GW in 2050. The Chinese government is aiming to increase renewable generation share from 15% to

30% by 2050, where hydropower is a large contributor.

Notable projects currently under construction:

- Baihetan station: 16 GW, largest station under construction due to be commissioned in stages between 2021 and 2022
- Wudongde plant: 10.2 GW due to be commissioned in late 2021
- Lianghekou: 3 GW due to be complete in 2023
- Yebatan: 2 GW due to be complete in 2025
- Shuangjiangkou: 2 GW scheduled for 2022
- Lawa: 2 GW
- Datengxia: 1.6 GW, multipurpose project due to be complete in 2023
- Yangfanggou: 1.5 GW
- Suwalong: 1.2 GW, scheduled stages commissioning between 2020 and 2021
- Wunonglong: 990 MW

Additionally, more than 30 large pumped-storage projects are currently under construction, with the largest being:

- Fengning: 3600 MW
- Meizhou: 2400 MW
- Yangjiang: 2400 MW
- Changlongshan: 2100 MW



Laos

### Market Overview

As Laos has the major tributaries of the Mekong River in its mountainous areas, and has relatively high levels of annual rainfall, it has great hydropower potential. Laos is one of south-east Asia's richest in terms of hydropower resources, and the country has an ambition to become the "battery of ASEAN". Its installed hydropower capacity is over 7000 MW, with a significant amount of plants under construction. By 2021, 47 plants are expected to be brought online bringing the total installed capacity to 13000 MW.

### Hydropower Capacity Forecast

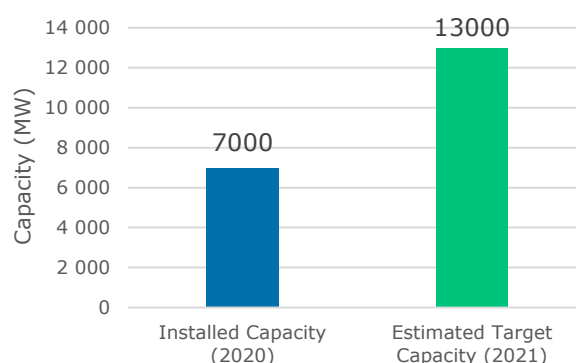


Figure 53 – Laos' hydropower capacity outlook

### Key trends

Over the last decade, Laos has had significant expansion in its hydropower development. As more than 95% of households already have access to electricity, increased capacity will mainly be covered by industrial demand and exports. In line with its ambition to be the region's battery, Laos is exporting large amounts of power to its neighboring countries Thailand, Vietnam, Cambodia, and Myanmar, but also even further to Singapore.

Laos is planning on exporting 9000 MW to Thailand by 2025. Additionally, the country is aiming to export 5000 MW to Vietnam in 2030.

Beyond hydropower, Laos has a target to diversify its energy generation mix aiming to increase the share of non-hydro renewables to 30% of total consumption by 2025. However, the country is still focusing on developing big hydropower projects as revenue generation through exports to neighboring countries as well as small hydropower development (400 MW by 2025) to increase off-grid electrification.

However, the expansion of large hydropower development in Laos, the main tributary to the Mekong River basin, has raised concerns. The development may significantly harm the ecosystems in the Mekong river and the livelihood of downstream villages who rely on its bountiful sources of protein.



Malaysia

### Market Overview

Malaysia has an installed hydropower capacity of over 6100 MW which represents around 21% of the country's technically feasible potential. However, most of the economic potential has already been developed. In Malaysia the power sector is regulated

by the independent Energy Commission. Due to its geography, Malaysia has three major, vertically integrated utility companies, which are not interconnected:

1. Tenaga Nasional Berhad (TNB) on Peninsular Malaysia
2. Sabah Electricity Sdn Bhd (SESB), wholly owned by TNB, on Sabah
3. Sarawak Energy Bhd on Sarawak

The utility companies each undertakes its own generation, transmission, and distribution. Malaysia's grids are not interconnected but are connected internationally to Thailand, Singapore, and Indonesia.

*Hydropower Capacity Forecast*

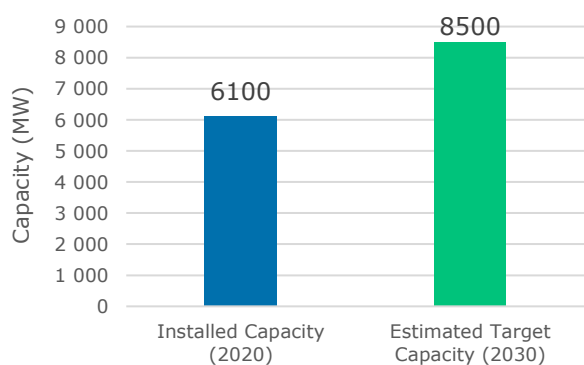


Figure 54 – Malaysia’s hydropower capacity outlook

As most of Malaysia’s economically feasible capacity is developed, it is not expected that significantly more capacity will be added than those already planned, as described below.

**Key trends**

Considering that Malaysia’s energy demand is rising by about 3% annually, private sector investment is needed to continue to develop new generation capacity. Malaysia has announced a target of 20% renewables in its generation mix by 2025. However, the nation is mostly relying on thermal power now and will need significant investment from the private financing and public-private partnerships in order to achieve its target.

The minister of Energy Science, Technology, Environment and Climate Change has expressed that large hydro will only be considered as a last resort in achieving its renewable energy targets. This, combined with the ambition to primarily use indigenous energy sources and large untapped small hydro potential, suggests that there will be increased focus on developing small hydropower.

In order to incentivize renewable energy generation, the Sustainable Energy Development Authority

(SEDA) has introduced competitive bidding through an e-bidding process, in addition to the previous feed-in-tariffs. A quota for 160 MW for small hydropower has been provided. Each application is capped to 30 MW per location with COD before the second half of 2024.

Due to the high rainfall in Sarawak on Borneo, it is expected that future development will be more concentrated here compared to previous development, which has mostly been on Peninsular Malaysia.

Major developments per geography:

- Peninsular Malaysia
  - Tekai project: 171 MW – scheduled to be complete in 2020
  - Neggiri project: scheduled operation 2024 where TNB have the development rights
- Sabah
  - 12 sites have been surveyed as economically feasible for development with a total of 782 MW. Many of these 12 projects have started or completed feasibility studies (economical and environmental). Multiconsult has been awarded majority of these including preparation of tender documents
- Sarawak
  - Sarawak Energy is currently constructing the 1295 MW Baleh project which is due to be commissioned in 2026



Myanmar

**Market Overview**

Myanmar is rich in indigenous energy resources such as hydropower, natural gas, and coal. The total hydropower resources in Myanmar is estimated to be equivalent to 108 GW. Most of the capacity is concentrated in the Karen and Shan states. The installed capacity is around 3350 MW. Due to the 15% annual increase in electricity demand and its plan to reach full electrification by 2030, Myanmar is ramping up investment in new power generation. However, with electrification currently at around 40%, the country needs to add significant capacity in the coming years.

### Hydropower Capacity Forecast

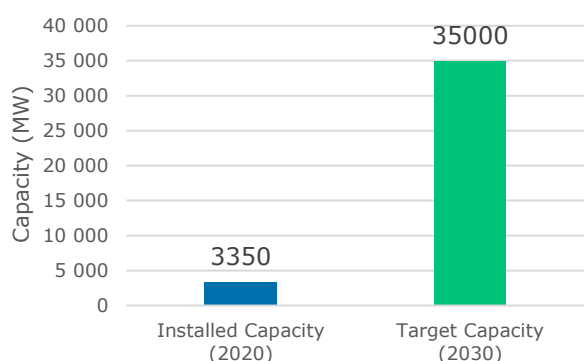


Figure 55 – Myanmar’s hydropower capacity outlook

#### Key trends

According to Myanmar’s energy Masterplan, the installed hydropower capacity will be around 9000 MW by 2030 to cover the 23.6 GW electricity demand. However, the project pipeline amounts to much more than this.

There is a total of 302 hydropower projects that have been studied with a combined capacity of just over 46 GW. The majority of these come from the 90 largest hydropower plants above 10 MW. It is expected that until 2031 a total of 49 projects will be commissioned, increasing installed capacity significantly by 35 GW. Notable projects currently being developed:

- Nine projects are under construction totaling 1417 MW
- Upper Yeywa: 280 MW currently scheduled to come online in 2021
- Mid Paunglaung: 152 MW
- Thahtay: 111 MW, scheduled for 2025
- Upper Keng Tawng: 51 MW, expected commissioning 2021
- Shweli 3 storage project: 671 MW with scheduled commissioning in 2023
- Deedoke: 60 MW scheduled to be commissioned in 2022
- Nam Paw: 20 MW
- Upper Baluchaung (run-of-river): 30 MW due to come online in 2020



Nepal

#### Market Overview

At just 1128 MW, the total installed hydropower capacity in Nepal only represents around 2% of the technically feasible potential. The Nepal Electricity Authority (NEA), the state-owned transmission and

distribution grid operator is the dominant power producer in Nepal. There are 136 operational hydropower plants where NEA owns and operates around 570 MW while IPPs operate around 560 MW of hydropower. As 90% of Nepal’s population lives in rural and isolated communities, small hydro is considered an attractive means of electrification for Nepal. According to NEA’s annual report 2019, it is planned that around 8 GW of hydropower capacity will be installed from NEA and IPPs in the next coming decades.

### Hydropower Capacity Forecast

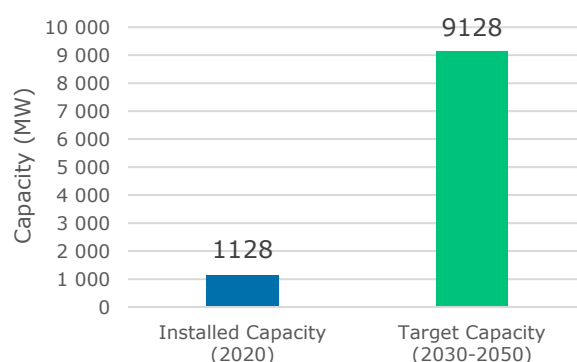


Figure 56 – Nepal’s hydropower capacity

#### Key trends

Nepal’s immediate concern is to end their significant issue with load shedding, before focusing on becoming self-sufficient in electricity supply in the medium-to-long term. It is expected that most hydropower developments in the short-term will be run-of-river projects. According to NEA’s 2019 annual report, there are:

- 124 hydropower projects currently under construction totaling nearly 2.9 GW. Notable projects currently under construction by NEA:
  - Upper Tamakoshi Hydropower Project: 456 MW (After almost 2 years delay, deadline for this important project has been set to mid-2020, but doubts on completion due to frequent delays in this project)
  - Tanahu Hydropower Project: 140 MW
  - Kulekhani III HEP: 14 MW
  - Rahuganga HEP: 40 MW
  - Upper Sanjen: 14.6 MW
  - Sanjen: 42.5 MW
  - Rasuwagadi: 111 MW
  - Madhya Bhotekoshi: 102 MW
  - Upper Trishuli 3B: 37 MW
- Further 147 hydropower projects are planned or proposed totaling 5.1 GW. NEA is planning to develop 10 of these totaling almost 2.3 GW while IPPs are planning the remaining 137 projects



totaling 2.8 GW. Notable projects currently planned to be developed by NEA:

- Upper Arun HEP: 1060 MW
- Upper Modi A HEP: 42 MW
- Upper Modi HEP: 18.2 MW
- Dudhkoshi Storage HEP: 635 MW
- Tamor Storage HEP: 762 MW
- Uttar Ganga Storage HEP: 828 MW
- Tamakoshi V HEP: 95 MW
- Aandhikhola Storage HEP: 180 MW
- Chainpur Seti HEP: 210 MW
- Begnas Rupa Pump Storage HEP: 150 MW

Note – full list of projects and description available in the NEA’s annual report.



## Vietnam

### Market Overview

Vietnam has technical hydropower potential of around 26 GW, where over 65% of this has currently been developed. The installed hydropower capacity today is around 19.5 GW, with almost 1 GW being brought online in 2019. The state-owned power producer Electricity of Vietnam (EVS) owns and operates around 60% of the installed power capacity through its series of wholly owned subsidiaries. Private foreign and local investors are developing projects under build-operate-transfer (BOT) concessions.

Hydropower Capacity Forecast

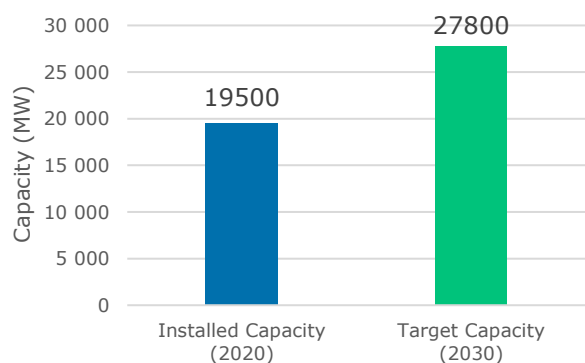


Figure 57 – Vietnam’s hydropower capacity outlook

### Key trends

According to the government’s Power Development Plan 7 (PDP 7) will Vietnam need to add around 90 GW of new generation capacity by 2030. Goal and gas fired plants are set to increase along with renewables (small hydro, wind power, solar power,

and biomass), while large-scale hydropower projects will be mostly limited to multipurpose projects and pumped storage. Pumped-storage is likely to play a larger role to solve intermittency issues with new renewables and planned hydropower plants. The PDP 7 indicates that hydropower capacity (large/medium) will only increase by around 8 GW to 27.8 GW in 2030, where 2400 MW comes from pumped storage. In other words, hydropower share is set to fall around 40% to 15.5% of the energy output by 2030.

However, some notable projects are under development:

- Pak Ma: 220 MW expected to be fully commissioned in 2020
- Dak Mi 1: 84 MW scheduled to be completed in 2020
- Yen Son: 90 MW scheduled to be completed in 2021
- Hoi Xuan: 102 MW
- Bac Lam 4: 30 MW expected to come online 2020
- Bac Ai Pumped storage: 1200 MW phased commissioning between 2026 and 2028



## Balkan

### Market Overview

We have defined Balkan as the following 10 countries; Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosovo, Montenegro, North Macedonia, Romania, Serbia, and Slovenia. In most Balkan countries’ hydropower potential has not been significantly developed and there remains substantial potential in several of the countries. Albania shines through with significant potential with less than 10% of its technical potential built and more interconnections being developed with neighboring countries.

Estimated installed capacity per country:

- *Albania*: 2.1 GW
- *Bosnia and Herzegovina*: 2.2 GW
- *Bulgaria*: 3.2 GW
- *Croatia*: 2.2 GW
- *Kosovo*: 106 MW
- *Montenegro*: Installed 682 MW
- *North Macedonia*: 676 MW
- *Romania*: Installed 6.8 GW
- *Serbia*: Installed 3 GW
- *Slovenia*: Installed 1.3 GW

The region has an installed capacity over 22 GW with Romania taking a large share at almost 7 GW. Based on current plans, it is estimated that installed

capacity in the region will be between 25000 – 26000 MW by 2030:

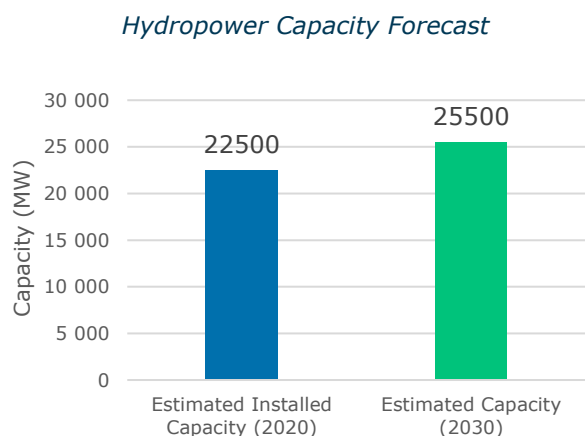


Figure 58 – Balkan hydropower capacity outlook

### Key trends

The Balkan countries can be split into those who are continuing to significantly expand within hydropower and those which are not:

Balkan countries investing in hydropower development:

- **Albania:** Although 96% of the total power production comes from hydropower, Albania is continuing to develop and will be reliant on hydropower in the foreseeable future. The new interconnections with Montenegro and Italy are expected, which will likely open the doors for Albania to tap into its 33 GW technical potential. Moreover, Albania is focusing on expanding in small hydropower.
- **Bosnia and Herzegovina:** Bosnia is prioritizing further development in hydropower as it represents the lowest cost and easiest way to reduce use of fossil fuels. Expected to add 500 MW by 2020.
- **Kosovo:** Coal power production accounts for 97% of electricity, making Kosovo desperate for energy mix diversification. Therefore, the country is focusing on building out small hydropower to diversify with around 80 planned projects.
- **North Macedonia:** North Macedonia has prioritized further development of its hydropower resources as a critical part in meeting its renewable energy targets. There are currently four major projects planned; Boskov Most (70 MW), Chebren pumped-storage (333 MW), Galiste (193.5 MW), and Spilje II (70 MW). However, these projects must be developed in accordance with relevant EU environmental legislation to secure multilateral bank financing.
- **Romania:** The state-owned hydropower producer Hidroelectrica owns and operates almost all

plants in Romania and is continuing to rehabilitate its existing assets and building new plants. Plans are to increase capacity of around 1 GW in the next decade. Romania has a tremendous potential for pumped storage too, up to 5 GW, which may play an increasingly important role with the expansion of wind and solar as a form of storage

- **Serbia:** Serbia has large potential for development of small hydropower with an estimation of around 800 potential plants ranging from 0.1 MW to 8.5 MW with combined capacity of around 300 MW. Additionally, around 25% of installed hydropower plant capacity comes from plants older than 40 years old, which could potentially be updated from a total of 783 MW to 1 GW. However, the construction of these have caused major protests in rural areas.

Balkan countries not investing significantly in hydropower development:

- **Bulgaria:** Sees hydropower as complimentary to other renewable sources and only 35 MW of 401 MW added capacity until 2027 is hydropower with no large-scale development.
- **Montenegro:** As hydropower represents around 70% of the total power capacity, the government is aiming to diversify its energy mix away from hydropower as it suffers from high imports during droughts.
- **Croatia:** Although Croatia has one of the better chances to create more energy independence from hydropower, most the development is focused around refurbishing existing plants. Long-term planned hydropower development capacity only sums up to 600 MW.
- **Slovenia:** Opportunities for small hydro development is being studied on the Lower Sava and its tributaries. Many of key development sites for hydropower are in protected areas which has slowed down development and increased costs due to challenges in getting environmental and planning permissions.

In recent years, there has been a series of protests from environmental organizations saying that countries such as Serbia, Bosnia, and Kosovo need to change their renewable incentive schemes. In 2018, around 70% of renewable incentives awarded benefited small hydro, even with serious environmental consequence. Some countries are bowing to the pressure with Montenegro phasing out incentives and Albania introducing an auction-based system for larger plants by 2020. North Macedonia is taking steps toward auction system but has left feed in tariffs for hydropower, hence giving it an advantage of solar and wind.

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