Partnership Ready: Renewable Energies

Legal and institutional context of the Ethiopian electricity sector

→ THE LEGAL FRAMEWORK

The Ethiopian Government has very ambitious plans for the country's industrialisation. Its Growth and Transformation Plan II (GTP II) includes a series of new publicly funded investments in infrastructure. The government sees power generation and access to electricity as crucial if it is to meet its ambitious targets. This is reflected in specific energy policies, for example, the goal of increasing generating capacity from 4,5 GW in 2019, most of it hydropower, to as much as 35 GW by 2037. In the long term, GTP II is designed to overcome the challenges currently holding back the development of the energy sector. These include outdated and inefficient distribution grids (especially in the medium- and low-voltage range) and power stations, poor customer service, a shortage of skilled workers, a very tight funding situation and a shortage of foreign currency. In terms of installed generation capacity, Ethiopia already ranks number two in sub-Saharan Africa with 4,5 GW and a relatively advanced infrastructure network.

The legal framework governing the Ethiopian energy sector was established in the current Energy Law (Proclamation 810/2013), which came into force in 2014. Independent power producers (IPPs) are now allowed to generate electricity independently, and long-term power supply contracts are also possible.

The Law sets energy-efficiency rules for the national integrated distribution grid and specifies minimum efficiency standards for energy consumption (e.g. electrical devices and lighting), labelling codes and energy audits. It also supports the Ethiopian Government's Climate Resilient Green Economy (CRGE) strategy, including the goal of improving living conditions for the country's inhabitants through CO_2-neutral growth. One crucial element of this strategy is renewable energy — in particular, up to now at least, in the form of hydroelectricity.

In November 2017, the Ethiopian Government launched a National Electrification Programme (NEP), the goal of which is to ensure that all Ethiopians have access to electricity by 2025. It is anticipated that 65% of this power will be supplied 'on grid', i. e. through the country's national grid, and the remaining 35% through off-grid solutions. The original NEP was revised at the end of March 2019. NEP 2.0 introduced a detailed framework setting out how off-grid systems could be connected to the national grid in order to improve conditions for private off-grid installations. At present, only 25% of Ethiopia's 110 million

inhabitants have access to electricity (85% in towns and cities but only 10% in rural areas). Average annual per capita consumption is just under 70 kWh. The vast majority of people in both rural areas (99%) and urban areas (80%) still use biomass for cooking. The NEP is being implemented in phases, with the immediate focus on the first years of the programme (2018-2023). Ethiopia already sells a small percentage of its electricity to its neighbours Sudan, Kenya and Djibouti. It has also signed power export agreements with South Sudan, Tanzania and Rwanda and a declaration of intent with the Gulf Cooperation Council (GCC) for a joint transmission line. Ethiopia plans to make electricity one of its principal export goods.

Thanks to subsidies, electricity bills for end users are among the lowest in Africa. The Ministry of Water and Energy of Ethiopia (MoWIE) has announced plans to quadruple the price of electricity, arguing that the state currently receives much less revenue than it spends on providing electricity. To ease the financial pain for customers, the price will rise in four stages over four years and will vary depending on the amount used. The price for industrial users will be up to three times higher than the current level. The unit price for end users recently increased from around ETB 0,4508/kWh (USD 0,016 /kWh) to around ETB 0,7807/kWh (USD 0,027/kWh) for those with a monthly consumption of up to 200 kWh. The corresponding price for units of electricity over the 500 kWh threshold for a single month is ETB 1,1410/kWh (USD 0,04/kWh).

→ THE INSTITUTIONAL FRAMEWORK

In 2013/14, the former Ethiopian Electric Power Corporation was split into two separate units: Ethiopian Electric Power (EEP) and Ethiopian Electric Utility (EEU). As the state-owned energy generator, EEP is responsible for power station development, investment, construction and management as well as generation and transmission. It is the biggest player in the Ethiopian energy sector. EEP owns and operates the national power grid, including all high-voltage lines (over 66 kV), all the associated substations and nearly all the power stations on the grid (some power plants belong to the state-owned Ethiopian Sugar Corporation). Through EEP, the state has an almost complete monopoly when it comes to generating power for the Ethiopian national grid. Although IPPs have been allowed to develop, construct and operate power stations and feed electricity into the national grid since 1997, all current feed-in projects are based on public-private partnerships (PPPs). As yet, it is not clear when there will be a system of payments for electricity fed into the grid by entirely private generating companies or indeed what form such a system will take. At local level, Ethiopia also has small-scale, standalone power generation systems and power stations (up to 5 MW) that are not connected to the national grid. These do not belong to EEP and may be owned by private companies or by regional government bodies. In such cases, EEP is not responsible for transmission or distribution.

The role of EEU is to distribute low-voltage electricity and purchase bulk electricity. It is also responsible for buying and selling electricity and for leasing transmission lines (up to 66 kV). In addition, EEU's remit covers the construction, operation, optimisation and maintenance of transmission lines and substations up to 66 kV; feasibility studies; planning and supervision; and the administration, operation and maintenance of off-grid power generation systems.

As the industry regulator, the role of the Ethiopian Energy Authority (EEA) is to develop rules for renewable energy technologies on behalf of the government. It is also responsible for awarding generation, transmission and distribution licences. EEA grants generation licences covering 25 years for hydroelectric and geothermal power, and 20 years in the case of wind power, solar, biomass and waste-to-energy. In this capacity, it designs, models and sets pricing structures for power purchase agreements (PPAs) and supervises the measures taken to apply the relevant implementation agreements, contracts and directives for all renewable technologies. EEA is also responsible for the introduction of energy-efficiency measures. It has already developed a feed-in tariff mechanism to support generation by IPPs. Prices for renewable energy are negotiated between IPPs and EEA on a case-by-case basis depending on the scale and location of the project and on the specific technology involved. At present, the feed-in tariff for wind and solar energy projects lies between USD 0,05 and 0,06 per kWh.

The Rural Electrification Fund (REF) has a specific remit within MoWIE, being responsible for coordinating and monitoring the implementation of alternative energy services, including mini-grids. Until recently, these approaches went largely unrecognised, and the Fund still has only limited capacity and experience in the use of mini-grids.

Opportunities for German and European companies

→ PARTNERSHIP WITH THE ETHIOPIAN GOVERNMENT

The Ethiopian Government is generally open to foreign investment in the country's energy sector. It offers a generous package of incentives for investors and has a good track record of infrastructure development. The benefits available include access to foreign currency, faster access to investment licences, tax relief schemes, income tax exemption (between five and seven years), exemption from import tax and tariffs (for certain components and equipment) and from export duties. From a security perspective, Ethiopia is relatively stable. Compared to its western and eastern neighbours, the overall risk of holding assets in the country is therefore limited.

However, there are certain regulatory and financial restrictions. The state remains the largest single investor in the Ethiopian energy sector. To date, it has mainly invested in large power stations – predominantly hydroelectric installations. Stakeholders other than the Ethiopian Government are excluded from investing in the transmission and distribution of power through the integrated national grid. Accessing international capital is problematic. Foreign investments must amount to at least USD 150,000 in the case of joint ventures or USD 200,000 for projects without an Ethiopian partner. Local companies are required to seek approval from the National Bank for any international financing agreements denominated in a foreign currency. Approval is usually granted only to companies that have an export business and therefore generate foreign currency. Due to financial market regulations, foreign currency is available to companies with international operations only in limited quantities and subject to delays. It is also important to be aware of the potential of local inter-ethnic conflict and unrest in the context of the parliamentary elections originally scheduled for August 2020, which have been adjourned indefinitely due to the Covid-19 pandemic. Other non-financial incentives for investors are listed below:

- A one-stop shop and follow-up support from the Ethiopian Investment Commission (EIC)
- Reduced tariffs through customs warehousing and voucher schemes
- Accelerated e-visa, work permit and residency schemes
- The right to own property if required for investment purposes
- The right to open and operate foreign currency accounts
- The right to appoint managers and experts in other countries

→ PRIVATE-SECTOR ENGAGEMENT

The first IPP contract (a 20 MW geothermal energy project in Corbetti) was signed in 2017, opening up future energy projects to private-sector investment. Since then, further IPPs have entered the market for wind and solar energy projects. The government has recognised the need for a reliable and sustainable regulatory environment in order to encourage private-sector engagement in the electricity sector. For example, it is currently developing specific regulatory frameworks for different sub-sectors. Unfortunately, the absence of key energy policy measures and regulations (e.g. on feed-in tariffs and net metering mechanisms) is slowing the pace of private-sector investment. As a result, most projects are financed by multilateral and bilateral institutions and by export credit agencies. Over the coming years, priority will again be given to large-scale, on-grid projects based on public tenders. The construction of new power stations will be financed by the Ethiopian Government, the African Development Bank, the World Bank and the European Investment Bank, as well as with private and bilateral government loans. The countries most heavily involved in developing energy projects in Ethiopia are Italy, Norway, India, France, Germany and, above all, China.

Renewable energies

In terms of natural resources, Ethiopia is well placed to develop its renewable energy sector: solar radiation is high given the country's proximity to the equator; wind loads are among the highest on the continent; and the Great Rift Valley is a promising source of geothermal energy. Although some initial progress has been made in efforts to exploit this tremendous potential, up to now only a small fraction has been used.

At present, the country has a total generating capacity of 4,5 GW. Plants representing a further 8,9 GW are under construction. Most of this additional capacity will come from renewable sources. Until recently, the majority of renewable energy projects were primarily focused on (on-grid) hydroelectric installations. However, driven by an acute shortage of energy, demand is growing for alternative and innovative supply options to complement hydroelectric generation and meet the country's increasing energy needs. The use of biomass and diesel generators is to be kept solely as a reserve option. The government is taking steps to diversify the country's energy mix and has already drawn up targets for the expansion of renewables. Its main focus is on large-scale solar, wind and geothermal projects.

Expansion targets for energy and renewables energies in Ethiopia (Source: GTPII)

	Target by 2019/2020 (MW)
Power generation capacity in MW of which:	**17,208**
Hydro	**13,817**
Wind	**1,224**
Geothermal	**577**
Diesel/gas (stand-by)	**509**
Sugar cane waste	**474**
Solar energy	**300**
Biomass	**257**
Waste-to-energy	**50**

Although in recent years foreign investment in Ethiopia's energy sector has been dominated by Asian companies, the importance of European and US companies is now growing. In particular, there is a demand for high-quality products and solutions. Today, however, these are also available from highly regarded Chinese providers. In the continued absence of quality standards and

sanction mechanisms, the number of counterfeit and low-quality products found on the market has increased significantly. These affect the business of reputable companies and their brand integrity. It can be difficult to obtain products of the right quality, especially in rural areas. This trend creates potentially attractive business opportunities for the German energy sector, which enjoys a good reputation in the region.

Ethiopia's private renewable energy sector is developing rapidly, and is looking for opportunities to cooperate with international players. However, while the Ethiopian companies have made considerable progress over recent years with regard to technical and management capacity, they still have a great deal of catching up to do when it comes to planning, constructing, commissioning, operating and maintaining more complex systems such as hybrid solutions, micro-grids and mini-grids.

→ OFF-GRID- AND MICRO-GRID-SYSTEMS

Growing demand, especially in the off-grid segment, has encouraged many international and German companies to enter the Ethiopian market and work with the country's expanding private sector. Such partnerships enable German companies to participate in major international tenders. Most local market players want to import systems and components for a range of off-grid solutions to meet growing demand.

However, off-grid and micro-grid projects are still poorly regulated. Key operating frameworks are not yet in place, especially with regard to licensing and links between companies and the rural electrification authorities. It is very difficult for off-grid investors to ascertain if they are likely to be competing for potential customers against state-owned organisations. The private sector and other potential stakeholders are reluctant to invest because of market uncertainty over future grid expansion.

Another challenge is the lack of technical and management expertise in the off-grid segment. While the private sector has made considerable progress over recent years in terms of technical and management capacity, there is still a great deal of catching up to do, above all with regard to the technical know-how and institutional capacity needed to train skilled workers.

Private-sector investment has been allowed in the rural electrification segment since 2013, specifically with a view to providing off-grid energy for homes, health centres, schools and businesses. However, the role of the private sector has barely expanded beyond the sale of 'solar home' and 'pico' systems. This is due to inadequate regulation, a lack of financing options and securities, and a shortage of foreign currency. Furthermore, within the rural electrification segment, prices for solar home systems (SHS) and pico systems are still high for the vast majority of people in rural areas, while on-grid electricity prices are very low.

One way of providing greater certainty for the private sector in the off-grid segment would be to speed up import processes. If import costs fall, system prices will also fall for end users. Uniform standards covering imports of high-quality products would also help to build confidence among consumers and therefore stimulate demand. Electricity prices for power supplied by the national grid need to be set at a level that reflects the actual cost of supplying electricity to remote areas. That would make off-grid solutions financially more viable than expanding the national grid into rural areas.

To help users manage the up-front costs, financial support could be made available through microfinancing institutions (MFIs) and pay-as-you-go (PAYG) schemes.

PARTICIPATING IN TENDERS

The Ethiopian Electric Utility (EEU) is authorised to conduct EPC tenders covering the design, installation, testing and commissioning of mini-grids. Invitations to tender are also open to international companies.

Ethiopian Electric Power (EEP) is authorised to implement IPP projects. Invitations to tender are prepared by the Ministry of Finance.

Invitations to tender are published for local and international companies. They usually appear in newspapers and on EEP's own website.

→ HYDROELECTRIC POWER

Ethiopia has the potential to generate around 45,000 MW of hydroelectric power. Despite building several large hydroelectric power stations, the country is a long way from exhausting its potential. In recent years, Ethiopia's installed generating capacity has seen a massive increase. The government has set a target of 22,000 MW of installed hydroelectric generating capacity by 2030. Ethiopia currently obtains around 85% of its electricity (approximately 3,800 MW of installed output) from hydro power stations. The Grand Ethiopian Renaissance Dam (GERD) on the Blue Nile is expected to start feeding power into the national grid in 2022. The mega-project will generate 6,450 MW and cost a total of USD 5 billion. The dam was originally scheduled for completion in 2017, but shortages of fossil fuels (e.g. oil and gas), increasing periods of drought, longer dry seasons and the

government's determination to reach its ambitious targets for economic development have gradually intensified the focus on generating power from other renewable sources such as geothermal, wind and solar. With such major infrastructure projects adding to the already high levels of national debt, the government is also under greater pressure to involve the private sector.

→ SOLAR ENERGY

With solar radiation levels of between 5 and 7 kWh/m², depending on the location and time of the year, the potential for new solar generating capacity is very high. This could help to diversify the country's energy mix and use water resources more effectively. The Ethiopian solar energy market has grown consistently over recent years. While it is still relatively small compared with other countries in the region, it has now reached the point where it is potentially interesting to investors. One of the key drivers of this growth is customer demand for small and micro-systems, such as SHS for lighting, recharging mobile phones and running radios and televisions. There is also growing interest in standalone PV systems as a way of providing electricity to rural households.

The Ethiopian Government is keen to expand the use of off-grid solutions. It has ambitious plans to roll out off-grid solar technology (3,6 million lamps/pico PV systems and 400,000 solar home systems by 2020). In December 2018, EEU published invitations to tender for 12 pilot systems of varying capacity in the mini-grid segment (between 75 and 550 kW) for 12 villages. 12 pilots are currently being implemented by EEU with additional 25 in the tendering process. If this phase is successful, the project will be expanded to cover 250 villages as IPPs. The mini-grids are being financed by the World Bank as part of the Ethiopia Electrification Program (ELEAP).

EEP has signed an agreement with the International Finance Corporation (IFC) to advise on the scaling up of solar power generation. The aim is to install 500 MW of solar PV capacity by 2020. Dicheto, Dire Dawa and Ketom are potential locations for phase 1 of the scaling-up programme (200 MW output). Three other sites have already been identified for the remaining 300 MW of output.

In early February 2019, the Ethiopian Government announced that it would be inviting tenders for four solar PV projects with a total capacity of 500 MW in the form of PPPs. The corresponding power purchase agreements (PPAs) will run for 20 years. These four projects are intended to complement the two scaling-up projects (each generating 125 MW) currently being procured under the IFC's Scaling Solar programme. In December 2019, EEP signed a 20-years power purchase agreement with ACWA Power for two 125 MWac solar photovaltaic projects.

In October 2017, EEP issued a pre-qualification request for a 250 MW PV contract. Of the 28 developers that took part in the pre-qualification stage for the two solar PV projects (2 x 125 MW), 12 were approved and invited to submit full tenders. In addition, following a contract award procedure in 2016, the Italian energy firm Enel announced that its subsidiary Enel Green Power (EGP) – together with the Orchid Business Group from Ethiopia – had been selected to build a 100 MW solar power station in Metehara, which is located in the Central Ethiopian region of Oromia. The USD 120 million project will sell power to EEP under a 20-year PPA. Back in 2013, to mitigate the impact of ongoing foreign currency shortages, the World Bank and the Development Bank of Ethiopia (DBE) set up a USD 40 million fund linked to the Lighting Africa Programme. This fund grants USD loans to small and medium-sized enterprises and their suppliers in the energy sector to help them deal with the lack of foreign currency and working capital constraints. The Lighting Africa Programme has already announced that it will continue to support the development of an independent solar market in Ethiopia and make additional funding available through the DBE's lending facility.

→ WIND POWER

There is growing interest in wind power. The government wants to step up efforts to harness the country's wind power generating capacity, primarily as a way of supplementing the hydro electricity supply, which is not constant, and to exploit the strong winds that blow during the dry season. With wind speeds of 4-8 metres per second blowing across the plateau at the edge of the East African Rift Valley, it is estimated that wind power installations could generate at least 100 GW. The country's wind power sector has grown rapidly in just a few years. Foreign investors have been attracted by a public-private partnership (PPP), in which independent power producers are granted a power purchase agreement. Two wind farms generating a total of 171 MW (the 120 MW Ashegoda wind farm and the 51 MW Adama I wind farm) were constructed in late 2013. These were followed in 2015 by the even bigger 153 MW Adama II wind farm.

Best Practice

The Energising Development programme (EnDev)

EnDev is a partnership for energy, which is funded and implemented on a multilateral basis. At present, there are six donor countries – the Netherlands, Germany, Norway, the UK, Switzerland and Sweden. As part of a global programme, EnDev Ethiopia also benefits from funds from Ireland, the Korea Foundation for International Healthcare and the European Union.

EnDev Ethiopia supports the creation of modern energy supply markets with a focus on rural areas. Thanks to the programme, households, community organisations and SMEs that cannot be connected to the national grid due to their remote location can nevertheless obtain a reliable source of energy. The focus is on three different forms of technology: (1) energy-efficient cookers; (2) photovoltaic systems; and (3) the construction of small-scale, standalone hydropower stations for remote villages without access to the national grid.

In total, the country had 324 MW of installed, on-grid wind power capacity in 2019. A 120 MW wind farm in Ayisha is currently at the planning stage. The government plans to build at least five other wind farms that will supply up to 5,200 MW within four years. The goal is to reach 7 GW by 2023. The government intends to award contracts for future projects through the public tendering system so that investors can compete on a level playing field.

→ GEOTHERMAL ENERGY

At the end of 2011, Ethiopia had 7,3 MW of installed geothermal energy capacity (Aluto–Langano geothermal power station). Ethiopia's Rift Valley and the Afar Depression are a huge store of geothermal resources that could be harnessed to generate over 7,000 MW of electricity. The country's overall geothermal potential has been estimated at over 10,000 MW. The 520 MW Corbetti I geothermal power station has a 25-year PPA with Reykjavik Geothermal Ltd. Initial preparations are now in progress, and power is expected to flow into the national grid from 2023. In a second phase, the geothermal power station in Corbetti and Tulu Moye is expected to reach a total capacity of 1,000 MW and will be connected to the grid in eight years. The grid will receive a further boost in 2020 from additional 70 MW Alulta geothermal project. The country's total geothermal capacity is projected to reach 1,000 MW by 2030.

→ BIOMASS

The potential for Ethiopia to generate power from biomass is vast. The agricultural processing industry produces a huge volume of rejected or waste products that can be used to generate energy, e. g. sugar cane bagasse, cotton stalks, coffee husks and oilseed husks. At present, none of the country's biomass power stations is linked to the national grid. Treatment systems for household waste and other sources of bioenergy are very inefficient, although the current GTP II aims to resolve the situation by intensifying the installation of local biogas systems, oil burners and more efficient stoves. Traditional forms of biomass are used very widely in Ethiopia and currently make up 90% of the total primary energy used by households. The government wants to make households less dependent on fuel from biomass (wood and charcoal) by promoting the use of more environmentally friendly cooking technologies. To this end, it aims to make over 12 million improved cookers available in rural households, including efficient biomass energy cookers. Households are expected to shift away from biomass once they have a supply of electricity. In turn, this should lead to health improvements, cut the time needed to collect traditional fuels, and reduce deforestation and carbon emissions. The National Biogas Programme (NBPE) was established in 2009 and is now in its second phase. Measures have recently been put in place to roll out biogas systems in rural households with support from microfinancing providers.

Sources and useful links:

- Ethiopian Electric Power: www.eep.gov.et
- Ethiopian Electric Utility: www.eeu.gov.et
- Lightning Africa Program: www.lightingafrica.org/country/ethiopia/

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In order to support the sustainable engagement of German companies in emerging and developing countries, Germany Trade & Invest (GTAI), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the German Chambers of Commerce Abroad (AHKs) as well as other partners combined their expertise in the publication series "New Markets – New Opportunities".

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