



Project Information Document (PID)

Appraisal Stage | Date Prepared/Updated: 20-May-2022 | Report No: PIDA34017



BASIC INFORMATION

A. Basic Project Data

Country Malawi	Project ID P178914	Project Name Emergency Power Restoration Project	Parent Project ID (if any)
Region Eastern and Southern Africa	Estimated Appraisal Date 09-May-2022	Estimated Board Date 17-Jun-2022	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) Ministry of Finance and Economic Affairs, Government of Malawi	Implementing Agency Electricity Supply Corporation of Malawi, Ltd., Electricity Generation Company (Malawi) Ltd.	

Proposed Development Objective(s)

To rehabilitate and increase resilience of the Kapichira hydropower dam and spillways, and transmission and distribution infrastructure damaged by Tropical Storm Ana.

Components

- Component 1: Kapichira Dam Rehabilitation and Strengthening
- Component 2: Transmission and Distribution Network Restoration

The processing of this project is applying the policy requirements exceptions for situations of urgent need of assistance or capacity constraints that are outlined in OP 10.00, paragraph 12.

Yes

PROJECT FINANCING DATA (US\$, Millions)

SUMMARY

Total Project Cost	60.00
Total Financing	60.00
of which IBRD/IDA	60.00
Financing Gap	0.00

DETAILS



World Bank Group Financing

International Development Association (IDA)	60.00
IDA Credit	36.00
IDA Grant	24.00

Environmental and Social Risk Classification

High

Decision

The review did authorize the team to appraise and negotiate

Other Decision (as needed)

B. Introduction and Context

Country Context

1. Malawi is a landlocked country in southeastern Africa, bordered by Zambia, Tanzania, and Mozambique, with a population of about 18 million people of which 52 percent are women and girls.

The population growth rate is estimated at about 3 percent per year, and the population is expected to reach 23 million by 2025. Malawi remains a rural economy; however, the country is urbanizing at an annual rate of about 3.5 percent, higher than the average for Sub-Saharan Africa. The country remains one of the world’s poorest countries, with over half of its population living in poverty. In 2020, the proportion of poor households living below the poverty line of US\$1.9 per day (2011 purchasing power parity) stood at 68 percent of the population.¹ The gross national income (GNI) per capita was estimated at US\$430 in 2021. Malawi ranked 174 out of 189 countries on the United Nations Human Development Index in 2020.² Food inflation increased to 12.8 percent and non-food inflation to 9.5 percent, combining into a headline figure of 11.1 percent year-on-year in November 2021.

2. Malawi’s economy has shown only modest growth over the past decades and faces significant development challenges.

Malawi’s gross domestic product (GDP) per capita grew at an average of 1.5 percent per year from 1995 to 2018 before the COVID-19 pandemic, which was about half the growth rate of comparable countries in Sub-Saharan Africa. Economic growth that was 0.8 percent in 2020 during the Covid pandemic, remained weak at 2.8 percent in 2021 primarily driven by one-time increases in the agricultural sector. Economic growth is expected to decline to 2.1 percent in 2022 due to chronic fiscal and external imbalances, compounded by severe weather events. With a population growth rate of around 3.0 percent in 2021, however, this level of economic growth represents a contraction in per capita output (Malawi Economic Monitor, December 2021). The budgeted fiscal deficit of an annualized 9.1

¹ Malawi Economic Monitor, December 2021

² UN Human Development Index tables



percent of GDP is the highest in years. The country also faces significant development challenges as it (i) is one of the poorest countries in the world, (ii) is land-locked, (iii) has suffered from chronic fiscal and debt vulnerability, (iv) is vulnerable to extreme weather events and climate change, and (v) has achieved limited educational progress (only 16 percent of children transition from primary to secondary school, and of those, only 8 percent move on to tertiary education). It also has a weak enabling environment for private sector-led job creation, and its asset base and total wealth (a combination of natural, produced, and human capital) suffer from weak management.

3. **Malawi's Vision 2063 builds intended actions around three key pillars** i) agricultural productivity and commercialization, ii) industrialization, and iii) urbanization. Without adequate and affordable energy, mainly in the form of electricity, achievement of Vision 2063 through the identified three key pillars would not be possible. Development of climate adaptive and resilient electricity infrastructure is thus key and a critical factor in order for the Vision to be realized.

4. **Malawi has one of the lowest electricity access rates in the world**, at 11 percent with severe disparities between urban and rural areas (30 percent in the urban areas and 4 percent in the rural areas). The inequity among the rich and poor is stark—the poorest 20 percent reports 1 percent electrification rate while the richest 20 percent reports 31 percent electrification rate³. There is almost no coverage in the bottom 40 percent of the population which has serious implications for human development and economic transformation outcomes. The progress on electricity access has been much slower compared to other countries in Sub-Saharan Africa. The Government of Malawi has taken important steps in recent years to open its generation sector to private sector participation, particularly in solar and hydropower generation. To date, there are signed PPAs with IPPs for solar generation amounting to 216 MW (compared to an installed generation capacity of 520 MW). The World Bank is supporting the Government of Malawi to develop the 350 MW Mpatamanga Hydropower plant as a public private partnership (PPP) with IFC as a co-developer in the project.

5. **Despite the above outlined initiatives and interventions to improve and grow Malawi's power sector, the sector has been and continues to be highly impacted by climate change**, While Malawi has very low greenhouse gas (GHG) emissions, it is highly vulnerable to the impacts of climate change. Malawi accounts for only 0.04 percent of global emissions but is ranked 158 out of 188 countries in terms of its vulnerability to climate change impact⁴. According to climate projections, the increase in mean annual temperature in Malawi is projected to be between 1°C and 2°C by the 2050s and up to 5°C by 2100⁵. Climate and disaster risk screening indicates that Malawi has high risks of river floods, volcano, extreme heat, and wildfires, which will add further stress to Malawi's climate vulnerability⁶. According to the World

³ Kojima, M., X. Zhou, J. Han, J. de Wit, R. Bacon, and C. Trimble. 2016. "Who Uses Electricity in Sub-Saharan Africa – Findings from Household Surveys." In each country, people are divided into quintiles based on per capita expenditures, with quintile 1 being the poorest and quintile 5 being the richest.

⁴ Notre Dame Global Adaptation Initiative Country Index summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. <https://gain.nd.edu/our-work/country-index/rankings/>

⁵ <https://climateknowledgeportal.worldbank.org/country/malawi>

⁶ <https://thinkhazard.org/en/report/152-malawi>



Bank's Lifelines report, the cost of disruption to the power sector due to natural shocks in Malawi was about 3.58 percent of GDP in 2019⁷. This has been especially severe on its existing hydropower stations, the majority of which are located in a cascade on the Shire River, which sits in a watershed that is increasingly under pressure from environmental degradation. Both climate and human activity pressures had resulted in the performance of the hydropower plants being greatly reduced over the years (including reduced storage capacity of the reservoirs) and impacted by some major climate-related flood events that have on more than one occasion extensively damaged the hydropower plants, rendering them out of operation for considerable lengths of time and at a high direct and indirect cost to the economy (loss of revenue by the utilities and loss of production by the industry and other consumers due to reduced power production).

Situations of Urgent Need of Assistance or Capacity Constraints

6. **On Friday January 21, 2022, a tropical depression developed north-east of Madagascar, in the Indian Ocean.** The Malawi Department of Climate Change and Metrological Services (DCCMS) issued the first warning on Saturday January 22, 2022, at 11:00 am. On Monday January 23, 2022, the depression intensified overnight into a Tropical Storm (TS), named Ana. TS Ana was moving at a speed of 40km/hour and maximum wind speed of 100km/hour and made landfall on the Mozambique coast around midday of Monday, January 24, 2022, and later headed for southern Malawi. Heavy rains exceeding 150mm (up to 300 mm in some areas) in a day and very strong winds exceeding 80km/hour were prevalent in areas of southern Malawi, causing flash flooding that affected both people, property, and infrastructure.

7. **On January 26, 2022, all districts affected by the floods caused by Tropical Storm Ana were declared Disaster Areas.** The affected districts included Nsanje, Chikwawa (location of Kapichira dam), Phalombe, Zomba, Blantyre, Chiradzulu, Thyolo, Mulanje, Balaka, Machinga, Mangochi, Neno, Mwanza, Ntcheu, Dedza, Salima, Lilongwe, Mchinji and Dedza. Reports indicated that TS Ana had affected more than 130 Traditional Authorities (TAs) in 20 districts in Southern and Central Malawi.

8. **As of early March 2022, Tropical Storm Ana had caused 46 fatalities and affected 995,072 people and over 221,000 households.** Over 190,429 people (approximately 32,000 households) were displaced and were being sheltered in schools, churches, hospitals and other make-shift camp sites. The storm inflicted heavy damage to housing and critical public infrastructure – roads, bridges, rail network, electricity and water supply systems, classrooms and health centers. The storm damaged or destroyed at least 476 schools (affecting over 398,000 students), damaged 47 health centers, and flooded over 115,000 hectares of crops. The electricity sector was one of the worst hit sectors with damage to the 128 MW Kapichira Hydropower Plant rendering the plant out of commission. The transmission and distribution infrastructure in Southern Malawi was similarly affected with 14 transmission lines and several distribution lines requiring immediate restoration through emergency repairs.⁸

⁷ "Hallegatte, Stephane; Rentschler, Jun; Rozenberg, Julie. 2019. Lifelines: The Resilient Infrastructure Opportunity. Sustainable Infrastructure; Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/31805> License: CC BY 3.0 IGO."

⁸ The Shire Valley Transformation Project canal intake, located immediately upstream of the Kapichira Dam, also suffered significant damage during the Tropical Storm. The damaged intake was under construction at the time of the storm event, which would have resulted in its higher vulnerability to flood impact, in comparison to completed and commissioned infrastructure.



9. **On February 1, 2022, the Government of Malawi requested World Bank assistance for response, recovery and reconstruction from the impact of Tropical Storm Ana.** Specifically, the Government requested World Bank assistance to (i) undertake a disaster impact assessment using the Global Rapid Post Disaster Damage Estimation (GRADE) methodology; (ii) support disease surveillance and response in flood affected areas; and (iii) activate contingency emergency response components (CERC) under on-going projects as appropriate.

10. **The results of a GRADE analysis estimate the direct damages of Tropical Storm Ana in Malawi to be around 1.1 to 1.7 times greater than those caused by the flooding associated with higher-intensity Tropical Cyclone Idai in March 2019.** While the intensity of the windspeed in Tropical Cyclone Idai was higher (as its cyclone classification would indicate) precipitation levels under TS Ana were significant, resulting in severe flooding, with peak recordings of 300mm of rainfall in certain locations, compared to 250mm rainfall peaks recorded under Cyclone Idai. The GRADE assessment estimates non-infrastructure economic damage to be US\$192 million, with infrastructural damages amounting to US\$136 million⁹. The total damages are assessed to be US\$328 million (equivalent to 3.3% of Malawi's national GDP (2020)).

11. **The energy sector was impacted particularly severely, contributing to high infrastructure damage.** This was driven by damage to the Kapichira Hydroelectric Power Plant (responsible for one-third of the country's electricity generating capacity) that included extensive damage to the main dam and other reservoir structures that has left the Power Plant out of operation. Damage to the transmission and distribution networks was also considerable with downed towers and poles, either due to wind, debris flow and flooding impacts, followed by the vandalizing of 400 transformers in the aftermath of the storm. The loss of Kapichira initially resulted in about 6 hours of load shedding per day for the majority of customers. The loadshedding hours increased to about 8 hours per day when the Aggreko diesel generators were offloaded from the power system during the fourth week of April 2022, after four years of operation. Load shedding is expected to remain fairly constant, especially during the cold months of May to July 2022, which also coincides with the tobacco processing period when the load is expected to increase considerably. Replacing generation from Kapichira with diesel would cost at least US\$ 228 million a year.¹⁰

12. **The Government has taken multiple actions to respond to the crisis.** The Government of Malawi declared a national disaster on January 26, 2022. It has also prepared a short-term response plan and has appealed for assistance from the international donor community, the United Nations, Non-governmental Organization (NGOs), and the private sector. To mitigate the impact of the loss of Kapichira and also the offloading of Aggreko diesel generators, the Government was planning accelerate the addition of renewable energy generation mainly from solar and also the acquisition of additional diesel generators by EGENCO.

Reconstruction of this intake would directly interface and benefit from some of the reconstruction works for the Kapichira Main Dam. The SVTP had unallocated funds that could be deployed towards some of the initial reconstruction works for the Kapichira Dam. An amount of up to \$15m was available from the SVTP to fund part of the initial reconstruction works for Kapichira.

⁹ The damage estimates for infrastructure were informed by damage reports to various sectors, particularly energy and roads. Damage to the energy sector have been particularly severe in TS Ana when compared with historic events, and so have been calculated explicitly based on various reports. Damage to other infrastructure sectors have again been estimated via comparison of various metrics between TS Ana, and those of previous events.

¹⁰ At a variable cost of about US\$ 34/kWh as provided in the economic analysis.



13. **The impact of Tropical Storm Ana is a reminder of Malawi’s chronic vulnerability to natural disasters and shocks, and the need to re-position crisis preparedness as a foundation for long-term poverty reduction.** Southern Malawi, including Nsanje and Chikwawa Districts, has been particularly vulnerable: over the past five years it has suffered multiple years of acute food insecurity due to flooding in 2016, 2019, and 2022 and dry spells in the 2019/20 and 2020/2021 production seasons. Past climatic shocks, such as Tropical Cyclone Idai (2019) and the recent TS Ana (2022) also increased the depth of poverty in the two southern most districts of Chikwawa and Nsanje. During FY22, Malawi undertook a Crisis Preparedness Assessment Framework as a pilot exercise for IDA20 and is currently also undertaking a Country Climate and Development Report (CCDR). These exercises, together with an ENB/Water Global Practice-led effort to review integrated flood and water resource management in the Shire River Basin system, will provide a sound basis for IDA20 investments that build on earlier investments and robustness of infrastructure to improve resilience for climate change.

14. **In response to the Government’s request for support to the energy sector, IDA CRW funds in the amount US\$60 million are being mobilized** to restore damaged electricity transmission and distribution infrastructure and damaged electricity generation infrastructure. This is based on detailed needs assessments carried out in the field in conjunction with the Electricity Supply Corporation of Malawi Limited –(ESCOM) and Electricity Generation Company (Malawi) Limited –(EGENCO), the owners of the damaged assets. The request for financial support was made through the Malawi Government Letter Reference Number FIN/DAD/RM/5/2/18, dated March 7, 2022. The CRW resources, would be deployed through a standalone operation prepared under emergency procedures. No other energy-related projects in the sector can absorb the scope or cost of the recovery effort and through which the Government of Malawi could seek financial support for this critically important undertaking. Donors (including USAID, AfDB, and the EU) are providing smaller scale energy sector support to ESCOM for energy sector master planning and grid upgrades. This will complement IDA’s crisis response capabilities to mobilize the funding instruments to be responsive in the immediate term to this sector gap. The IDA CRW resources, as well as the GRADE assessment recently shared with the Government and donors will both be important in advancing the Government’s dialogue on disaster relief with other financiers. In addition, the GRADE assessment will inform the structuring and orientation of longer-term donor-financed development programs responsive to the reconstruction gaps and post-TS Ana needs. Thus, the gap in burden sharing between IDA and other donors in response to TS Ana would be expected to be lowered through the leveraging effect of CRW.

15. **While preparing a response to urgent needs, this project aims to address key root causes that undermined the resilience of the damaged infrastructure.** Based on the preliminary assessment, it is understood that at the time of the storm only two out of the five gates of Kapichira’s main spillway were open and partially functional, hence reducing its capacity to evacuate flood waters. This resulted in water rising in the reservoir above the dam’s crest before the fuse plug was washed away, enabling the water level in the reservoir to decrease. The reasons for only two gates being operational are multiple. They include (i) the sediments that accumulated over time in the reservoirs constrained EGENCO’s capacity to operate the reservoir at higher water levels, and (ii) stoplogs required for repairing the gates were not high enough to protect the gates at these levels. These resulted in a need for planning outages of the Kapichira generation plant to rehabilitate the gates. In the midst of the pandemic, as hospitals needed steady electricity supply, it is also understood that adequate times for a planned outage could not be identified and granted during prior dry seasons, i.e., periods when such repairs could be planned and



executed. Thus, activities proposed under the project aim at strengthening both technical features (including upgraded spillways and improved sediment management) and also operation and management capacity and procedures of the Kapichira hydropower scheme.

Sectoral and Institutional Context

16. **Malawi's power sector is guided and structured by the National Energy Policy (2018) and the Electricity (Amendment) Act of 2016.** The Ministry of Energy (MOE) is tasked with overall policy oversight. The Malawi Energy Regulatory Authority (MERA) was established in 2007 as an independent electricity regulator whose mandate is set out in the Energy Regulation Act (2004, with subsequent amendments). The role of MERA includes, among others: (a) reviewing tariff applications from ESCOM and recommending tariff changes to the Government of Malawi (GoM); (b) granting licenses for generation and distribution operators; and (c) arbitrating commercial disputes that arise under the 2004 energy legislation. Under the amended Electricity Act of 2016, ESCOM was unbundled in January 2017 into two entities, ESCOM and EGENCO. ESCOM assumed the new function of single buyer and procures power from EGENCO and from independent power producers (IPPs) and in future, potentially, from the Southern African Power Pool (SAPP). The Government decided to further unbundle the Malawi power market by carving out the Single Buyer function from ESCOM to form a new company called Power Market Limited. The new Company, which was registered in 2019, is not yet fully operational.

17. **Malawi has abundant, largely untapped solar and hydro resources.** The country's current installed generation capacity is 520 MW, of which 75 percent is from hydropower resources and the remainder is from solar and diesel power, the latter in the form of emergency generation. All major power stations are located in the southern region along the Shire River. One small hydro station, the 4.5 MW Wovwe plant, operates in the north of the country. The hydro potential of the Shire River alone is estimated at about 1,300 MW, and another 1,000 MW of potential exists on other rivers. In addition, Malawi has great untapped solar potential with an average of 3,000 hours of sunshine per year. Finally, the country is also strategically located for interconnection with the SAPP.

18. **Notable results have been achieved with regard to infrastructure expansion and electricity service delivery but challenges remain.** Electricity connections have grown steadily over the years but have not kept pace with the population growth rate of about 3 percent, making the electrification rate remain relatively constant between 11-12 percent. In the previous fiscal year (ending June 30, 2021), ESCOM connected 38,000 customers. This left a backlog of about 45,000 customers to be connected¹¹. This backlog was expected to be cleared under the IDA financed Malawi Electricity Access Project (P164331) with an estimated 60,000 customers being connected per year over the next five years. However, implementation has remained slow and the higher connection rates have yet to be achieved.

19. Significant progress has been made in developing a robust transmission network. ESCOM's transmission system presently comprises some 1,340 km of 132 kV lines and 1,100 km of 66 kV lines and associated substations. Total system losses have seen an improvement from 21 percent in 2012–13 to 18

¹¹ ESCOM Backlog Report – August 2021



percent in 2020–21.¹² The bill collection rate in Malawi is 94 percent.¹³ This has resulted from the steady installation of Automated Metering Infrastructure for industrial customers that represent about 50 percent of ESCOM’s annual base (121 of 750 meters installed as of May 2022), and the migration from postpaid meters to prepaid meters for domestic consumers. Despite this progress, the sector is beset with a multitude of challenges.

20. **Power supply is constrained at times and vulnerable to hydrologic variability.** While Malawi’s current installed generation capacity is 520 MW, demand is estimated at around 720 MW leading to a supply deficit due to the low availability of hydropower especially during the dry season. In addition, the hydropower sources are exposed to hydrologic variability. In 2016, severe droughts led to reduced water levels in Lake Malawi and consequently, reduced flow rates in the Shire River. This shortage resulted in prolonged load shedding of up to 12–16 hours a day during several months of the year, but the situation has abated somewhat with the introduction of new solar IPPs, and diesel generation. About 108 MW of emergency diesel generation capacity was installed in 2018-19 to immediately assist with the supply deficit although at a high cost of about US\$0.42/kWh.¹⁴

21. **The weak financial position of the utility hampers the ability to undertake aggressive access expansion and ensure reliable service delivery.** The average electricity tariff is insufficient to meet ESCOM’s cash flow requirements. Due to its financial situation, the utility has no borrowing capacity, and the Government has been assuming debt for meeting ESCOM’s capital expenditure (CAPEX) needs. As a result of its financial position, ESCOM (a) has not been able to perform regular operation and maintenance (O&M), which led to poor customer service including service interruptions and increased restoration time; and (b) has focused on only connecting high-value customers able to afford the connection charge. Minor improvements in the tariff regime have been made over time. ESCOM submitted an application to MERA to request a 60 percent increase in tariffs for the four-year period of 2018 to 2021 against which 31.8 percent was approved and implemented. The average tariff for 2021/22 is MWK 134.25 (about US\$0.13).

22. **The GoM is addressing these challenges through a comprehensive power sector reform program:**

- **First, through investment in generation and transmission projects.** The GoM is aggressively expanding its generation and transmission capacity in the near-to-medium term to ensure power supply adequacy and by matching demand growth and grid expansion plans through three major initiatives: (a) immediate additional power from 108 MW of emergency diesel generation and 120 MW of solar photovoltaic (PV) from IPPs¹⁵ (b) interconnecting to the SAPP through the Mozambique-Malawi Regional Interconnector transmission line, which will initially allow for an additional 50 MW of imported capacity from 2024 onward; and (c)

¹² ESCOM. 2018. “5-Year Integrated Strategic Plan (2017–2022).”

¹³ <http://rise.worldbank.org/country/malawi>. According to ESCOM this collection rate represents ESCOM’s paying customers only. If non-paying customers e.g. hospitals, water boards, are taken into consideration, the collection rate drops to about 70 percent in 2021.

¹⁴ 78MW of leased diesel based generation was retired in April 2022 and offset to some extent by solar IPPs and proposed 30 MW of diesel generation owned and operated by EGENCO.

¹⁵ The solar IPP program entailed a solar auction, which was the first instance of this approach being used in Malawi’s power sector. In addition to the 120 MW of solicited solar IPP generation, another 90 MW of unsolicited solar PV generation is also under review.



increased domestic generation through IPPs by embarking on reforms that attract more private investment in generation. The World Bank, under the completed Energy Sector Support Project (ESSP) (P099626), supported the preparation of an Integrated Resource Plan, that is, a least-cost generation and transmission expansion plan that offers a list of priority energy projects through 2037.¹⁶ The World Bank is supporting the Government with the design and financing of the Mpatamanga Hydropower Project (P165704) and the Mozambique-Malawi Regional Interconnector Project (P164354). Other donors, especially the Millennium Challenge Corporation (MCC), are also active in the sector (the MCC compact closed in September 2018). The US\$350.7 million U.S.-funded MCC compact invested in transmission and distribution system strengthening and expansion through investments in the transmission backbone project, transmission and distribution substations, and related technical assistance (TA) support.

- **Second, by improving the financial and operational performance of the utility.** The MCC financed the implementation of ESCOM's financial turnaround aimed at restoring the utility's financial health and rebuilding the organization into a financially sustainable and well-managed utility. Consultants through MCC funding conducted a financial modeling exercise that resulted in a set of recommendations on improving the financial health of the utility, including a sustainable debt management plan for ESCOM, plan for reducing ESCOM's high operating costs, a tariff adjustment methodology that will align tariffs more with costs, and new accounting policies to adhere more closely to international financial standards. These interventions have already yielded results, that is, improvement in ESCOM's tax management, improved monitoring of capital expenditure and budget utilization, and improved corporate performance. The MCC also supported ESCOM to introduce stronger operational practices to improve maintenance planning and execution, which will reduce the high system losses. In addition, ESCOM has moved most of its customers from postpaid to prepaid meters. ESCOM is also implementing a revenue protection program (RPP) and is moving.
- **Third, by enhancing transparency and effectiveness of the regulatory framework.** To allow for the implementation and management of the new structure of the electricity sector that introduced the single buyer, the system and market operator, and IPPs in generation, MERA has adopted a new grid code and market rules for Malawi's electricity market. The Government has adopted a National Energy Policy (2018) and a Renewable Energy Strategy (2017-2030), which will improve transparency of Malawi's regulatory framework, increase predictability, and generate investor confidence. Through ESMAP support, the World Bank prepared a National Electrification Strategy that reviewed the institutional, technical, and financial parameters for efficient electricity access scale up. The Bank also carried out a regulatory gap analysis as well as a review of policies and regulatory instruments, including the National Energy Policy, the Renewable Energy Strategy, and the IPP Framework, which resulted in recommendations for supporting the reform process.

¹⁶ The World Bank has further financed, under the ESSP, the preparation of feasibility studies, environmental and social impact assessments (ESIAs), and tender documents for two large hydropower projects; and the western transmission backbone, along with solar resource mapping (Energy Sector Management Assistance Program [ESMAP] grant); and assessment of geothermal potential, wind resource mapping, and bagasse-fired generation. In addition, the World Bank prepared, through financing from the Government of Norway, the feasibility study and ESIA for the Mozambique-Malawi Regional Interconnector Project.



23. The GoM aims to rapidly scale up electricity access to reach about 80 percent of the population by 2035, and it is developing a National Electrification Program (NEP). In 2018, the GoM updated the National Energy Policy of 2003 to define the national energy development agenda in relation to the Malawi Vision 2063, MGDS III, and the Sustainable Development Goals (SDGs). The overall goal of the National Energy Policy 2018 is to establish a guiding framework including policy and strategic direction for achieving increased access to affordable, reliable, sustainable, efficient, and modern energy for every person in the country.

C. Proposed Development Objective(s)

Development Objective(s) (From PAD)

To rehabilitate and increase resilience of the Kapichira hydropower dam and spillways, and transmission and distribution infrastructure damaged by Tropical Storm Ana.

Key Results

The indicators that will be used to measure achievement of the PDO are:

- (a) Kapichira dam and spillways rehabilitated and upgraded with increased resilience
- (b) Transmission wheeling capacity restored (MW)



D. Project Description

24. The project has the two main components, the first being related to generation, and the second to transmission and distribution:

Component 1: Kapichira Dam Rehabilitation and Strengthening (US\$ 44.7 million)

25. This component will finance the return to resilient operation of the 128 MW Kapichira hydropower plant through the rehabilitation and upgrade of the Kapichira dam and spillways. The following phased approach is proposed to be implemented for the protection, rehabilitation, and strengthening of Kapichira dam:

26. **Immediate actions mobilized by EGENCO** include urgently restoring main spillway capacity while also kick-starting actions on the critical path for Kapichira dam rehabilitation such as collecting topographic data and assessing the quality of sand available in the reservoir for construction, commencing sediment management studies, and removal of sediment from the reservoir. These immediate actions are being currently implemented and funded by EGENCO.

27. **Phase 1: Energy restoration** to be implemented through raising water levels back to operational levels and by developing a temporary cofferdam upstream of the damaged infrastructure (the fuse plug and damaged section of the embankment dam) in order to restore impoundment of the reservoir. This would prevent further damage while protecting works for Phase 2 and SVTP irrigation intake. In order to safeguard the safety of the dam during this phase, reinforcement of the upstream face of the dam and treatment of existing scars downstream will be also implemented. This phase is planned to be implemented under the ongoing SVTP project, benefiting from existing financial and human resources (including existing PIU, owner's engineer and contractors).

28. **Phase 2: Build-back better:** Based on a revised design that would address key technical and operational features that contributed to the failure, this component will aim at (i) rehabilitating damaged infrastructure (mainly the dam), (ii) upgrading Kapichira scheme to enhance the resilience of the hydropower scheme (especially the main and emergency spillways), and (iii) supporting companion actions on operation and maintenance (O&M) and sediment management. It will be structured around mobilization of an international consultancy firm who, as Owner's Engineer (OE) for EGENCO, will (i) further review damage and previous design of the Kapichira scheme. On this basis and while integrating the new needs for SVTP irrigation intake, the OE will model hydraulic and sediment flows under different build back better scenarios and recommend detailed scope of rehabilitation and upgrade for key infrastructure such as the dam, fuse plug, and main spillway. For the latter, the OE will be required to propose an upgrade to ease operation and maintenance of the gates since they were identified as part of the root causes of the damage. The project will (i) take stock of existing studies and modeling to support the design of a basin-wide sediment management strategy for the operation of the HPP cascade (existing and proposed reservoirs) and irrigation scheme and (ii) together with the OE, develop a specific-costed implementation plan for Kapichira reservoir. The proposed basin-wide sediment management strategy will likely be funded, designed, and delivered under the upcoming Mpatamanga Phase I IDA credit.

Component 2: Transmission and Distribution Network Restoration (US\$15.3 million)

29. This component will finance the reconstruction of ESCOM's infrastructure damaged by TS Ana including both transmission (132kV & 66kV) and distribution (33kV, 11kV and 400V lines) networks where a number of power line components have been affected. These include steel towers, wooden poles and structures,

transformers, conductors and insulators among others. The damage caused by the tropical storm has been in various degrees including complete line sections, isolated structures and damage to specific equipment and materials in a manner that permanent rehabilitation works shall have to comprise of complete line construction works, replacement of structures, and replacement of specific equipment and materials. As part of this reconstruction, natural and climate risks will be included in the engineering design. Examples of such resilience measures include, among others: provision of appropriate anchorage support, deep foundation and size of footings to adapt against extreme wind and flooding, elevated control room and critical equipment to reduce flood hazard potential, use of steel, concrete or composite towers, creation of vegetation buffers and regular vegetation management.

Project Cost and Financing

30. The total cost of the project of **US\$67 million** is being financed mainly from the IDA CRW, with initial funding from the Shire Valley Transformation project (SVTP, P158805). The IDA CRW funds of US\$60 million are allocated between EGENCO for Kapichira rehabilitation in the amount of US\$44.7 million, and ESCOM for transmission and distribution network restoration in the amount of US\$15.3 million. The IDA CRW funds will be a combination of 40 percent (US\$24 million) grant and 60 percent (US\$36 million) credit. IDA funds will be on-granted and on-lent by the Ministry of Finance to the two utilities at the same terms as those offered by IDA. IDA funds will be supplemented by resources from the SVTP in the amount of about US\$7 million to fund Kapichira Phase 1 activities. Considering that a cofferdam was already planned within SVTP to protect the irrigation canal intake, no project restructuring is deemed to be necessary for the SVTP project.

Table 1: Estimated Project Cost and Financing

	Utility	Actions	IDA CRW (US\$ millions)	SVTP (US\$ millions)	Amount (US\$ millions)
1.	EGENCO	Phase 1: Cofferdam reconstruction		7.0	7.0
		Phase 2: Dam rehabilitation	44.7		44.7
		Subtotal			51.7
2.	ESCOM	Transmission & distribution network repairs	15.3		15.3
		Total	60.0	7.0	67.0

31. It is expected that the utilities shall seek retroactive financing to cover the costs of emergency rehabilitation works undertaken for temporary restoration of electricity to affected areas. The amount of retroactive financing is as follows:

Table 2: Retroactive Financing

	Utility	Actions	Amount
1.	EGENCO	Kapichira immediate actions	TBD
2.	ESCOM	Transmission & distribution network repairs	TBD



Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	Yes
Projects in Disputed Areas OP 7.60	No

Summary of Assessment of Environmental and Social Risks and Impacts

E. Implementation

Institutional and Implementation Arrangements

32. There will be two implementing agencies for the project, i.e. EGENCO for Component 1, and ESCOM for Component 2. The PIUs will be created for the Project, one each within EGENCO and ESCOM’s Planning & Development Divisions, that are responsible for implementation of major projects.

- **Project Steering Committee (PSC)** comprising of senior staff from the Ministry of Energy, EGENCO, ESCOM, and potentially the Department of Irrigation for coordination with the SVTP project, will provide oversight and high-level coordination. The PSC will provide quarterly and annual progress reports. The report will describe the status of physical progress, safeguards implementation and issues, and financial reports. The PSC will include a project coordinator responsible for consolidating information from both utilities for reporting through the above progress reports. The PSC will meet on a monthly basis with the PIUs and receive a status update from the heads of the PIUs, based on which it will recommend actions to address bottlenecks, and the way forward toward timely delivery.
- **EGENCO and ESCOM PIUs.** For the two utilities, the PIUs will include a project manager, project engineer, social specialist, environmental specialist, procurement specialist familiar with World Bank procurement guidelines, financial management (FM) specialist, and safeguards and technical specialists. The PIUs will procure EPC contractors or, in the case of ESCOM, use a combination of contractors and in-house technicians and linesmen for network restoration. An Owner’s Engineer will also be hired by EGENCO for Phase 2 implementation (Build Back Better phase), while the required scope of work for the OE for Phase 1 (cofferdam) will be added as an addendum to the existing OE for the SVTP project. ESCOM will extend the scope of work of the design and supervision engineer under the Malawi Electricity Access Project (P164331) to include transmission and distribution line restoration works under the proposed project. The EGENCO and ESCOM project managers with input from the FM specialists will be responsible for financial reporting of the EGENCO and ESCOM parts respectively.

33. **Project implementation manuals:** The project’s implementation will be guided by project implementation manuals (PIMs) at EGENCO and ESCOM PIUs. The PIMs will set out detailed institutional, administrative, financial, technical and operational guidelines and procedures for the implementation of the Project, including detailed safeguards requirements, financial management, procurement arrangements as well as monitoring and evaluation. The PIMs need to be prepared, adopted by the Borrower and sent to the World Bank Task Team for no-objection prior to the project’s effectiveness.



34. The IDA contribution to the project will be in the form of an IDA CRW credit and grant to the Ministry of Finance. IDA funds will be on-granted and on-lent to the two utilities at the same terms as those offered by IDA. ESCOM has experience in implementing World Bank financing while EGENCO will be a recipient of IDA funds for the first time and will need support in preparing the PIU's institutional structure to meet IDA's fiduciary and legal requirements.

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