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Report No: PAD00020

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROGRAM APPRAISAL DOCUMENT

ON A

PROPOSED GRANT

IN THE AMOUNT OF SDR 75.2 MILLION
(US\$100 MILLION EQUIVALENT)

TO THE

REPUBLIC OF ZAMBIA

FOR A

NATIONAL ENERGY ADVANCEMENT AND TRANSFORMATION PROGRAM
AS PHASE 1 OF A MULTI-PHASE PROGRAMMATIC APPROACH
WITH AN OVERALL FINANCING ENVELOPE OF US\$540 MILLION

February 21, 2024

Energy and Extractives Global Practice
Eastern and Southern Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective January 31, 2024)

Currency Unit = SDR

US\$1 = SDR 0.75

FISCAL YEAR

January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

8NDP	Eighth National Development Plan
ACC	Anti-Corruption Commission
AM	Accountability Mechanism
ASCENT	Accelerating Sustainable and Clean Energy Access Transformation
CAIDI	Customer Average Interruption Duration Index
CDF	Constituency Development Fund
CDRS	Climate Change and Disaster Risk Screening
CEC	Copperbelt Energy Corporation
CPF	Country Partnership Framework
DLIs	Disbursement-Linked Indicators
DLRs	Disbursement-Linked Results
DoE	Department of Energy
EAPP	Eastern Africa Power Pool
ECF	Extended Credit Facility
ERB	Energy Regulation Board
ESSA	Environmental and Social Systems Assessment
FHH	Female-Headed Households
FSA	Fiduciary Systems Assessment
GDP	Gross Domestic Product
GRS	Grievance Redress Service
GRZ	Government of the Republic of Zambia
IFC	International Finance Corporation
IMF	International Monetary Fund
IPF	Investment Project Financing
IPPs	Independent Power Producers
IRP	Integrated Resource Plan
M&E	Monitoring and Evaluation
MIGA	Multilateral Investment Guarantee Agency
MoE	Ministry of Energy
MoFNP	Ministry of Finance and National Planning
MPA	Multiphase Programmatic Approach
MYTF	Multi-Year Tariff Framework
NEP	National Energy Policy
PDO	Project Development Outcomes
PforR	Program for Results Financing
PrDO	Program Development Objective
PSC	Project Steering Committee
RE	Renewable Energy
REA	Rural Electrification Authority
REF	Rural Electrification Fund
RETRADE	Regional Energy Transmission, Trade and Decarbonization
SAIDI	System Average Interruption Duration Index
SAPP	Southern Africa Power Pool
SMEs	Small and Medium Enterprises
SOE	State-Owned Enterprise

STEM	Science, Technology, Engineering and Mathematics
ToC	Theory of Change
ZPPA	Zambia Public Procurement Authority



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DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
Zambia	National Energy Advancement and Transformation Program		
Operation ID	Financing Instrument	Does this operation have an IPF component?	
P179380	Program-for-Results Financing (PforR)	No	

Financing & Implementation Modalities

<input checked="" type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Contingent Emergency Response Component (CERC)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Small State(s)	<input type="checkbox"/> Conflict
<input type="checkbox"/> Alternative Procurement Arrangements (APA)	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Hands-on Expanded Implementation Support (HEIS)	

Expected Approval Date	Expected Closing Date	Expected MPA Program Closing Date
07-Mar-2024	30-Dec-2026	30-Dec-2033
Bank/IFC Collaboration	Joint Level	
Yes	Complementary or Interdependent project requiring active coordination	

MPA Program Development Objective

To increase the financial sustainability, operational reliability, and resilience of the electricity sector in Zambia.

MPA FINANCING DATA (US\$, Millions)

MPA Program Financing Envelope	700.00
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Organizations

Borrower: Republic of Zambia
 Implementing Agency: Rural Electrification Authority
 Contact: Linus Chanda
 Title: Chief Executive Officer
 Telephone No: 0211241296
 Email: LChanda@rea.org.zm

Implementing Agency: ZESCO
 Contact: Victor Mapani
 Title: Managing Director
 Telephone No: 0211362711
 Email: vbmapani@zesco.co.zm

MPA FINANCING DETAILS (US\$, Millions)

MPA Financing Envelope:	700.00
of which Bank Financing (IBRD):	0.00
of which Bank Financing (IDA):	540.00
of which Other Financing sources:	160.00

COST & FINANCING (US\$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)? Yes
 Is this project Private Capital Enabling (PCE)? Yes

SUMMARY

Government program Cost	249.00
Total Operation Cost	100.00



Total Program Cost	100.00
Total Financing	100.00
Financing Gap	0.00

Financing (US\$, Millions)

World Bank Group Financing

International Development Association (IDA)	100.00
IDA Grant	100.00

IDA Resources (US\$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
National Performance-Based Allocations (PBA)	0.00	100.00	0.00	0.00	100.00
Total	0.00	100.00	0.00	0.00	100.00

Expected Disbursements (US\$, Millions)

WB Fiscal Year	2024	2025	2026	2027
Annual	20.00	40.00	30.00	10.00
Cumulative	20.00	60.00	90.00	100.00

PRACTICE AREA(S)

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

CLIMATE



Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Operation Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Substantial
2. Macroeconomic	● High
3. Sector Strategies and Policies	● High
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● Substantial
6. Fiduciary	● Substantial
7. Environment and Social	● Substantial
8. Stakeholders	● Moderate
9. Overall	● Substantial
Overall MPA Program Risk	● Substantial

POLICY COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

Yes No

Does the project require any waivers of Bank policies?

Yes No

LEGAL



Legal Covenants

Sections and Description

Schedule 2, Section 1.E. 1(a) Not later than three (3) months after the Effective Date appoint and thereafter maintain at all times during the implementation of the Program, an independent verification agent with experience and qualifications and under terms of reference acceptable to the Association (the “Independent Verification Agent”), to: (i) verify the data and other evidence supporting the achievement of the DLIs/DLRs, as set forth in the table in Section IV of Schedule 2 to this Agreement; and (ii) recommend corresponding disbursements to be made, as applicable, pursuant to Section IV

Conditions

Type	Citation	Description	Financing Source
Effectiveness	Article V. Section 5.01 (a)	the ZESCO Subsidiary Agreement has been executed and delivered on behalf of the Recipient and ZESCO	IBRD/IDA
Effectiveness	Article V. Section 5.01 (b)	the REA Subsidiary Agreement has been executed and delivered on behalf of the Recipient and REA	IBRD/IDA
Effectiveness	Article V. Section 5.01 (c)	the Program Operations Manual has prepared and adopted in form and substance satisfactory to the Association and in accordance with Section I.D of Schedule 2 of this Agreement	IBRD/IDA
Effectiveness	Article V. Section 5.01 (d)	the Recipient has established a Program Steering Committee in form and substance satisfactory to the Association and in accordance with Section I.B.1 of Schedule 2 of this Agreement	IBRD/IDA



I. STRATEGIC CONTEXT

A. Country Context

- Zambia is a landlocked, resource rich, sparsely populated country at the heart of Southern Africa.** The country has a total area of 752,614 square kilometers and borders the Democratic Republic of Congo, Tanzania, Malawi, Mozambique, Zimbabwe, Botswana, Namibia, and Angola. Population, much of it urban, is estimated at about 19.6 million with a growth rate of 2.7 percent per year¹. Zambia ranks among the countries with the highest levels of poverty and inequality. The country's Human Development Index places it at 154 out of 191 countries and territories.²
- The country is in recovery following an extended period of economic mismanagement that was compounded by external shocks and resulted in the country's first sovereign debt default in November 2020.** The country saw external debt balloon from 63.7 percent of GDP in 2015 to 111.8 percent of Gross Domestic Product (GDP) in 2020. The COVID-19 pandemic saw a contraction of 2.8 percent in 2020. Growing inflation, primarily driven by severe exchange rate depreciation over the 2017-2021 period, reached 22 percent in 2022. In the middle of the same year, the poverty rate was measured at 60 percent, up from 54.4 percent in 2015, and a drop in per capita income led to the reclassification of Zambia as a Low-Income Country.³ At end-2022, Zambia's public and publicly guaranteed external debt stood at US\$20.9 billion.⁴
- Since the 2021 change in administration, the Government of the Republic of Zambia (GRZ) has demonstrated its commitment to restoring macroeconomic stability, returning the country to a high growth trajectory, and reinvigorating poverty reduction efforts.** In October 2023, GRZ agreed to sign a memorandum of understanding (MoU) with creditors to restructure bilateral debt and reduce it to sustainable levels through the G-20 Common Framework for Debt Treatments beyond the Debt Service Suspension Initiative. GDP grew robustly at 4.7 percent in 2022 and is expected to increase to 4.3 percent in 2023, driven by momentum in services—notably transport, information and communications, and hospitality—and offsetting lower mining output.⁵
- The country's economic turnaround nevertheless depends on successfully catalyzing new growth in key sectors for which energy remains the binding constraint.** Launched in December 2022, Zambia's 8th National Development Plan 2022-2026 (8NDP) sets out massive infrastructure investment in new generation to overcome the shortages of recent years and in expanding electricity access. This underpins the higher-level objective of unleashing the manufacturing, tourism, mining, and agriculture sectors. Mining and agriculture remain major contributors to Zambia's economy and together account for over 80 percent of the country's export earnings.
- GRZ has launched an ambitious reform program to pave the way for increased investment in priority sectors, including energy.** In so doing, GRZ aims to return the energy sector to viability so that it is no longer a fiscal drag, can attract private sector investment at scale to enable a high-growth trajectory, and delivers on its promise of more inclusive electrification and broader development across the national territory.

¹ World Bank. 2023. World Development Indicators database. Retrieved from: <https://data.worldbank.org/indicator/>

² UNDP (United Nations Development Programme). 2022. Human Development Report 2021-22: Uncertain Times, Unsettled Lives: Shaping our Future in a Transforming World. New York.

³ Zambia Statistical Agency. 2023. Highlights of the 2022 Poverty Assessment in Zambia

⁴ IMF. Staff Report for the 2023 Article IV Consultation, First Review under the Extended Credit Facility Arrangement, and Financing Assurances Review, IMF Country Report No. 23/256, July 2023

⁵ Zambia Statistical Agency.



B. Sectoral and Institutional Context

6. **The Zambian power sector is dominated by the state-owned enterprise ZESCO Limited (ZESCO), a vertically integrated power utility, and remains a single-buyer model in practice.** Other key stakeholders include: (i) the Ministry of Energy (MoE) that is responsible for formulating energy policies and strategies; (ii) the Energy Regulation Board (ERB); (iii) the Rural Electrification Authority (REA) that is responsible for promoting and facilitating the electrification of rural areas; (iv) Copperbelt Energy Corporation (CEC), a private utility largely dedicated to supplying the mines in the country's Copperbelt region; and (v) several Independent Power Producers (IPPs). Zambia has historically attracted private participation, though limited, in all segments of the electricity market. The National Energy Policy (NEP) of 2019 demonstrated Government openness to going further, however regulatory and policy gaps remain with ERB decisions – though technically sound – frequently subject to Ministry review and direction.
7. **The country has made progress on expanding electricity access in recent years, especially off-grid, but the electrification rate remains at 42 percent, below the Sub-Saharan Africa average of 47 percent.**⁶ This overall rate does not capture the full story however: while over 75 percent of urban households have access to electricity – almost exclusively through the grid – less than 12 percent of rural households have access to any kind of electricity source. Grid connection fees allow the utility to recover about 70 percent of the cost of connection (an increase from the 25 percent of connection costs being recovered through connection fees until a January 2022 adjustment),⁷ making grid-based access expansion a burdensome and unrewarding activity for ZESCO. Off-grid electrification plays an increasingly important role in this regard as it provides 85 percent of the access in rural areas, predominantly through solar lanterns, diesel generators, solar homes systems, and a small share of mini-grids.
8. **Despite considerable domestic hydropower, coal, solar, and wind resources in the country, the country's power supply is inadequate.** Installed capacity comprises 86 percent renewables (84 percent hydropower and 2 percent is solar), 9 percent coal, 3 percent HFO, and 2 percent diesel. The country's hydropower-dependent and geographically concentrated supply is highly exposed to climate-related shocks, the volatility and frequency of which have increased in recent years. Insufficient generation capacity and underinvestment in the grid result in frequent power planned and unplanned outages, a significant barrier to productivity. Electricity is the second most frequently reported constraint to the business environment, with 21 percent of firms reporting electrical outages as a major constraint to their operations.⁸
9. **ZESCO's financial challenges have persisted and grown in recent years, and debt and arrears have ballooned from approximately US\$700 million in 2011 to US\$3 billion in 2022.** The drought of 2015-2016 revealed sector weaknesses and triggered a deterioration in ZESCO's financial performance followed by a rapid accumulation of trade payables in addition to growing long-term debt. The drivers of this accumulation include: (i) residential tariffs set at less than half of cost recovery and average tariff also substantially below cost recovery until 2020, (ii) operational inefficiencies, with ZESCO's transmission and distribution losses estimated at 22 percent; (iii) increasing operating costs due to increasingly expensive power purchases and growing headcount; and (iv) increasing customer arrears especially from the mining sector, which accounts for nearly half the sales with collection rate at 72 percent in 2022.⁹

⁶ World Bank. 2023. Zambia Beyond Connections: Energy Access Diagnostic Report Based on the Multi-Tier Framework. ESMAP Report, Energy Sector Management Assistance Program. Washington, DC.

⁷ World Bank calculations based on ZESCO data.

⁸ World Bank. 2019. Enterprise Surveys: What Businesses Experience, Zambia 2019 Country Profile.

⁹ World Bank calculations based on ZESCO data.



10. **As a result of the above and a severe depreciation of the local Kwacha (ZMW), ZESCO's operating cost and debt recovery severely decreased over the 2014-2019 period (from over 90 percent in 2014 down to 58 percent in 2019).** While ZESCO had an operating cost and debt recovery of 110 percent in 2021 as a result of the tariff hike of 2020, the one-time recovery of outstanding public sector bills, and a significant appreciation of the ZMW, cost recovery decreased again to 100 percent in 2022 due to increase in power purchase costs and depreciation of the ZMW.
11. **Addressing ZESCO's financial and operational challenges is critical to attracting the new, predominantly private, investment needed in the sector to ensure adequate power availability and sustain an economic transformation.** In 2019, GRZ approved new policies and revised legislation to promote open access to the grid and increase private sector participation. This has not materialized however as ZESCO's central role in the sector makes its financial viability (and operational efficiency) a key concern to developers and lenders alike. GRZ is currently limited in its ability to provide financial relief to the utility or sovereign guarantees to new investors.
12. **GRZ recognizes that only a whole-sector approach will yield the turnaround and viability needed to attract new investment and is implementing ambitious reforms accordingly.** In 2022, ZESCO published and began implementation of a comprehensive plan for utility transformation. In early 2023, ERB approved and published its first Multi Year Tariff Framework (MYTF) outlining annual tariff increases of 15 percent in 2023 and 13 percent on average over 2024-2027 and providing for pass-through cost adjustments. Government has replaced the Rural Electrification Act. No. 20 of 2003 with the Rural Electrification Act No. 5 of 2023 to inter alia promote and enhance rural electrification; continue and reinforce functions of the Rural Electrification Fund (REF) and the Rural Electrification Agency (REA). In addition, GRZ has approved a REA strategy towards a target of 22.4 percent of rural household electrification by 2026 with a view of achieving universal access to electricity by 2030 in line with the Vision 2030, the country's first long-term development plan approved in 2006. In February 2024, GRZ launched the Integrated Resource Plan (IRP), a least cost sector expansion plan, which provides for increasing power supply, transmission, and distribution that also increases variable renewable energy to 30 percent of the energy mix.

C. Relationship to the CPF and Rationale for Use of Instrument

13. **The Multiphase Programmatic Approach (MPA) is aligned with the World Bank Group Country Partnership Framework (CPF) for Zambia (FY2019-2023) (Report no. 128467), that was extended to FY2024 following a Performance and Learning Review.** The overarching objective of the CPF is the diversification of Zambia's economy so that it is more resilient and inclusive. The MPA also provides the long-term support required to tackle the interlinked challenges of energy supply and viability that Zambia is currently facing. Improvement in the management and financial performance of ZESCO supports strengthened economic management and growth by lessening its reliance on Government and improving the delivery of energy services to customers. Through support to REA, the MPA supports access to and quality of resilient infrastructure services in rural areas. In this first phase of the MPA, the Program-for-Results (PforR) instrument has been selected as it encourages and incentivizes result oriented approach, which is essential for GRZ, particularly ZESCO, to demonstrate commitment and progress towards utility transformation and institutional development. This clear measure of success in the initial phase is essential to build confidence of all energy sector stakeholders in GRZ and ZESCO towards a longer-term vision for the sector. In so doing, the PforR will help to improve efficiency, accountability, and transparency in the use of public resources.
14. **The MPA is consistent with Zambia's Nationally Determined Contribution (NDC) and aligned with the Paris Agreement.** Zambia's updated NDC¹⁰ paves the way for more resilient, green growth, with a bold 2030 goal to reduce

¹⁰ United Nations Climate Change. 2021. Zambia First NDC (Updated submission).



greenhouse gas emissions by 91 percent against business-as-usual, including 14 percent with unconditional contributions, together with plans to scale-up renewable energy and an elaborated adaptation component. In the energy sector, Zambia commits to reduce GHG emissions by a factor of 11.94 percent by 2030, against business-as-usual by increasing domestic RE generation. The MPA will contribute to these mitigation goals by improving the financial and operational performance of ZESCO, enhancing electricity supply, promoting renewable energy, and enhancing climate resilience.

II. PROGRAM DESCRIPTION

A. Government Program

15. **The government program encompasses the ZESCO Strategic Plan 2022-2031 (ZESCO plan), the REA Strategic Plan 2022-2026 (REA plan) and the IRP-2050.** The plans are fully aligned with the country's economic growth objectives, reflect policy pronouncements in the 8NDP, Vision 2030, NEP, and 2021 NDC, and provide for rapid expansion of generation capacity and access to electricity. GRZ-led IRP outlines the comprehensive infrastructure investments needed to make the sector climate resilient, financially sustainable, and capable of providing high quality and affordable service to all customers countrywide. The IRP investment cost are estimated at US\$11.6 billion by 2030 and US\$31 billion by 2050 across generation, transmission, distribution, access to on- and off-grid electricity.
16. **The ZESCO and REA plans provide a more granular articulation of the relevant infrastructure and access investments from the IRP for their respective periods while also detailing further commitments around organizational, operational, and financial performance.** The ZESCO plan is a 10-year turnaround strategy and business plan that aims to return the utility to profitability while meeting growing demand, improving quality of service, promoting cost-reduction, and expanding revenue-generating initiatives across key operational and financial segments. To successfully execute the ZESCO plan, an estimated US\$6.2 billion (aligned with the IRP and much of which is sourced through utility revenues) is required to implement more than 50 initiatives focusing on customer satisfaction, financial sustainability, expanded infrastructure, effective maintenance, and optimized human capital. The five-year REA plan reflects the recent Rural Electrification Act No. 20 of 2023 and aims to increase rural electricity access rate from under 11.9 percent in 2023 to 22.4 percent by 2026. The plan requires US\$2.9 billion (funded in large part through the national budget) with a focus on improving rural electrification service delivery both on and off the grid. The REA plan is informed by the past implementation of the Rural Electrification Master Plan¹¹.

B. Multiphase Programmatic Approach

(i) Rationale for Using MPA

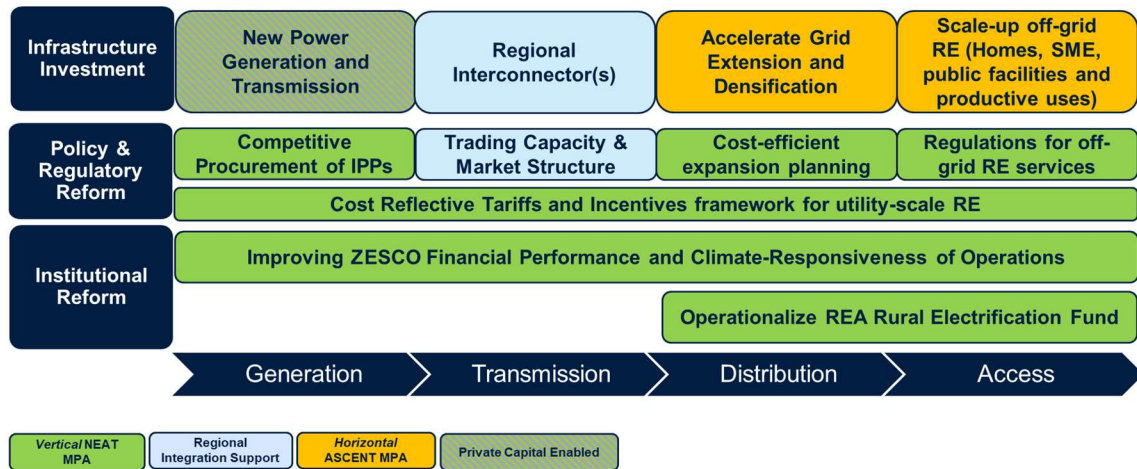
17. **The National Energy Advancement and Transformation (NEAT) MPA aims to crowd in private sector investment in Zambia's energy sector by providing the long-term, predictable policy support and financing needed to successfully implement a complex reform process and return ZESCO to financial viability.** The reform process underway aims to clarify and improve financial flows in the sector, reduce inefficiencies, implement new capital expenditure plans, and restore confidence in ZESCO and GRZ as reliable long-term counterparts to new private investors. The interdependencies of such a transformation mean that they cannot be achieved piecemeal. The MPA aims to systematically tackle the foundational issues affecting sector creditworthiness and change the paradigm for

¹¹ Government of the Republic of Zambia. 2009. Rural Electrification Master Plan for Zambia 2008 – 2030.



investment in the sector, which is currently hamstrung by ZESCO’s poor financial performance. It is expected to comprise PforR and Investment Project Financing (IPF) operations to ensure that reforms improving both financial and operational performance are implemented and institutionalized over the long term. As utility performance improves, the MPA will also provide the support needed to crowd in the private sector on value-adding investments from debt refinancing to renewable energy generation. In so doing, the MPA combines the signaling effect of long-term support to partners and private sector as well as an accountability mechanism for ensuring adherence to GRZ’s reform agenda.

Figure 1: Complementary Initiatives for Transformation Across Zambia’s Electricity Sector Value-Chain



18. **The MPA provides the framing around which other sector investment targeting complementary segments can be anchored.** Zambia’s access to sufficient, affordable, reliable, and sustainable electricity requires an integrated approach across all segments in the value chain. This includes securing cheaper and more climate-resilient generation, promoting regional power interconnection to capitalize on surpluses and hedge against shortfalls, and ring-fencing and optimizing financing for domestic access expansion efforts. The MPA provides the long-term support needed to ensure the feasibility of other complementary investments that in turn support sector viability, through improving financial and operational performance and enhancing reliability of the sector necessary for growth. Figure 1 above shows how the MPA is expected to complement the regional energy access program - the Accelerating Sustainable and Clean Energy Access Transformation Program (ASCENT – P180547), and initiatives such as the proposed Regional Energy Transmission, Trade, and Decarbonization Project (RETRADE – P175190) currently under preparation. The MPA will create a platform for broader engagement with International Finance Corporation (IFC), Multilateral Investment Guarantee Agency (MIGA), and development partners to align support to government efforts to optimize public investment and mobilize private investment.

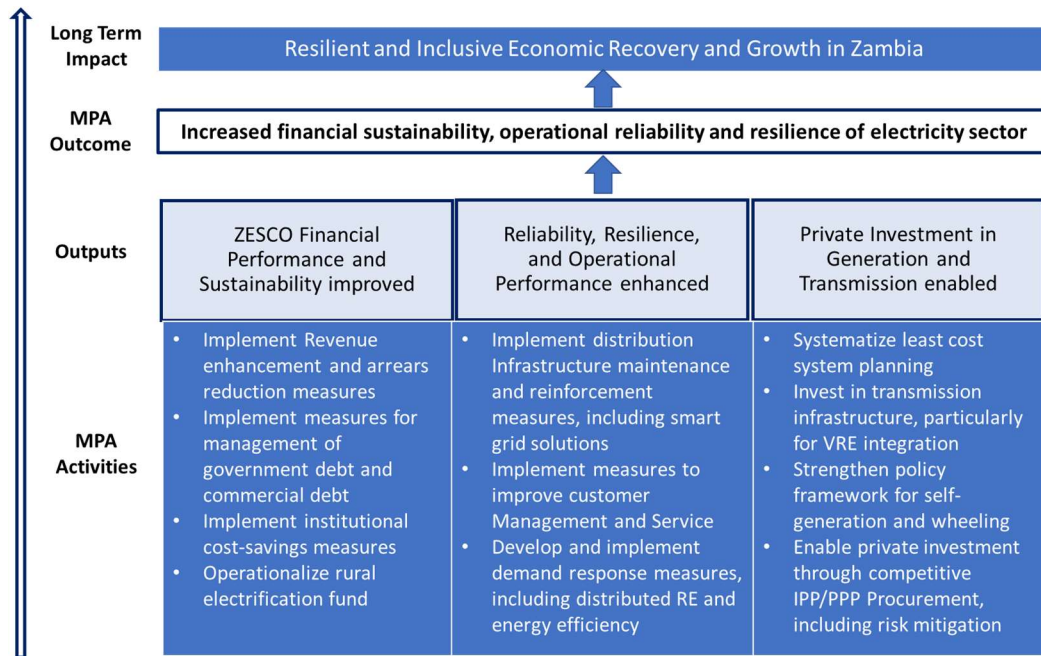
19. **The MPA provides a risk mitigation-based approach for implementing a high-stakes reform process that enables adaptive management of the World Bank’s support at each phase, provides flexibility, and builds institutional capacity to address unforeseen challenges.** The electricity sector financial flows are closely tied to Zambia’s broader fiscal constraints, and availability of development financing is limited. The phased approach therefore creates flexibility for GRZ to navigate continued pressures, tailor each phase to the context at the time of preparation and undertake course correction as new challenges and opportunities emerge, while ensuring progress toward NEAT program outcome.



(ii) MPA Program Results Chain

20. The theory of change (ToC) for the MPA considers outcomes in the context of the national goals enshrined in the 8NDP towards achieving inclusive economic recovery and growth. The MPA contributes to the national plan and recognizes the importance of parallel synchronous actions across the energy value chain to ensure sustainability. The ToC presents the longer-term view of the MPA, which will support ZESCO, REA, in close coordination with the MoE, Ministry of Finance & National Planning (MoFNP), and ERB in implementing measures identified in IRP and the ZESCO and REA plans that expand opportunities for economic growth.

Figure 2: MPA Theory of Change



(iii) MPA Program Development Objective

21. The MPA Program Development Objective (PrDO) is to increase financial sustainability, operational reliability, and resilience of electricity sector in Zambia. The MPA PrDO is expected to be achieved by end of 2033. The Project Development Outcome (PDO) for each phase will contribute towards one or more of the PrDO indicators and will be cumulatively counted towards the MPA’s overall outcome indicators. The MPA outcome indicators with baselines and end targets are summarized in Table 1 below.



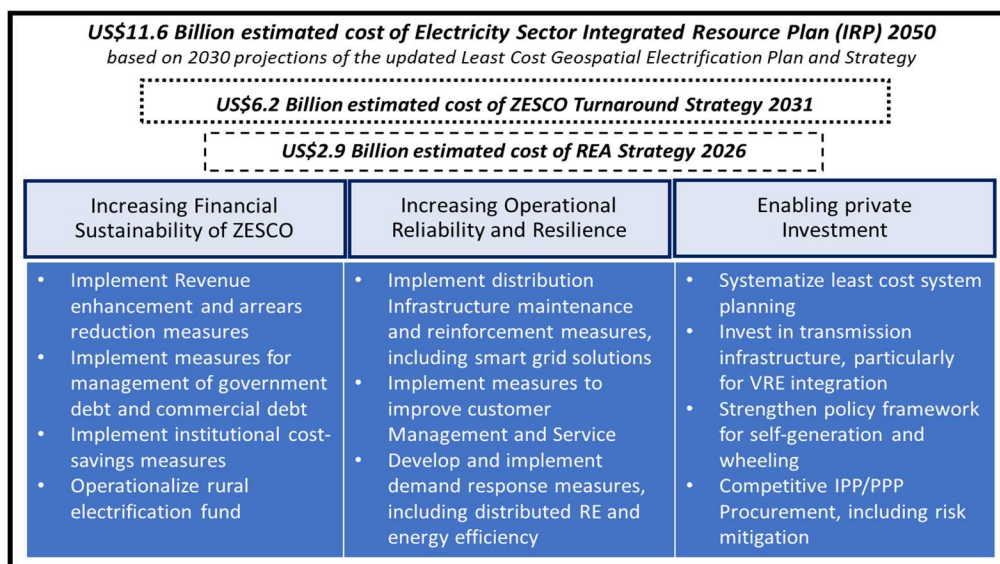
Table 1: MPA Outcome Indicators

PrDO: To increase the financial sustainability, operational reliability, and resilience of electricity sector in Zambia.			
PrDO Indicator	Unit	Baseline (2023)	Target (2033)
PrDO 1: Increased ZESCO Financial Sustainability Measured as operating and debt recovery including trade payables and excluding subsidies on a cash basis, in line with the ZESCO Strategic Plan	Percentage	35	98
PrDO 2: Enhanced Operational Reliability Measured through the Customer Average Interruption Duration Index (CAIDI), in line with the ZESCO Strategic Plan.	Hours	7	5
PrDO 3: Increased Renewable Energy Capacity and Climate Resilience Measured through procurement of new non-hydropower renewable energy capacity to diversify energy mix, in line with the IRP	MW	0	1,458 MW

(iv) MPA Program Framework

22. **The MPA creates a pathway to achieve GRZ’s vision to spur inclusive economic growth by expanding reliable electricity supply, focusing on non-hydro renewable energy (RE) sources.** The MPA is structured around three output pillars namely, improving financial performance, enhancing reliability and resilience, and enabling private investment in RE. These pillars are aligned with the priorities of the national strategies and government’s longer-term vision of sector sustainability, universal energy access and tripling of electricity generation.

Figure 3: MPA Program Framework



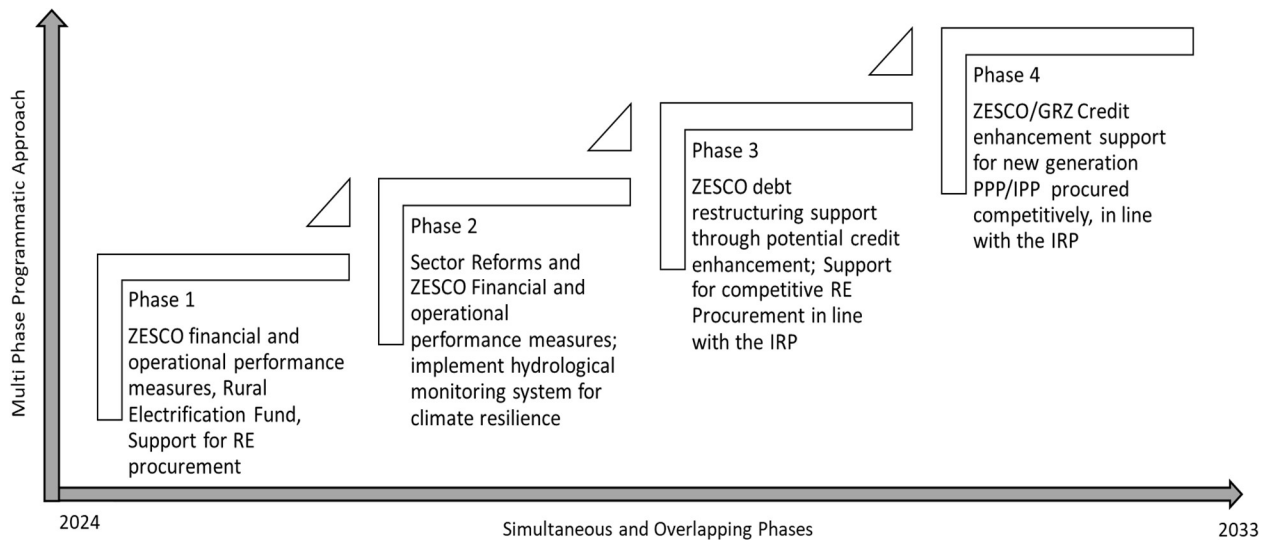
23. **The 10-year MPA envisages four phases, with lessons learned and experience gained from initial phases informing the design of subsequent phases.** Phases 1 supports foundational measures to begin this process of improving ZESCO’s operational and financial performance. Phase 2 will continue this focus but expand the measures to include technical and commercial loss reduction, revenue enhancement, and to identify opportunities and barriers to private investments in the sector. Phase 3 is expected to focus on ZESCO’s debt restructuring, including a possible refinancing guarantee contingent on improvement in ZESCO’s operating and financial performance. Phase 4 is expected to



catalyze new generation through ZESCO credit enhancements to allow new IPP transactions. To enable guarantees, ZESCO will need to demonstrate acceptable levels of collection rates, technical losses, system availability, and service quality hence the focus on these areas under Phases 1 and 2, which are expected to lead to an improved track record of ZESCO performance and creditworthiness. The impact of the different operational and financial improvement measures for ZESCO will be tracked in a dedicated utility financial model and will inform the design of subsequent phases. In addition, the MPA will allow for an assessment of existing and remaining obstacles for private investments after each phase to inform design of subsequent phases.

- 24. **The MPA will monitor key financial ratios across Phases 1 and 2 to inform design of Phase 3 as part of its monitoring and evaluation (M&E) plan.** These include financial performance indicators such as operating and debt service cost recovery on a cash collected basis, debt service coverage ratio, trade receivables (both on a gross and net basis), trade payables, current ratio, long term debt to equity ratio, (long term debt + trade payables) to equity ratio, and the earnings before interest, taxes, depreciation, and amortization EBITDA to net interest expense ratio (interest coverage ratio). The design of Phase 4 will reflect the enabling environment for private sector participation in generation at the time and seek to optimize use of funds by providing the minimum effective support needed for private sector investment. To this effect, earlier phases will support a competitive procurement framework for renewable energy generation that is aligned with the IRP and the continued implementation of cost reflective tariffs. Program phasing is presented in Figure 4 and the MPA Program Framework is provided in Figure 3.

Figure 4: MPA Phasing



- 25. **As outlined in Table 2, the MPA will be implemented over a 7 year period covering FY2024 to FY2030 with total financing envelope of US\$700 million, of which the estimated IDA amount is US\$540 million.** The MPA will comprise four phases. Co-financing from other development partners or climate finance sources is anticipated in the amount of US\$160 million. Phases 2-4 of the MPA may overlap as function of sector needs, absorption capacity, and financing availability.



Table 2: MPA Financing Framework

Phase #	Operation ID	Sequential or Simultaneous	Phase's Proposed DO*	IPF or PforR	Estimated IDA Amount (US\$ million)	Estimated Other Amount (US\$ million)	Estimated Approval Date	Estimated Environmental & Social Risk Rating
1	P179380	Sequential	To improve financial performance of the electricity sector	P4R	100.00	0.00	03/10/24	S
2	TBD	Simultaneous	To increase financial sustainability, reliability and resilience of the electricity sector	P4R	100.00	60.00	FY26	M
3	TBD	Simultaneous	To increase financial sustainability, reliability and resilience of the electricity sector	IPF	140.00	50.00	FY27	S
4	TBD	Simultaneous	To increase financial sustainability, reliability and resilience of the electricity sector	IPF	200.00	50.00	FY30	S
Total					540.00	160.00		
Financing Envelope					US\$700.00			
Board Approved Financing Envelope					US\$0.00			



(v) Learning Agenda

26. **The MPA builds on lessons learned through implementation of the Zambia Scaling Solar Guarantee and Second Scaling Solar Guarantee (P157943 and P163958, respectively), the ongoing Electricity Service Access Project (ESAP, P162760), the First and Second Zambia Second Macroeconomic Stability, Growth and Competitiveness Development Policy Financing operations (P174911 and P181011) linked to Zambia’s broader reform efforts that included energy sector prior actions, and technical assistance to the sector.** The lessons learned include the need to consider the interdependencies across the value-chain during program design, the need for a comprehensive approach given the dominant role of ZESCO in all segments of the sector, and the importance of improving financial and operational sustainability of the sector as the fulcrum for broader expansion. Lessons learned from Phase 1 will inform future phases as well as the broader energy sector engagement in Zambia.
27. **The MPA will ensure continuous learning to inform interventions in and beyond its completion.** As the MPA will track the impact of the different operational and financial improvement measures for ZESCO, it allows for comparison between projected and actual results. It also allows for the identification of the biggest drivers or obstacles of performance improvement, as well as previously unforeseen interventions that could have improved outcomes for the MPA had they been considered at design stage. Findings will then be used to inform the design of subsequent phases within the MPA, related Technical Assistance (TA) activities, and as needed secure complementary support from other partners, particularly IFC and MIGA. In addition, it is anticipated that findings will also contribute to the design of operations under complementary regional programs.
28. **The MPA will provide a learning platform for understanding the market response to reforms and identifying the tipping point at which private capital mobilizing becomes possible again.** This is possible as the MPA adopts a ratcheting approach to improving financial performance through increasingly large interventions as ZESCO and REA demonstrate a track record of reform implementation. To this effect, the MPA will identify policy and regulatory support required to enable private investments in generation, transmission and off-grid electrification through market sounding and engagement.
29. **The MPA will ensure the financial reforms to be implemented in the energy sector contribute to closing key gender gaps.** According to the Zambia Gender Equality Strategy and Action Plan¹² key gender gaps in the energy sector include disparities in access to electricity in households and enterprises, and the underrepresentation of women in the energy sector. The MPA anticipates that strengthening the implementation of the country’s existing Rural Electricity Fund will close some of the gender gaps pertaining to access in rural Zambia. In subsequent phases, the MPA will work with ZESCO and REA to identify interventions that would increase the employment of women with technical backgrounds.

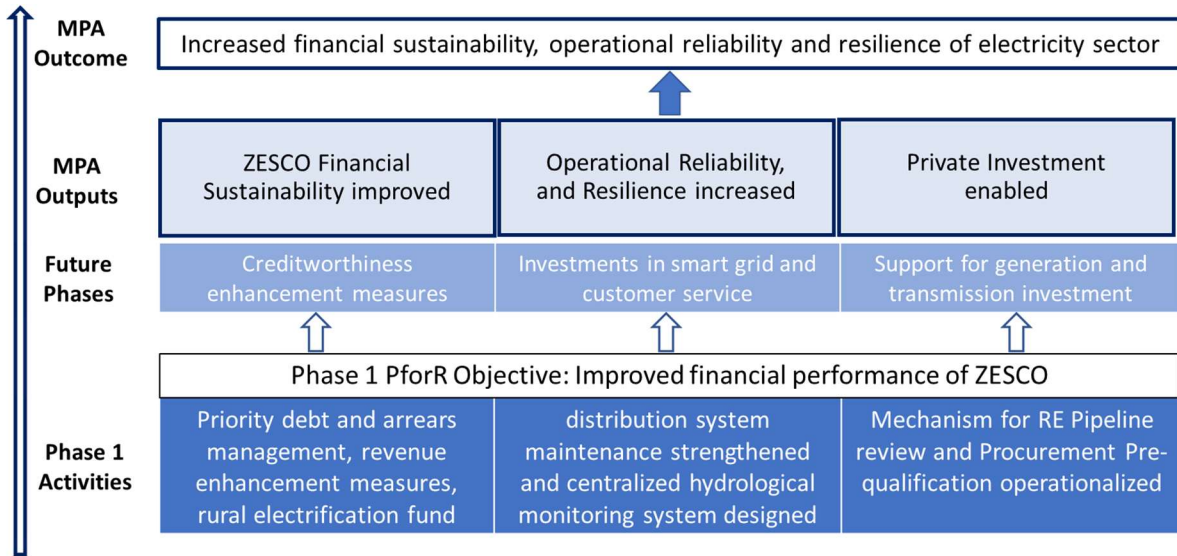
C. PforR Theory of Change

30. **The phase 1 PforR establishes the foundations for design and implementation of subsequent phases to achieve the PrDO, as well as for broader energy sector engagement through complementary World Bank-financed operations and donor coordination.** This creates a sector-wide approach to align World Bank efforts with the national vision for electricity sector and for broader economic growth.

¹² Government of the Republic of Zambia. 2022. Gender Equality Strategy and Action Plan.



Figure 5: PforR Program Theory of Change



D. PforR Program Scope

31. The PforR scope of the phase 1 PforR comprises a subset of country-wide activities taken from the GRZ program for energy sector transformation that includes the ZESCO Strategic Plan, the REA Strategy, and the IRP. The PforR scope is further detailed in Table 3 and centers on three results areas, namely:

- a. **Result Area 1: Improving Financial and Operational Performance of ZESCO** focuses on supporting implementation of the measures identified in the ZESCO strategy for management of debt and arrears, optimizing operational costs, enhancing revenues, and reducing the impact of the upfront cost of connecting new customers through grid-connection subsidy program. This is addressed through two Disbursement Linked Indicators (DLI) listed below.
- b. **Result Area 2: Increasing Reliability and Climate Resilience of the Electricity Sector** focuses on supporting implementation of the measures identified in the ZESCO strategy for improved customer management, reliability of supply and system resilience to climate change (further details in Annex 6), all of which are expected to also strengthen revenue collection while reducing ZESCO’s costs.
- c. **Result Area 3: Enabling private investment in non-hydro renewable energy** focuses on establishing the foundation for competitive, cost-efficient procurement of new generation that is urgently needed in Zambia to meet the current energy demand, effectively support electrification, and for the fast-growing needs of key economic growth sectors. Given the current excessive dependence on hydropower, addition on non-hydro resources will strengthen climate resilience of the system by diversifying the energy mix.



Table 3: Program Boundary

	Government program	Phase 1 PforR	Reasons for nonalignment
Objective	ZESCO Strategic Plan, and REA strategy, contributing to the IRP	Priority measures in the ZESCO strategy and actions to support implementation of REA strategy and IRP	Based on the limited IDA funding available, the PforR supports priority measures under the ZESCO strategy and towards achievement of REA strategic goals. These measures can be achieved in the short-term, establish foundations for transformation and can help GRZ make measurable progress towards the sector goals in the medium-to-long term.
Duration	ZESCO plan (2022-31), REA plan (2023-26), IRP (2050)	June 2023 to December 2025	Supporting priority measures that need to be implemented in the short-term to demonstrate government commitment to the strategies, as well as to achieve measurable progress that will determine design of the subsequent phases
Geographic coverage	All the country	All the country	N/A
Results areas	ZESCO plan (all aspects of ZESCO operations), REA plan (all aspects of REA operations), IRP (infrastructure investments),	ZESCO: Support limited to financial and operational measures. REA: Support limited to implementation of REA Act 2023 focus on strengthening implementation of the REF IRP: Support limited to competitive procurement of non-hydro RE generation.	ZESCO: To focus on tangible debt management, revenue enhancement, operational improvement measures, facilitate MoF support for ZESCO, and improve climate resilience of supply. REA: To focus on strengthening implementation of a key section of the REA Act 2023, which would facilitate fund-raising from donor partners to accelerate pace of access in the future. IRP: The PforR excludes high-risk projects (hydropower and transmission investments), avoids support for fossil-fuel based generation; and encourages use of competitive procurement to attract private investment into least-cost non-hydropower renewable energy PPP/IPPs.
Overall Financing	Government Program (2023-26) for ZESCO and REA is US\$249 million	US\$100 million	For financing, government program scope is calculated only for the short-term, to align with the PforR timeframe. Under the longer-term vision, this PforR supports the short-term priority actions, that are necessary pre-requisites to achieving GRZ's ambition.



Table 4: Program Financing

Source	Amount (US\$, Millions)	% of Total
International Development Association (IDA)	100.00	100%
IDA Grant	100.00	100%
Total Program Financing	100.00	

E. Program Development Objective (PDO) and PDO Level Results Indicators

32. The Phase 1 PforR Program Development Objective (PDO) and PDO Indicators are subsets of the MPA PrDO.

Table 5: Phase 1 Program Outcome Indicators

Phase 1 PDO: To improve financial performance of the national utility, ZESCO Limited.			
PDO Indicator	Unit	Baseline (2023)	Target (2026)
Improved Financial Performance of ZESCO	Percentage	100	105

33. The Phase 1 PforR aims to improve the financial performance of the national utility, ZESCO. The PDO indicator for the PforR is defined as ZESCO’s ability to consistently recover its operating cost and ongoing loan service payments on a cash basis. This is calculated as operating cost and debt recovery *excluding* trade payables and *excluding* subsidies on a cash basis.

F. Disbursement Linked Indicators and Verification Protocols

34. **The PforR includes four Disbursement-Linked Indicators (DLIs) with clear and verifiable Disbursement-Linked Results (DLRs) that support GRZ program.** The DLIs are focused on priority measures towards improving sustainability of ZESCO, financially and operationally, as per the ZESCO Strategic Plan, establishing the institutional framework to accelerate achievement of the Zambia’s electrification expansion goals while limiting financial impact on ZESCO, and launching mechanisms for attracting private investment into non-hydro RE generation and for enhancing climate resilience of the sector (refer to Annex 6 for details). The PforR provides an opportunity for direct engagement of the MoFNP in understanding and addressing the needs of ZESCO and REA to improve utility performance and expansion of access and generation capacity that is affordable to people, ZESCO, and GRZ. Verification that DLRs have been achieved will be carried out by an Independent Verification Agent (IVA) hired by the implementing entities and in line with the verification protocols outlined in Annex 1. Verification will comprise a combination of desk review and sampling of physical infrastructure investments.

- a. **DLI 1: Improved Financial Performance of ZESCO** This DLI translates into four DLRs, supporting (i) adoption of Debt and Arrears Management Plan, including mining sector endorsed by ZESCO Board; (ii) publishing updated ERB approved tariffs as implementation of the MYTF towards ensuring cost-reflective tariffs that are key to improving demand-side efficiency and sector financial sustainability; (iii) managed reduction in the outstanding balance of currently on-lent loans by conversion to equity in ZESCO’s balance sheet; and (iv) managed reduction in ZESCO’s gross receivables from the mining sector.



- b. **DLI 2: Operationalization of the REF, pursuant to the Rural Electrification Act.** The DLRs follow the process of strengthening implementation of the REF, with adoption of the operating guidelines and their implementation documented through an annual report. REF was established under Section 18 of the Rural Electrification Act No. 20 of 2003 of the Laws of Zambia and continued under Section 15 of the Rural Electrification Act No. 5 of 2023 of the Laws of Zambia. REF is managed by REA and consisting of money appropriated by Parliament, electricity levy collected as well as loans, grants or donations. REF is the national platform for government and development partners to channel funds for energy access programs. This is expected to ensure financial sustainability of capital expenditure for social objectives while increasing accountability. GRZ and ERB recognize the upfront cost burden on ZESCO and have approved a consumer facing grid-connection subsidy program to lower the cost of connection to households and businesses. The REF streamlines the process for expanding grid-based electrification and is also expected to support still nascent off-grid private-sector business models.
- c. **DLI 3: Improved reliability and customer service:** This includes three DLRs supporting distribution network management and improved customer service. Specifically, DLRs comprise: (i) maintenance of the reliability index namely, CAIDI, measured in hours, in line with targets set by ERB for Dry Season; (ii) deployment of smart-metering for 11,000 high-value customers, which not only improves revenue collection but also enables ZESCO to provide better customer service, enable customers to actively manage consumption and gradually expand Time Of Use tariffs to encourage and increase share of renewable energy; and (iii) design for hydrological monitoring system to enhance energy forecast finalized and approved by ZESCO. The system will enable operational short, medium, and seasonal inflow forecasting and reservoir operations system for cascaded hydropower plants on the Kafue basin. The system is essential for planning and building system resilience to long-term, multiple-year droughts, exacerbated by climate change.
- d. **DLI 4: Enabling private investment in non-hydro renewable energy:** This includes two DLRs that support implementation of the recently approved Integrated Resource Plan (IRP), through review of the existing pipeline of Renewable Energy Generation project proposals, launch of the Renewable Energy Procurement pre-qualification process to identify and prioritize projects.

35. Further detail on DLIs, DLRs, and the amount of financing allocated to them are listed in Table 6 below.

Table 6: Disbursement Linked Indicators, Results and Allocation

Disbursement Linked Indicator	DLR Disbursement Linked Result	Disbursement Calculation Formula (Expressed in SDR)	Amount of the Financing Allocated [expressed in USD equivalent of SDR]
(1) DLI #1: Improved Financial Performance of ZESCO	DLR #1.1: Adoption of Debt and Arrears Management Plan, including mining sector endorsed by ZESCO Board	DLR #1.1: Allocated amount of SDR 2,406,400 to be disbursed on confirmation of achievement	US\$3,200,000
	DLR #1.2 (i): ZESCO publishes updated ERB approved tariffs with full	DLR #1.2(i): Allocated amount of SDR 5,264,000 to be disbursed on confirmation of achievement	US\$7,000,000



Disbursement Linked Indicator	DLR Disbursement Linked Result	Disbursement Calculation Formula (Expressed in SDR)	Amount of the Financing Allocated [expressed in USD equivalent of SDR]
	passthroughs for calendar year 2024		
	DLR #1.2 (ii): ZESCO publishes updated ERB approved tariffs with full passthroughs for calendar year 2025	DLR #1.2(ii): Allocated amount of SDR 5,264,000 to be disbursed on confirmation of achievement	US\$7,000,000
	DLR #1.3: Reduction in the outstanding balance of currently on-lent loans by conversion to equity in ZESCO's balance sheet	DLR #1.3: Allocated amount of SDR 7,520,000 to be disbursed on confirmation of reduction of the outstanding balance of currently on-lent loans through conversion to equity, in ZESCO's balance sheet, from a baseline of US\$370million to a target of US\$185million	US\$10,000,000
	DLR #1.4: ZESCO's gross receivables from the mining sector reduced	DLR #1.4: Allocated amount of SDR 7,520,000 to be disbursed on confirmation of reduction of ZESCO's gross receivable from the mining sector from baseline of US\$600 million to target of US\$570 million	US\$10,000,000
(2) DLI #2: Operationalization of the Rural Electrification Fund, pursuant to the Rural Electrification Act	DLR #2.1: REA Board adopts Operating Guidelines for Rural Electrification Fund (REF)	DLR #2.1: Allocated amount of SDR 3,760,000 to be disbursed on confirmation of achievement	US\$5,000,000
	DLR #2.2: Rural Electrification Fund (REF) Year 1 Annual Report submitted, as per the REF Operating Guidelines	DLR #2.2: Allocated amount of SDR 3,760,000 to be disbursed on confirmation of achievement	US\$5,000,000



Disbursement Linked Indicator	DLR Disbursement Linked Result	Disbursement Calculation Formula (Expressed in SDR)	Amount of the Financing Allocated [expressed in USD equivalent of SDR]
(3) DLI #3: Improved reliability and customer service	DLR# 3.1(i): Maintenance of Customer Average Interruption Duration Index (CAIDI) of 7 Hours for Dry Season in 2024.	DLR# 3.1(i): Allocated amount of SDR 3,008,000 to be disbursed on confirmation of achievement	US\$4,000,000
	DLR# 3.1(ii) Maintenance of Customer Average Interruption Duration Index (CAIDI) of 7 Hours for Dry Season in 2025.	DLR# 3.1(ii): Allocated amount of SDR 3,008,000 to be disbursed on confirmation of achievement	US\$4,000,000
	DLR #3.2: Deployment of smart-meters for 11,000 high-value customers	DLR#3.2 Upon achieving minimum threshold of deployment of the first 2,500 smart meters, disburse SDR2105.6 for each smart meter deployed, up to a maximum of 11,000 smart-meters with a total allocation of SDR 23,161,600	US\$30,800,000
	DLR #3.3: Design of hydrological monitoring system to enhance energy forecast finalized and approved by ZESCO	DLR# 3.3: Allocated amount of SDR 3,008,000 to be disbursed on confirmation of achievement	US\$4,000,000
(4) DLI #4: Enabling private investment in non-hydro renewable energy	DLR #4.1: Renewable Energy Generation Pipeline review completed.	DLR# 4.1: Allocated amount of SDR 3,760,000 to be disbursed on confirmation of achievement	US\$5,000,000
	DLR #4.2: Renewable Energy Procurement pre-qualification, in line with IRP, launched	DLR# 4.2: Allocated amount of SDR 3,760,000 to be disbursed on confirmation of achievement	US\$5,000,000
TOTAL AMOUNT			US\$100 million equivalent

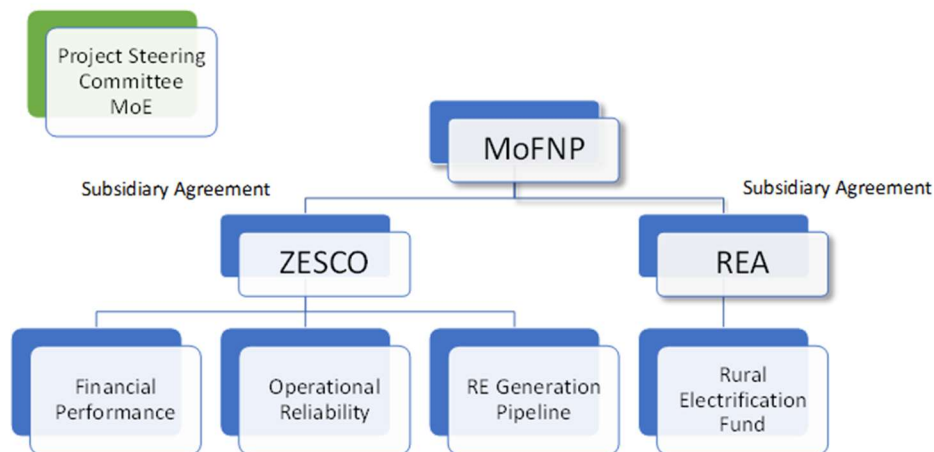


III. PROGRAM IMPLEMENTATION

A. Institutional and Implementation Arrangements

36. **The MoFNP will ensure overall coordination of the PforR including for fiduciary and environmental and social aspects.** The overall policy guidance and regular oversight and coordination over the PforR implementation will be conducted by the Project Steering Committee (PSC) chaired by the MoE and comprising representatives of MoFNP, ERB, ZESCO, and REA. The Department of Energy (DoE), within the MoE, will serve as the Secretariat of the PSC. ZESCO and REA will assign dedicated project coordinators to implement respective sub-programs with sufficient technical staff. The two institutions will maintain appropriate monitoring and evaluation arrangements as well as credible disbursement-linked indicator verification protocols and are required to hire an Independent Verification Agent (IVA) to verify the achievement of the results. In addition, the World Bank may hire a third-party verification agent for Phase 1. Both ZESCO and REA have had many years of implementation of large, medium, and small capital projects involving on financing, development partners including the World Bank, and resources from the capital markets. This has enabled the institutions to acquire valuable experience in financing, planning, procurement, and contract management. Execution of these activities will be done with the application of industry standards and quality assurance systems.

Figure 6. Program Implementation Arrangements



B. Results Monitoring and Evaluation

37. **Capacity to monitor results will be key to ensure PforR success and effectiveness.** REA has functioning M&E systems that were put in place during the implementation of ESAP to monitor the results of the Project. In addition, ZESCO recently created and staffed the M&E unit and equipped it with a robust monitoring and evaluation system.

38. **REA and ZESCO will be responsible for M&E and reporting on PforR implementation progress, as per Results Framework in Annex 1.** Reports will be prepared quarterly during project implementation and submitted by the institutions to the World Bank no later than 45 days after the end of the period. Furthermore, the World Bank will continually supervise the project and, as necessary, corrective actions will be agreed upon, including during the midterm review.



C. Disbursement Arrangements

39. **The IDA grant will be disbursed through the MoFNP, through separate subsidiary grant agreements, to ZESCO and REA.** This will be consistent with the fund flow arrangements used for the execution of the national budget. The funds released to REA and ZESCO would be available to carry out each institution's activities as per their approved budgets and also assist them achieve other DLIs. It is expected that the use of funds will be in accordance with the country systems and implementing agencies' financial management systems.
40. **Disbursement of the proceeds of the World Bank funding will be made upon request by the Recipient and the verification of the achievement of DLIs.** While REA and ZESCO will be in charge of preparing withdrawal applications (WAs), WAs will be reviewed by the MoFNP that will also submit them to the Association. Corresponding funds for achieved DLIs will be disbursed to the Treasury Account held at Bank of Zambia. MoFNP will thereafter proceed to make such funds available to implementing agencies as per subsidiary agreements. Disbursements for scalable DLIs will be proportional to the progress towards achieving the targeted DLI value. Disbursements for non-scalable DLIs will be determined based on whether the actions are either achieved or not. The balance of the allocated amount against scalable DLIs will be carried over to subsequent years. To provide the Recipient with resources to start or to facilitate the achievement of the DLIs, the World Bank may provide an advance disbursement of up to 25 percent of the total PforR financing upon Program effectiveness. Due the financial situation of ZESCO a detailed rationale for any advance to the corporation will be provided prior to such a transfer being made. When the DLI(s) for which an advance has been disbursed are achieved, the amount of the advance is deducted (recovered) from the amount due to be disbursed under such DLIs. The advance amount recovered by the World Bank will be made available for additional advances. The World Bank will require the Recipient to refund any advances (or portion of advances) if the DLIs have not been met (or have been only partially met) by the PforR closing date.

D. Capacity Building

41. **Capacity building and institutional strengthening are priorities for the PforR.** An in-depth assessment of the NEAT program has been completed, including the Fiduciary Systems Assessment, Environmental and Social Systems Assessment, and technical assessments. While these have shown that the implementing agencies, REA and ZESCO are prepared to execute the activities under the PforR, they have also identified areas that could be strengthened to improve their performance. Specific areas of support under the PforR include, among others: (i) Strengthening ZESCO capacity to develop and procure climate-resilient generation capacity; (ii) strengthening ZESCO and REA fiduciary capacity, which will contribute to long-term viability of the sector; and (iii) enhancing environmental and social (E&S) capacity to monitor and mitigate E&S risks and impacts of projects.

IV. ASSESSMENT SUMMARY

A. Technical Assessment

42. **Strategic relevance: Through the Vision 2030 and the 8NDP, GRZ has cast an audacious vision for economic transformation in which the operational and financial viability of the power sector is a sine qua non.** Powering expansion and diversification and reaching universal access by the end of the decade requires a thriving energy sector able to muster and efficiently allocate the financing needed to more than double the country's installed energy capacity, interconnect with neighboring countries, and vastly expand distribution to new customers in rural areas. As Zambia completes a sovereign debt restructuring process, it is therefore essential to put in place a program that ensures the institutional and financial sustainability of ZESCO, the country's state-owned utility that has in recent years



been the source of growing fiscal drag. The PforR aims to turn around the sector by ensuring GRZ adheres to least cost planning across the value chain and restores ZESCO to financial viability. The latter is expected to be achieved through a combination of revenue generation, cost containment, and governance measures to ensure that energy is produced and delivered at lowest cost, suppliers are paid, and financing for capital expenditures related to household access is ring-fenced. The PforR is closely aligned to the draft World Bank Group Roadmap on Accelerating Electricity Access and Financial Sustainability of the Power Sector in Zambia, which will be finalized prior to effectiveness.

43. **Paris Alignment: The PforR is fully aligned with the Paris Agreement on Climate Change on both adaptation and mitigation and is anticipated to have substantive impacts on improving climate adaptation and resilience.** All activities under DLI 1-4, are from the list of activities considered universally aligned with respect to mitigation. As collection of tariffs under DLI 1 will help improve the financial stability of ZESCO, it will also be reflected in a correct price mechanism for customers. While DLI 3 will improve the energy supply and DLI 3-4 will establish markets, increase competitiveness, and capacitate Zambia by enabling private funds for renewable energy generation. On the adaptation side, DLI 2 will address part of the Zambia's National Adaptation Plan to ensure medium- and long-term development planning and budgeting to integrate climate change adaptation to effectively identify climate change adaptation actions. The PforR is also aligned with the country's NDC, the scope of which includes a focus on renewable energy with respect to mitigation and a focus on strategic infrastructure, such as the grid, with respect to adaptation.
44. **Climate resilience of the PforR and through the PforR:** Refer to Annex 6 for a summary of hazards and climate risk assessment. The electricity infrastructure faces climatic and hazard risk, such as floods, and wildfires. The activities will improve climate resilience of assets through design and implementation, particularly of the distribution network and electrification expansion activities through siting and technical design. In addition, activities such as smart metering and investments to enhance reliability will improve system-wide climate resilience, which would be further strengthened over the longer-term through diversification of the energy mix with non-hydro renewable resources.
45. **Gender Strategy: The PforR is fully aligned with the World Bank Group Gender Strategy (2024-2030) which underlines key gender gaps and acceleration of gender equality in human capital development and reduction of gender-based violence, increasing economic opportunities for women, and advancing women in management and leadership positions.** The Zambia Gender Equality Strategy and Action Plan 2022 (GESAP) shows that only 32 percent of female headed households (FHH) and 36 percent male-headed households (MHH) have access to electricity in Zambia. Further 10 percent of FHH and 13 percent of MHH have access to clean cooking technologies. The drivers of access to gender gaps include lack of affordability, lack of willingness to pay, and lack of consumer awareness on benefits of access to clean energy. While 24 percent of the workforce in the energy public sector are women, women with Science, Technology, Engineering and Mathematics (STEM) background make up only 5 percent of employees at REA and 6 percent of employees at ZESCO.
46. **Strengthening the REF will enable the increase of connections to rural households.** Gender-targeted consumer awareness and education programs will be included in the REF operational guidelines (DLI 2) to ensure FHH benefit from the project. Further, the consumer awareness campaigns complementing the REF will include education of income generating activities to allow women to engage in productive uses of energy, resulting to positive outcomes in livelihoods of vulnerable households particularly female headed households including affordability of connections and tariffs. Upon completion of financial reforms, subsequent phases of the PforR will support the development of internship and scholarship programs targeting women with STEM backgrounds at REA and ZESCO in alignment with the GESAP in order to increase the employment of women with STEM backgrounds in the energy sector. The



monitoring and evaluation will include the following gender linked indicators: i) female headed households with access to electricity (grid and off grid) (Phase 1) and ii) women SMEs engaged in productive uses of energy (Phase 1). For the subsequent phases, results could include share of women in internships at ZESCO and REA; and share of women with STEM backgrounds employed in the energy sector.

47. **Technical soundness of the PforR: The activities proposed under this Program are aligned with regional programs and based on proven concepts and experiences in other projects.** For the 1st phase of the MPA, the PforR builds on a suite of reforms already implemented by Government that include approval of a MYTF and first year tariff adjustment, approval of the new Rural Electrification Act, approval of the IRP. The IRP is the result of extensive collaboration, consultation, and analysis led by Government and convening public and private sector stakeholders. Prepared with the support of sector experts, its findings are based on rigorous modeling that includes demand assessment and forecasting as well as least cost planning for generation, transmission, distribution, and off-grid investments. Though ambitious, it remains a critical and modular roadmap for least cost sector expansion that forms the basis for a credible, transparent, and competitive procurement process and against which all power sector investments can be benchmarked. The strategic plans for both ZESCO and REA provide further granularity on activities to be implemented by each institution and their timing.
48. **By supporting ZESCO's financial performance, REF operations, and renewable energy procurement, the PforR creates a solid foundation for new energy supply both on and off the grid.** On-grid generation is the largest cost component of the IRP, comprising 62 percent of the capital investment required by 2030, while the cost of off-grid energy access is the second largest cost component, comprising 19 percent of the overall required capital investment by 2030. Though IRP generation recommendations point to a combination of hydro, solar, wind, coal and geothermal as being the optimal solution for Zambia, IRP is agnostic as to the commercial model for development of these generation projects. The Electricity Act of 2019 allows for private sector participation in project ownership and for private sector off-take arrangements, with power wheeling services provided by the licensed transmission and distribution network operators. It also includes cross-cutting assessment of the climate resilience and gender dimensions as well as pragmatic procurement and financing considerations. The World Bank-financed ESAP project, which is closing in June 2024, has built technical and implementation capacity in REA and ZESCO to support implementation of their respective plans in support of the IRP. Design of Phases 2 and beyond will increasingly focus on strengthening private sector investment in generation, transmission and off-grid electrification solutions.
49. **The PforR specifically supports REA's implementation of the Rural Electrification Act provisions with respect to the REF.** Through the REF, Government aims to leverage funds from ZESCO levies, the national budget, development partners, and the private sector to finance rural electrification projects in line with the REA plan. The management of the REF is crucial for maintaining confidence in REA and expanding electricity access throughout the country given the capital expenditures envisaged under the IRP. To this effect, the Rural Electrification Act No. 5 of 2023 tasks REA with developing plans for grid and off-grid rural electrification, mobilizing funds to support rural electrification, encouraging private sector participation, and recommending suitable policies to the government. The Act also includes specific provisions for strengthening and operationalizing the REF, including management and administration, allocation of funds, controls, and reporting. The REA plan is closely aligned with the Act and provides the grid and off-grid rural electrification planning, costing, and partnership (ZESCO, private sector, etc.), and timelines required.
50. **The PforR provides high-leverage but nonetheless achievable measures planned under the ZESCO 10-year Strategic Plan to support ZESCO's transformation.** The ZESCO plan is anchored in Government policy and demonstrates ZESCO's commitment to a transformational agenda that will address the many challenges to its viability. The plan is closely



aligned with 8NDP objectives that include: enhancing operational efficiency of ZESCO, including its cost structure; expanding generation, transmission and distribution of electricity as well as upgrading of transmission infrastructure to reduce transmission losses and promote trade; promotion of alternative green and renewable energy sources as well as scaling up rural electrification; and implementation of policy and legal reforms to strengthen institutional arrangements and adherence to best practice in corporate governance for sustainable performance. The plan is structured around customer satisfaction, financial sustainability, system expansion, maintenance, and staffing and includes more than 50 relevant initiatives for some of which implementation is already underway. The plan is supported by a thorough annual implementation, monitoring, and evaluation framework spanning Key Performance Indicators.

51. **Economic Analysis.** The PforR is expected to have a robust economic return. An economic model was developed to assess the expected economic impacts of the PforR by comparing “with project” and “without project” scenarios. The monetized benefits in the “with project” scenario arise from higher reliability and service quality together with increased electricity access through on and off-grid rural electrification, and lower greenhouse gas emissions. The costs include capital investments to maintain the current level of reliability and service quality in terms of System Average Interruption Index (SAIFI) and CAIDI, as well as the costs for new rural grid connections (capital costs for new connections) and increased off-grid access through solar home systems (capital and operating costs). In the longer term the PforR results will help improve ZESCO’s financial performance, thereby paving the road towards improved creditworthiness and ability to attract private sector capital (at a lower cost of capital than today) for new (variable) renewable generation freeing up scarce public resources. The PforR is estimated to have a positive net present value (NPV) of US\$88.3 million and an economic internal rate of return (EIRR) of 18 percent without monetization of the GHG emission reduction benefits. Inclusion of the GHG emission reduction benefits using the World Bank low forecast for the shadow price of carbon increases the NPV to US\$93.5 million and the EIRR to 19 percent. The economic analysis used a discount rate of 5 percent and is further discussed in Annex 2.
52. **Expenditure Framework:** The first phase of the MPA Program will allocate US\$100 million equivalent to improve financial and operational sustainability of ZESCO and to operationalize the REF. The PforR aims to improve accountability and transparency in the use of public resources, particularly within ZESCO to ensure adequate service provision and system expansion in a financially sustainable manner. The PforR will complement a government program funding last mile electrification. ZESCO and REA will only undertake access expansion programs using the available funding from the government program supported and development partners. Table 6 summarizes the list of expenditures.
53. **ZESCO’s capital expenditures for increased customer satisfaction (smart meter roll-out and distribution network upgrade to ensure security and reliability of supply to customers) were taken from ZESCO’s Strategic Plan.** Relevant budgeted operating costs for ZESCO in the expenditure framework (distribution system maintenance, maintenance of tools and equipment, consultancy fees, training costs, and salaries linked to operating and maintenance activities) were estimated based on ZESCO’s 2023 Budget, ZESCO 2023 Management Accounts, the Strategic Plan in consultation with ZESCO. In the case of REA, the national program that the PforR will finance is represented in the 2024 GRZ annual budget under the MoE, with an allocation of ZMW 434,517,453, equivalent to US\$20.7 million to the rural electrification program, Budget line number 2002. Based on this budgetary allocation by the government, REA budgets for on-grid and off-grid capital expenditure as well as operation and administrative expenses. GRZ’s budget is augmented by funds from donors and other cooperating partners, which have a separate line in the REA budget. Relevant capital (rural grid development and off-grid renewable energy deployment) and operating costs (consultancy fees and support services) for the expenditure framework were taken from REA’s 2023 workplan.



Table 6. PforR Expenditures (July 2023- June 2026) in US\$ million

	2023-24	2024-25	2025-26	Total
Cost items				
ZESCO				
Increased customer satisfaction (smart meter roll-out and distribution network upgrade)	29.4	29.4	29.4	88.2
Solar IPP payments	10.0	10.0	10.0	30.0
Distribution system maintenance	3.7	3.7	3.7	11.2
Equipment and tools maintenance	1.4	1.4	1.4	4.1
Consultancy fees	1.4	1.4	1.4	4.1
Training costs	0.8	0.8	0.8	2.4
Salaries – operations and maintenance	0.6	0.6	0.6	1.8
TOTAL ZESCO COSTS				141.8
REA				
Rural electrification (on + off grid)	29.4	29.4	29.4	88.2
Consultancy fees and support services	6.3	6.3	6.4	19.0
TOTAL REA COSTS				107.2
TOTAL PROGRAM COSTS				249.0

B. Fiduciary

54. MoFNP, will provide overall coordination of fiduciary aspects of the project including the submission of WAs to the World Bank. The MoFNP has previous experience in coordinating PforR operations such as the Zambia Devolution Support Program (P178492) and the Zambia Growth Opportunities Program (P178372).
55. Planning and Budgeting: The GRZ has an established budget preparation process that is guided by the National Planning & Budget Act 2020. The MoFNP will provide budget ceiling to each ministry and budget guidelines. In turn MoE through its Budget committee will send notices to departments, agencies (including REA) and provinces giving ceilings, for them to budget in line with their priorities and within given ceilings. Consolidation of the budget is done using Budget software called Access. Budget instructions are issued by the Finance Department (generally in the month of July) each year to all departments and provinces.
56. ZESCO has its own budget preparation process that is guided by its internal procedures as outlined in the Accounting Manual or as may be guided by the Industrial Development Corporation, the holding company for ZESCO. Budget holders, with the assistance of Chief Accountants, will prepare budgets using budget templates. The budget will be discussed by the Finance and Investment Committee Board and later presented to the ZESCO Board for approval.
57. ZESCO budgeted revenues have been increasing over the 4-year period rising from ZMW12,569.35 million to ZMW33,872.29 million. However, this has not translated into profits for the company due to the following: i) use of non-cost reflective tariffs, ii) provision for doubtful debts due to disputed mining debt; iii) high levels of interest-bearing debt; and iv) the depreciation of the Kwacha against major convertibles. The budget expenditures also increased from ZMW 11,336.12 million to ZMW 33,686.57 million over the same period whereas actual expenditure



was in excess of budget for 2019 and 2020 at an average of 174 percent but fell to an average of 58 percent for 2021 and 2022. This is mainly attributed to the appreciation of the Kwacha against the US dollar from 2019 to 2022 resulting in an exchange gain of ZMW 7,520 million (2021) compared to the exchange loss of ZMW 9,344 million incurred in 2020.

58. REA's budgetary allocation increased from ZMW 312 million for FY 2019 to ZMW 796 million for FY 2022. The actual releases to REA ranged from a low of 54 percent in 2021 to a high of 107 percent in 2020 of what was budgeted for as income for that year. On the expenditure side, it has also been noted that the lowest actual expenditures occurred in 2021 at 16 percent of the Budgeted expenditure and the highest was in 2019 at 70 percent of the budgeted expenditure for that year. The low actual revenues for 2019, 2020, and 2022 were partly due to low disbursement from GRZ Treasury whereas the low expenditure yields in 2021 were mainly because only 12 projects out of the 42 planned were successfully completed within that year.
59. ZESCO and REA budget as it relates to specific budget lines that will form part of the PforR. The data is only for the years 2021 and 2022 as these are the years for which information was made available. The analysis of this data shows that ZESCO's actual expenditure for plant maintenance, direct labor and external services exceeded budget in 2021 compared to 2022 with performance ranging from 190 percent to 309 percent. This was attributed to increased operational and maintenance activities than originally planned due to resumption of physical activities after COVID-19 restrictions were lifted. The adverse budget performance in direct labor in 2022 of 115 percent was due to salary adjustments awarded to staff as well as conversion of staff electricity to monthly payroll in that year.
60. REA's actual expenditure was generally lower than budget for both 2021 and 2022. The variances for Grid development, Renewable energy and Management support services were between 28 percent and 45 percent for 2022 compared to a range of 17 percent to 44 percent in 2021. This was due to prolonged procurement processes which take approximately six months in grid development and renewable energy activities.
61. **Fund Flows:** GRZ revenue accounts are held at the Bank of Zambia (BOZ) in the consolidated account (Control 99). All revenues including funds from the Donors and World Bank for the PforR will be deposited at BOZ in a consolidated account. BOZ being the Central Bank, is the banker to the GRZ and all expenditures are routed through a treasury single account (TSA). The budget releases to the MoE and its institutions will follow the budget profiles prepared by the ministry in line with AWPB. The ministry will use Integrated Financial Management and Information System to fund the approved budgets in line with budget lines as per Yellow Book. The funds will flow from the World Bank to the GRZ revenue accounts based exclusively on the achievement of agreed results or Disbursement Linked Indicators (DLIs).
62. **Internal Controls and Audit:** Internal Controls arrangements for ZESCO are deemed adequate and are guided by the Institution's Accounting Manual of 2021 and the provision of the Companies Act. The Internal Control Environment for REA is governed by the Finance and Accounting Policies and Procedures Manual for 2014 which were developed in line with Public Policy, Rural Electrification Act No. 20 of 2003 and the Finance Act of 2004.
63. **Program Audit:** The audit for the PforR will be embedded in the Financial Statement of the implementing entities and this will be undertaken by the Office of the Auditor General (OAG) in line with terms of reference to be agreed with the World Bank. The audit will ascertain and confirm that (i) no contract awards have been made to debarred firms, (ii) no high value contracts have been procured. (iii) all procurement is in accordance with the ZPPA rules and applicable circulars/regulations. The World Bank will carry out regular implementation mission to support the



implementing agencies to achieve results. The progress on agreed DLIs and PAPs will be reviewed and any additions/changes to the action plan will be made during the implementation phase. The treasury reports on budget allocation and execution by implementing agencies, Procurement progress, contract management and financial reports, internal and external audit reports and annual financial statements of the PforR Boundary will be reviewed from a Financial Management (FM) perspective. Each implementing entity will be in charge of submitting its own audited financial statements to the World Bank no later than 6 months after the end of the fiscal year.

64. Both REA and ZESCO's manuals provide for appropriate responsibilities to management and staff to ensure effective segregation of duties and compliance with internal controls. Both manuals need to be updated, particularly the one for REA which should be aligned to the Financial Management Act no. 1 of 2018 and other recent government circulars. This, coupled with the external audits by OAG, provide reasonable assurance that adequate controls are in place for all transactions/payments.
65. **Procurement Planning:** ZESCO/ REA initiates procurement activities derived from the annual work plan and budget (AWPB). The AWPB is used to prepare the Annual Procurement Plan (APP). The completed AWPB and the APP are approved by the respective Boards. A copy of the APP is sent to ZPPA for records and information. The Procurement Entity then commences procuring the activities in the procurement plan. The Public Procurement Act (PPA) and its Procurement Regulations require all procuring entities to prepare APPs as part of the AWPB. To maximize economy and efficiency in procurement, all IAs are required to aggregate their requirements within the departments of the institution. In compiling such plans, IAs are required to establish appropriate methods of procurement and timescale for each package to be calculated based on the standard processing times prescribed in the regulations. The APPs are prepared based on the annual work plans of different departments of the implementing entities. The assessment made revealed both ZESCO and REA published its General Procurement Notices and APPs in the procurement portal of ZPPA. However, some of the packages in the APPs were not processed as per the timelines indicated in the APPs, and procurement plans are not used as a tool to monitor progress of implementation of procurement activities but rather compliance with the law. With e-GP monitoring of implementation of the procurement activities in the Procuring Entities will be enhanced.
66. The PforR will be subject to the World Bank 'Guidelines on Preventing and Combating Fraud and Corruption in Program-for-Results Financing' dated February 1, 2012 and revised on July 10, 2015. These guidelines shall apply to all activities within the PforR scope. As there is no distinction between World Bank-financed activities and government-financed activities within the PforR, these guidelines will be applied in an unrestricted manner on all activities within the PforR boundary. The tender documents' Fraud and Corruption Clauses will be aligned with the World Bank's Anti-Corruption Guidelines. They include the requirement that the "Borrower" will:
- a. Report promptly and regularly to the World Bank any material allegations of fraud and corruption including actions to be taken to investigate and the outcome of such investigations.
 - b. Report the remedies in cases where one is determined to have been engaged in F&C including how recurrence will be prevented.
 - c. Based on the provision of Zambia's Anti-Corruption Act of 2012 which also established the Anti-Corruption Commission (ACC), the implementing agencies constituted Integrity Committees (IC). Ics provide education on prevention of fraud and corruption in the agencies and report on incidences. The Ics have the mandate to strengthen institutional arrangements to prevent fraud and corruption. Cases of procurement fraud and corruption are addressed by ACC as part of its mandate.



67. **Complaint Handling Mechanism:** Procurement related complaints, if any, are processed by following the administrative procedure. The process may involve ZESCO, REA DOE. If not satisfied, bidder appeal to ZPPA and if not satisfied may approach the Court of Law for seeking redress. An online procurement related complaint handling mechanism (including appeal mechanism), with pre-defined roles, responsibilities, and timelines, will be put in place to deal with complaints arising from the envisaged procurement activities through the PforR.
68. **Based on the Fiduciary Systems Assessment, fiduciary risk of the PforR is assessed as Substantial.** The rating is a result of weakness identified during the FSA which included the following on financial management (i) Negative Working Capital as Current Assets were less than Current Liabilities, (ii) Prepaid transactions in the customer system management manually reconciled transactions in financial management system, (iii) Failure to undertake timely Trade Debtors reconciliations, and (iv) Property without Title Deeds. In addition, both technical and procurement capacity constraints were identified as weaknesses that will result from increased financing expected from the Community Development Fund, Government Appropriation, and donor funding. Further, efficiency in procurement processing at different stages continues to be a challenge.

C. Environmental and Social

69. **The overall risk of the PforR is rated as Substantial.** An Environment and Social Systems Assessment (ESSA) for the Program was prepared, approved, and disclosed on the World Bank website on November 17, 2023. Consultations were completed on December 11, 2023. The ESSA identified gaps that would potentially undermine the application of the country systems for effective management of Environmental Social Health Safety (ESHS) risks and impacts under the PforR. Despite the robustness of the country's ESHS system, the ESSA identified some gaps including: (i) low commitment to E&S sustainability leading to inadequate resourcing and accountability for ESHS risk management; (ii) fragmented legislative and institutional frameworks for managing social risks and impacts; (iii) ineffective GRM systems; (iv) inadequate targeting and inclusion of Vulnerable and Marginalized Groups and other disadvantaged individuals and groups in participation and accessing Program benefits; (v) inadequate public participation; (vi) limited monitoring and reporting on ESHS risks and impacts management, (vii) inadequate collaboration and coordination of ESHS activities between lead ESHS agencies to manage ESHS risks; (viii) inadequate ESHS staffing at the implementing agencies; (ix) lack of inclusion and/or implementation of ESHS clauses in the contract and bidding documents; and (x) inadequate contract management and supervision of Environmental and Social Management Plans.
70. **The PforR design will incorporate measures to address ESHS risks.** Consistent with the requirements of the World Bank PforR Policy, the PforR will not finance activities that pose high ESHS risks. To mitigate against adverse environmental and social risks, all subprojects under the PforR will undergo a screening process which will include a criterion to exclude certain categories of subprojects which would result in high risks and significant negative environmental and social impacts which are irreversible or unprecedented on the environment and/or affected people. The definition of investments to be excluded is included in Annex 5.
71. **The ESHS risks management under the PforR is enhanced by integration of the following measures under the Program Action Plan:** (i) actions to strengthen ESHS systems; (ii) actions to strengthen ESHS practice and monitoring of the sub-projects; and (iii) actions to build the capacity of staff in relevant institutions involved in the PforR to enhance performance in ESHS. This has been included in the PAP that shall be legally binding and incorporated into the financing agreement of the PforR.
72. **Citizen engagement.** Citizen engagement is critical to the success of the PforR. Implementing entities are expected to



actively seek involvement of stakeholders as program measures are implemented. The PforR will employ various methods such as consultations, one-on-one meetings, and formal meetings to gather feedback, concerns, and suggestions from the private sector, affected communities, local NGOs, national and local government representatives, and other relevant stakeholders. The PforR aims to ensure that all stakeholder groups, including vulnerable and disadvantaged groups, are equally represented in the consultation and decision-making processes associated with the PforR activities, and their feedback will be integral to success of the utility and broader sector transformations.

73. **Grievance Redress Mechanism (GRM).** The PforR will also include a grievance mechanism to enable stakeholders to submit grievances and concerns, ensuring transparency and accountability in all engagements. The PforR will build on and strengthen grievance redress mechanisms established and currently functioning under the ongoing Electricity Service Access Project (ESAP, P162760) and relating to both REA and ZESCO. The GRM under the PforR will be further strengthened based on lessons learnt from ESAP to be effective, transparent, culturally appropriate, and readily accessible to all project-affected parties. This will include rollout of digitized GRM systems out ZESCO and REA, as well as utilization of existing systems setup by the Department for Community Development under the Ministry of Community Development and Social Services.

V. GRIEVANCE REDRESS SERVICES

74. **Grievance Redress. Communities and individuals who believe that they are adversely affected as a result of a Bank supported PforR operation, as defined by the applicable policy and procedures, may submit complaints to the existing program grievance mechanism or the Bank's Grievance Redress Service (GRS).** The GRS ensures that complaints received are promptly reviewed in order to address pertinent concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), visit <https://www.worldbank.org/GRS>. For information on how to submit complaints to the Bank's Accountability Mechanism, visit <https://accountability.worldbank.org>.

VI. KEY RISKS

75. **The overall risk of the PforR is rated Substantial.** The main risks and mitigation measures are summarized below. Climate change mitigation and adaptation related residual risks is low and falls under the acceptable threshold level.
76. **Political and Governance risk is rated Substantial.** 2021 saw Zambia's third peaceful handover of power cementing the country's status as a leading democratic nation in Africa and raising hopes for a more inclusive process towards economic and social development. However, while sweeping reforms have been implemented, their success is premised on the successful restructuring of the country's sovereign debt through the Common Framework process still underway. Failure of the process or other shocks would likely hamper the implementation of further reforms and possibly lead to reversal of those already accomplished. Mitigation measures include early and frequent consultation



with relevant government authorities such as MoFNP, MoE, and ERB, to understand the evolving political context. The PforR design also provides for improved transparency and accountability, as well as adaptive management.

77. **Macroeconomic risk is rated High.** Zambia has been facing a tight fiscal space owing to the huge debt contracted during the period 2015-2020, high inflation and volatile exchange rate. However, GRZ has shown commitment for fiscal consolidation, debt sustainability and mitigating the risks of macroeconomic disruption. In addition to the ongoing restructuring of external debt and the IMF-financed ECF program, World Bank support towards mitigating these macroeconomic risks includes a US\$275 million Development Policy Operation. Given ZESCO's liquidity constraints and foreign currency exposure, the energy sector is especially vulnerable to macroeconomic shocks.
78. **Sector Strategies and Policies risk is rated High.** Zambia's energy sector development is primarily guided by the 2019 NEP, supported by the Electricity Act No.11 of 2019, the Energy Regulation Act No.12 of 2019, and the Rural Electrification Act No.5 of 2023, which together form robust basis for regulation of the sector. Risks nevertheless remain such as overall sector governance, and specifically the implementation and long-term continuation of competitive, transparent procurement policies and procedures for energy projects. These have historically often been approved on an unsolicited or negotiated basis. Another key risk to sector viability is regulatory risk, including weak, uneven, and unclear implementation of policies and regulations, which is a key concern for the private sector. The PforR is designed to mitigate this risk by supporting continued, future adjustment of tariffs in line with the 2023 multi-year tariff framework and ERB's published manual on pass-through costs. Furthermore, by supporting adherence to the IRP and competitive procurement of renewable energy projects, the PforR supports improved sector governance.
79. **Institutional Capacity for Implementation and Sustainability risk is rated Substantial.** ZESCO and REA are well-known institutions within Zambia's power sector with established technical capacity for day-to-day operations. Nevertheless, risks remain, largely attributable to their lack of familiarity with the PforR instrument, the consistency and technical expertise required for the implementation of many initiatives under ZESCO's 10-year Strategic Plan and limited liquidity. By promoting transparency, accountability, and good governance practices as well as linking disbursements to achievements within these institutions, the PforR can contribute to improved project implementation and long-term sustainability of the implementing entities as well as the actions implemented under the operation.
80. **Fiduciary risk is rated Substantial.** The key risks include historical risks to procurement and overall governance within ZESCO. The rating is a result of weakness identified during the FSA which included the following on financial management; (i) Negative Working Capital as Current Assets were less than Current Liabilities; (ii) Prepaid transactions in the customer system management manually reconciled transactions in financial management system; (iii) Failure to undertake timely Trade Debtors reconciliations; and (iv) Property without Title Deeds. In addition, both technical and procurement capacity constraints were identified as weaknesses that will result from increased financing from the Community Development Fund, Government Appropriation, and donor funding. Further, efficiency in procurement processing at different stages continues to be a challenge. Mitigation measures, such as improved data collection, tracking, and software integration, are included in the Program Action Plan.
81. **The Environment and Social risk is rated Substantial.** The scope of subprojects to be undertaken under the PforR will include civil works ranging from new construction and rehabilitation of small to large scale infrastructures. The civil works activities have potential ESHS implications, including but not limited to physical and economic displacement, occupational health and safety, pollution, labor influx and related impacts, among others. The ESSA noted the significant geographic dispersion of the participating districts, different scales of proposed investments by REA and ZESCO, the potential direct, indirect, and cumulative environmental and social impacts associated with many sub-



projects in the PforR, the capacity of the NPCT (at MoE, ZESCO, and REA), and gaps identified in the institutions responsible for managing ESHS risks in the country. Mitigation measures, centering on strengthening institutional capacity and processes, are included in the Program Action Plan.



ANNEX 1. RESULTS FRAMEWORK MATRIX

Program Development Objective(s)

To improve financial performance of the national utility, ZESCO Limited (ZESCO).

PDO Indicators by Outcomes

Baseline	Closing Period
To increase financial sustainability, operational reliability, and resilience of electricity sector	
PrDO 1: Increased ZESCO Financial Sustainability (Percentage)	
Sep/2023	Dec/2033
35	98
➤ Phase 1-PDO Indicator: Improved Financial Performance of ZESCO. (Percentage)	
Sep/2023	Dec/2026
100	105
PrDO 2: Enhanced Operational Reliability (Hours)	
Sep/2023	Dec/2033
7	5
PrDO 3: Increased Renewable Energy Capacity and Climate Resilience (Megawatt)	
Sep/2023	Dec/2033
0	1458.00

Intermediate Indicators by Results Areas

Baseline	Closing Period
Improving Financial Performance of ZESCO	
Operating cost and debt recovery excluding trade payables and excluding subsidies, on a cash basis (Percentage)	



Sep/2023	Jun/2026
100	105
Deployment of smart-metering for high-value customers (Number)	
Sep/2023	Jun/2026
0	11000
Increasing Reliability and Climate Resilience of the Electricity Sector	
Female headed households with access to electricity (on-grid and off-grid) (Number)	
Sep/2023	Jun/2026
0	5000
Number of annual consultation events and publicly disclosed summaries/minutes of these consultations (Number) (Number)	
Sep/2023	Jun/2026
0	2
Maintain Customer Average Interruption Duration Index (CAIDI) (Hours)	
Sep/2023	Jun/2026
7	7
Enabling private investment in non-hydro renewable energy	
Institutional capacity for RE procurement strengthened (Text)	
Sep/2023	Jun/2026
No RE procurement Pre-qualification process	RE pre-qualification process launched
Female-led SMEs engaged in productive uses of energy (Number)	
Sep/2023	Jun/2026
0	250

Disbursement Linked Indicators (DLI)

Period	Period Definition	Timeline
Period 1	2024	2024
Period 2	2025	2025
Period 3	2026	2026

Baseline	Period 1	Period 2	Period 3
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1 : DLI 1: Improved Financial Performance of ZESCO (Text)			
ZESCO 10 year transformation strategy adopted	DLR 1.1: Adoption of Debt and Arrears Management Plan, including mining sector endorsed by ZESCO Board (SDR equivalent of US\$3,200,000), DLR 1.2 (i) ZESCO publishes updated ERB approved tariffs for calendar year 2024 (SDR equivalent of US\$7,000,000)	DLR 1.2 (ii) ZESCO publishes updated ERB approved tariffs for calendar year 2025 (SDR equivalent of US\$7,000,000); DLR 1.3 Reduction in the outstanding balance of currently on-lent loans by conversion to equity in ZESCO's balance sheet (SDR equivalent of US\$10,000,000)	DLR 1.4 ZESCO's gross receivables from the mining sector reduced (SDR equivalent of US\$10,000,000)
0.00	10,200,000.00	17,000,000.00	10,000,000.00
DLI allocation	37,200,000.00	As a % of Total Financing Amount	37.2%
2 : DLI 2: Operationalization of the Rural Electrification Fund, pursuant to the Rural Electrification Act (Text)			
Rural Electrification Act (May 2023) approved	DLR 2.1 REA Board adopts Operating Guidelines for Rural Electrification Fund (REF) (SDR equivalent of US\$5,000,000)	None	DLR 2.2 Rural Electrification Fund (REF) Year 1 Annual Report submitted, as per the REF operating guidelines (SDR equivalent of US\$5,000,000)
0.00	5,000,000.00	0.00	5,000,000.00
DLI allocation	10,000,000.00	As a % of Total Financing Amount	10.0%
3 : DLI 3: Improved reliability and customer service (Text)			
ZESCO transformation Strategy adopted	DLR 3.1 (i) Maintenance of Customer Average Interruption Duration Index (CAIDI) of 7 Hours for Dry Season in 2024 (SDR equivalent of US\$4,000,000)	DLR 3.1 (ii) Maintenance of Customer Average Interruption Duration Index (CAIDI) of 7 Hours for Dry Season in 2024 (SDR equivalent of US\$4,000,000) DLR 3.2 The Recipient will receive SDR equivalent of US\$2800 for each smart meter deployed, upto 11,000 smart-meters with total allocation of SDR equivalent of US\$30,800,000.	DLR 3.3 Design for Centralized hydrological monitoring system to enhance energy forecast finalized and approved by ZESCO (SDR equivalent of US\$4,000,000)
0.00	4,000,000.00	34,800,000.00	4,000,000.00
DLI allocation	42,800,000.00	As a % of Total Financing Amount	42.8%
4 : DLI 4: Enabling private investment in non-hydro renewable energy (Text)			
Integrated Resource Plan (IRP) adopted	DLR 4.1 Renewable Energy Generation Pipeline review completed (SDR equivalent of US\$5,000,000)	DLR 4.2 Renewable Energy Procurement pre-qualification, in line with IRP, launched (SDR equivalent of US\$5,000,000)	None
0.00	5,000,000.00	5,000,000.00	0.00



DLI allocation	10,000,000.00	As a % of Total Financing Amount	10.0%
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Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

To improve financial performance of ZESCO.	
Phase 1-PDO1: Improved Financial Performance of ZESCO. (Percentage)	
Description	This is a sub-set of the MPA PrDO indicator on ZESCO financial sustainability. This indicator assesses ZESCO's performance improvement over the short-term (two years) by monitoring 'Operating cost and debt recovery, excluding trade payables and excluding subsidies, on a cash basis'.
Frequency	Annual
Data source	ZESCO audited financial report
Methodology for Data Collection	The following formula will be utilized to calculate the indicator based on information published in the ZESCO audited report. Formula is [Revenue minus Cashflow from Net Trade Receivables (Net Trade Receivables in Year T minus Net Trade Receivables in Year T-1) plus Bad Debt Expense plus (Deferred Income on Prepaid Sales in Year T minus Deferred Income on Prepaid Sales in Year T-1)] divided by [Operating Costs (- Operating Expenses + Bad Deb Expense - Income Tax) plus Debt Service (Interest Expense + Principal Repayment Component of Loan Servicing Cashflows)]
Responsibility for Data Collection	ZESCO

Monitoring & Evaluation Plan: Intermediate Results Indicators by Results Areas

Result Area 1: Improving Financial and Operational Performance of ZESCO	
Operating cost and debt recovery excluding trade payables and excluding subsidies, on a cash basis	
Description	This is a sub-set of the MPA PrDO indicator on ZESCO financial sustainability. This indicator assesses ZESCO's performance improvement over the short-term (two years) by monitoring 'Operating cost and debt recovery, excluding trade payables and excluding subsidies, on a cash basis'.
Frequency	Annual
Data source	ZESCO audited financial report
Methodology for Data Collection	The following formula will be utilized to calculate the indicator based on information published in the ZESCO audited report. Formula is: [Revenue minus Cashflow from Net Trade Receivables (Net Trade Receivables in Year T minus Net Trade Receivables in Year T-1) plus Bad Debt Expense plus (Deferred Income on Prepaid Sales in Year T minus Deferred Income on Prepaid Sales in Year T-1)] divided by [Operating Costs (-Operating Expenses + Bad Debt Expense - Income Tax) plus Debt Service (Interest Expense + Principal Repayment Component of Loan Servicing Cashflows)]
Responsibility for Data Collection	ZESCO
Result Area 2: Increasing Reliability and Climate Resilience of the Electricity Sector	
Deployment of smart-metering for high-value customers	
Description	This indicator tracks the deployment of 11,000 smart meters over the 2024-25
Frequency	Bi-annual
Data source	ZESCO
Methodology for Data Collection	The ZESCO metering department will provide monthly updates to ZESCO management on deployment of smart-meters. This information will be collected and quality verified by ZESCO management and reported on bi-annual basis.
Responsibility for Data Collection	ZESCO
Female headed households with access to electricity (on-grid and off-grid)	
Description	This indicator measures the number of female-headed households receiving access to electricity through the program implemented under the Rural electrification Fund.



Frequency	Once (2026)
Data source	REA rural electrification database
Methodology for Data Collection	The relevant REA teams provide monthly updates on rural electrification progress. This information will be collected, quality verified by REA and reported on a semi-annual basis. This will be reported alongside the REF annual report.
Responsibility for Data Collection	REA
Number of annual consultation events and publicly disclosed summaries/minutes of these consultations (Number)	
Description	This is a citizen engagement indicator and is required from ZESCO and REA. Both agencies are expected to organize public events to present the strategic vision and work plans to solicit feedback. These events can be held virtually, in-person or blend and can be held at national-level or a local-level for specific initiatives (e.g., villages covered by a REF activity).
Frequency	Annual
Data source	ZESCO and REA
Methodology for Data Collection	ZESCO and REA will provide the invitations issued for such events, recording and/or minutes of the event, and location where the minutes of the event has been publicly disclosed
Responsibility for Data Collection	ZESCO and REA
Result Area 3: Enabling private investment in non-hydro renewable energy	
Institutional capacity for RE procurement strengthened	
Description	This indicator tracks the internal coordination and progress towards RE procurement. ZESCO with support from MoE and relevant government agencies will prepare a procurement institutional capacity plan, which identifies training and technical advisory needs. The indicator will track its preparation and implementation.
Frequency	Bi-Annual
Data source	ZESCO, in coordination with MoE
Methodology for Data Collection	ZESCO will prepare the capacity development plan and track implementation progress.
Responsibility for Data Collection	ZESCO
Female-led SMEs engaged in productive uses of energy	
Description	This indicator measures the number of women-owned businesses that are supported through REF, and through other ongoing ZESCO and REA initiatives to receive access to electricity for productive uses
Frequency	Once (2026)
Data source	REA database
Methodology for Data Collection	The relevant REA teams provide monthly updates on rural electrification progress. This information will be collected, quality verified by REA and reported on a semi-annual basis. This will be reported alongside the REF annual report.
Responsibility for Data Collection	REA



Verification Protocol Table: Disbursement Linked Indicators

1.1: Adoption of Debt and Arrears Management Plan, including mining sector endorsed by ZESCO Board (Yes/No)	
Formula	DLR1.1: US\$3,200,000 on confirmation of achievement
Description	The Debt and Arrears Management Plan, including mining sector, establishes a timebound approach to addressing the existing debt and arrears.
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)
Procedure	ZESCO will submit the Plan along with ZESCO Board endorsement, which may take the form of minutes of Board meeting or a Board resolution approving the Plan, to IVA
1.2: ZESCO publishes updated ERB approved tariffs for calendar year 2024 and 2025 (Yes/No)	
Formula	DLR1.2 (i): US\$7,000,000 on confirmation of achievement for calendar year 2024 DLR1.2 (ii): US\$7,000,000 on confirmation of achievement for calendar year 2025
Description	ZESCO publishes in local newspapers and on its website, updated ERB approved tariff upon completion of the tariff review process, in accordance with the MYTF. This DLR pertains to the last step of the process.
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)
Procedure	ZESCO will submit proof of publication of the updated approved tariffs to IVA. This will be in the form of ZESCO submission to relevant news agencies and copies of the newspapers and website link.
1.3: Reduction in the outstanding balance of currently on-lent loans by conversion to equity in ZESCO's balance sheet (Yes/No)	
Formula	DLR1.3: US\$10,000,000 on confirmation of reduction of the outstanding balance of currently on-lent loans by conversion to equity in ZESCO balance sheet, from baseline of US\$370million to target of US\$185million
Description	This refers to the loans taken by GRZ and on-lent to ZESCO. In particular, loans for rural electrification and distribution network upgrades, are identified for conversion to equity.
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)
Procedure	ZESCO will submit an interim financial statement, endorsed by ZESCO's auditor, for verification of the reduction in the outstanding balance of on-lent loans and of the corresponding conversion to equity on the balance sheet to IVA.
1.4: ZESCO's gross receivables from the mining sector reduced (Yes/No)	
Formula	DLR1.4: US\$10,000,000 on confirmation of reduction of ZESCO's gross receivable from the mining sector from baseline of US\$600million to target of US\$570million
Description	The mining sector has the largest contribution to ZESCO's receivables. This activity will involve settlement of these arrears through joint action between ZESCO, MoE, and relevant government agencies and mining companies.
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)
Procedure	ZESCO will submit audited financial statement for verification of the reduction in gross receivables from the mining sector on the balance sheet to IVA.
2.1: REA Board adopts Operating Guidelines for Rural Electrification Fund (REF) (Yes/No)	
Formula	DLR2.1: US\$5,000,000 on confirmation of achievement
Description	The Rural Electrification Act (Act No. 5 of 2023) promulgates the Rural Electrification Fund (REF) including the details of the the governance, operations, financing, and management. Through this DLR, the directives of the Act will be translated into Operating Guidelines, which will be adopted by the REA Board.



Data source/ Agency	REA
Verification Entity	Independent Verification Agent (IVA)
Procedure	REA will submit the final Operating Guidelines, cleared by WB and adopted by the REA Board, along with relevant minutes of REA Board Meeting or REA Board resolution, to the IVA.
2.2: Rural Electrification Fund (REF) Annual Report submitted, as per the operating guidelines (Yes/No)	
Formula	DLR2.2: US\$5,000,000 on confirmation of achievement
Description	REA will submit the Annual report of operation of REF, prepared in accordance with the approved Operating Guidelines, that enshrine the requirements of the Rural Electrification Act (Act No. 5 of 2023). The annual report should also include beneficiaries who have received on-grid or off-grid connections through the funding from the REF. This will inform the reporting on beneficiary households and SMEs, particularly female-headed households and women-owned businesses.
Data source/ Agency	REA
Verification Entity	Independent Verification Agent (IVA)
Procedure	REA will submit the Annual Report of REF, in accordance with the Operating Guidelines, reviewed by WB and approved by the REA Board, along with relevant minutes of REA Board Meeting or REA Board resolution, to the IVA. The annual report shall include a list of beneficiaries supported through the REF during 2024-25 to facilitate sample verification by the IVA, as appropriate.
3.1: Maintenance of Customer Average Interruption Duration Index (CAIDI) targets for calendar year 2024 and 2025 (Yes/No)	
Formula	DLR3.1(i): US\$4,000,000 on confirmation of achievement of the target of maintaining CAIDI of 7Hours for Dry Season for calendar year 2024 DLR3.1(ii): US\$4,000,000 on confirmation of achievement of the target of maintaining CAIDI of 7Hours for Dry Season for calendar year 2025
Description	ZESCO measures the Customer Average Interruption Duration Index (CAIDI), measured in Hours, as per IEEE1366-2012 standard and submits as per reporting requirement of the Energy Regulation Board (ERB).
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)
Procedure	ZESCO will submit the report presented to ERB on CAIDI values achieved for years 2024 and 2025, to IVA.
3.2: Deployment of smart-metering for high-value customers (Scalable)	
Formula	Upon achieving threshold of deployment of the first 2500 smart meters, disbursement of US\$2,800 per smart meter deployed, upto 11,000 smart-meters with total allocation of US\$30,800,000
Description	High value customers are customers with a maximum peak demand above 16 kVA.
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)
Procedure	ZESCO has provided the list of high-value customers included in the smart meter deployment program. The progress report listing the customers who have received the smart meters will be submitted to the IVA. The IVA may conduct sample verification.
3.3: Design for Centralized hydrological monitoring system to enhance energy forecast finalized and approved by ZESCO (Yes/No)	
Formula	DLR 3.3: US\$4,000,000 on confirmation of achievement
Description	ZESCO will finalize the detailed design proposal and implementation plan for the development of the basin-wide forecasting and reservoir operation system, including cost estimation for pilot implementation and full deployment.
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)



Procedure	ZESCO will submit the final design report with ZESCO management endorsement, in the form of a letter confirming readiness of the design for implementation subject to availability of funding, to IVA.
4.1: Renewable Energy Generation Pipeline review completed (Yes/No)	
Formula	DLR 4.1: US\$5,000,000 on confirmation of achievement
Description	ZESCO, under the guidance of the MoE, and MoFNP will coordinate the process for conducting a review of the pipeline of Renewable Energy generation projects, in line with the newly approved IRP. The terms of reference for this review are expected to include, alignment with IRP, priority for managing climatic variability and fuel price risks, alignment with ZESCO strategic, incl. T&D investment, plan, key techno-economic factors of project readiness, including availability of environmental impact studies, land of project, among others and approval stage.
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)
Procedure	ZESCO will provide an anonymized summary of the review with a letter confirmation completion of review from MOE to the IVA.
4.2: Renewable Energy Procurement pre-qualification, in line with IRP, launched (Yes/No)	
Formula	DLR 4.2: US\$5,000,000 on confirmation of achievement
Description	ZESCO will coordinate with the MoE and MoFNP the process for launch of procurement pre-qualification of projects developers, including those with projects in the existing pipeline.
Data source/ Agency	ZESCO
Verification Entity	Independent Verification Agent (IVA)
Procedure	ZESCO will provide evidence that notice of invitation for procurement pre-qualification has been issued to all RE project developers to the IVA. This will include government websites, newspaper advertisements, other media outreach and any direct communication channels.



ANNEX 2. TECHNICAL ASSESSMENT

- The PforR as a first phase of the MPA focuses on different major issues where structural low-cost reforms can have significant impact on ZESCO’s financial performance in the medium-term and establish the foundation for longer-term sector reliability and resilience. Future phases of the MPA will need to support ZESCO to tackle the issues of the unsustainable build-up of arrears (trade payables) and further help to lower the percentage of long-term debt in ZESCO’s capital structure.

Table 2.1: Responsibility Matrix

Disbursement Linked Indicators and Results	Responsible Agency
DLI #1: Improved Financial Performance of ZESCO DLI #3: Improved reliability and customer service	ZESCO, towards implementation of the ZESCO Strategic Plan
DLI #2: Strengthening implementation of the Rural Electrification Fund, as per the Rural Electrification Act 2013	REA, in coordination with MOE, MOF, ERB, ZESCO towards implementation of the Rural Electrification Act
DLI #4: Enabling private investment in non-hydro renewable energy	ZESCO, in coordination with MOE, MOF, ERB towards IRP implementation

ZESCO Strategic Plan

- ZESCO has embarked on a transformational agenda as outlined in its Strategic Plan after a sustained period (2015-2020) of declining financial, operational, and customer satisfaction performance. The Strategic Plan was prepared at the end of 2021 and is in line with the eighth National Development Plan (8NDP), the National Energy Policy , and the integrated resource plan (IRP2050). The Plan estimates the necessary investments to improve ZESCO’s performance over the 2022-2031 period at US\$6.5 billion.

Figure 2.1: ZESCO Strategic Plan 2022-2031.





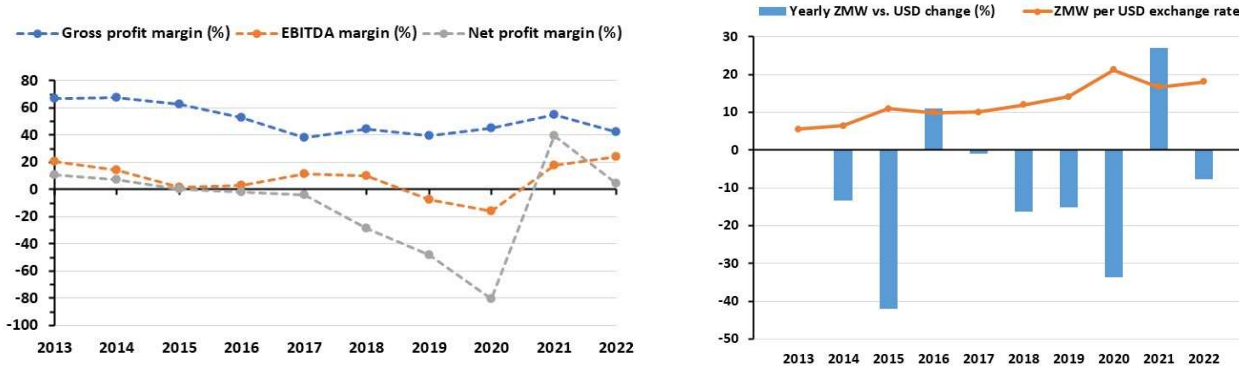
3. The Strategic Plan acknowledges the deteriorating performance of ZESCO's network and the need for ZESCO to increase network investments, improve maintenance and reduce losses. Increased regional connectivity will bring benefits in terms of increased export potential and energy security. In addition, the Plan also highlights ZESCO's decreasing customer service with increasing time to connect new customers, time to resolve power outages, and time to resolve customer complaints.
 - A. Expand generation, transmission, and distribution systems (estimated investment: US\$5.4 billion), including regional interconnections to increase energy security and regional trading opportunities.
 - B. Achieve financial stability (estimated investment: US\$0.4 billion) through measures to improve cash flows and reduce debt in order to achieve financial sustainability by 2031.
 - C. Improve maintenance of generation, transmission, and distribution systems (estimated investment: US\$0.1 billion) to reduce technical losses and improve reliability of service.
 - D. Improved customer satisfaction (estimated investment: US\$0.4 billion) through reliable service.
 - E. Optimize human capital (estimated investment: US\$0.1 billion) to bring ZESCO's staffing to efficient levels.

ZESCO Historical analysis

4. **The historic financial analysis is based on audited financial accounts of ZESCO up to FY21 and the management accounts for the 4th quarter of 2022.** ZESCO's financial performance has severely deteriorated as a result of droughts and macro-economic shocks combined with non-cost reflective tariffs, increased power purchase costs, and low collection rates. As a result, ZESCO has struggled to pay its suppliers and trade payables (arrears to suppliers) have increased from US\$50 million in 2014 to a massive US\$1.9 billion in 2022.
5. Historically, Zambia's power sector has been almost entirely reliant on hydropower generation leaving the country extremely vulnerable against the El Niño caused drought of 2015-2016. During this drought GRZ instructed ZESCO to procure emergency power imports at high cost (among others from a Karpowership barge based in Mozambique). However, GRZ only subsidized part of the increase in power purchase costs from these emergency imports. As from 2016, ZESCO has also signed multiple new expensive US\$ denominated Power Purchase Agreements (USc 10 per kWh and higher) with domestic IPPs to diversify its generation mix and increase generation capacity.
6. In combination with the climate related shock, Zambia's macro-economic context severely deteriorated after 2014 with the local currency (Zambian Kwacha – ZMW) depreciating from ZMW 6.15 per US\$ in 2014 to ZMW 18.31 per US\$ in 2020 (Figure 2.2). In the absence of cost reflective tariffs (in ZMW) with the necessary passthrough (e.g., increase in power purchase costs, currency depreciation) and the majority of ZESCO's costs denominated in US\$, the increased power purchase costs (from US\$65 million in 2014 to US\$410 million in 2019) in a deteriorating macroenvironment caused ZESCO's gross profit margin to decrease from 68 percent in 2014 to 40 percent in 2019. A tariff hike with a 113 percent increase on average across the entire customer base paying in ZMW (implemented in 2020) together with a significant appreciation of the Kwacha allowed ZESCO to return to positive margins and post a net profit margin of 39 percent in 2021.

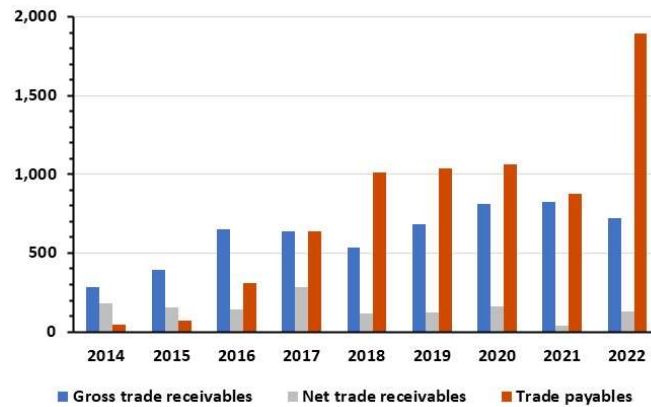


Figure 2.2. ZESCO’s historic margins (left) and yearly average ZMW to US\$ exchange rate (right)



- ZESCO’s net profit margin has plummeted from 13 percent in 2014 to -84 percent in 2020 due to the combined effects of increasing power purchase costs, non-cost reflective tariffs, historically low collection rates and associated bad expenses, and a depreciating Kwacha in a deteriorating macro environment. As a result, ZESCO has not been able to pay all its outstanding bills and trade payables have increased massively from US\$50 million in 2014 to US\$1.1 billion in 2020 (Figure 2.3).

Figure 2.3. ZESCO’s gross trade receivables, net trade receivables, and trade payables (Million US\$)



Box 2.1 Multi Year Tariff Framework

The Electricity Act No. 11 of 2019 provides for the implementation of an incentive-based tariff regime based on multi-year tariffs up to a period of five years. The Energy Regulation Board (ERB) has since published the MYTF rules for determining the Revenue Requirement for regulated generators, distribution network service providers as well as transmission network service providers and system operators. The rules describe the methodology for setting the tariffs using the Revenue Requirements for the provision of regulated activities. ERB approves retail tariff for the licensee for a period of up to five years taking into account the previous base tariff and adjustments. At the end of each tariff period, major tariff reviews are carried out under the guidance of ERB to establish the rules and tariffs for the next period. During each tariff period, automatic adjustments are implemented to update tariff charges as a result of changes to non-manageable factors such as inflation, exchange rate, hydrology (fuel expenses), etc. In April 2023, the ERB approved the application by ZESCO to adjust the electricity tariffs for its retail customers for a multi-year period of five years, with the first review due in 2024.



ZESCO Financial projections

8. The financial analysis was carried out by projecting and comparing the financial performance of ZESCO under scenarios “without PforR” and “with PforR”. Projections for FY23-28 are based on ZESCO’s latest financial model (as of July 2023), management accounts for the first and second quarter of 2023 and input assumptions developed with ZESCO. Table 2.2 summarizes the main assumptions for the two scenarios.

Table 2.2. Summary of assumptions for scenario without PforR program and scenario with PforR.

Assumption	Scenario without PforR	Scenario with PforR (Base case)
Tariffs	Tariff increase in 2023 as per ERB’s decision of April 2023 but no change in the ZMW denominated tariff afterwards.	Consistent implementation of the multi-year tariff framework (see Box 2.1 above) with relevant passthroughs over the 2023-2027 period.
Demand growth and capacity plan	In line with the Integrated Resource Plan (IRP 2050)	
IPP	Settlements with domestic IPPs	
Operating costs (excluding IPP payments) per kWh	Real* operating costs (excluding IPP payments) per kWh grow ~ 2% per year	Reduction of real operating costs per kWh in the next 2 years in line with ZESCO’s Strategic Plan
Gross receivables from the mining sector	No agreement with the mining sector to reduce gross receivables below current level.	Reduction in gross receivables from the mining sector with at least 30 million US\$ by the end of 2025.
Trade payables	Conversion of trade payables to long-term debt and reduction of payables days in line with ZESCO’s strategic plan	
CAPEX plan for 2023-2030	Based on ZESCO’s Strategic Plan	
Current on-lent GRZ loans	No conversion of currently on-lent GRZ loans to equity	Full conversion of current on-lent GRZ loans to equity by end of 2025
Restructuring of existing GRZ guaranteed debt	In line with the agreement reached between GRZ and the Official Creditors’ Committee (OCC) and consistent with the objectives of the IMF-supported program (38 month extended credit facility to GRZ).**	

*Real = Corrected for inflation

** The agreement between the OCC and GRZ stipulates a) a significant debt relief through a significant maturity extension of existing GRZ guaranteed debt by at least twelve years, b) a cut in interest rates on GRZ guaranteed debt from what they are currently to very concessional rates during the next fourteen years, and not to exceed 2.5 per cent thereafter and c) principle repayments on GRZ guaranteed debt to only restart after 2026.

9. The base case financials under the PforR-supported reform program show that ZESCO could achieve:
- i. A consistent return towards positive margins and full cost recovery
 - ii. A reduction in gross trade receivables and positive cash balances allowing for increased liquidity in the medium term but with additional measures needed to reduce outstanding payables
 - iii. A first step towards increased solvency with a small reduction in the total debt to equity ratio over the next 5 years



Rural Electrification Fund

10. GRZ established REA through the Act of parliament in 2003, which also established the REF. The Act was repealed in 2023 to strengthen the functions of REA and retained the REF with additional measures to strengthen it. The sources of funding for the REF include appropriation by Parliament, electricity levy collected through ZESCO from eligible customers and grants or donations. The Act demands that the levy must be deposited in the REF within 21 days after collection. The Act further prescribes controls that the Board of REA are supposed to put in place to ensure prudent use of the monies in the REF and directs the Board to ensure that they establish the criteria for application of the monies from the REF.
11. In its current form, the REF does not distinguish the sources of funds given to REA annually. The funds received by REA are allocated and approved by parliament as part of the national budget, and there is no distinction between what comes from the levy and what is allocated by MoF. These funds are treated as any other funds appropriated by the government to its agencies, hence subject to recall of any unutilized amounts at the end of a fiscal year. Further, due to lack of adequate controls that ensure transparency, Cooperating Partners are unable to channel their funding into the REF and usually opt to developing parallel funding structures to support the Rural Electrification Program. Strengthening of the REF would ensure developing internal controls for monitoring the collection and utilization of funds received from various sources and giving confidence to cooperating partners to channel their funding through the REF.

Integrated Resource Plan

12. Building on the 8NDP's vision of economic growth, the IRP establishes a long-term, least cost plan to ensure reliable and sustainable energy supply. The IRP recognizes Government priorities such as increased mining production, industrial development, agricultural transformation, modern transport system and universal electricity access by 2030. Hence, the IRP takes into account an increasingly diversified economy resulting in a 121 percent increase in peak electricity demand by 2030 (5,422 MW) and a 349 percent increase by 2050 (11,031 MW). Emphasizing sustainability, the IRP addresses climate change, environmental protection, as well as gender and social inclusion.
13. The process of developing the IRP involved three key areas of analysis, demand, supply (generation), and power networks comprising transmission and distribution. In addition, key cross-cutting issues of gender, climate and environment were also considered in the IRP development process. Development of the IRP applied least cost planning using a recognized Antares Software to match demand with supply. The results were then tested and verified using Digi Silent Power Factory software.
14. In order to implement the IRP, there is need to prioritize private investments through a transparent procurement process. This is in line with the Electricity Act of 2019 allows for private sector participation in generation and for private sector off-take arrangements, with power wheeling/transmission services provided by the licensed transmission and distribution network operators. With an already existing pipeline of projects, there is need to assist the government to evaluate the existing list and prioritize projects for procurement using a competitive platform.



2. Economic Analysis

15. **Program Economic Evaluation.** The PforR’s economic evaluation includes the justification of the rationale for public financing of the PforR, an assessment of the economic impacts of the PforR, and the value added from the World Bank’s involvement.
16. **Rationale for Public Financing.** ZESCO is experiencing sustained financial difficulties arising from the application of non-cost reflective tariffs, an increasing cost of supply, increasing other operational expenses from a large labor force and inefficient operations, and a build-up of receivables from the mining and public sector. These issues have resulted in the utility having an increasing outstanding payables balance to suppliers and a growing stock of debt, lowering the utility’s attractiveness for private investors. At the same time, rural electrification projects have typically low financial rates of return given the typically low levels of consumption from the newly connected customers requiring public sector financing to provide the necessary funds for capital expenditures.
17. **Economic Impact of the PforR.** An economic model was developed to assess the economic benefits of the PforR. The economic analysis considers the “with project” scenario versus the “without project” scenario. In the “with project” scenario, where the reform measures are implemented, ZESCO manages to keep reliability and service quality at the current level, and REF expands last-mile connectivity through a combination of on- and off-grid electrification with an additional ~10,000 on-grid connections and ~ 48,000 Solar Home Systems (SHS). In the “without project scenario”, ZESCO’s reliability and service quality deteriorate, and REA provides less households with access to electricity. The PforR will generate direct and indirect economic benefits. While improved revenue protection, cost recovery, clearance of receivables, conversion of on-lent loans to equity, and improved procurement processes will help improve ZESCO’s financial performance, thereby paving the road towards improved creditworthiness and ability to attract private sector capital (at lower cost of capital than today) for new (variable) renewable generation freeing up scarce public resources, these benefits are second-order and have not been included in the analysis. Reduction of commercial losses through smart meter deployment does not necessarily yield an economic benefit as their deployment would constitute a transfer of benefits from already connected customers to ZESCO. The quantified benefits are the higher reliability and service quality together with increased electricity access via an improved last-mile connectivity program and lower greenhouse gas emissions in the “with project” scenario. The economic lifetime for grid investments is 20 years and the assumed lifetime of SHS is 5 years. Benefits and costs were discounted at 5 percent.¹³
18. **Improved reliability and service quality.** The PforR will help retain CAIDI (7hrs) and SAIFI (30) at the current level whereas in the “without project” scenario these parameters are expected to increase to 18¹⁴ and 15¹⁵ respectively by 2026 and stay constant afterwards. The lower SAIFI and CAIDI in the “with project” scenario result in increased electricity consumption for customers different from mining and export customers (residential, commercial, social, and maximum demand customers). The increased consumption for these non-mining and non-export customers is priced at the expected average generation cost¹⁶ over the next 20 years.

¹³ The *Discounting Costs and Benefits in Economic Analysis of World Bank Projects* (2016) suggests the use of the Ramsey formula, linking discount rates to growth. As per the latest IMF World Economic Outlook, the average long-term GDP per capita growth rate for Zambia is 2.5 percent, giving an economic discount rate of 5 percent.

¹⁴ Expected SAIFI for a utility in the 75th percentile for utilities in the Southern Africa Power Pool as per the WB UPBEAT database, latest year of available data. (<https://utilityperformance.energydata.info/>).

¹⁵ Highest CAIDI for ZESCO over the last 6 quarters. This is a realistic assumption given that ZESCO’s average CAIDI increased by more than 20% in 2022 vs. 2021.

¹⁶ Expected average generation cost in US\$ per MWh was based on ZESCO’s financial model.



19. Implementation of the REF

Expanded last-mile connectivity – on grid. Using current sector parameters, the REF would support ~6,500 new residential connections over the next 2.5 years at an estimated cost of US\$4.2 million. The benefits from the new on-grid connections through REA’s last-mile program have been monetized based on the avoided cost for diesel consumption assuming a diesel fuel cost of US\$0.30 per kWh for small diesel gensets and an average rural household consumption of 58 kWh/month. The analysis used an average cost of US\$650 per connection¹⁷. The average cost of electricity generation for the new rural residential users was estimated from ZESCO’s financial model. The additional generation required was calculated from the number of new households being connected, the average rural household electricity consumption, and the expected level of technical losses (taken from ZESCO’s financial model).

Expanded last-mile connectivity – off-grid. The REF can support deployment of ~35,000 SHS over the next 2.5 years at an estimated cost of US\$4.2 million. Economic benefits from increased off-grid access have been monetized based on the willingness to pay (US\$31 per year per household and growing at 3.5 percent per year over the next 15 years). In terms of costs, an average capital cost of ~ US\$120 per SHS¹⁸ has been assumed together with an annual operation and maintenance cost at 3 percent of the deployed capital for SHS.

20. **Lower greenhouse gas emissions.** REA’s last mile electrification programs will generate significant greenhouse gas emission savings. Additional residential on-grid connections and off-grid SHS save 51 ktonCO₂ and 65 kton CO₂ respectively over the project economic life. The analysis assumes a reduction of 0.628 ton CO₂ per household per year for the households that get electrified through grid extension (electrification of Tier 2 customers) and a reduction of 0.374 ton CO₂ per household per year for the households getting electrified with SHSs (electrification of Tier 1 customers) in line with the World Bank - Greenhouse Gas Accounting Methodology for Energy Access Investment Operations. Shadow prices for carbon have been adapted from the World Bank 2017 Guidance note on the shadow price of carbon in economic analysis (low estimates). The analysis assumes no change in GHG emissions from the investments related to improved reliability and service quality.
21. **Program Costs.** The estimated additional investments for improved reliability and service quality have been estimated at US\$68 million in the “with project” scenario vs. the “without project” scenario. The additional capital expenditure for last mile electrification was estimated at US\$ 8.4 million split between US\$ 4.2 million for grid extension and US\$4.2 million for off-grid electrification. Capital expenditures are assumed to be spread 40%-40%-20% over the next three years.
22. **Result.** The analysis shows that the operation is economically feasible, generating an overall NPV of US\$88.3 million at a 5 percent discount rate and an EIRR of 18 percent (Table 2.2). The investments related to higher reliability and service quality, on-grid electrification, and off-grid electrification under the PforR all have positive NPVs of US\$81.7, 5.9, and 0.7 million respectively. Monetization of the GHG emission reduction benefits using the WB low shadow price of carbon would further increase the NPV of on-grid and off-grid electrification investments under the PforR to US\$8.0 and US\$3.8 million. Total estimated GHG emission savings amount to ~116 kton CO₂e over the project’s economic life. Table 2.3 summarizes the main assumptions of the analysis.

¹⁷ Average cost for single phase connections in low density, demarcated and reticulated areas as per ZESCO 2022 connection costs and fees.

¹⁸ Based on the Zambia Least Cost Geospatial Electrification Plan (2022).



Table 2.3. Economic analysis results

	<i>NPV (US\$ million)</i>	<i>EIRR (%)</i>	<i>NPV with GHG emission benefits (US\$ million)</i>
Program	88.3	18%	93.5
Investments			
Improved reliability and service quality	81.7	18%	81.7
On-grid electrification	5.9	24%	8.0
Off-grid electrification	0.7	13%	3.8

23. **Sensitivity analysis.** A sensitivity analysis with respect to the main inputs showed that the NPV of the different investments remained always positive for a 20 percent change in input value towards a lower NPV. Table 2.4 summarizes the sensitivity analyses and demonstrates the robustness of the positive impacts of the PforR. The largest decrease in NPV occurs in the case for lower differences in CAIDI between the “with project” and “without project” highlighting the need for ZESCO to ensure that reliability and service quality in terms of CAIDI should not deteriorate in the short term and that future investments in distribution network upgrade are essential to generate net positive economic impacts.

Table 2.4. Summary of sensitivity analyses results

<i>Investments in Improved reliability and service quality (Initial NPV: US\$ 81.7 million)</i>			
Parameter	Change	New NPV	Change vs. initial NPV for the investments (US\$ million)
Initial CAPEX	+20%	69.3	-12.4
Increase in CAIDI in “without project” scenario	-20%	27.7	-54.0
Average consumption of affected customers	-20%	52.9	-28.8
<i>Investments in on-grid electrification (Initial NPV: US\$ 5.9 million)</i>			
Connection cost per household	+20%	4.3	-1.6
Average consumption of affected customers	-20%	4.0	-1.9
Cost of diesel	-20%	2.7	-3.2



Table 2.5 Summary of Assumptions

<i>Parameter</i>	<i>Value</i>	<i>Notes</i>
General		
Discount rate	5%	Based on WB (2016), Discounting Costs and Benefits in Economic Analysis of World Bank Projects.
Project start year	2024	Assumption
Project end year	2026	Assumption
2023 ZMW/US\$ exchange rate	19.20	Bank of Zambia (https://www.boz.zm/historical-series-of-daily-zmw-usd-exchange-rates-zmw.htm)
Economic lifetime of project	20 years	Assumption
Shadow price of carbon	US\$ 52 per ton CO ₂ e in 2024 and increasing to US\$ 79 per ton CO ₂ e	Based on WB (2017), Guidance note on shadow price of carbon in economic analysis (low estimates).
Improved reliability and service quality		
Program CAPEX for improved reliability and service quality	US\$ 68 million	Assumption (75% of the allocation to ZESCO)
CAIDI “with project”	7 (constant over economic lifetime)	ZESCO Strategic Plan 2022-2031
CAIDI “without project”	Increase from current level to 15 by 2026 and constant afterwards	Highest CAIDI for ZESCO over the last 6 quarters.
Average cost of generation	US\$ 87 per MWh in 2024 and afterwards between US\$ 73 and 92 per MWh	Based on ZESCO’s financial model.
Average hourly consumption of non-mining and non-export customers (residential, commercial, social, and maximum demand customers)	965 MWh/h in 2024 and increasing up to ~ 1700 MWh/h in 2043.	Based on ZESCO’s financial model.
Expanded last-mile connectivity – on grid		
Program CAPEX for grid extension	US\$ 4.2 million	Assumption
Cost of diesel (fuel cost)	US\$ 0.3 per kWh	Assuming a diesel cost of ~ 1 US\$ per liter and a heat rate of ~10 MMBTu per MWh for small diesel gensets)
Average monthly consumption of rural residential customers per household	58 kWh per month	Zambia Least Cost Geospatial Electrification Plan (2022).



Level of technical losses	16.9% in 2024 and afterwards decreasing to 15.5% by 2030 and remaining constant afterwards.	Based on ZESCO’s financial model.
Average connection cost	US\$ 650	Based on ZESCO’s 2022 connection costs for rural households (low density, demarcated and reticulated areas; single phase connection)
Zambia grid emission factor	197 gCO ₂ e per kWh	IFI dataset of default grid factors (https://unfccc.int/documents/437880),
Emission reduction per household from connecting to the grid	0.628 tonCO ₂ e per household per year	World Bank - Greenhouse Gas Accounting Methodology for Energy Access Investment Operations.
Expanded last-mile connectivity – off-grid		
Program CAPEX for SHS	US\$ 5 million	Assumption
Cost of SHS	US\$ 120	Zambia Least Cost Geospatial Electrification Plan (2022).
O&M cost as a percentage of deployed Program CAPEX	3%	Assumption
Economic lifetime of SHS	5 years	Assumption
Willingness to pay	US\$ 31 per household per year	5% of household Gross National Income (GNI) for GNI middle quintile (from https://wdi.worldbank.org/).
Emission reduction per household from increased access	0.374 tonCO ₂ e per household per year	World Bank - Greenhouse Gas Accounting Methodology for Energy Access Investment Operations.



ANNEX 3. SUMMARY FIDUCIARY SYSTEMS ASSESSMENT

1. **Based on the Fiduciary Systems Assessment (FSA), fiduciary risk of the PforR is assessed as Substantial.** To strengthen the existing systems of the Implementing Agencies (IA), ZESCO Limited (ZESCO) and Rural Electrification Authority (REA), and to mitigate fiduciary risks, various action items are recommended including Program Action Plan (PAP). As part of the PforR preparation, the World Bank carried out an Integrated FSA of the PforR, to determine whether the fiduciary systems provide reasonable assurance that funds will be used for the intended purposes. The assessment also considered how existing system handle fraud and corruption risks. The conclusion of the FSA is that the legal, regulatory, and administrative systems including capacity and performance of the fiduciary systems of all IAs are adequate to provide reasonable assurance that the PforR funds will be used for the intended purposes with due attention to the principles of economy, efficiency, effectiveness, transparency, and accountability.
2. **Procurement Exclusions:** The PforR is not expected to procure any high value contracts valued at or above Operational Procurement Review Committee (OPRC) thresholds (US\$75 million for works, US\$50 million for goods and non-consulting services, and US\$20 million for consultant services). High value contracts under the PforR shall be monitored during the supervision missions to ensure that the PforR is in conformity with the Bank's policy on high value contracts in Program for-Results Financing.
3. **Scope of the FSA:** The objective of FSA of the arrangements under the PforR is to conclude whether the systems for financial management, procurement, and mitigating risk of fraud and corruption meet the requirements of the Bank's Program for Results (PforR) Policy & Directive and are adequate for the achievement of the PforR objectives. The FSA has been conducted in accordance with the principles governing PforR programs as set out in the PforR Policy and other World Bank's internal guidelines. The FSA focused on determining whether the PforR systems provide reasonable assurance that financing proceeds will be used for the intended purpose with due attention to the principles of economy, efficiency, effectiveness, transparency, and accountability. The salient features of the PforR are:
 - i. Use country systems: meaning that the client will use its own procurement and financial management systems; the PforR will seek to strengthen some of these systems; and the number of contracts and the value of expenditure under the PforR is relatively small when compared to the scale of operations of the MoE/agencies involved.
 - ii. Program financial management systems have been assessed for the effectiveness of planning and budgeting, budget execution, internal controls (including internal audit), and auditing.
 - iii. The Procurement systems have been assessed for effectiveness of the procurement planning, bidding, evaluation, contract award, and contract administration procedures, Public Procurement Act No.8 of 2020, Public Procurement Regulations of April 2022, and Zambia Public Procurement Authority (ZPPA) Circulars.
 - iv. The FSA has also assessed how Program systems address the risks of fraud and corruption and have mechanisms to redress complaints. The FSA reviewed the existence and adequacy of existing rules, policies, and procedures and the extent of their implementation in gaining assurance that the PforR objectives shall be met. The FSA has identified certain risks and mitigation actions on both ZESCO and REA have been included in the PAP as appropriate.



4. **Use of implementing agency's own Systems:** Program financial management arrangements to be used will be based on REA's and ZESCO's own financial systems. REA's own systems are in line with the Public Finance Management Act 2018, the Appropriation Act, 2021, Regulations for 2022 S. I to the Public Finance Management Act, National Planning and Budgeting Act, 2020, Budget Manuals and Public Financial Management (PFM) Circulars. On the other hand, ZESCO being a company established under the Companies Act and having GRZ as the sole shareholder through Industrial Development Corporation (IDC), will be guided by the Companies Act, International Reporting Standards, and ZESCO's internal policies in its systems for planning and budgeting, funds flow, accounting, payments and auditing.
5. Through a desk review of documents from the Implementing Agencies, some of the risks identified included the following some of which are included in the PAP. Weakness and risks identified under ZESCO included the following:
 - a. Lack of integration of the Customer Management System for Prepaid customers with the Financial Management system to eliminate human error and mitigate the risk of material misstatement.
 - b. Huge, impaired Trade debtors as of 31 December 2021 relating to Mine Debtors, Disputed Tariffs and Water Utilities debt which pose a liquidity risk.
 - c. Failure to reconcile Trade Debtors on a timely basis resulting in an increased risk of misstatement in the Company's accounting records.
 - d. Cashflow constraints seem to be affecting the ability of the Company to pay suppliers in a timely manner. Payment plans have been agreed with some suppliers to manage the risk of poor credit standing.
 - e. High penalties (ZMW1.426 billion) incurred in 2021 on late payments resulting in increased liabilities and strained working capital. Payment plans for the long outstanding debt have been proposed as well as enhanced efforts in settling of current liabilities as they fall due.
6. **Weakness** and risks identified under REA included the following:
 - a. Lack of detailed institution procurement complaints mechanism.
 - b. Inadequate capacity to serve increased demand for services – could lead to underutilization of resources hence failure to meet development objectives.
 - c. Inaccurate valuations of Inventory – misstatement of current assets.
 - d. Inadequate tools to monitor efficiency of procurement
7. **The PforR will be subject to the Bank 'Guidelines on Preventing and Combating Fraud and Corruption in Program-for-Results Financing'** dated February 1, 2012 and revised on July 10, 2015. These guidelines shall apply to all activities within the PforR scope. As there is no distinction between World Bank-financed activities and Government-financed activities within the PforR, these guidelines shall be applied in an unrestricted manner on all activities within the PforR boundary. Tender documents' Fraud and Corruption Clauses will be amended to ensure alignment with the Bank's Anti-corruption Guidelines. The Borrower shall:
 - a. Report promptly and regularly to the Bank any material allegations of fraud and corruption including actions to be taken to investigate and the outcome of such investigations.
 - b. Report the remedies in cases where one is determined to have been engaged in F&C including how recurrence will be prevented.
 - c. Based on the provision of Zambia's Anti-Corruption Act of 2012 which also established the Anti-Corruption Commission (ACC), the implementing agencies constituted Integrity Committees (IC). ICs provide education on prevention of fraud and corruption in the agencies and report on incidences. The ICs have



the mandate to strengthen institutional arrangements to prevent fraud and corruption. Cases of procurement fraud and corruption are addressed by ACC as part of its mandate.

8. **Complaint Handling Mechanism:** Procurement related complaints, if any, will be processed by following the administrative procedure. The process may involve ZESCO, REA or MOE. If not satisfied, a bidder may appeal to ZPPA and, if not satisfied, may approach the Court of Law for seeking redress. An online procurement related complaint handling mechanism (including appeal mechanism), with pre-defined roles, responsibilities, and timelines, will be put in place to deal with complaints arising from the envisaged procurement activities through the PforR.



ANNEX 4. SUMMARY ENVIRONMENTAL AND SOCIAL SYSTEMS ASSESSMENT

- 1. Scope of the PforR:** The scope of subprojects to be undertaken under the PforR will range from small to large scale infrastructures, such as rehabilitation and construction of transmission lines, rehabilitation of sub-stations, and last mile connections to households (under Key Results Area 3). This will support the expansion, maintenance, upgrade and modernization of the distribution network, and the mainstreaming of climate resilient standards in ZESCO's and REA's infrastructure projects. These sub-projects will be implemented in different regions across the country, with ZESCO and REA being the key implementing agencies. Based on the scope and scale of sub-projects to be financed under the PforR, the Environmental, Social and Health and Safety (ESHS) risks and impacts are expected to be low to moderate in scale per sub-project, with the most adverse impacts being site-specific, temporary and limited during the construction phase.
- 2. Program Risk Rating:** Because of the significant geographic dispersion of the participating districts, different scales of proposed investments by REA and ZESCO, the potential direct, indirect and cumulative environmental and social impacts associated with many sub-projects in the PforR, the capacity of the NPCT (at MoE), ZESCO, and REA, and gaps identified in the institutions responsible for managing environmental, social and health risks in the country, the overall ESHS risk of the PforR is rated as Substantial.
- 3. E&S Mitigation Measures:** To mitigate the potential ESHS risks of the PforR, the principles of exclusion in PforR Programs have been adopted. In this regard, potentially high-risk investments which are sensitive, or which have likely significant, adverse, or unprecedented impacts on the environment or people, are in-eligible for financing under the PforR. The exclusion principle applies to Program activities that meet the criteria regardless of the Borrower's capacity to manage such effects. In the PforR context exclusion means that an activity is not included in the identified investment menu. Also, an activity is not included if it requires completion of non-eligible activity to achieve its contribution to the Project Development Objective (PDO) and/or Disbursement linked indicator (DLI). The six core principles under the PforR will apply to all investments as a mechanism for avoiding, minimising, or mitigating adverse ESHS risks/impacts.
- 4. Potential ESHS Benefits:** The potential ESHS benefits from the PforR will be derived from; i) increased access to electricity services for households in Zambia, (ii) reduced dependency on kerosene and firewood as sources of energy for cooking and lighting thus reducing the cutting of trees and reduction of carbon emissions; (iii) Improved safety on faulty transmission lines (e.g. reduction on electrocution) (iv) improved indoor air quality as a result of using less firewood and kerosene; (v) reduced energy losses; (vi) adoption of climate resilient infrastructure therefore reducing the overall operation and maintenance costs of REA and ZESCO infrastructure; (vii) improved ZESCO and REA financial sustainability thus helping to provide affordable supply of electricity; and (viii) improvements in quality of public service delivery such as schools and health care facilities.
- 5. Potential Environment, Social, Health and Safety risks and impacts:** The main EHS risks and impacts will include: (i) Disturbance and loss of existing vegetation and potential impact to flora and fauna species (ii) potential solid and liquid waste generation from project activities; (iii) potential increased surface runoff during rainy season that could lead to erosion in areas with unprotected soil in neighboring facilities; (iv) Land degradation impacts from sourcing of construction material from quarry and borrow pits for use in civil works (v) civil and electrical works are likely to expose workers and the proximal community members to occupational safety and health related hazards and risks; (vi) Localized noise and air pollution (dust and emissions) from construction activities; (vii) equipment and machinery used could be a source of hazardous and noxious waste such as running engines, oil from wet transformers, electronic waste, used engine oil and oil filters; and (viii) community health and safety risks including



spread of diseases such as Covid and HIV and AIDS, among others.

6. **Potential Social Risks and Impacts.** Social risks and impacts will include: i) potential destruction of crops, vegetation and or/trees, and demolition of structures; (ii) loss of livelihoods due to temporary physical and/or economic displacement; (iii) potential exclusion of Vulnerable and Marginalized Groups (VMGs) and vulnerable households and individuals from Program benefits; (iv) potential increase in crime, child labor, and abuse, Gender Based Violence (GBV), Sexual Exploitation and Abuse, and Sexual Harassment (SEA-SH) cases due to influx of workers into sub-project areas;(v) disruption of services, access and damage to public utilities and/or private properties. (vi) elite capture or political interference excluding vulnerable households accessing project benefits; and (vii) limited stakeholder engagements and disclosure of program information presenting risks of increased grievances, among others.
7. **ESSA Findings:** The ESSA identified gaps that would potentially undermine the application of the country systems for effective management of ESHS risks and impacts under the PforR. Despite the robustness of the country's ESHS system, the ESSA identified some gaps including: (i) low commitment to E&S sustainability leading to inadequate resourcing and accountability for ESHS risk management; (ii) fragmented legislative and institutional frameworks for managing social risks and impacts; (iii) ineffective GRM systems; (iv) inadequate targeting and inclusion of VMGs and other disadvantaged individuals and groups in participation and accessing Program benefits; (v) inadequate public participation; (vi) limited monitoring and reporting on ESHS risks and impacts management, (viii) inadequate collaboration and coordination of ESHS activities between lead agencies i.e. Zambia Environment Management Authority (ZEMA), Ministry of Labor and Social Services (MLSS), Gender Division, Occupational Safety and Health Institute (OSHI), etc. to manage ESHS risks; (ix) inadequate ESHS staffing at the implementing agencies; (x) lack of inclusion and/or implementation of ESHS clauses the contract and bidding documents; and (xi) inadequate contract management and supervision of Environmental and Social Management Plans (ESMPs).
8. **ESSA Recommendations:** To mitigate against ESHS risks and impacts, all subprojects under the PforR will undergo screening, which will include a set criterion for excluding certain categories of sub-projects which would result into high risks and significant negative ESHS impacts which are irreversible or unprecedented on the environment and/or affected people. In addition, the ESSA has recommended the measures in the PAP, which shall be legally binding and incorporated into the financing agreement of the PforR.



ANNEX 5. PROGRAM ACTION PLAN

Action Description	Source	DLI#	Responsibility	Timing		Completion Measurement
(i) Include a robust ESHS risks and impacts management verification protocol in Annual Performance Assessment (APA) ; (ii) PCT to conduct an independent annual ESHS audit for all infrastructure investments, and reports shared with the WB	Environmental and Social Systems	NA	PCT / WB	Other	Before APA Annually	<ul style="list-style-type: none"> • Inclusion of APA verification indicators in the ToRs for APA • Inclusion of a chapter on ESHS in the main APA reports • Independent Annual ESHS Audit report
Carry out reconciliations on all loan accounts with lenders.	Fiduciary Systems	NA	ZESCO	Recurrent	Continuous	Provide reports of monthly/quarterly reconciliations of loan accounts as part of ZESCOs periodic reporting
Carry out reconciliations on	Fiduciary Systems	NA	ZESCO	Recurrent	Continuous	Provide reports of monthly reconciliations of



trade debtors accounts and submit statements to each customer immediately						customer accounts as part of ZESCOs periodic reporting.
Collaborate and partner with the lead ESHS agencies, including OSHI, ZEMA, National Construction Council (NCC), Department of Community Development, Gender Division, Dept of Resettlement etc to train implementing agencies and contractors on ESHS risk	Environmental and Social Systems	NA	MoE/PCT/ZESCO/REA/Lead ESHS agencies	Recurrent	Continuous	<ul style="list-style-type: none"> • Training and coordination Plan • Number of trainings and technical assistance provided in collaboration with relevant agencies, and confirmed through progress reports • Training reports.
Develop a manual and electronic procurement monitoring system capable of storing and	Fiduciary Systems	NA	ZESCO and REA	Other	Within the first 12 months from effectiveness	An effective manual/electronic procurement monitoring system developed and quarterly report being produced.



analyzing data against set standards						Improved data availability and reporting
Development and establishment of an institutional procurement related complaint handling mechanism	Fiduciary Systems	NA	ZESCO and REA	Other	Within first six months of program effectiveness	ZESCO and REA have developed and established a fair, accountable, transparent and efficient complaint handling mechanism for procurement.
Enhance the ESHS risk management capabilities by staffing the PIU with adequate, qualified, experienced, and a full-time Environmental Specialist, Health and Safety Specialist, and Social Specialist at ZESCO and REA Project Coordination Team (PCT)	Environmental and Social Systems	NA	ZESCO / REA / MoE	Other	Continuous	<ul style="list-style-type: none"> • Qualified and experienced staff assigned to REA and ZESCO • 1 Environmentalist, 1 Health and Safety Officer, and 1 Social Specialist and confirmed annually during APA



Implementing agencies to develop and manage functional GRM structures at all subproject levels	Environmental and Social Systems	NA	ZESCO / REA	Other	Before commencement of sub-projects	<ul style="list-style-type: none"> • GRM constituted and grievances being logged, responded, and resolved for sub-project levels • Confirmed annually through APA
Include all the applicable ESHS clauses and budgets in the bidding and contract documents for civil works	Environmental and Social Systems	NA	ZESCO / REA	Other	Prior to procurement of any civil works	<ul style="list-style-type: none"> • Bidding and Contract document templates with ESHS aspects. • Inclusion of ESHS in bills of quantities for all subprojects • Supervision and monitoring reports and confirmed through APA
Institutional capacity assessment and institutional roadmap	Fiduciary Systems	NA	REA	Other	This is currently underway. Within the first 18 months of	New REA institutional structure and implement roadmap in place after Board and MoE review.



developed, and institutional strengthening carried out to effectively carried REF and CDF projects.					effectiveness of the program	
Integrate the Prepaid customer management system with financial management system	Fiduciary Systems	NA	ZESCO	Due Date	31-Jul-2024	Provide verified report of fully automated interface to the Bank.
Procurement and operationalization of Business Integrated System (BIS) to address inventory valuation challenges	Fiduciary Systems	NA	REA	Due Date	30-Aug-2024	Roll out of BIS. Periodic review of system parameters and computations.
REA to develop an Environmental, Social, Health, and Safety Risk and Impacts Management (ESHRIM) Manual, including guidelines on land	Environmental and Social Systems	NA	REA	Other	To be submitted together with REF Operations Manual	<ul style="list-style-type: none"> • ESHSRIM Manual for REA. • Document introduced, and adopted by the organizations as part of improved ESHS



acquisition, grievance management, stakeholder engagement and social inclusion, GBV-SEA/SH, management of data						management practices.
Semi-annual reports collating allegation of fraud and corruption, complaints received, and investigations on the program activities.	Fiduciary Systems	NA	REA	Recurrent	Semi-Annually	Quarterly reports are submitted by REA IC, among other things reports on complaints received and investigated to Management and the Anti-Corruption Commission. However no complaints were received in the recent past
The REA ESHSRIM manual to be adopted by the organization and trained to company staff on implementation.	Environmental and Social Systems	NA	REA / Safeguard specialists	Other	Within 1 year of program effectiveness	<ul style="list-style-type: none"> All staff trained on ESHSRIM manual Operationalization of the manual on company operations
The ZESCO ESHSRIM manual to be adopted by the organization	Environmental and Social Systems	NA	ZESCO / Safeguard specialists	Other	Within 1 year of program effectiveness	<ul style="list-style-type: none"> Staff trained on ESHSRIM manual Operationalization of the manual on



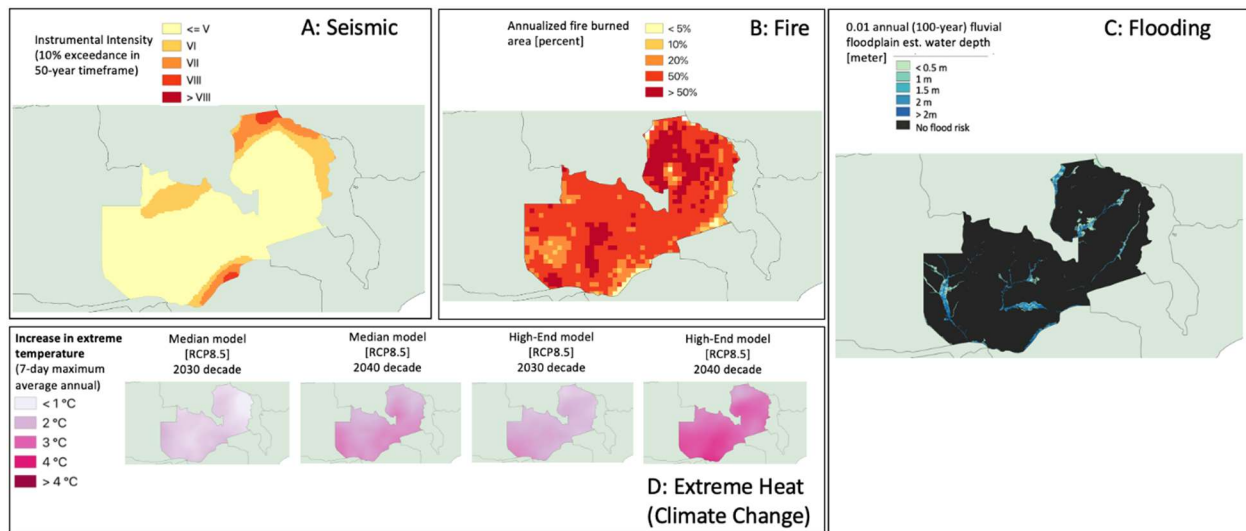
and trained to company staff on implementation.						company operations
ZESCO and REA to develop and manage functional and digitized GRM systems	Environmental and Social Systems	NA	ZESCO / REA	Other	Within 1 year after program effectiveness	Digitized GRM systems rolled out at ZESCO and REA
ZESCO to develop an Environmental, Social, Health, and Safety Risk and Impacts Management (ESHSRIM) Manual, including guidelines on land acquisition, grievance management, stakeholder engagement and social inclusion, GBV-SEA/SH, management of data	Environmental and Social Systems	NA	ZESCO	Other	3 months after Program effectiveness	<ul style="list-style-type: none"> • ESHSRIM Manual for ZESCO • Document introduced, and adopted by the organizations as part of improved ESHS management practices.



ANNEX 6. HAZARDS AND CLIMATE RESILIENCE

1. Resilient infrastructure development in Zambia includes consideration of existing natural hazards¹⁹ and ongoing climate change. Relevant risks for this project include wildfire, flooding, earthquake, and extreme heat, which is expected to increase due to climate change. Figure 6.1 details the geographical risks. Multiple strategies can be taken to mitigate the impacts of climate change and natural hazards. These fall generally into the categories of resistance and resilience to hazards.

Figure 6.1: Key hazard risks in Zambia and their geographic distributions.²⁰



2. Data detail areas that are at relatively high risks of earthquake (A), wildfires (B), and flooding (0.01-probability annual event) (C). Projected extreme heat map are also shown (D), represented by increases from climate change through the 2030 and 2040 decades of the hottest week of the year.

3. Wildfire is recognized as a ‘high’ risk in Zambia¹ under current climate conditions, and climate change is expected to exacerbate this risk²¹. This risk is severe everywhere in the country, with some of the highest risk concentrated in the northern part of the country, particularly in the Luapula and the Northern Provinces, and in the Central Province (Figure 6.1). Flooding is considered as ‘high’ risk for Zambia¹, although the risk varies geographically and seasonally. Available information for the depth of water under an expected 0.01-annual flood probability (“100-year flood”)²² is shown in Figure 6.1. Climate change models show that for Zambian regions, the current annual probability flood event could increase in frequency (the historical “100-year” event may become as frequent as a “25 year” event), although the models vary²³. Seismic motion is a risk in the very north part of the country as well as on the border with Zimbabwe. In

¹⁹ ThinkHazard database, Zambia. The World Bank (2021). <https://www.thinkhazard.org>

²⁰ Extracted from the World Bank Climate and Disaster Risk Screening Tool

²¹ Liu, Y., Stanturf, J. A., & Goodrick, S. L. (2009). Trends in global wildfire potential in a changing climate. *Forest Ecology and Management* 259:685-697, 259(2010), 685–697. <https://doi.org/10.1016/j.foreco.2009.09.002>

²² FATHOM Flooding Data [Fluvial]. The World Bank Group (2021)

²³ Hirabayashi et al, Global flood risk under climate change, *Nature Climate Change*, 3, 816-821, 2013



most locations, the increase in maximum temperatures over a 7-day average across each decade is approximately 1.5-2°C in the median model for the 2030 decade, while the higher end model shows increases of 3-4°C.

4. The project contributes directly to strengthening resilience of Zambia's power system and reliability of power for more consumers. Climate adaptation considerations will also be integrated in all areas of the project, including on-grid and off-grid connections. Specific measures can be identified to mitigate the risks described above, prevent disruptions and limit repair costs. For example, using light-duty steel poles in place of wooden poles for transmission systems would decrease the risk of damage by wildfires if vegetation is kept away from the transmission lines and substations. The use of light-duty steel poles was found to increase costs by a ~ 4% relative to wooden poles in the United States²⁴, and yearly maintenance to manage vegetation would add to this cost. Consideration of aerial bundled cables and application of fire-retardant to all existing wood poles could also be recommended in wildfire prone regions. The easiest and most effective method to limit flood impacts is to site infrastructure in location with low flood hazard. Baring this, deep anchor or beams around transmission poles and towers can reduce flood damage. Elevation of substations is another common approach. A simple floor wall can also be installed, often at lower costs.
5. Extreme heat has impacts on energy demand (cooling for buildings), transmission and distribution efficiency, transformer life, and potential increases to other hazards already a concern in the region, including wildfire risk. Extreme heat reduces the efficiency of photovoltaic panels between 0.3-0.5 percent per increase in degrees Celsius above the standard operating temperature of 25 degrees Celsius²⁵. The efficiency and sag of transmission lines is also impacted by ambient air temperature²⁶. Increased sag can increase the likelihood of the lines contact vegetation if vegetation is not managed. Transmission efficiency losses require additional generation to compensate, and lines should be rated to compensate for reductions in their capacity. Transformers are expected to experience a reduction in operating life due to climatic shifts as well as efficiency losses. Additionally, decreases in generator output with rising temperature is a design consideration which can be compensated for by increasing the size of installed capacity, which is linear in cost. Siting choices away from regions with high landslide susceptibility may reduce the damages and long repair times resulting from landslides that damage substations or transmission lines.

²⁴ PG&E. 2019. "PG&E 2019 Draft Per Unit Cost Guide." California ISO. www.caiso.com/Documents/PG-E2019DraftPerUnitCostGuide.xlsx

²⁵ E Skoplaki, JA Palyvos, "On the temperature dependence of photovoltaic module electrical performance: A review of efficiency/power correlations," *Solar Energy*, 83, 5, 614-624, 2009

²⁶ R. Yao, K. Sun, F. Liu and S. Mei, "Efficient Simulation of Temperature Evolution of Overhead Transmission Lines Based on Analytical Solution and NWP," in *IEEE Transactions on Power Delivery*, vol. 33, no. 4, pp. 1576-1588, Aug. 2018, doi: 10.1109/TPWRD.2017.2751563