UK Government Centres of Expertise
Green Cities, Infrastructure and Energy

CoST Infrastructure Transparency Initiative

Enhancing Transparency and Performance in the Zambian Energy Sector

March 2026

Preface

This study was led by CoST, the Infrastructure Transparency Initiative and commissioned to the Centre of Trade, Policy and Development (CTPD).

CoST, the Infrastructure Transparency Initiative, is a UK-registered charity that has developed a range of tools and standards that aim to improve the transparency, participation and accountability of infrastructure investments. CoST supports government, civil society and the private sector to adapt and apply these tools and standards, generating information and systems that help stakeholders to make more informed decisions, investing in the right infrastructure, delivering quality infrastructure as contracted, and providing citizens with the services they expect.

CTPD is a leading Zambian policy research and advocacy think tank with a strong record in governance, fiscal transparency and sectoral reform. Its multidisciplinary team combines expertise in economics, law and public finance to translate technical analysis into actionable policy dialogue.

This study was funded by the UK Government through the Green Cities, Infrastructure and Energy Programme (GCIEP).

The UK Government Centre of Expertise in Green Cities, Infrastructure and Energy delivers support to low- and middle-income countries seeking to accelerate the development of sustainable cities and resilient infrastructure. The Centre of Expertise was implemented primarily through the Green Cities, Infrastructure and Energy Programme (GCIEP), led by PricewaterhouseCoopers LLP (PwC) with an alliance of sub-consultants: Mott MacDonald Ltd, Adam Smith International Ltd, Marriott Davies Yapp LLP and Engineers Against Poverty.

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Acronyms list

CoST	CoST, Infrastructure Transparency Initiative
CSO	Civil Society Organization
E4GH	Energy for Growth Hub
ERB	Energy Regulation Board
EU	European Union
FIIP	Framework for Integrity in Infrastructure Planning
FX	Foreign Exchange
GDP	Gross Domestic Product
GRZ	Government of the Republic of Zambia
IPP	Independent Power Producer
IRP	Integrated Resource Plan
KII	Key Informant Interview
MoE	Ministry of Energy
MoFNP	Ministry of Finance & National Planning
OC4IDS	Open Contracting for Infrastructure Data Standard
PDU	Presidential Delivery Unit
PPA	Power Purchase Agreement
PPP	Public–Private Partnership
PSIP	Public Sector Investment Programme
SOE	State-Owned Enterprise
WB	World Bank
ZESCO	Zambia Electricity Supply Corporation

Glossary

Affordability (Energy Projects)	Ability of government, utilities, or consumers to sustain electricity costs over the full lifecycle of a project, including tariffs, subsidies, guarantees and FX exposure.
Biased Preparation	FIIP concept where political urgency or vested interests displace feasibility studies, alternatives analysis and analytical scrutiny.
Capacity payment	Fixed payment to a power producer to ensure generation availability regardless of dispatch.
Contingent liability	Potential fiscal obligation that may materialise due to guarantees, FX exposure, or take-or-pay obligations.
Cost Recovery	Extent to which tariffs cover full generation, transmission, distribution and financing costs.
Curtailment	Reduction of electricity generation below available capacity due to grid constraints or demand shortfalls.
Disclosure journey	Lifecycle process through which infrastructure data is disclosed, standardised, assured and used.
Feasibility study	Technical, financial, economic, environmental, and social assessment of project viability and alternatives.
FIIP	Diagnostic framework identifying integrity and performance risks at early stages of infrastructure planning.
Guarantee (Energy Sector)	Government commitment to cover specific project risks such as payment default or FX exposure.
Independent Power Producer (IPP)	Private entity generating electricity for sale to a utility or large consumers under a PPA.
Infrastructure Data Standard (IDS)	International data standard that provides a list of recommended data points required for monitoring infrastructure projects and contracting process.
Integrity (Infrastructure Planning)	Degree to which planning decisions are evidence-based, rule-consistent, and accountable.
Integrated Resource Plan (IRP)	Planning tool identifying least-cost options for meeting electricity demand over time.
Open Contracting for Infrastructure Data Standard (OC4IDS)	. International data standard that provides a detailed schema and codelists describing precisely how to structure and format the data points as JavaScript Object Notation (JSON) or Comma-Separated Value (CSV) data.
Offtaker risk	Risk that the electricity purchaser cannot meet payment obligations under a PPA.
Open access	Regulatory framework allowing non-discriminatory use of transmission and distribution networks.
Optimistic bias	Systematic underestimation of costs and risks or overestimation of demand during preparation.
Political economy (Energy Sector)	Interaction of political incentives, institutional power, and economic interests shaping decisions.
Power Purchase Agreement (PPA)	Long-term contract defining tariffs, dispatch, risk allocation, and payment obligations.
Project appraisal	Analytical assessment of technical, financial, economic, and fiscal viability prior to approval.
Public Sector Investment Programme (PSIP)	Framework through which public investment projects are prioritised and financed.
Risk allocation	Distribution of risks among government, utility, and private investors.
System fragmentation	Bypass of the national grid by large consumers or producers, weakening utility revenues.

Take-or-Pay obligation	Clause requiring payment for a minimum electricity quantity regardless of consumption.
Upstream decision-making	Early lifecycle stages where key cost, scope, and risk decisions are taken

Definition of Key Terms

For the purposes of this assessment, the following key terms are used throughout this report and are to be understood in accordance with the definitions listed below.

1. Integrity risks

Integrity risks refer to vulnerabilities in decision-making, processes or information disclosure that allow undue influence, conflicts of interest, non-competitive practices, or discretionary conduct that undermines transparency, fairness and value for money across the energy investment lifecycle.

2. Performance risks

Performance risks refer to factors that undermine the timely, cost-effective and reliable delivery and operation of energy infrastructure assets, including risks of cost overruns, delays, underperformance, inefficient operation, and misalignment between projected and actual technical or financial outcomes.

3. Fiscal risks

In the context of the Energy sector, fiscal risks refer to potential or actual impacts on public finances arising from energy sector projects, including explicit and implicit contingent liabilities, subsidy commitments, tariff shortfalls, government guarantees, and long-term operations and maintenance obligations that may materialise over the project lifecycle and affect debt sustainability.

4. Energy investment lifecycle

The energy investment lifecycle refers to the sequence of stages through which energy infrastructure projects pass, including planning and project identification, preparation and feasibility, financing and procurement, construction and commissioning, and operations and maintenance (O&M).

5. Data

Data refers to structured information generated or held by public or private institutions during the planning, regulation, procurement, financing, construction and operation of energy projects, including documents, datasets, standard contract fields, performance indicators and financial variables relevant to transparency, accountability and oversight.

Executive Summary

Zambia's energy sector is at a pivotal moment. Demand is rising with population growth, urbanisation and industrial expansion, while government efforts to attract private investment and increase renewable generation are reshaping the sector. However, the system remains vulnerable to hydropower variability, supply insecurity and persistent information gaps that complicate planning, raise financing costs and obscure fiscal risks. Improving transparency is therefore essential for better project selection, stronger oversight and more credible investment.

This study assesses how transparency and performance can be strengthened across the energy investment lifecycle, from project identification and planning through contracting, financing and operations. Using a risk-based approach, it identifies where integrity, performance and fiscal risks emerge and which disclosures are most important for addressing them. The analysis draws on desk research, stakeholder consultations and a validation workshop, and is aligned with CoST, the Infrastructure Data Standard (IDS) and the Open Contracting for Infrastructure Data Standard (OC4IDS).

The findings show that the most significant risks arise upstream, particularly during planning and financing. Limited disclosure of planning assumptions, least-cost analysis, demand forecasts and project rationale weakens scrutiny and increases the likelihood of decisions that later prove costly or unsustainable. Contracting and financing arrangements also remain opaque, despite their direct implications for consumer costs and public financial exposure. Operational data, such as generation availability, outages, losses and cost recovery, is produced but rarely published in a structured or timely way, limiting accountability and learning.

A key contribution of the study is the identification of 12 priority energy-specific transparency datapoints that address gaps not captured by generic infrastructure standards, including hydrological risk, commercial arrangements and contingent liabilities. The report recommends a sequenced approach: short-term publication of existing documents and basic indicators using CoST templates, followed by the development of a more comprehensive, OC4IDS-aligned framework tailored to the energy sector. Strengthening disclosure will not resolve all sector challenges, but it is a practical foundation for reducing fiscal risks, improving investment discipline and enhancing overall sector performance.

1. Introduction and sector context

Zambia is currently poised for a significant transformation in its energy landscape, driven by a combination of a rising population, gross domestic product (GDP) growth and rapid urbanisation and industrialisation. These factors have created a strong and dynamic market for renewable energy and energy efficiency solutions across diverse sectors, including mining, agriculture, commercial and residential buildings and transportation.[1] The country's abundant natural resources, such as solar irradiation, wind potential and biomass, strengthen its prospects for developing renewable energy; however, the volatility of fossil fuel costs and the growing vulnerability of hydropower which currently accounts for 85 per cent of Zambia's total energy output[2] underscore the urgent need for diversified, sustainable energy sources.[3]

According to the ERB, Zambia's total installed electricity generation capacity increased to 3,985.86 MW in 2025, reflecting a 2.6 percent growth from 3,885.86 MW in the same period of 2024.[4] Hydroelectricity continues to dominate the installed electricity generation capacity, with total national generation standing at 7,051.04 GWh in 2025.[5] About 64 percent of the total electricity generation activity is conducted by ZESCO through hydro and diesel generation plants.[6] While hydropower remains the dominant energy source and is projected to continue as such until 2050 according to the Integrated Resource Plan (IRP), its generation is increasingly vulnerable to droughts and fluctuations in the Kafue and Zambezi Rivers, leading to severe concerns regarding the stability of energy supply.[7] Further, the vulnerability of hydropower has been directly attributed to constrained industrial production and economic output and increased financial pressure on ZESCO, the state-owned utility.[8][9]

Installed and available generation capacity (MW), Mid 2024 and Mid 2025[10]

Technology	2024 Installed Capacity (MW)	Mid 2025 Installed Capacity (MW)	% Change
Hydro (grid-tied)	3,162.80	3,162.80	0.0%
Solar (grid-tied)	183.00	283.00	54.6%
Thermal - Coal (grid-tied)	330.00	330.00	0.0%
Thermal - Diesel (grid-tied)	203.80	203.80	0.0%
Thermal - HFO (grid-tied)	-	-	0.0%
Sub-Total (grid-tied)	**3,879.60**	**3,979.60**	2.6%
Hydro (off grid)	1.34	1.34	0.0%
Solar (off grid)	0.12	0.12	0.0%
Thermal - Diesel (off-grid)	4.80	4.80	0.0%
(off grid) Total	**6.26**	**6.26**	**0.0%**
Total Installed Capacity (MW)	**3,885.86**	**3,985.86**	2.6%

[1] International Renewable Energy Agency, KfW and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), *The Renewable Energy Transition in Africa: Powering Access, Resilience and Prosperity* (German Federal Ministry for Economic Cooperation and Development (BMZ): 2021).
[2] L. Spahia, *Zambia: Building Resilience to Climate Shocks. IMF Selected Issues Pape*r (SIP/2025/127), (Washington, D.C.: International Monetary Fund, 2025) at page 12.
[3] Ibid https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/March/Renewable_Energy_Transition_Africa_2021.pdf. Accessed on 26 December 2025
[4] [5] ERB, 2025 Mid-Year Statistical Bulleting, (August 2025), available at: https://www.erb.org.zm/statistics.

[6] Numbers and details in this chapter are primarily extracted from Energy Regulation Board Energy Sector Report 2020, http://www.erb.org.zm/content.php?viewpage=rept
[7] Integrated Resource Plan for the Power Sector in Zambia (2023) accessed 26 December 2025.

[9] L. Spahia, *Zambia: Building Resilience to Climate Shocks. IMF Selected Issues Pape*r (SIP/2025/127), (Washington, D.C.: International Monetary Fund, 2025) at page 12.

[10] Ibid, at page I.

In response to these opportunities and challenges, the Zambian government has undertaken significant initiatives to promote renewable energy and green investments, laying the groundwork for a sustainable and resilient energy future. These strides include the National Energy Policy 2019, which incentivises private sector participation, and the Renewable Energy Strategy and Action Plan (RESAP 2022), providing a comprehensive roadmap for the adoption of renewable energy technologies.[11] Furthermore, the Energy Efficiency Strategy and Action Plan (EESAP 2022) aims to optimise energy use across economic, financial, social and environmental dimensions, positioning Zambia as a potential net energy exporter. The legal and regulatory framework has been further bolstered by the Electricity Act (Act No 11 of 2019), which regulates the generation, transmission and supply of electricity while promoting transparency in the identification and allocation of risks, costs and revenues between participants.[12]

These reforms are complemented by market-opening measures, including the operationalisation of Open Access to the transmission and distribution network and the introduction of net metering frameworks for distributed generation. Open Access reforms are intended to enable independent power producers and large consumers to transact electricity across the grid on transparent and non-discriminatory terms, while net metering seeks to incentivise small-scale and embedded generation by allowing consumers to offset consumption with self-generated power. However, the effective implementation of these reforms is highly contingent on transparent information about issues such as grid capacity, connection costs, dispatch rules, wheeling charges and other system constraints. In the absence of such data, market participants face uncertainty that undermines investment decisions and limits the practical realisation of policy intent.

Despite this recognised potential, significant challenges in accessing market information and sector-specific knowledge continue to hinder the full realisation of these opportunities. Inadequate access to market information, such as insights on national demand, supply and technology availability, poses a significant barrier to establishing and validating business models for customers and financiers.[13] This information asymmetry leads to distorted risk assessments and unreliable valuation methods by private investors, ultimately hindering the deployment of essential funding in critical sectors. Consequently, private sector entities face higher perceived risks and increased capital costs, which reduces the number of bankable projects.[14]

Studies by the IMF and the World Bank have documented this type of challenges with a very central finding pointing to financial pressures in Zambia's energy sector not only being driven by exogenous shocks such as droughts and tariff rigidities, but also by structural governance weaknesses[15]. These include limitations in project preparation and appraisal, insufficient transparency around power purchase agreements (PPAs) and contingent liabilities and the absence of publicly accessible data on system planning assumptions and long-term capacity needs. Such information gaps constrain effective regulatory oversight and investor due diligence, contributing to elevated risk perceptions and uneven investment outcomes[16].

It is within this context that transparency becomes not merely a normative governance objective, but a practical tool for improving sector performance. Access to accurate, timely and standardised data across planning, procurement, financing, construction and operations is critical for regulators to exercise oversight, for financiers to assess bankability and risk, and for citizens to understand how public resources and guarantees are being used. Strengthening data publication practices is therefore essential to ensuring that Zambia's energy transition delivers efficient, cost-effective, resilient and fiscally sustainable outcomes.

[11] National Energy Policy 2019 (Ministry of Energy, Republic of Zambia 2019); Zambia Energy Efficiency Strategy and Action Plan 2022 (Ministry of Energy, Republic of Zambia 2022).
[12] Electricity Act No 11 of 2011 section 1 the interpretation.
[13] GIZ (n 1)
[14] Ibid
[15] World Bank, *Zambia Energy Sector Public Expenditure Review*; World Bank, *Managing Fiscal Risks from State-Owned Enterprises in Zambia*
[16] IMF, *Zambia: Staff Report for the Article IV Consultation* (sections on SOE arrears, contingent liabilities and fiscal risk)

This assessment responded directly to these challenges by examining how transparency and performance can be improved across Zambia's energy investment lifecycle. Anchored in the country's existing legal and policy framework and aligned with international standards, such as the Infrastructure Data Standard (IDS) and the Open Contracting for Infrastructure Data Standard (OC4IDS), the study focused on identifying where integrity and performance risks arise, why they persist, and which data points are most critical for mitigating them in practice. These structural and climatic pressures magnify the consequences of weak transparency, as non-disclosure of planning assumptions, procurement decisions and fiscal exposures increases the risks of higher costs, reduced bankability and increased systemic risk whereby institutional transparency gaps and climate vulnerabilities create interconnected fiscal and economic instability across the energy value chain. The assessment draws on the to focus attention on early-stage decision-making, where integrity risks are most likely to shape long-term performance and fiscal outcomes.

1.1 Objectives of the study

The study delivered two core objectives:

I. **Map lifecycle risks:** Develop a comprehensive, stage-by-stage analysis of performance and integrity risks across Zambia's energy investment lifecycle. This includes the identification of risk drivers, institutional actors and the legal and procedural factors that influence cost, timelines and fiscal exposure.

II. **Recommend actionable transparency measures:** Propose a prioritised set of data points and publication practices, that can mitigate these risks and strengthen transparency and performance. Recommendations are to be aligned with OC4IDS principles for standardised, machine-readable and lifecycle-oriented infrastructure data and benchmarked against international best practice. Recommendations are to be designed for technical feasibility within Zambia's regulatory and institutional context.

1.2 Scope, limitations and risk mitigation

The study examined the full energy investment lifecycle from project identification and planning (including IRP implementation) through preparation, financing, procurement, construction, commissioning and operations and maintenance (O&M)

The focus was on governance, data and publication risks rather than technical or engineering evaluation of projects. While the study examined the full energy investment lifecycle, the depth of analysis is risk-based, with greater focus on stages where integrity and performance risks are most pronounced. This prioritisation ensures that the assessment remains practical and impactful within the allocated level of effort.

Primary institutional focus included the Ministry of Energy (policy and planning), the Energy Regulation Board (tariff regulation, licensing), ZESCO (state utility and offtaker), the Rural Electrification Authority (off-grid programmes), the PPP/Procurement Unit (procurement oversight), the Ministry of Finance and National Planning (MoFNP) (guarantees, budgetary exposures), development finance institutions and major IPPs. The study also engaged civil society actors with expertise in transparency and energy sector policy.

The study examined the relevant statutes, subsidiary instruments and regulatory guidelines that govern procurement, licensing, tariffs and information access to identify gaps between formal obligations and practice.

The study recognised limitations related to institutional sensitivity, data availability and access to senior stakeholders. These risks were mitigated through triangulation across sources, strict anonymisation of stakeholder inputs, reliance on aggregated analysis, and alignment with existing legal disclosure obligations. As a result, findings focused on systemic patterns and governance dynamics rather than attribution to individual projects or institutions.

1.3 Methodological approach

The study applied a qualitative, risk-based and data-driven methodology to identify integrity, performance and fiscal risks across Zambia's energy investment lifecycle and to translate these risks into a prioritised, implementable set of standardised data points.

The methodological premise was that governance failures in infrastructure frequently arise during early-stage decision-making planning, appraisal, budgeting and approval, where discretion is high and transparency is limited. The assessment therefore focused on linking observable integrity and performance risks at each lifecycle stage to specific data publication gaps, and identifying which data, if publish systematically, would materially reduce these risks.

The methodology integrated three interlinked components:

1. **Desk review:** A structured review of Zambia's legal, policy, regulatory and institutional framework governing the energy sector, including energy legislation, Open Access regulations, planning instruments (IRP, National Energy Policy), regulatory frameworks, public finance laws and relevant international standards (CoST IDS and OC4IDS). This established the baseline for existing disclosure obligations, institutional mandates, and identified gaps between formal rules and practice.
2. **Risk and data mapping:** Integrity, performance and fiscal risks were mapped across the full energy investment lifecycle from project identification to operations. For each lifecycle stage, the analysis identifies how risks manifest in practice and the critical data points required to mitigate them, forming the basis of the Categorised Risk Matrix and proposed disclosure dataset.
3. **Targeted stakeholder engagement:** A series of semi-structured Key Informant Interviews were conducted with different pre-identified stakeholders to discuss their perspective on the current outlook in terms of the energy sector's transparency and efficiency profile as well as to obtain proposed data points for disclosure. Stakeholders were drawn from policy and oversight institutions, utilities and power market stakeholders, financiers, civil society organisations.

   This included a validation workshop to test the findings from the desk review and subsequent Key Informant Interviews. The workshop held on 10 March 2026 was successful in testing the feasibility, relevance and prioritisation of the proposed data points against the identified integrity and performance risks.

2. Stakeholder mapping

2.1 Overview and purpose of stakeholder mapping

The stakeholder mapping helped to identify the key public, private and non-state actors involved in the planning, procuring, regulating, financing and operation of energy infrastructure projects in Zambia. This included the analysis of relationships and linkages between each identified stakeholder to understand the landscape and stakeholder dynamics within the sector. This exercise helped to identify which institutions generate, hold, publish and/or rely on data at each lifecycle stage, and how gaps or asymmetries in access to data might contribute to integrity and performance risks.

2.2 Key institutional actors and their roles

2.2.1 Policy and planning institutions

The **Ministry of Energy (MoE)** is the principal policy-making authority in the energy sector. It is responsible for national energy policy development, oversight of sector reforms and coordination of long-term planning instruments such as the Integrated Resource Plan (IRP). The ministry plays a decisive role in shaping which projects enter the investment pipeline and under what conditions, through the now legislated administration of feasibility study rights.[17] Stakeholder interviews indicated that while the IRP provides a formal planning anchor, its application in practice is uneven, with projects at times entering the investment pipeline outside the sequencing envisaged in the plan.[18]

The **Presidential Delivery Unit (PDU)** provides high level oversight of priority energy projects and reform commitments, particularly those linked to national development objectives and donor supported programmes. The PDU is responsible for ensuring that the President's social contract with the electorates is honoured and that developmental pledges are fulfilled.[19] While the institution does not formally generate data for project monitoring purposes, the PDU influences project prioritisation and sequencing. Facilitating PDU access to reliable and timely information is therefore crucial for accountability and performance monitoring[20]. During our key informant interviews, it was noted that PDU's influence over project prioritisation increases in contexts of urgency or political commitment, heightening the importance of timely and reliable upstream data.

The **Ministry of Finance and National Planning (MoFNP)** is key to the management of fiscal risks that may arise from the energy sector, including government guarantees on lending arrangements and contingent liabilities associated with the PPAs. Although the ministry does not lead sector planning, its role in approving financing structures and managing public debt means transparency failures in the energy sector can translate directly into macro-fiscal risks.

The **Zambia Development Agency (ZDA)** plays a key role in investment facilitation within the energy sector, particularly for independent power producers and large-scale renewable energy projects. ZDA supports project developers through investment promotion, facilitation of licensing processes, and the administration of investment incentives. While ZDA is not a sector regulator, its position at the entry point of private investment gives it access to commercially sensitive project information and early-stage project data. Limited public visibility of investment approvals, incentive packages and project pipelines can therefore contribute to information asymmetries at the earliest stages of the investment lifecycle.

2.2.2 Regulatory and oversight institutions

The **Energy Regulation Board (ERB)** is a statutory regulator whose establishment has continued under the Energy Regulation Act No 12 of 2019. ERB is responsible for licensing, tariff regulation, market oversight and enforcement of technical and economic standards[21]. ERB generates and receives substantial volumes of data, including licensing information, tariff applications, cost-of-service studies, compliance reports and technical performance submissions from regulated entities.

ERB's regulatory role is significant in the context of Zambia's Open Access Market reforms, where transparent and predictable regulatory processes are essential for enabling third party access to transmission and distribution networks. ERB generates and receives extensive regulatory, financial and technical data in the course of licensing, tariff regulation, market oversight and compliance monitoring. Desk reviews and stakeholder consultations indicate that although the ERB generates substantial regulatory information across the energy investment lifecycle, the disclosure of such information remains limited, fragmented and largely ad hoc. Publicly accessible information is typically disseminated through narrative reports, regulatory notices and other static documents rather than through structured, standardised and machine-readable datasets that would enable systematic analysis.

Findings from key informant interviews confirmed that data publication practices remain largely tied to periodic reporting processes, rather than structured, systematic, real-time data publication in publicly accessible data

[17] Unlike before where the administration of feasibility study rights was an administrative process, the 2019 Electricity Act No. 11 made the requirement for feasibility study rights a legal requirement for the first time.
[18] CSOET01 (Interview held on 23/01/2026)
[19] PDU Informant Interview held on 27/01/2026.
[20] Available at: https://www.pdu.gov.zm/about-pdu
[21] The Electricity Act No. 11 of 2011, available at https://www.erb.org.zm/wp-content/uploads/files/The-Electricity-Act-No.-11-of-2019.pdf

platforms.[22] This means that while ERB's mandate and reporting obligations are rooted in statutory[23] and compliance-based frameworks, there is no explicit legal requirement to publish data in machine-readable formats so as to enable its use for data analytics or real-time use rather than for mere retrospective statutory reporting, as is currently the case.

Notably, information on ongoing energy projects is primarily disclosed through the ERB's annual reports prepared pursuant to section 12 of the Energy Regulation Act No. 12 of 2019, which requires the Board to submit a report on its activities within 90 days after the close of the financial year. While this fulfils statutory reporting obligations, reliance on retrospective annual reporting limits the timeliness of regulatory proactive disclosure, efficient stakeholder participation and transparency across key stages of the investment lifecycle. Consequently, the utility of regulatory data for prospective investors, civil society, researchers and consumers remains restricted, particularly for purposes such as comparative analysis, project lifecycle tracking and sector performance benchmarking. Addressing these institutional and technical constraints is central to improving transparency and regulatory efficiency within Zambia's energy investment governance framework.

Other oversight bodies, such as the **Zambia Environmental Management Agency (ZEMA)** and the **Zambia Public Procurement Authority (ZPPA)**, play supporting roles in environmental approval and procurement compliance, respectively. Their data intersects with energy investment decisions, particularly at the project preparation and construction stages.

2.2.3 Utility and market participants

ZESCO is a vertically integrated company and a dominant player in generation, transmission, distribution and supply of electricity in Zambia considering that the system operator function is also located within ZESCO. While the sector has opened to new Independent Power Producers (IPPs), ZESCO continued to assume *de facto* single buyer functions.[24] This has implied that most of the investment opportunities in electricity power generation require a Power Purchase Agreement (PPA) with ZESCO as the preferred off-taker of electricity.[25] While there are currently no contestable customers in the retail market of electricity due to the fact that ZESCO currently owns most of the electricity infrastructure, open access by IPPS to the ZESCO transmission and distribution networks and/or significant investments by IPPS in transmission and distribution infrastructure could see more IPPs competing for ZESCO's retail and non-retail customers.[26]

ZESCO is involved in system planning, procurement of generation capacity, negotiation and administration of PPAs, grid operations and maintenance of transmission and distribution infrastructure. Consequently, it is the primary custodian of operational performance data, including generation availability, outage rates, system losses and dispatch information.

IPPs, private transmission developers and energy service companies participate in project development, financing, construction, and operations. These actors generate project-level technical and financial data but are typically subject to confidentiality clauses that limit public disclosure. As a result, critical information on project costs, tariffs, performance metrics and contract variations is often accessible only to a narrow group of institutions, reinforcing information asymmetries within the sector. Findings from key informant interviews confirmed that ZESCO has signed over 90 PPAs with developers as of 31 December 2025, but without a centralised system where publication of data of pending projects can be publicly disclosed. In terms of project

[22] CSOET05 (Interview held on 26/01/2026)
[23] Section 18 of the Energy Regulation Act No. 12 of 2019 provides that the Energy Regulation Board (ERB) must prepare and submit an annual report on its operations within three (3) months after the end of each financial year.

[24] Multiconsult Norge AS, *"Inception Report: Technical Assistance in Developing the Open Access Regulations and Transmission and Distribution Use of System Pricing Methodology*", 2021.
[25] Ibid.

[26] Multiconsult Norge AS, *"Report: Technical Assistance in Developing the Open Access Regulations and Transmission and Distribution Use of System Pricing Methodology*", 2021.

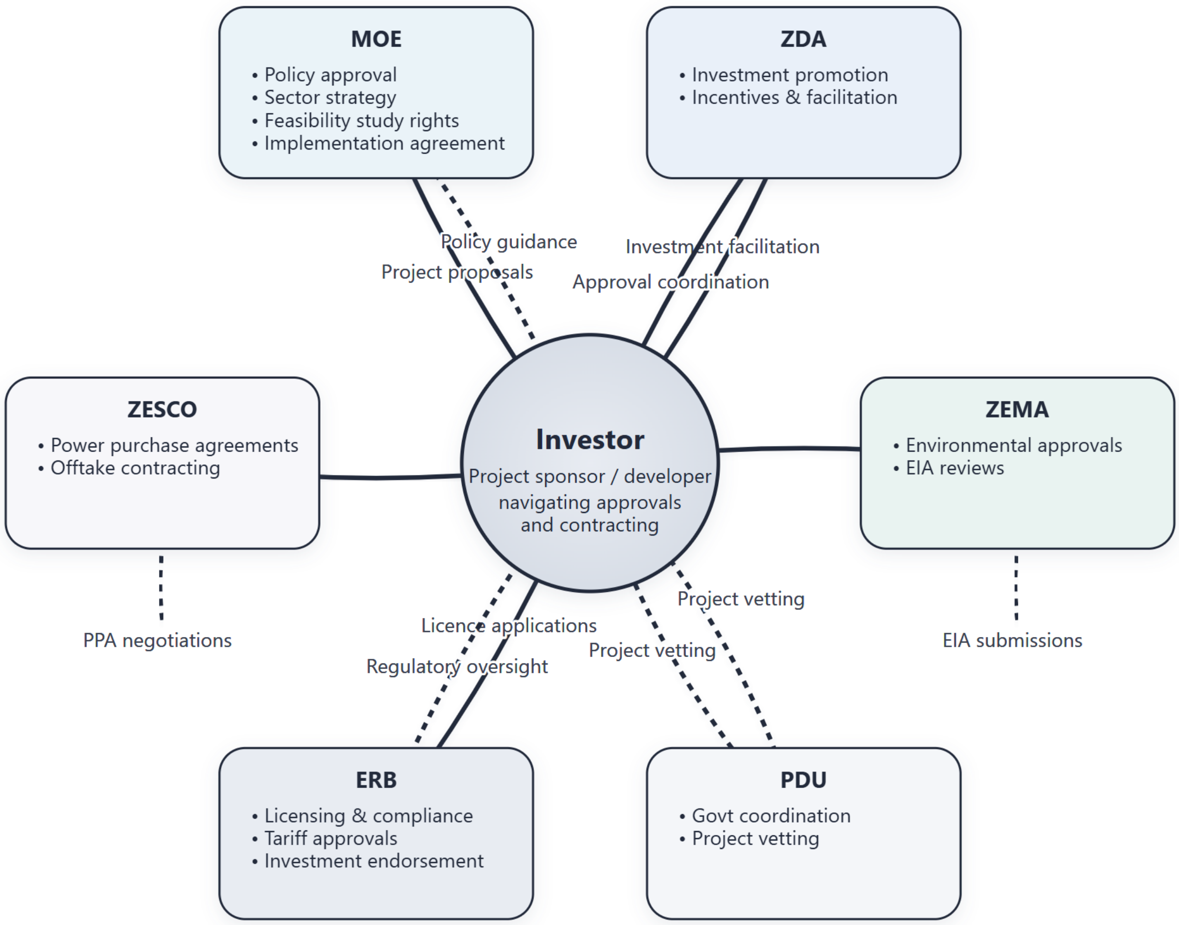
disclosure, ZESCO depends on the developer to engage the public as part of the environmental and social impact assessment carried out under the auspices of ZEMA.

2.2.3 Financiers, civil society and other stakeholders

International financiers, such as the World Bank, and domestic financiers including commercial banks, such as Stanbic Bank Zambia whose role is to provide long-term project finance, rely heavily on transparent and credible data to assess project bankability, credit risk and regulatory stability when considering whether to finance energy infrastructure. Inconsistent disclosure of planning assumptions, contractual terms and performance outcomes increases perceived risk and, according to financiers consulted during this study, contributes to higher transaction costs and financing premiums.

Civil society organisations, such as Transparency International-Zambia, in their interaction with key stakeholders, such as consumer groups and research institutions who provide independent findings, play an accountability and advocacy role by scrutinising energy sector decisions and their distributional impacts. Their effectiveness, however, is constrained by limited access to timely and reliable data on tariffs, subsidies, procurement outcomes and project performance.

Figure 1: Institutional Interaction in Zambia's Energy Infrastructure Investment Process



Source: Author's compilation based on desk review of Zambia's energy sector legislation and policy documents, including the Energy Regulation Act, Electricity Act, and institutional mandates of ERB, MoE, ZESCO, ZDA, ZEMA and PDU, supplemented by stakeholder interviews conducted for this study.

3. Energy investment lifecycle risk mapping and proposed data points

3.1 Purpose and analytical approach

The table below presents an overview of Zambia's major power generation facilities, highlighting the diversity of energy sources, installed capacities, and commissioning timelines. This table serves as a foundational reference for analysing Zambia's energy generation mix, planning future capacity expansions, and understanding historical investment trends in both conventional and renewable energy sources.

No.	Developer Name	Capacity	Year of Commissioned
1	Itezhi Tezhi Hydropower Plant	120 MW	2016
2	Kafue Gorge Lower Power Station	750 MW	2021
3	Kafue Gorge Upper Power Station	990 MW	1972
4	Kariba North Bank Extension	360 MW	2014
5	Kariba North Bank	720 MW	1977
6	Lusiwasi Lower	12 MW	1973
7	Lunzua Power Station	0.75 MW -14.89 MW	2015
8	Bangweulu Solar Power Station	54 MW	2019
9	Ngonye Solar Power Station	34 MW	2019
10	Itimpi Solar Power Station	60 MW	2024
11	Chisamba Solar Power Station Phase 1	100 MW	2025
12	Maamba Coal Power Plant Phase 2	300 MW	2015
13	Zengamina Hydro Power Station	0.75 MW	2007
14	Shiwang'andu Mini Hydropower station	1 MW	2010
15	Kasanjiku Mini Hydropower Station	0.75 MW	2024
16	Copperbelt Energy Coorporation Solar Power Plant	34 MW	2023
17	Lunsemfwa Power Plant	24 MW	2018
18	Mulungushi Power Station	32 MW	2018
19	Musonda Falls Hydropwer Station	10 MW	2015
20	Chishimba Falls Hydropower Station	15 MW	2018 (Upgraded)
21	Victoria Falls Power Station	108 MW	1936
22	Ndola Energy Power Station	105 MW	2017

Table 1. Overview of Zambia's major power generation facilities. Source: This information was compiled by the Office for Promoting Private Power Investment (OPPPI), a unit within Zambia's Ministry of Energy that acts as government's one-window focal point for private-sector participation in the electricity sub-sector.

Energy infrastructure projects in Zambia are risky and complex endeavours due to the technical, financial, regulatory and socio-environmental characteristics affecting implementation. The interdependence between generation, transmission and offtake means that a failure at one point cascades across the whole system. At the same time, the country's overdependence on hydropower, leaves supply exposed to climate shocks and unpredictability.

In terms of the regulatory landscape, the involvement of multiple institutional actors with overlapping mandates and different levels of access to information adds to the fragmentation of the sector when it comes to planning, financing and tendering projects. These challenges translate in governance gaps, especially around transparency and disclosure, that are both larger in scale and harder to reverse than in most other infrastructure sectors.

The ongoing power deficit has seen a surge in renewable energy projects, with both the ERB and ZEMA providing simplified requirements for licensing these projects and to some extent, offer complete exemptions.

The distinctive risk profile of energy infrastructure includes the following:

I. **Large land footprints and competing land uses**

Utility-scale solar projects require extensive tracts of land. For example, the proposed Serenje Solar Power Station is planned on approximately 448 hectares of land in Kosamu Village, Central Province, highlighting the significant spatial footprint of modern solar facilities that often intersects with agricultural and farming land.

II. **Potential displacement and livelihood disruption**

While some solar developments in Zambia have occurred with community cooperation, such as the 100-hectare allocation for the Chisamba Solar Power Plant through customary land arrangements, "the broader risk of displacement and disruption remains significant".[27] For instance, environmental and social impact assessments for a proposed 50 MW solar project in the Chanyanya area of Kafue District documented that land within the project footprint was used for grazing and was home to settlements such as Mukata, whose residents depend on fishing and subsistence livelihoods.[28] Clearing such lands for solar infrastructure can directly disrupt traditional land uses and economic activities, precipitating disputes over land rights, compensation, and access to natural resources.

Solar projects spread spatially across agricultural and grazing lands. This dispersal increases the importance of integrated land-use planning and transparent environmental and social assessments. Although many solar developments in Zambia are advancing under favourable policy frameworks, due to the Government's intervention to facilitate an enabling regulatory framework that promotes rapid investment in the wake of the current power deficit, the current regulatory system does not yet mandate sufficiently detailed, publicly accessible datasets on project footprint impacts, resettlement plans, or ongoing mitigation which undermines stakeholder ability to monitor, compare, or benchmark outcomes.

III. **Land tenure and customary systems**

Zambia's predominant land tenure system (customary land) further complicates solar project development. Because customary land is managed through community norms and traditional leadership rather than State titles, negotiations over land rights and compensation can be complex and protracted with potential to disadvantage local owners due to the lack of firm protection of land ownership. Projects that fail to engage communities early, risk unresolved disputes or perceptions of inequity. In other contexts, such issues have delayed implementation or sparked legal challenges, particularly as family legacy issues are likely to arise at some point.

IV. **Uneven benefits vs. socio-economic costs**

The economic benefits of solar projects, such as job creation or energy access, may not accrue evenly across affected communities. This dynamic can heighten perceptions of injustice, particularly if households lose productive land without adequate replacement of lost livelihoods or clear compensation arrangements. While the Chisamba Solar Power Plant was publicly acknowledged as a driver of regional development, the long-term implications for local food production and land availability remain unassessed in national discourse.[29]

The foregoing sector-specific risks make the energy sector particularly vulnerable to integrity and performance risks where decision-making processes are opaque, fragmented or weakly governed. This section of the study, maps where and how such risks arise across the energy investment lifecycle, with particular attention to the points at which decisions are taken, commitments are made and information asymmetries emerge. This

[27] LusakaTimes Newspaper, "*Chief Chamuka Commended for Availing Land for Landmark Solar Power Plant*", Published on 1 July, 2025, (accessed on 8 March 2026).

[28] Final Environmental and Social Impact Assessment (ESIA) Report for the Proposed Development of a 50MW Solar PV Power Plant in Chanyanya Area of Kafue District in Lusaka Province by Sevenyrds (7Yrds) Energy Limited, available at https://www.zema.org.zm/wp-content/uploads/2024/01/Updated-FINAL-ESIA-REPORT-FOR-THE-PROPOSED-50MW-Solar-Project-in-Chanyanya-Area-by-7Yrds-Energy-Limited-1.pdf?utm_source=chatgpt.com, (accessed on 8 March 2026).

[29] Lusaka Times Newspaper, " *Chief Chamuka Commended for Availing Land for Landmark Solar Power Plant",* (accessed on 8 March 2026).

lifecycle risk mapping (See Annex 1: Energy Infrastructure Lifecycle Risk–Data Mapping Matrix) mirrors the structure of the CoST Infrastructure Data Standard (IDS), including the water sector (FIIP principles) and sustainability extensions, allowing integrity and performance risks to be directly linked to data points and disclosure requirements at each stage of the energy investment lifecycle.

By examining gaps in access to timely, standardised and decision-relevant data, this section highlights how limited transparency can hinder project legitimacy, community participation and acceptability, as well as enable poor project selection, non-competitive procurement, hidden fiscal exposures and suboptimal asset performance. This lifecycle-based approach is consistent with the IDS, which emphasise disclosure as a tool for identifying and mitigating risks at each stage of infrastructure delivery.[30] A summary of suggested data points per stage of the energy infrastructure lifecycle is detailed in Annex 2: Priority Energy Sector Disclosure Data Points.

3.2 Planning and project identification

The project identification and planning stage (sometimes also referred to as pre-feasibility and appraisal stages) represent the most consequential point in the infrastructure lifecycle, as decisions taken at this stage determine technology choice, project scale, location, delivery model and long-term cost structures. International evidence consistently shows that weaknesses in early-stage planning are a primary driver of cost overruns, delays and fiscal stress in infrastructure projects.[31] In the Zambian energy sector, integrity risks at this stage may arise where project selection is insufficiently anchored in transparent demand forecasts, least-cost generation analysis, or publicly scrutinised planning instruments such as the IRP.

To address these risks, there is a need to carry out a comprehensive analysis and disclose macroeconomic assumptions, electricity balances, calculation of economic returns and benefits and carbon accounting table.[32] Good data publication practices at this stage further require that project appraisal be grounded in transparent demand forecasts, system adequacy metrics and least-cost generation planning, as encapsulated in Zambia's IRP, which incorporates a structured demand forecast and least-cost generation modelling to guide investment prioritisation over a 30-year horizon.[33]

The World Bank's project appraisal framework further recommends a systematic evaluation of benefits, costs, risks and alternatives through economic and financial analysis, cost-benefit methodologies and sensitivity testing to ensure projects are both efficient and aligned with sector objectives.[34] In terms of identification of project costs particularly O & M, there is need for a transparent reconciliation of economic and financial costs, clearly identifying costs that can be excluded from the economic flows, a careful breakdown of foreign and domestic costs, and what elements of costs amount to transfer costs.[35] On the other hand, those who advocate for independent energy planning guidance emphasise the need for comprehensive scenario analysis, probability adequacy assessments, and long-term modelling of demand, supply options, costs and uncertainties in order to inform investment decisions and improve policy outcomes over a period.[36]

Limited disclosure of the assumptions underpinning project prioritisation, such as projected demand growth, hydrological risk, or comparative technology costs constrains external scrutiny and increases the scope for discretionary or politically influenced decision-making. Core data points at this stage include project concepts

[30] Infrastructure Data Standard (IDS), CoST, the Infrastructure Transparency Initiative, 2024.
[31] Bent Flyvbjerg, 'Survival of the Unfittest: Why the Worst Infrastructure Gets Built' (2009) 68 *Oxford Review of Economic Policy* 344.
[32] World Bank, "Guidelines for Economic Analysis of Power Sector Projects (Vol 1)", "Version 1: Renewable Energy Projects ", (Issued: September 2015), at page 15.
[33] Ministry of Energy, Integrated Resource Plan (IRP), (2024), (Lusaka: Government of the Republic of Zambia. Available at: https://www.moe.gov.zm/irp/ (accessed 23 March 2026)
[34] World Bank, "Guidelines for Economic Analysis of Power Sector Projects (Vol 1)", "Version 1: Renewable Energy Projects ", (Issued: September 2015), at page 11.
[35] Ibid, at page 11.
[36] International Energy Agency, Developing Capacity for Long-Term Energy Policy Planning: A Roadmap. Paris: IEA, 2024. Available at: https://www.iea.org/reports/developing-capacity-for-long-term-energy-policy-planning-a-roadmap (accessed 23 March 2026)

and rationales, demand and supply forecasts, least-cost generation analysis, feasibility studies, and alignment with national planning instruments such as the IRP and National Energy Policy and the Zambia Power Development Framework.[37] On face value, the methodology for development of Public Investment Plans (PIP) demonstrates a robust process to achieving "transparency, fiscal discipline, and strategic alignment of public investments with national priorities".[38]Disclosure of these materials is essential to facilitating meaningful stakeholder scrutiny around whether proposed energy infrastructure projects are justified by evidence, resilient to climate and hydrological risks, and consistent with long-term sector objectives[39]. In the absence of such disclosure, early-stage decisions can lock in high-cost or inappropriate technologies, creating downstream fiscal and performance risks that are difficult to reverse. In fact, global trends demonstrate that a weak foundation characterising the project identification stage and planning often leads to cost overruns, delays and underperforming assets.[40]

During this study, it was evidenced that one of the key resource documents that guide identification of projects is the Public Investment Guidelines and the Public Investment Plan[41]. Parameters forming the bulk of the criteria include project viability as contained in project concepts, pre-feasibility or feasibility (for projects above the value of U$D 100 million). However, project prioritisation is at the discretion of spending Ministries and agencies with the Ministry of Finance offering arm's length fiscal guidance which could potentially give rise to integrity risk due to undefined benchmarks for project prioritisation. Progressively, however, Ministry of Finance is in the process of developing prioritisation criteria which would standardise project prioritisation criteria across all spending ministries and agencies.[42]

While the appraisal process mitigates performance risk by ensuring alignment with national development and energy plans, validating technical and institutional feasibility, and confirming implementation readiness prior to approval, having a standardised criteria would be essential to mitigating integrity risk. This is because integrity risk requires transparent documentation, objective screening criteria, segregation of roles, and layered appraisal mechanisms that reduce discretion, costs and political interference.

The ERB also plays a fundamental role in ensuring strategic disclosure of prospective energy infrastructure projects through investment endorsements which is a unique sectoral data point. This is a critical data point because it mitigates all foreseeable risks at the earliest point prior to project licensing, authorisation and implementation and presents a chance for effective stakeholder mapping and involvement as well as a great latitude for assessing project viability before an investor commits resources. One of the greatest challenges regulators face is objectively assessing an application for project after the intended developer has already expended a great deal of resources and this often leads to regulatory capture through a deliberate attempt to balance between regulatory autonomy and investment ring-fencing[43]. The ERB uses the following data points when considering applications for investment endorsements which presents critical disclosure points at the earliest stage of electricity infrastructure investment cycle:

- The costs of the works for the purpose of setting tariffs for the Applicant under the Energy Regulation Act and the Electricity Act;
- the need for the works;
- financing costs, timely delivery;
- other factors that the Board considers relevant; and
- the optimality of the approach or solution proposed by the Applicant.

[37] Zambia Power Development Framework, MoE, 2026.
[38] Ministry of Finance and National Planning, *2026 Public Investment Plan,* (August 2025)
[39] Water Integrity Network (WIN), *Framework for Integrity in Infrastructure Planning (FIIP): Methodology Guide*, WIN, 2025.
[40] Flyvbjerg, B., *Survival of the Unfittest: Why the Worst Infrastructure Gets Built.* Oxford Review of Economic Policy, Vol. 25, No. 3, 2009.
[41] CSOEST02
[42] Informant Interview ..held on 23/01/2026.
[43]https://www.erb.org.zm/wp-content/uploads/files/LicensingGuidelines.pdf, *Licensing and Investment Endorsement Guidelines for Projects in the Electricity Sub-Sector*, (accessed on 01 February, 2026)

However, while ERB is obliged to "file in the Public Register any information relating to an application for an endorsement"[44] and "ensure that the public record of an endorsement proceeding shall be open to the public" there is currently no machine-readable public register or disclosure of investment endorsements on the ERB website. In essence, this process is conducted in camera thereby limiting its impact in facilitating proactive disclosure of prospective electricity projects.

Stakeholder consultations confirmed this risk profile. It was noted that while high-level planning instruments exist, the assumptions underpinning project selection and sequencing are not routinely disclosed in a manner that allows external verification 45. This limits the ability of regulators, financiers and civil society to assess whether proposed investments align with least-cost planning principles or adequately account for hydrological and climate-related risks. As a result, projects may advance to procurement with limited external scrutiny of their strategic justification. Disclosing planning rationales, alternatives analysis and decision criteria in order to detect unusual patterns and reduce the risk of bias or undue influence before projects become locked in is crucial.

Further, utility-scale solar projects in Zambia, which require large land parcels, present significant socio-environmental risks that must be factored into project identification.[46] If land use conflicts, displacement risks, and customary land tenure are not sufficiently analysed early, project proposals may advance without realistic mitigation strategies, impeding community buy-in and timelines. Empirical studies show that early inclusion of socio-environmental risk assessment improves project viability and reduces conflict during implementation.[47] One Informant noted the importance of a comprehensive project identification framework to guide consistent and transparent project identification. As they expressed: "We have plans, but the plans are not always what determines what gets implemented. Sometimes the plan comes later, to explain a decision that was already taken".[48]

3.3 Procurement and contracting

Procurement is initiated only after the investment decision and the financial commitment is made -- essentially, when a project transitions from planning to a legally binding commitment. This phase is also highly exposed to integrity risks, particularly in sectors such as energy where contracts are complex, values are high and competition may be limited.

Risks at this stage include non-competitive tendering, poorly justified direct negotiations, opaque evaluation criteria and limited disclosure of bid outcomes. In the context of power generation projects, procurement risks are often compounded by the use of bespoke PPAs, which may embed long-term tariff structures, risk allocation mechanisms and government support measures that are not subject to public scrutiny. Consultations with private sector participant and development partners indicated that recent procurement reforms have improved procedural clarity in some segments of the power sector[49]. However, other stakeholders reported that there is limited public visibility of bid evaluation criteria, negotiated PPA and Implementation Agreements parameters and contract amendments.[50] To this extent, one of the key informants mentioned during the interview that "by the time some of these projects come to us [as procuring entities], the decision is already made. You are not really being asked whether it should happen, but how to make it happen"[51] This suggests pre-determined procurement processes where procurement criteria are tailored to produce a particular outcome.

[44] *Licensing and Investment Endorsement Guidelines for Projects in the Electricity Sub-Sector,* clauses 17 and 19.
[45] Informant Interview CSOET06
[46] Saunders, P. J. (2020). *Land use requirements of solar and wind power generation: Understanding a decade of academic research.* Energy Innovation Reform Project. ISBN: 978-1-7359335-0-4.
[47] World Economic Forum, "*The Global Risks Report 2018",* 13th Ed., (Geneva: World Economic Forum, 2018). https://www3.weforum.org/docs/WEF_GRR18_Report.pdf

[49] World Bank Informant -COSET09
[50]
[51]

It is crucial to publish core procurement information including procurement method, tender documents, bid evaluation summaries and contract award details to enable accountability and value-for-money assessment[52] in line with the transparency and value-for-money principles under the Public Procurement Act No. 8 of 2020. These general disclosures should be augmented by sector specific data points generation capacity (MW), technology type, tariff structures approved by the ERB, power purchase agreement (PPA) terms (including duration, pricing mechanisms, and risk allocation), project costs (CAPEX and OPEX), licensing and permitting status, grid connection requirements, and commissioning timelines. Where such data is not disclosed in a timely and structured manner, it becomes difficult to assess whether procurement outcomes reflect competitive processes or whether risks have been transferred appropriately between the public and private sectors.

Interview findings confirmed that PPA terms including tariff structures, indexation mechanisms, capacity payment obligations, curtailment provisions and risk allocation clauses are treated as commercially confidential. This is the case even though these terms directly determine electricity costs borne by consumers and contingent liabilities assumed by the State. Confidentiality in this context is not narrowly applied to protect genuine commercial sensitivity but functions as a default position that insulates procurement outcomes from scrutiny. As noted in Section 3.4, the IMF and World Bank have highlighted that such non-disclosure of fiscal commitments undermines oversight and can lead to the accumulation of hidden public debt obligations a risk that is directly relevant where PPA terms determining long-term consumer tariffs and State contingent liabilities remain inaccessible to regulators, oversight bodies and the public despite no explicit legal prohibition on their disclosure.

The distinction between firm and non-firm PPAs is one of the consequential governance features of Zambia's power sector contracting arrangements. A firm PPA guarantees that a generator will be dispatched regardless of system conditions, creating an unconditional obligation on the off taker, typically ZESCO, to pay for power whether or not it is needed or can be absorbed by the grid. A non-firm PPA, by contrast, allows curtailment of generation when system conditions require it, reducing but not eliminating payment obligations. In Zambia, where ZESCO has signed several PPAs against a backdrop of transmission constraints, load management pressures and a persistent power deficit, the balance between firm and non-firm obligations has direct implications for the fiscal exposure of the utility and, ultimately, the State.

In the context of Zambia's power deficit and Open Access reforms, the distinction between firm and non-firm PPAs carries significant governance implications that are currently invisible to external stakeholders. As noted above, firm PPAs guarantee dispatch regardless of system conditions, while non-firm agreements allow curtailment. Where this distinction is not disclosed, it is impossible for regulators, consumers or civil society to assess how power scarcity is managed, how domestic needs are prioritised, or whether take-or-pay obligations are being triggered at public expense. The firm or non-firm status of PPAs should therefore be treated as a mandatory disclosure requirement.

Transparency at the procurement and contracting stage therefore requires more than the publication of tender notices. It requires structured disclosure of procurement method justification, bid evaluation criteria and scores, the number and identity of qualified bidders, contract award decisions with supporting rationale, and key PPA terms including tariff structure, duration, indexation, risk allocation, capacity payment obligations, and firm or non-firm status. Beneficial ownership disclosure of winning contractors and project developers is also essential to detecting conflicts of interest and undue influence in award decisions. Where contract variations or renegotiations occur post-award, these must equally be disclosed with supporting justification, as renegotiation without transparency is a primary channel through which initial procurement integrity is undermined.

3.4 Financing and fiscal commitments

[52] CoST – Infrastructure Transparency Initiative, Disclosure Manual (CoST, 2023).

Fiscal risks in the energy sector frequently emerge during project structuring, financing negotiations and tariff-setting, even where projects are privately financed. During financing and budgeting, transparency shifts toward understanding how projects are funded and where financial risks ultimately lie. For example, in terms of generation projects that are privately financed, governments often assume significant contingent liabilities through guarantees, subsidies, foreign-exchange risk allocation, or take-or-pay obligations embedded in PPAs.[53]

In Zambia's energy sector, fiscal risks pose material weight on public finances and debt sustainability. The state-owned utility, ZESCO, carries substantial debt and contingent liabilities, much of which is linked to PPAs, government guarantees and delayed payments to IPPs. As at the end of 2023, ZESCO's debt to domestic and external IPPs and other stakeholders exceeded US $1.2 billion, with roughly US $1.1 billion owed to IPPs alone, a liability included in Zambia's public debt sustainability assessments because of its potential fiscal impact.[54]

On the other hand, Parliamentary records from mid-2022 show that the total stock of government guarantees stood at US $1.50 billion, with guarantees for ZESCO and the Kafue Gorge Lower hydropower project accounting for the vast majority (93 per cent) of that total.[55]

The financial pressures associated with these arrangements are evident. ZESCO has faced significant interest charges from delayed payments to IPPs, with interest costs of over US $70 million in 2022 and more than US $85 million in 2023 accruing as a result of late payments under PPAs.[56] International financial institutions, including the IMF and World Bank, have highlighted such data points to remain partially or wholly undisclosed, despite their potential to crystallise.[57] In the absence of transparent reporting on the fiscal implications of PPAs and related agreements, policymakers and oversight institutions may underestimate the cumulative exposure of the energy sector to macro-fiscal risk. Stakeholders involved in fiscal oversight and project financing highlighted the absence of consolidated and publicly accessible information on government guarantees, in view of government exposure arising from energy sector commitments.[58][59] It must be noted that the law, in particular the Public Debt Management Act [60], still permits the State to provide guarantees to the state utility, subject to the approval of the parliament. This remains the case until this section is repealed.

In Zambia's energy sector, where PPAs and public guarantees as well as off-taking guarantees by Zambia's sole electricity utility, ZESCO play a central role in mobilising private investment, non-disclosure of key data points obscures the true fiscal exposure of the state and undermines macro-fiscal oversight. The IMF and World Bank have repeatedly highlighted that non-disclosure of key financial commitments undermines fiscal oversight and can lead to the accumulation of hidden public debt.[61] Proactive disclosure of structured financial data enables the Ministry of Finance, regulators, financiers and oversight bodies to assess affordability, value for money, and cumulative risk across the sector. At this stage of the project life cycle, key data points for energy infrastructure projects in Zambia are total capital and operational costs for generation and transmission assets, financing structures and sources of funds, Power Purchase Agreement terms with off-takers, tariff assumptions approved by the Energy Regulation Board[62], government guarantees, on-

[53] International Monetary Fund (IMF), *How to Manage the Fiscal Risks of Public–Private Partnerships.* IMF, 2018.
[54] The International Monetary Fund, Fourth Review under the Arrangement under the Extended Credit Facility and Financing Assurances Review – Debt Sustainability Analysis, 27 November 2024, Available at https://www.elibrary.imf.org/downloadpdf/view/journals/002/2024/350/article-A002-en.pdf?utm_source=chatgpt.com https://www.elibrary.imf.org/downloadpdf/view/journals/002/2024/350/article-, (accessed on 6 March 2026).
[55] https://www.parliament.gov.zm/, (accessed on 5 March 2026).
[56] Zambia Reports Newspaper, "Experts Warns ZESCO to Honour Contractual Obligations with Independent Power Producers to Avoid Financial Crisis", 19 February 2025, Available at https://zambiareports.news/2025/02/19/expert-warns-zesco-to-honor-contractual-obligations-with-independent-power-producers-to-avoid-financial-crisis (accessed on 5 March 2026).

[57] International Monetary Fund, *How to Manage the Fiscal Risks of Public–Private Partnerships* (IMF, 2018).
[58] MOFNP (Check their code)
[59] CSOET08, CSOET02
[60] Public Debt Management Act Section 31
[61] IMF, *Fiscal Transparency Handbook.* IMF, 2018; World Bank, *Managing Fiscal Commitments in Infrastructure PPPs.* World Bank Group, 2021
[62] Republic of Zambia, *Renewable Energy Strategy and Action Plan*, 2022.

lending arrangements, subsidies[63], and contingent liabilities arising from take-or-pay obligations, exchange rate exposure, and other fiscal commitments linked to the electricity sector including revenue requirements and multi-year tariff projections in accordance with the ERB's Multi Year-Tariff Framework.[64]

The integrity challenge at this stage is not solely the existence of fiscal support mechanisms, but the lack of disclosure and cross-institutional visibility regarding their scale, duration and risk profile. Without consolidated and publicly accessible information, it is difficult to link project-level commitments to broader fiscal policy and debt sustainability considerations.

3.5 Construction and implementation

During construction, integrity and performance risks shift from decision-making to execution. Common risks include cost overruns, delays, contract variations, and quality deficiencies, which may arise from weak contract management, inadequate supervision or poorly defined performance standards.

While construction-phase risks are often treated as technical or managerial issues, experience demonstrates that transparency plays a critical role in mitigating these risks. Disclosure of contract amendments, variation orders, implementation timelines and progress reports enables early identification of deviations from original plans and supports corrective action[65]

The PDU plays a role in monitoring priority energy projects against presidential commitments, but as this study found, there are no pre-disclosed criteria governing which projects receive presidential-level oversight or what triggers escalation. This discretionary prioritisation means that accountability is unevenly applied. Some projects receive intensive attention while others with equivalent or greater public interest implications proceed with minimal scrutiny. Where oversight is politically driven rather than risk-based and transparent, it creates incentives for project sponsors to manage political relationships rather than construction performance.

ZESCO, as the primary off taker and counterparty to PPAs, also has a stake in construction progress but limited formal authority over contractor conduct. Stakeholders involved in the implementation of a project may each maintain separate progress records that are not consolidated or publicly accessible. This fragmentation means that cost overruns, variation orders, and schedule slippages may be recorded in different systems with different methodologies, making independent verification extremely difficult.

Interviews with sector stakeholders suggested that while implementation data exists within contracting authorities and utilities, it is rarely disclosed in a systematic[66] manner. As a result, deviations from original cost, scope or timelines may only become visible after they have already generated impacts on fiscal or service delivery. Where such information is unavailable or fragmented, cost escalation and schedule slippage may go undetected, until they have already generated significant financial and service delivery impacts.

A risk worth noting, specific to Zambia's energy sector context, relates to payment delays during and immediately after construction. Where ZESCO or the Government is a counterparty to construction-related financial obligations, including capacity payments, grid connection contributions or advance payments under PPAs, delays in meeting these obligations can directly impair construction progress, trigger penalty provisions or force contractors into arrangements that compromise quality. The absence of publicly disclosed payment certification processes and milestone payment records makes it impossible to assess whether delays are attributable to contractor underperformance or to off taker or government payment failures

3.6 Operations and maintenance

[63] Economics Association of Zambia, "*Learning from Zambia's Economic Mistakes*", available at https://eaz.org.zm/articles/2022/09/08/learning-from-zambias-economic-mistakes, (accessed on 12 March 2026).
[64] Available at: https://www.erb.org.zm/wp-content/uploads/files/MYTFTNSP-Pricing-Rule_200922_ERB.pdf (accessed 24 March 2026).
[65] World Bank, *Enhancing Government Effectiveness and Transparency: The Fight Against Corruption* (World Bank, 2020).
[66] CSOET010-Ministry of Energy

The operations and maintenance (O&M) phase determine whether energy infrastructure delivers the performance outcomes originally envisaged. Risks at this stage include underperformance of generation assets, high system losses, inadequate maintenance and inefficient dispatch, all of which can undermine system reliability and affordability.

Neither the Electricity Act nor the Energy Regulation Act explicitly mandates systematic public disclosure of operational performance data, leaving disclosure largely at the discretion of utility and regulators. The result is that critical information on generation availability, forced outage rates, system losses, dispatch patterns, and tariff recovery is generated internally by ZESCO and the ERB, but rarely published in a structured, comparable, or timely format. Stakeholder consultations confirmed this gap, with one informant noting that operational data exists but is not consistently disclosed in a way that enables external analysis or benchmarking.

This is crucial because without publicly accessible performance data, regulators cannot effectively assess whether assets are delivering against the contractual obligations including capacity factors, availability guarantees, and grid connection performance. Financiers and investors rely on operational track records to assess the bankability of future projects. Therefore, the absence of standardised performance data raises perceived risk and financing costs across the sector.

Operational data is the primary feedback mechanism between infrastructure performance and future planning decisions. Where it is unavailable, poor-performing assets and technologies are invisible to the planning process, perpetuating the same mistakes in successive investment cycles.

Zambia already possesses the institutional infrastructure to address this gap. ZESCO generates dispatch and outage data as part of routine system operations, and the ERB collects performance submissions from licensed generators. The constraint is disclosure practice and standardisation. A credible first step would be the regular publication of high-level system performance indicators generation availability by plant, aggregate system losses and outage frequency in a structured and publicly accessible format, aligned with CoST IDS performance data requirements.

In many jurisdictions, including Zambia, operational data such as generation availability, outage rates and transmission losses is generated by utilities and regulators but not systematically disclosed in a standardised, machine-readable format. The absence of such disclosure limits the ability of regulators, financiers and the public to assess whether assets are performing in line with contractual and regulatory expectations.

Limited transparency during operations weakens feedback loops across the lifecycle, as lessons from underperforming assets are not readily available to inform future planning and procurement decisions.[67] Data points around annual reports and audited financial reports, essential for assessment of project profitability and viability, can be disclosed to address the gaps.

3.7 Cross-cutting systemic risks

Across all lifecycle stages, systemic risks particularly those related to governance, climate variability, and institutional coordination interact with project-level risks. Climate-related shocks, such as droughts affecting hydropower generation, can amplify existing weaknesses in planning assumptions and risk allocation. Where such vulnerabilities are not transparently acknowledged and addressed in project design and contracting, they may translate into recurrent fiscal transfers, emergency interventions, or reduced service quality.

Similarly, fragmented disclosure practices across institutions impede holistic risk assessment. When planning data, contractual commitments, fiscal exposures and performance outcomes are held by different entities without a shared disclosure framework, the cumulative risk profile of the sector remains obscured. Addressing these challenges requires a lifecycle-based disclosure approach that connects project-level information to

[67] OECD, *Public Governance of Infrastructure Investment* (OECD, 2015).

system-level oversight, consistent with certain good international practice.[68] Across interviews, stakeholders consistently emphasised that these risks are rarely confined to a single institution or lifecycle stage. Instead, fragmented disclosure practices and limited cross-institutional coordination were seen as systemic constraints that amplify both integrity and performance risks across the sector.

Throughout the entire spectrum of an investment cycle, there are identified cross-cutting governance and integrity data reinforce accountability data points. These include licensing and permitting status, regulatory decisions and justifications, audit reports, records of stakeholder consultations, conflict-of-interest declarations, beneficial ownership information, and complaints or grievance logs. Such data illuminate who makes decisions, on what basis, and with what consequences, addressing concerns about regulatory capture, undue influence, and weak or wide discretionary oversight that were highlighted through stakeholder engagement.

The publication of project data serves stakeholders across different sectors and interests, from regulators and financiers assessing bankability and compliance, to civil society monitoring distributional impacts and fiscal exposures, to communities tracking resettlement and compensation commitments. What constitutes decision-relevant information will therefore vary depending on the stakeholder and the stage of the lifecycle at which data is accessed. In Zambia's energy sector specifically, the combination of long-term PPAs locking in fiscal obligations, contingent liabilities linked to government guarantees, hydropower vulnerability to climate variability, and the involvement of multiple institutional actors with asymmetric access to information, means that systematic data publication across the lifecycle carries consequences that are both larger in scale and harder to reverse than in many other sectors. Zambia can therefore reduce integrity risks, improve investor confidence, strengthen fiscal discipline, and enhance the performance and resilience of its energy infrastructure portfolio by ensuring that data is published systematically, consistently and in formats accessible to all stakeholder groups.

3.8 Alignment with OC4IDS and structured disclosure

To ensure usability, comparability and sustainability, all recommended data points should be published in alignment with the OC4IDS whose structured approach to infrastructure data publication ensures that data is:

- **Lifecycle-based**, enabling systematic tracking of projects from identification and planning through procurement, construction, operations and maintenance and where applicable, decommissioning. This is particularly significant in Zambia's energy sector where, as this study documents, disclosure gaps at early lifecycle stages project identification and financing generate integrity and performance risks that compound as projects progress. A lifecycle-based approach ensures that data published at each stage can be traced, compared and verified against commitments made at earlier stages.
- **Machine-readable**, allowing automated analysis and cross-project comparison;
- **Interoperable**, enabling linkage between contracts, beneficial ownership, fiscal data, and performance outcomes.

For the energy sector, OC4IDS provides a solid foundation because it already captures the core data points most critical to the integrity and performance risks identified in this study procurement method, contract award values, financing sources, implementation timelines and project parties including beneficial ownership. This means that adoption of OC4IDS does not require building a disclosure system from scratch but simply aligning existing data collection practices across the Ministry of Energy, ERB, and ZESCO with a globally recognised and interoperable standard for publication.

However, sector-specific extensions are necessary because OC4IDS was designed as a cross-sector infrastructure standard and does not fully capture the data points that are distinctive to electricity

[68] CoST – Infrastructure Transparency Initiative, *Improving Infrastructure Outcomes through Disclosure* (CoST, 2022).

infrastructure. Operational performance indicators such as generation availability, forced outage rates and system losses, as well as energy-specific contracting data such as PPA tariff structures, capacity payment obligations and offtaker identity, fall outside the generic OC4IDS framework but are critical to regulatory oversight and investor confidence in Zambia's energy sector as documented in Sections 3 and 5 of this study. Developing these as modular extensions, rather than bespoke data points, ensures consistency with global practice while remaining responsive to Zambia's context.

3.9 Prioritisation and sequencing of disclosure reforms

Recognising institutional capacity constraints, this study recommends a sequenced approach.

Short-term priorities

- Proactive publication of existing planning documents, procurement notices and contract summaries.
- Standardised disclosure of basic PPA terms.
- Use of existing CoST IDS templates for procurement and contracting data.
- Regular publication of high-level operational performance indicators by ZESCO and ERB.

These measures require minimal new systems but yield immediate gains in accountability and investor confidence.

Medium- to long-term reforms

- Full integration of OC4IDS into government and regulatory information systems.
- Development of energy-specific OC4IDS extensions for performance and grid data.
- Harmonisation of reporting across MoE, ERB, ZESCO, and MoFNP.
- Capacity building for data analysis and use by regulators, oversight bodies, and civil society.

Over time, these reforms shift transparency from a compliance exercise to a core governance function that improves sector outcomes.

6. Implementation roadmap

This study has demonstrated that transparency in the energy sector is not merely a question of legal compliance or information availability, but one of institutional design, sequencing, and incentives. The proposed disclosure framework therefore requires a carefully structured implementation roadmap one that recognises capacity constraints, addresses integrity and performance risks at critical decision points, and embeds disclosure as a routine function of sector governance rather than a standalone reform.

Consistent with CoST principles and the Framework for Integrity in Infrastructure Planning (FIIP), implementation is conceived as a progressive, iterative process, beginning with targeted pilots and culminating in sector-wide institutionalisation. This roadmap is therefore intentionally scoped to the implementation of the recommended disclosure framework and pilot exercise under this assignment, rather than broader sector reform.

6.1 Institutional architecture for implementation and performance

The proposed institutional architecture does not require the creation of new statutory bodies, but rather the designation and coordination of functions within existing institutions. Effective implementation of the recommended disclosure framework requires coordinated action across multiple institutions, each performing distinct but complementary roles.

In the Zambian energy sector, implementation should be anchored within existing governance arrangements, while introducing clear accountability lines for disclosure and review.

a) Lead coordinating entity

The MOE as principal policy authority, custodian of feasibility study rights and designated contracting institution for implementation agreements. It already interfaces with all key data holders and receives project-level data required by the framework, ideally situated within government but operating with functional independence should be responsible for overall coordination, sequencing and quality assurance.

The lead entity's responsibilities should include:

- Endorsing disclosure standards and templates.
- Coordinating pilot implementation.
- Resolving cross-institutional data inconsistencies.
- Reporting periodically on progress and challenges.

b) Disclosure teams within implementing entities

Disclosure Teams should be embedded within project-owning or implementing institutions, such as utilities, project development units or relevant ministries. Their function is operational rather than advisory: collecting, validating and publishing project-level data in accordance with the agreed framework.

Disclosure should not rely on ad hoc information requests, but be integrated into routine project management and reporting processes. This reduces transaction costs and increases sustainability.

c) Independent review

An independent review function, drawing on existing civil society organisations, development partners and sector experts already active in Zambia's energy sector, should provide periodic review of disclosed information to verify its completeness and flag material gaps or inconsistencies. This function does not require a new institutional structure but rather the formalisation of roles that civil society actors, such as Transparency International-Zambia and development partners, already perform informally. Its scope is limited to reviewing disclosed data against the framework's requirements, consistent with CoST's independent review[69] principles, rather than conducting independent investigations or audits.

d) Role of regulators

Sector regulators, particularly the Energy Regulation Board, are pivotal as custodians of technical, licensing, tariff and performance data. Their role extends beyond regulation to:

- Standardising datasets.
- Publishing regulatory decisions and underlying justifications.
- Clarifying confidentiality boundaries that affect disclosure.

Strengthening this data stewardship function is essential to addressing the regulatory ambiguities identified earlier in the study.

6.2 Sequencing reforms

The following phased approach is recommended:

Phase 1: Legal and policy anchoring

As the stakeholder engagement and lifecycle risk mapping in this study confirm, several disclosure gaps persist not because law prohibits publication but because institutions default to confidentiality in the absence of clear guidance. The ERB, for instance, is obligated under its licensing guidelines to file information relating

[69] CoST, Independent Review Manual, 2025.

to investment endorsement applications in a public register and to ensure that the public record of endorsement proceedings is open to the public, yet no machine-readable public register currently exists on the ERB website. Similarly, the Ministry of Energy does not sign non-disclosure agreements with developers, yet implementation agreements have largely been treated as confidential, limiting public disclosure. The immediate priority at this phase is therefore interpretive clarity establishing within existing legal and regulatory frameworks what information must be proactively disclosed at each stage of the energy investment lifecycle, without requiring new legislation.

Phase 2: Framework adoption and sector customisation

As recommended in Section 5, adoption of the CoST Infrastructure Data Standard and OC4IDS should be formalised as the disclosure standard for energy infrastructure projects in Zambia. This adoption should be accompanied by energy-sector-specific extensions, capturing data points identified in this study as critical to mitigating integrity and performance risks but not fully addressed in the generic OC4IDS framework. These extensions are detailed in Annex 2 of this study. Framework adoption should be coordinated across the Ministry of Energy, ERB and ZESCO, given that each institution holds distinct but complementary data across the energy investment lifecycle, and fragmented adoption would replicate the very disclosure gaps this study identifies as a systemic constraint on sector governance

Phase 3: Capacity building and process integration

Capacity building must move beyond awareness-raising to hands-on integration of disclosure into project workflows. Disclosure quality improves significantly when officials understand how data is used for oversight and decision-making, rather than viewing it as a compliance burden.

Phase 4: Pilot implementation

The pilot phase translates the disclosure framework into practice. Drawing on the short-term priorities identified in Section 5.8, proactive publication of existing planning documents, procurement notices and contract summaries, standardised disclosure of basic PPA terms, application of CoST IDS templates and publication of high-level operational performance indicators by ZESCO and ERB the pilot should test disclosure requirements against real project data across the energy investment lifecycle, with particular focus on the project identification and financing stages where this study identifies integrity and performance risks as most acute. Findings should be used to refine templates, resolve cross-institutional data inconsistencies, and build the foundation for scale-up.

Phase 5: Scale-up and institutionalisation

Following refinement, disclosure requirements should be progressively embedded into the formal processes governing energy sector investment. The MoFNP ongoing development of standardised project prioritisation criteria identified in Section 5.1 provides a concrete entry point for integrating disclosure obligations at the earliest stage of the investment pipeline. ERB licensing and investment endorsement procedures and standard PPA and implementation agreement templates represent further institutionalisation anchors across the lifecycle.

Phase 6: Continuous monitoring and learning

Disclosure systems must be reviewed periodically to assess whether they are reducing integrity and performance risks, identified in the lifecycle risk matrix in Annex 1. Operational data published systematically by ZESCO and ERB should feed back into planning and procurement decisions, addressing the absence of feedback loops between infrastructure performance and future investment decisions that stakeholders consistently identified as a critical governance gap in Zambia's energy sector.

This assessment demonstrates that while Zambia has established a robust policy foundation for energy diversification and market reform, a persistent transparency gap remains a material constraint to sector performance and fiscal stability. The mapping of the energy investment lifecycle reveals that integrity and performance risks are most acute at the **Project Identification** and **Financing** stages, where discretionary decision-making and undisclosed contingent liabilities create long-term macro-fiscal exposures.

Improving sector outcomes requires moving beyond ad hoc disclosure toward a standardised, lifecycle-based approach aligned with OC4IDS, where the recommended data points identified in this study are not merely a compliance checklist but technical tools designed to:

1. **Reduce the cost of capital:** By providing financiers with the predictable, verified data needed for bankability assessments.
2. **Enable technical oversight:** Allowing academia and technical bodies to translate raw data into performance benchmarks for the public.
3. **Secure fiscal sustainability:** Ensuring that the Ministry of Finance and oversight bodies have full visibility into the long-term commitments embedded in PPAs and government guarantees.

The longer-term aspiration should be a dedicated operational transparency platform. Denmark's Energinet portal offers a useful reference point publishing real-time and historical data on generation mix, system losses, transmission capacity, and market prices in machine-readable formats accessible to regulators, investors, researchers, and the public alike. While Zambia's immediate institutional capacity may not support real-time disclosure of this kind, establishing the architecture for structured, periodic operational reporting is both feasible and necessary. Such a platform would strengthen regulatory oversight, support investor confidence, and provide the empirical foundation for evidence-based planning and procurement decisions going forward.

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Annex 1: Energy Infrastructure Lifecycle Risk–Data Mapping Matrix

Lifecycle Stage	Key Decision Point	Integrity / Performance Risk	Risk Consequence	Critical Data / Document (FIIP / CoST)	Primary Data Holder	Typical Disclosure Gap Identified by CoST	Relevant CoST Standard / Tool
Planning & Project Identification	Inclusion of generation or transmission projects in the IRP and national power system expansion planning	Undue influence; politically motivated project selection; weak justification; projects entering pipeline outside IRP sequencing	Misallocation of public resources; non-priority or non-viable projects approved	Demand forecasts, least-cost power system modelling, generation expansion scenarios, IRP planning assumptions	MOE	Project rationale and alternatives rarely published or published late	FIIP (Planning Integrity Indicators); CoST IDS (Project Identification)
Planning & Appraisal	Technical and economic appraisal of generation or transmission projects	Optimism bias; cost underestimation; risk understatement	Cost overruns; stranded or underperforming assets	Generation feasibility studies, grid impact assessments, resource assessments (hydrology, solar irradiation), economic least-cost analysis	Project financiers MOE, ZESCO planning units	Appraisal documents not disclosed or disclosed only in summary form	FIIP; CoST IDS (Preparation)
Financing & Structuring	Structuring of project finance arrangements and negotiation of PPAs.	Hidden contingent liabilities; opaque guarantees and subsidies	Long-term fiscal exposure; tariff distortions	PPAs, tariff structures, government guarantees, grid connection agreements, payment security mechanisms ~~s~~	Ministry of Finance; ZESCO; project financiers	Fiscal risk data not disclosed or treated as confidential	CoST IDS; IMF–aligned fiscal transparency principles

Procurement (Pre-Tender)	Design of competitive procurement for IPPs	Tailored tender requirements; limited competition	Reduced value for money; perception of favouritism	Request for Proposals (RFP), qualification criteria for IPP bidders, grid capacity information, project site data	MOE	Justification for procurement choices not disclosed	CoST Procurement Disclosure Guidance; OC4IDS
Procurement (Tender & Award)	Evaluation of IPP bids and selection of qualified power producer	Collusion; non-transparent evaluation; conflicts of interest	Inflated prices; weak contractors selected	Bid evaluation reports, tariff bids, financial models	MOE	Evaluation criteria and scores not disclosed	CoST IDS; OC4IDS; Beneficial Ownership disclosure
Contracting	Finalisation of PPAs and implementation agreements	Contract renegotiation without scrutiny; scope creep	Cost escalation; weakened accountability	Signed PPAs, government support agreements, grid connection contracts	ZESCO; Ministry of Finance; project financiers	Contracts and variations partially disclosed or not disclosed	CoST IDS (Contract)
Construction	Construction of generation facilities or transmission infrastructure	Weak oversight; quality compromise; delayed delivery	Time overruns; infrastructure defects	EPC contracts, construction progress reports, grid interconnection milestones	Project company; EPC contractor; implementing agency	Implementation data disclosed irregularly or not at all	CoST IDS (Implementation)
Operations & Maintenance	monitoring operational performance of generation assets	Poor performance masked by lack of data	Reliability issues; high lifecycle costs	Plant availability factors, forced outage rates, generation dispatch data, system losses	ZESCO system operator; generators; ERB	Performance data rarely disclosed systematically	CoST IDS (Operation)
Cross-cutting	Regulatory oversight of tariffs and service performance	Fragmented responsibilities; weak citizen oversight	Persistent integrity failures	Tariff review decisions, cost-of-service studies, system reliability reports	ERB	Oversight outputs not disclosed or hard to access	CoST Assurance Framework

Annex 2: Priority Energy Sector Disclosure Data Points

Lifecycle Stage	Data Point	Definition (OC4IDS meaning)	Energy-Sector Application (Generation vs Transmission)	Integrity / Performance Risk Addressed	Relevant CoST / FIIP Link/Study link/Validation workshop
Planning & Project Identification	**Project title**	Official name assigned to an infrastructure project in the disclosure dataset.	Identifies individual generation plants or transmission infrastructure projects in national plans.	Projects appearing in policy documents without clear identification or traceability.	CoST IDS – Project Identification
	Project description	Narrative description outlining the purpose and scope of the project.	Generation: describes plant construction or expansion. Transmission: describes grid reinforcement or interconnection.	Politically motivated or poorly justified project selection.	FIIP Planning Indicators
	Project sector	Sector classification to which the project belongs.	Allows filtering of electricity generation and transmission investments within infrastructure datasets.	Misclassification or incomplete reporting of energy investments.	CoST IDS – Project Identification
	Project location	Geographic location where the project is implemented.	Generation: plant site location. Transmission: route of transmission lines or substations.	Environmental or community conflict due to poorly disclosed siting decisions.	FIIP Planning Indicators
	Needs analysis	Assessment of the gap between existing supply and projected demand that demand justifies the project.	Generation: justification of capacity addition against demand forecasts and IRP targets. Transmission: justification of grid expansion against load growth projections.	Politically motivated project selection without evidence base; misalignment with actual demand	FIIP Planning Indicators; validated by workshop participants (Group 2)
	Alignment with national planning instruments	Documented alignment of the project with the IRP, National Energy Policy, RESAP and the 8th National Development Plan.	Generation and transmission: confirms project is consistent with least-cost planning and national development priorities.	Projects entering pipeline outside IRP sequencing; misalignment with national development priorities.	FIIP Planning Indicators; CoST IDS-Project Identification; validated by workshop participants (Groups 1 and 2)

Feasibility & Appraisal	**Planning budget amount**	Estimated total project budget during the planning stage.	Generation: projected plant construction costs. Transmission: estimated grid expansion costs.	Optimism bias and cost underestimation.	FIIP Appraisal Indicators
	Planning budget currency	Currency used to report the project budget estimate.	Relevant where power projects rely on imported equipment or foreign financing.	Hidden exchange-rate exposure in project financing.	FIIP Appraisal Indicators
	Cost-benefit analysis	Economic assessment of project costs against projected benefits over the full project lifecycle.	Generation: economic justification for technology choice and capacity addition. Transmission: justification for grid expansion against demand projections.	Weak project justification; inadequate basis for least-cost planning; optimism bias at appraisal stage.	OC4IDS Sustainability Module – Economic and Financial; evidenced in Section 5.1 of this study
	Climate and disaster risk assessment	Assessment of climate variability, hydrological risk and disaster vulnerability affecting project viability.	Generation: hydrological risk for hydro projects; solar irradiation variability; drought vulnerability. Transmission: climate vulnerability of grid infrastructure.	Inadequate planning for climate-related shocks; hydropower vulnerability to drought undisclosed in project appraisal.	OC4IDS Sustainability Module
	Environmental and social impact	Assessment of the environmental and social consequences of the project including land use, displacement and community impacts.	Generation: EIA findings, land use impacts, community displacement. Transmission: right-of-way impacts, resettlement requirements.	Social harm and environmental non-compliance; inadequate mitigation planning.	CoST IDS - Preparation Stage (proactive element 9)
	Land and resettlement impact	Assessment of land acquisition requirements and resettlement obligations associated with the project	Generation: customary land negotiations, compensation arrangements for affected communities. Transmission: right-of-way acquisition and community displacement	Disputes over land rights and compensation; community opposition delaying implementation.	CoST IDS- Preparation Stage (proactive element 10)
	documents.url (planning stage)	Public link to planning-stage documents associated with the project.	Enables disclosure of feasibility studies, resource assessments, and grid planning reports.	Lack of transparency in project appraisal.	CoST IDS - Preparation Stage

	Resettlement and compensation plan	Documented plan for resettlement of displaced communities and compensation arrangements.	Generation: community resettlement plans for plant siting on customary land. Transmission: right-of-way compensation arrangements	Inadequate compensation; community disputes delaying implementation; violations of customary land rights.	OC4IDS - Reactive element 4; validated by workshop participants (Group 1
Procurement	**Tender procurement method**	Method used to procure a contract (e.g., open tender, limited tender, direct award).	Generation: independent power producer procurement or negotiated projects. Transmission: EPC contracts for grid infrastructure.	Non-competitive procurement.	CoST IDS – Procurement
	Tender number of tenderers	Number of bidders submitting tenders in the procurement process.	Indicates level of competition in power plant or transmission construction tenders.	Collusion or restricted competition.	CoST IDS – Procurement
	Tender status	Current status of the procurement process (e.g., active, cancelled, complete).	Tracks transparency of procurement outcomes in electricity infrastructure projects.	Procurement manipulation or unexplained cancellations.	CoST IDS – Procurement
	Procurement plan aligned with IRP	Documented procurement plan confirming alignment of planned procurement activities with the IRP and national energy planning instruments.	Generation: confirms IPP procurement is sequenced in accordance with least-cost planning. Transmission: confirms grid expansion procurement aligns with system needs	Non-competitive procurement driven by political priorities rather than planning rationale.	CoST IDS - Procurement; validated by workshop participants (Group 2)
	Tender evaluation results	Results of the evaluation of bids including scores, ranking and award rationale.	Generation: IPP bid evaluation scores and tariff bid outcomes. Transmission: EPC contractor evaluation results and award rationale	Non-transparent evaluation; conflicts of interest in award decisions; inability to assess value for money.	OC4IDS - Reactive element 11
Contracting	**Award value amount**	Monetary value of the contract awarded to the successful bidder.	Generation: value of plant construction contracts or concessions. Transmission: EPC contract values for grid infrastructure.	Inflated contract values.	CoST IDS – Contract Award

	Contract period start Date	Date when the contract becomes effective.	Indicates start of construction or operational phase for energy infrastructure.	Unclear project timelines.	CoST IDS – Contract
	Contract period end Date	Date when the contract ends or expires.	Generation: concession or operational agreement duration. Transmission: construction contract duration.	Hidden long-term obligations.	CoST IDS – Contract
	Variation to contract price, duration and scope	Any change to the originally agreed contract price, duration or scope including escalation, renegotiation and variations.	Generation: PPA renegotiations and EPC cost escalation. Transmission: variation orders on grid construction contracts	Cost escalation and scope creep without accountability; renegotiation undermining initial procurement integrity.	OC4IDS – Proactive elements 29, 31 and 32
	Reasons for price, duration and scope changes	Documented justification for any variation to contract price, duration or scope.	Generation and transmission: formal justification for all contract variations and renegotiation	Cost overruns and scope changes without transparency or accountability.	OC4IDS - Proactive elements 33 and 34
	M&E framework	Monitoring and evaluation framework defining performance indicators, reporting obligations and review mechanism	Generation: performance indicators for plant availability, dispatch and PPA compliance. Transmission: performance indicators for grid reliability and system losses.	Absence of structured performance monitoring enabling underperformance to go undetected.	CoST IDS – Contract; validated by workshop participants (Group 2)
Financing	**Finance funders**	Organisations providing financial support for the project.	Generation: lenders or equity investors in power plants. Transmission: public finance institutions or development banks.	Hidden financing arrangements.	CoST IDS – Finance
	Finance amount	Amount of financing contributed by each funding organisation.	Reveals scale of financial exposure associated with electricity infrastructure projects.	Undisclosed fiscal exposure.	CoST IDS – Finance
	Lifecycle cost	Full cost of the project over its operational life including construction,	Generation: full cost over PPA duration including O&M and decommissioning.	Hidden long-term fiscal obligations; optimism bias	OC4IDS Sustainability Module – Economic and Financial;

		operations, maintenance and decommissioning.	Transmission: full cost of grid infrastructure including maintenance and eventual replacement.	through underestimation of total project cost.	evidenced in Sections 3 of the study
Construction / Implementation	**Implementation start Date**	Date when construction or implementation begins.	Generation: start of power plant construction. Transmission: start of line or substation works.	Project delays and weak oversight.	CoST IDS – Implementation
	Implementation end Date	Planned or actual completion date of project implementation.	Indicates when generation or transmission of assets become operational.	Cost overruns and schedule delays.	CoST IDS – Implementation
	Disbursement records and payment certificates	Records confirming payments made to contractors and developers at agreed milestones.	Generation: milestone payments under PPAs and EPC contracts. Transmission: payment certification for grid construction milestones.	Payment delays to IPPs triggering penalty provisions and interest charges; absence of accountability for offtaker payment failures.	OC4IDS – Reactive element 19; validated by workshop participants (Group 1)
	Contract performance data	Data on actual performance of contractors and developers against contractual obligations during construction.	Generation: EPC contractor performance against construction milestones and quality standards. Transmission: grid construction contractor performance.	Quality compromise and cost escalation masked by absence of structured performance tracking.	CoST IDS – Implementation; identified as most critical missing data point by validation workshop
Operations & Oversight	**parties.name**	Name of organisations participating in the project.	Identifies utilities, developers, contractors and financiers in energy infrastructure projects.	Hidden project actors.	CoST IDS – Project Parties
	Parties roles	Role played by each organisation involved in the project.	Distinguishes developers, contractors, utilities and financiers across generation and transmission infrastructure.	Accountability gaps in project governance.	CoST IDS – Project Parties
	documents.url (contract or implementation)	Public link to key project documents such as contracts or reports.	Enables public access to contracts, regulatory approvals or monitoring reports.	Limited access to project information.	CoST IDS – Disclosure

	Performance monitoring	Structured publication of operational performance data against contractual and regulatory benchmarks.	Generation: plant availability, forced outage rates, dispatch data and PPA compliance. Transmission: system losses, grid reliability indicators and capacity utilisation.	Underperformance masked by absence of structured data publication; weak feedback loops between operational outcomes and future planning decisions.	OC4IDS Sustainability Module – Institutional; evidenced in Section 3.6 of this study
	Lobbying transparency	Records of stakeholder engagement, pre-decision consultations and representations made to decision-makers regarding energy projects.	Generation and transmission: disclosure of who engaged with decision-makers, on what basis and with what outcome.	Undue influence and regulatory capture; absence of transparent records of who influences decisions and on what basis.	OC4IDS Sustainability Module – Institutional
	Maintenance plan or programme	Documented plan for operations and maintenance of the asset over its operational life.	Generation: O&M obligations and arrangements under PPA. Transmission: grid maintenance programme and scheduling	Underperformance of assets; high lifecycle costs; unreliable supply due to inadequate maintenance planning.	OC4IDS Sustainability Module – Economic and Financial; evidenced in Section 3.6 of this study
Integrity & Accountability	**Beneficial Ownership (contracting party)**	Disclosure of the beneficial owners of companies awarded infrastructure contracts.	Applies to contractors involved in plant construction or transmission infrastructure development.	Corruption risks and hidden ownership structures.	CoST Beneficial Ownership Standard
Additional Energy-Specific Data Points (Sector Extension)	**Generation capacity MW**	Installed electricity generation capacity of a power plant measured in megawatts.	Generation infrastructure only.	Allows tracking of national generation expansion and potential overcapacity.	Energy-sector extension to OC4IDS
	Generation technology	Type of electricity generation technology used (e.g., hydro, coal, solar, wind).	Generation infrastructure only.	Critical for assessing environmental impact and carbon intensity, climate vulnerability and technology diversification.	Energy-sector extension to OC4IDS
	Rural electrification master plan alignment	Documented alignment of the project with the rural electrification	Generation and transmission projects in rural or peri-urban areas.	Projects advancing without alignment to electrification priorities; uneven	Validated by workshop participants (Group 1)

		master plan and REA investment priorities.		distribution of energy access benefits.	
Contracting	**PPA tariff structure and Indexation**	Tariff rate agreed under PPA including base tariff, indexation mechanism and currency denomination.	Generation infrastructure only.	Enables assessment of whether tariffs reflect competitive market rates and how obligations escalate over PPA duration.	As discussed in the study under section 3.
	Firm vs non-firm PPA status	Classification of PPA as firm (guaranteed dispatch) or non-firm (subject to curtailment).	Generation infrastructure only.	Enables assessment of take-or-pay exposure, curtailment risk and fiscal obligations triggered by grid constraints.	The study identified as one of the most consequential yet least visible governance features of Zambia's power sector
	Capacity payment obligations	Fixed payments owed to a generator to ensure availability regardless of actual dispatch	Generation infrastructure only.	Reveals unconditional fiscal obligations assumed by ZESCO and the State under PPAs irrespective of electricity offtake	Section 3.4: ZESCO debt to IPPs exceeded US$1.1 billion partly driven by capacity payment obligations
	Government guarantees and contingent liabilities	Explicit government guarantees and implicit contingent liabilities arising from PPAs and financing arrangements.	Generation infrastructure; relevant to transmission where public financing is involved.	Reveals full fiscal exposure of the State arising from energy sector commitments; essential for debt sustainability assessment.	This is in instances when the government provides guarantees.
	Additional interest on outstanding debts	Interest charges accruing on delayed payments to IPPs and contractors under PPAs and construction contracts.	Generation infrastructure: interest obligations arising from ZESCO payment delays to IPPs.	Hidden accumulation of fiscal liabilities through delayed payments; understatement of true cost of energy sector obligations.	Section 3.4: interest costs exceeded US$85 million in 2023; validated by workshop participants (Group 1)
Operations &Maintenance	**Electricity off taker**	Entity purchasing electricity produced by a generation project.	Generation projects supplying industrial users or utilities.	Reveals direct supply agreements with mining companies in open-access markets.	Energy-sector extension

	Electricity revenue	Revenue generated from electricity sales by utilities or generators.	Relevant for both generation companies and transmission utilities.	Improves transparency in electricity markets and financial performance of utilities.	Energy-sector extension
	Grid connection terms and wheeling charges	Terms and charges applicable to third-party access to transmission and distribution infrastructure under Open Access.	Transmission infrastructure; relevant to generation projects requiring grid connection.	Enables market participants to assess real cost of grid access; critical for bankability of independent generation projects.	Open Access reforms contingent on transparent disclosure of grid capacity and connection
	Hydrological and climate risk assessment	Assessment of hydrological variability, drought risk and climate change impacts on generation output.	Generation infrastructure (hydro) primarily.	Reveals vulnerability of generation portfolio to climate shocks; essential for stress-testing planning assumptions.	The vulnerabilities have been witnessed in instances there had been droughts.