COP27 POLICY BRIEF SERIES

The market environment for enabling growth of clean energy in Zambia

Bothwell Batidzirai [1*], Bernard Tembo [2], Meron Tesfamichael [3], James Dixon [4], John Hine [5], Samuel Fankhauser [6], and Stephanie Hirmer [7]

Summary

Zambia is committed to meeting sustainable energy for all and contributing to climate change mitigation by scaling up clean energy. To facilitate this transition, Zambia has created an enabling environment for clean energy investment. However, these reforms are still to translate into increased investments. Through rapid evidence review and stakeholder interviews, this brief critically examines the efficiency of the interlinked energy project development stages and processes, and corresponding policies and regulations, plus the actors involved and their roles. We identified several institutional and structural factors related to the energy market that hinder the growth of clean energy. These include procedural challenges such as licencing and permitting and the absence of a truly open-access grid regime.

Key Policy Recommendations

- Zambia's energy policies need to be operationalized and refined in practice to have the desired impact on clean energy investments.
- There is a need to restructure power sector institutions and adjust electricity tariffs to improve the performance of the sector.
- There is a need for a truly open-access market regime and regulations including a transmission pricing methodology that guarantees equal access to the grid for all actors.
- Zambia's Power Development Framework (ZPDF) should be revised to reduce project risks and check for consistency with other national regulations.

PHOTO: JOSEPH SANDALA / PIXABAY

The views expressed in this material do not necessarily reflect the UK government's official policies.

Introduction

Access to sustainable modern energy services is still limited in Zambia. The national average electrification rate is estimated to be only 32% [1]. Less than 10% of the rural population have access to electricity [2]. The Zambian government has committed to creating an enabling environment to increase investment in clean energy and expand modern energy infrastructure [3]. This enabling environment is expected to facilitate low-carbon economic development and contribute to climate change mitigation globally. Further, the national target is to increase rural electrification to 51% by 2030 [4]. This target is in line with the country's development objectives as articulated in the successive National Development Plans and Vision 2030 that sets out a plan to make Zambia a middle-income country by 2030 [5].

To support these targets, Zambia has been enhancing its policies, regulations, and institutions. These include the National Energy Policy (2019), the Renewable Energy Feed-in Tariffs (REFiT), the Grid Code, the Distribution Grid Code, and the mini-grid regulations. The Energy Regulation Act No. 12 of 2019 and Electricity Act No. 11 of 2019 were also enacted to improve private sector participation. In addition, various programmes including Beyond the Grid Zambia, Scaling Solar, and the Global Energy Transfer Feed-in Tariffs for Zambia (GET-FiT) have been initiated to support the effort. Further, Zambia's Power Development Framework (ZPDF) [6] has been developed to improve processes and procedures in the sector. The document outlines the processes under which power projects are to be developed and provides a procurement and regulatory guideline for both private and public sector initiated power development projects.

Despite developing and enacting various progressive policies and regulations, these interventions are yet to translate into increased clean energy investments.

The aim of this policy brief is therefore to evaluate the current energy project development processes and corresponding policy and regulatory instruments in Zambia as they relate to ZPDF. The brief also outlines insights into the challenges that the sector faces regarding the adequacy and efficiency of the project development process.

Methodology

We conducted a review of the literature on the current energy sector governance structure in Zambia. The study combined a rapid evidence review with stakeholder mapping through stakeholder consultation. A workshop with 17 stakeholders (given in **Table 1** below) helped to map key steps and processes in energy project development and identify corresponding institutions and regulations that govern events at each stage.

CATEGORY	# OF INTERVIEWEES	ABBREVIATION IN TEXT
National government (Energy)	4	NG
Energy Regulator	3	CG
Academia/ Research Org	3	NGO
Other Govt Agencies	1	ONG
Private sector	5	PS
Donor	1	DN

Table 1: Participants by category

Anonymous quotes are inserted to support the points made in the text.

Governance

Under the stewardship of the Ministry of Energy (MoE), the electricity market in Zambia is structured as a single-buyer model with the national utility, ZESCO Limited, acting as the de facto off-taker (single buyer of generated power) and bulk retailer. Independent power producers (IPPs) sell electricity to ZESCO through Power Purchase Agreements (PPAs). An Office for Promoting Private Power Investments (OPPPI) links Government and private investors while the sector regulation falls under the Energy Regulation Board (ERB). The Rural Electrification Authority (REA) provides power infrastructure in rural areas. Several other public bodies are also involved in the regulation of power project development.

Zambia's power sector has been dominated by hydropower, accounting for over 80% of installed generation capacity. However, a non-hydro renewable energy market is gradually emerging with a focus on solar PV. This is mainly driven by private sector commercial interests and a proactive government effort to diversify the national energy mix and ensure energy security. Between 2002 and 2022, thirteen grid connected power plants were commissioned and operationalized (**Table 2**). Of those, nine were developed by private investors or under public–private partnership (PPP) arrangements, while the rest are owned by ZESCO. In addition, several mini-grids have been built over the last few years.

"The Zambian government has committed to creating an enabling environment to increase investment in clean energy and expand modern energy infrastructure."

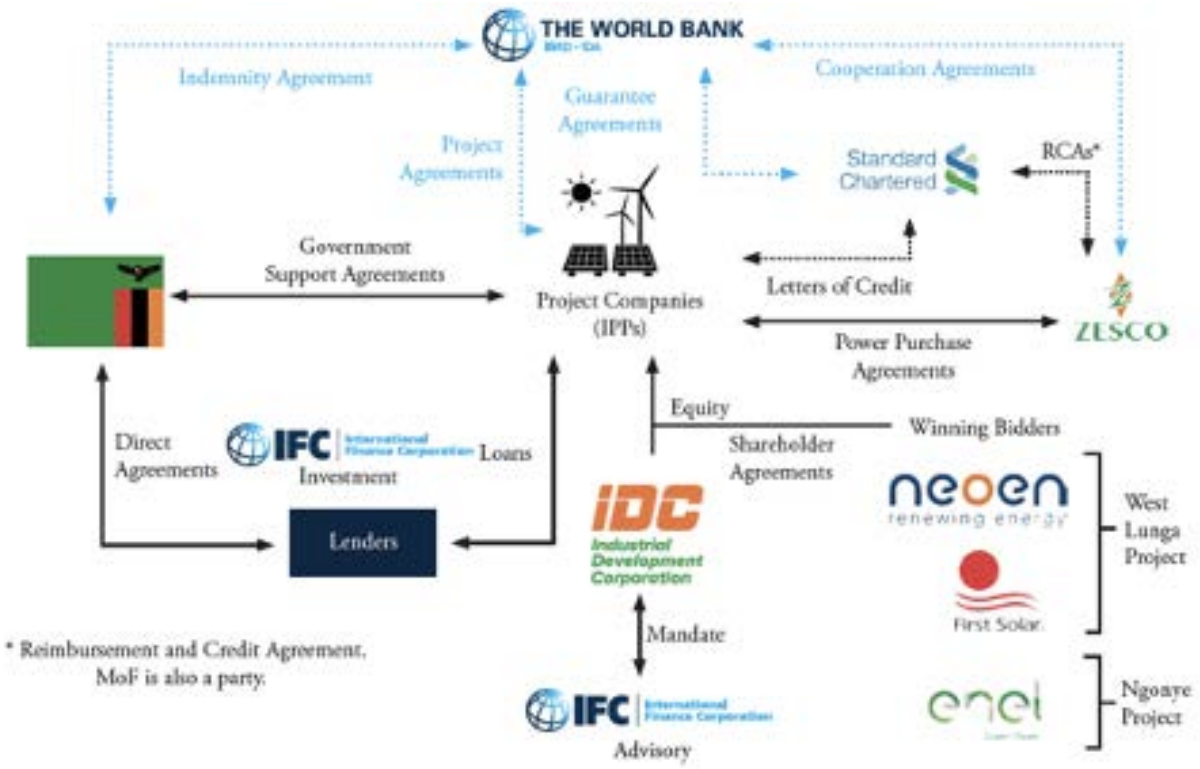
STATION	TECH	CAPACITY (MW)	COMMISSIONED
Public sector (ZESCO) investments			**525.8 MW**
Shang'ombo	D	1	2008
Kariba North (ext)	H	360	2013
Lunzua River	H	14.8	2015
Kafue Gorge Lower	H	150	2020
Private sector (IPPs) investments			**477 MW**
Mulungushi	H	32	2009
Lunsemfwa	H	24	2012
Kankoyo	D	10	2012
Ndola	HFO	110	2013–2017
Maamba	C	300	2015
Riverside	S	1	2018
Public–Private partnership investments			**208 MW**
Itezhi-tezhi	H	120	2016
Ngonye	S	34	2019
Bangweulu	S	54	2019
CUMULATIVE CAPACITY INVESTMENTS			**1,210.8 MW**

Table 2: Summary of recent power projects (as of April 2022). Where H=Hydro, S=Solar, D=Diesel, HFO=[Heavy Fuel Oil], C=[Coal]. Sources: [5, 7]

Results & Discussion

Although Zambia has created an enabling market environment for clean energy projects, the interest and momentum which has been created over the last decade has not translated into rapid growth of the sector. For instance, the Scaling Solar programme (see Case Study below: **Box 1**) was initiated in 2015 and aimed to establish 600 MW of grid connected Solar power plants. But only 88 MW capacity has been installed to date, and the World Bank cancelled the programme's second round due to concerns about ZESCO's insolvency. ZESCO's financial challenges are a long-term result of electricity tariffs that are not cost reflective. Furthermore, IPP projects awarded under the GET-FiT programme are in limbo as developers have

been unable to secure funding and sign PPAs with ZESCO. Discussions with stakeholders also highlighted structural challenges and bottlenecks in relation to **poor macroeconomic conditions and the monopoly** of ZESCO. Moreover, although on paper Zambia has good policies and regulations, these need to be further refined and actioned to create impact.



***Box 1:** Scaling Solar programme case study*

The Scaling Solar programme aimed to rapidly develop privately owned solar PV projects in Zambia. It was designed to use a range of World Bank resources and services. The Bank took a 'one-stop-shop' approach to provide advisory services, standardized contracts, and concessional financing[1], guarantees and insurance to accelerate and expedite private investments (see Figure 1). These 'best practice' elements offered the Government a standardized, straightforward solar PV procurement model with significant multilateral backing that translated into low tariffs and rapid project implementation. However, the inability of ZESCO to sign new PPAs with IPPs affected the implementation of the second round of this programme.

***Key:** MOF – Ministry of Finance; IDC – Industrial Development Corporation*

SOLICITED AND UNSOLICITED PROCUREMENT PATHWAYS

The ZPDF provides two different procurement processes for solicited and unsolicited energy projects. The focus of this brief is on unsolicited projects. On the surface, it appears that the private sector (unsolicited) approach is quicker and more straightforward. However, stakeholders expressed reservations about the current process: more specifically, issues around the need to reach an agreement with ZESCO and the risks that are associated with its dominance of the market.

[1] Pre-arranged financing package offered to potential bidders for an acquisition.

> *Most developers would rather have ZESCO as the off-taker and prefer to have the No-Objection from ZPPA as they feel more secure* (NG OFFICIAL)

Although ZESCO is the preferred off-taker for developers (compared to providing services to end users directly), the poor financial state of the utility company also represents another form of risk for developers[2].

VALUE OF 'NO OBJECTION' PROCEDURE

Developers within the private sector also expressed concerns about unnecessary steps in the procurement process that risk hindering projects from happening. This specifically refers to the requirement to obtain a 'no objection" from the Zambia Public Procurement Authority (ZPPA) before a developer can sign an implementation agreement with the Ministry of Energy. For others, however, the 'no objection' endorsement from ZPPA is a welcomed step as it is seen to reduce project risks.

> *Financiers assess project risks to determine if projects are bankable; especially regulatory risks for things like permits should be in place and an off-taker must be identified, otherwise the project is not bankable* (NG OFFICIAL)

In practice, the Ministry of Energy offers to expedite some projects by removing the obligation, even though this is a requirement under the ZPDF regulations.

OPERATIONALIZING EXISTING REGULATIONS

Other observations made by stakeholders point to the need to review and fully operationalize some of the recent rules and regulations.

BANKABILITY STAGE

Establishing project bankability is identified as an important stage in the project development cycle as this determines whether financing can be secured for the project. Bankability is determined by financiers who evaluate project risks.

> *Even though open grid access is provided to in the Electricity Act, this in is not guaranteed in practice as access is subject to ZESCO authorization* (PS OFFICIAL)

To reduce project risks, the current ZPDF framework needs to be reviewed to ensure bankability is established when technical, legal, and commercial project issues have been addressed. It is also important to ensure the ZPDF is consistent with other national regulations.

OPEN ACCESS REGIME

It was also noted that while the regulatory framework and processes are well developed, in practice, the structure of the power sector still provides obstacles to IPPs. For instance, stakeholders noted that even though the Electricity

[2] This is attributed to electricity tariffs that are not cost-reflective

Act of 2019 provides an open-access regime to the national grid, this access is not guaranteed to IPPs.

INDEPENDENT SYSTEM OPERATOR

Also, although ERB issued a system operator licence to the National Control Centre (NCC), the NCC is effectively a part of ZESCO and therefore not independent in its dispatch and control of the system.

A truly independent system operator supported by clear open-access regulations would enable fair and non-discriminatory dispatch and coordination of the wholesale electricity market trading. This should be accompanied by a clear transmission pricing methodology to guide the market.

Recommendations

Zambia has improved its energy sector policies, regulations and institutions to create a better environment for investment in clean energy and support sustainable development. However, while these reforms are welcome, there are several areas that need to be improved, fine-tuned, and tested in practice to achieve impact. These include the following:

- **Restructuring** of power sector institutions and rationalizing electricity **tariffs** to improve the technical and financial performance of the power industry, especially the national power utility ZESCO.
- Developing a truly **open-access market** regime and regulations, accompanied by a ring-fenced independent power systems operator.
- Developing a **transmission pricing methodology** to guarantee equal grid access to all market participants, including IPPs.
- Revising Zambia's Power Development Framework (ZPDF) to reduce project risks by ensuring Independent Power Producers (IPPs) engage with ZESCO early in the project development process
- Revising the ZPDF to ensure that bankability is established after all permits and approvals have been secured.
- Reviewing the ZPDF framework to check for consistency with other national regulations.

References

[1] ZamStats. 2018. Zambia Demographic and Health Survey 2018. Lusaka. Available at: https://dhsprogram.com/pubs/pdf/FR361/FR361.pdf.

[2] Ministry of Energy (MoE), 2020. The National Woodfuel Study 2017. Ministry of Energy, Lusaka.

[3] Ministry of Energy (MoE), 2019. Zambia SE4ALL Action Agenda. Sustainable Energy for All Initiative. Ministry of Energy, Lusaka. Available at: https://rise.esmap.org/data/files/library ambiaa/Documents/Energy%20Efficiency/Zambia_SEforALL%20AA.pdf.

[4] Ministry of Energy (MoE), 2017. Ministry of Energy Strategic Plan 2018 – 2021. Ministry of Energy, Lusaka. Available at: https://www.moe.gov.zm/irp/?wpdmpro=ministry-of-energy-strategic-plan-for-the-period-2018-2021-2.

[5] Ministry of Energy (MoE). 2022. Renewable Energy Strategy and Action Plan for Zambia. Lusaka, Zambia.

[6] Ministry of Energy (MoE). 2020. The Zambia Power Development Framework (ZPDF). Ministry of Energy, Lusaka.

[7] Energy Regulation Board (ERB). 2020. The Energy Sector Report 2019. Lusaka. Available at: https://www.erb.org.zm/wp-content/uploads/files/esr2019.pdf.

[8] Kruger, W. and Eberhard, A. July 2019. Zambia Country Report. Report 4: Energy and Economic Growth Research Programme (W01 and W05). UCT-GSB/Energy & Economic Growth/UK Aid. Available at: https://www.gsb.uct.ac.za/files/Zambia_Country_Report.pdf.

ACKNOWLEDGEMENTS:

Dr Stephanie Hirmer (Oxford University) and Prof. Jim Watson (University College London) have led the curation of this policy brief series. The policy briefs underwent an anonymous (double blind) peer-review process. They were edited by Simon Patterson (Loughborough University) and designed by Sarel Greyling (Sarel Greyling Creative).

This material has been produced under the Climate Compatible Growth (CCG) programme, which brings together leading research organizations and is led out of the STEER centre, Loughborough University. CCG is funded by UK aid from the UK government. However, the views expressed herein do not necessarily reflect the UK government's official policies.

AUTHOR INFORMATION:

[1]***Bothwell Batidzirai*** (Independent Consultant): Methodology, Data Curation, Writing - Original Draft.

[2]**Bernard Tembo** (Independent Consultant): Methodology, Investigation, Writing – Original Draft

[3]**Meron Tesfamichael** (University College London): Conceptualization, Methodology, Project administration, Writing - Original Draft

[4]**James Dixon** (University of Oxford): Investigation, Writing – Original Draft

[5]**John Hine** (University of Oxford): Conceptualization, Writing - Review & Editing

[6]**Samuel Fankhauser** (University of Oxford): Conceptualization, Writing - Review & Editing

[7]**Stephanie A. Hirmer** (University of Oxford): Conceptualization, Investigation, Writing – Original Draft, Funding acquisition

*Corresponding Author: ***[bbatidzirai@gmail.com]***

CITATION: Batidzirai B., Tembo, B., Tesfamichael, M., Dixon, J., Hine, J., Fankhauser, S., and Hirmer, S. (2022). The market environment for enabling growth of clean energy in Zambia. Climate Compatible Growth Programme COP27 Policy Brief Series (Version 1). Available at: https://doi.org/10.5281/zenodo.7107853.