Securing Africa's Energy Future: Building Robust Energy Security Data Systems -AFREC-IEA Joint Webinar

Presentation On Energy Security Data In Zimbabwe

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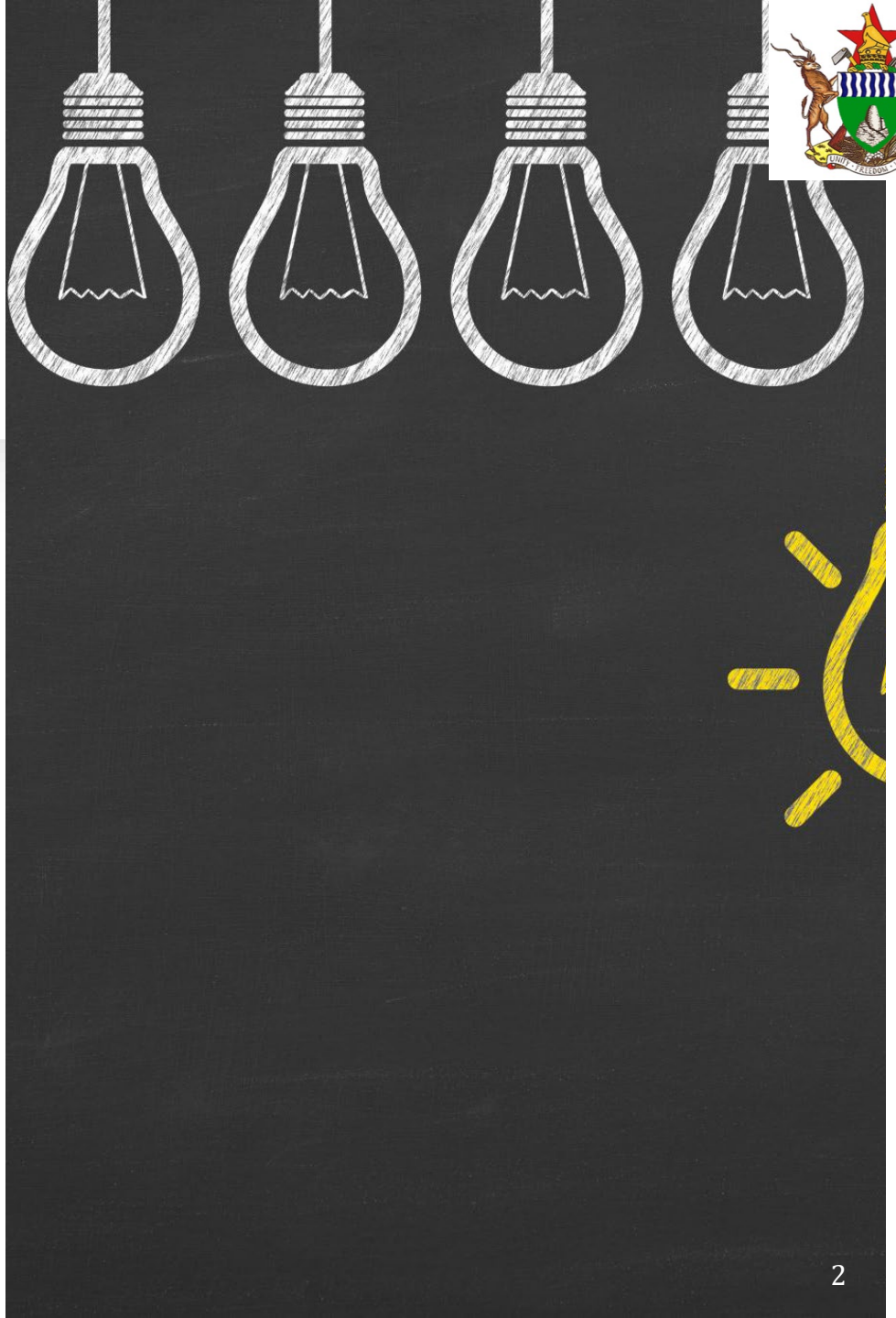
Presentation Outline

- Energy Situation in Zimbabwe
- Energy Availability Indicators
- Energy Accessibility Indicators
- Energy Efficiency Indicators
- Energy Security Governance Indicators
- Energy Supply Chain Resilience Indicators
- Conclusion



ENERGY SITUATION IN ZIMBABWE

Zimbabwe is a net importer for its energy requirements. Explorations for oil and gas are currently being done.

Oil and LPG are imported as the country doesn't have a refinery and has an Average daily consumption rate of 2 million litres petrol, 3.5 million litres diesel and 200 tons LPG. The country imports an average of 2,692 tonnes of LPG per week

The **main sources of energy** used in Zimbabwe are:-

Fuel wood (65%),

- Coal (7%),
- Liquid fuels (17%)
- Electricity (8%) (Final Consumption **Energy balance** 2023).

National electricity access is at 62%,

on-grid - 34%
off-grid - 28% (Zimstats 2022)

Main sources of electricity to total installed capacity:-

coal contributing 56% of the total installed capacity,
hydropower 37% ,
4% solar systems and 3% biomass.

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Energy Availability Indicators

Total energy production (renewable and non-renewable**)** 10455.77 ktoe

•Battery Energy Storage Systems (BESS): The country is promoting the development of a utility scale BESS as complimentary investment for management of increased variable renewable energy systems and several companies have submitted bids to build BESS.

GoZ has petroleum storage tanks in Beira with a capacity to store 95 million litres fuel, Feruka has capacity of 118.4 million litres, Msasa 53.8 million, Mabvuku 360 million, Beitbridge 2 million litres and ethanol storage is 2million litres

•Natural gas and CBM reserves: Enhance exploration and quantification of gas reserves.

Energy Import Dependency: for 2023 was 14% this is because Zimbabwe imports all of its oil and gas products as we don't have a refinery

•Proportion of energy imports (oil 83.1%, gas 6.3%, electricity 8.6%)

•There is Import diversification as Zimbabwe imports its electricity mainly from Mozambique, South Africa and Zambia and as for the Oil it is imported from various countries and uses the port in Beira where it will be stored before being pumped into the pipeline to Zimbabwe. Some fuel is also imported by road or rail from South Africa and Mozambique

•Infrastructure is vulnerable eg Kariba Hydro with an installed capacity of 1050MW but is now generation only around 500MW thus the country is now also advocating for clean coal technologies for power generation as the base load

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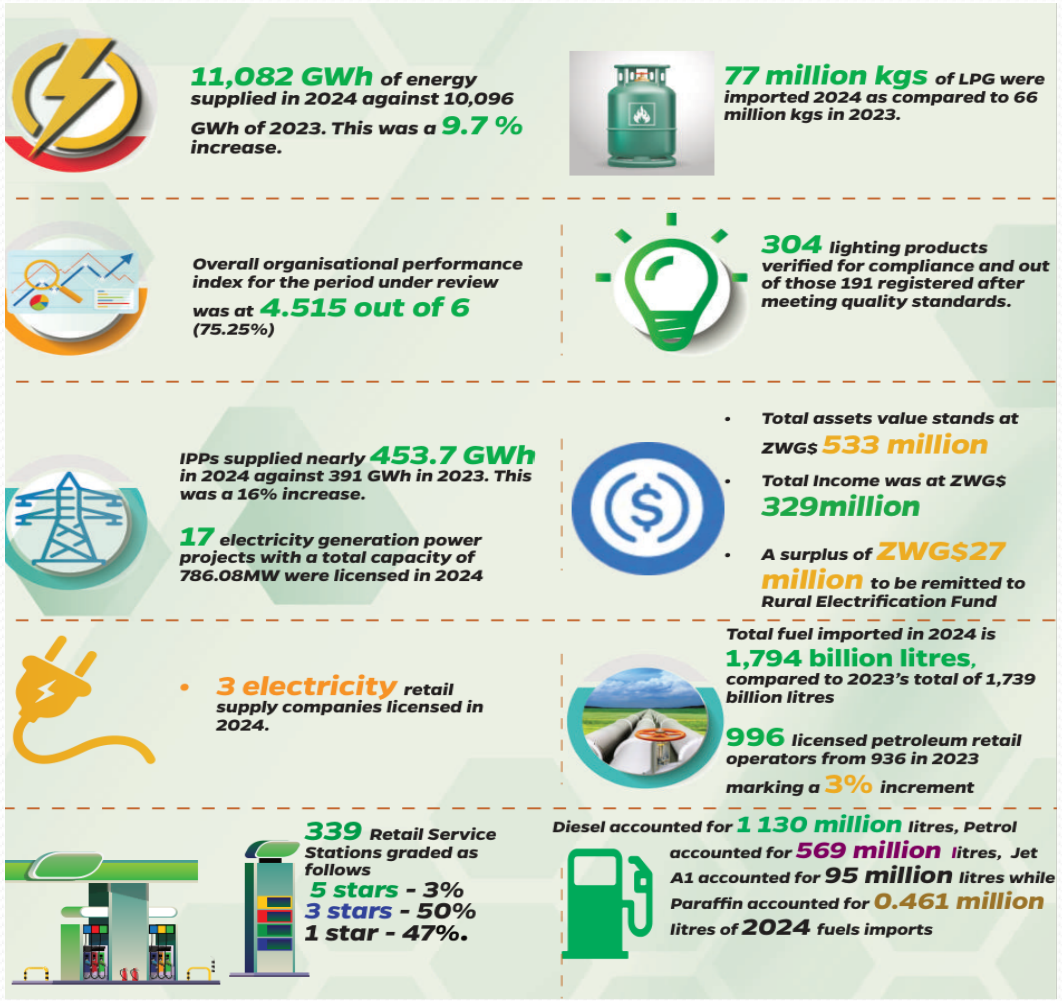
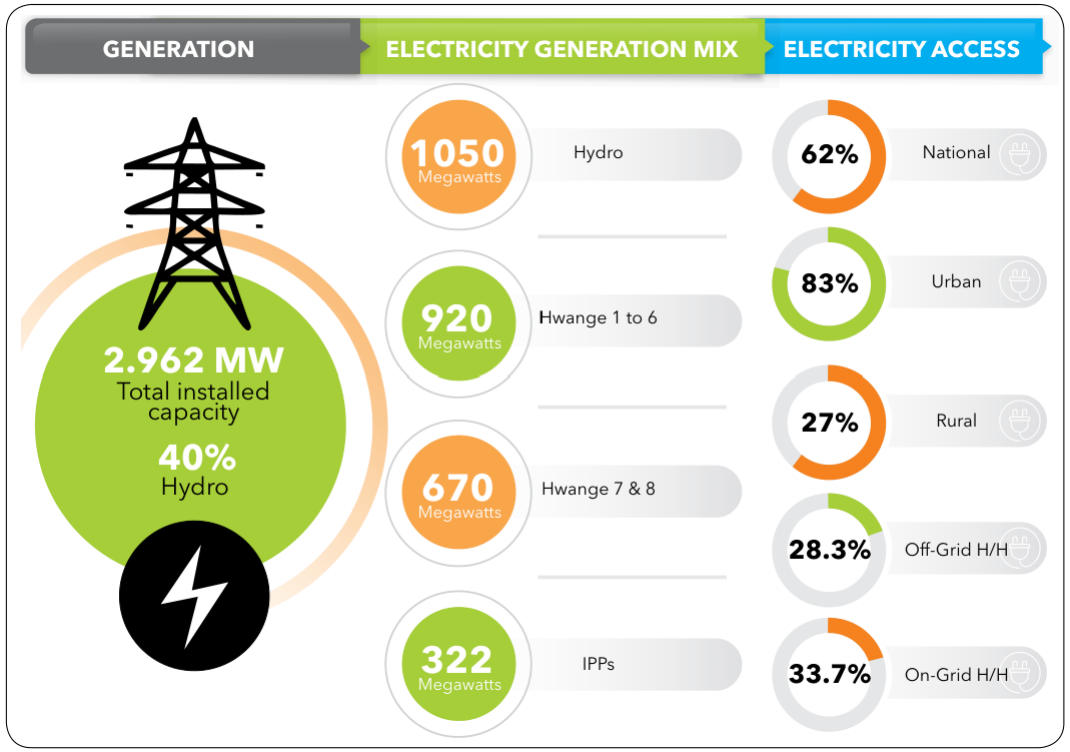
Energy Availability indicators





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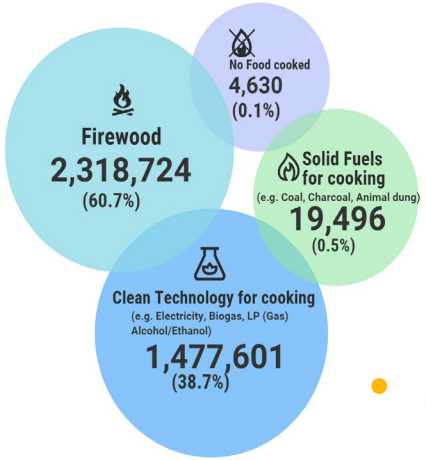
Energy Availability Indicators…

- ZPC's installed generation capacity is 2,640MW (Kariba – 1,050MW, Hwange 1 to 6 – 920 MW, and Hwange 7&8 – 670MW).
- The dependable capacity is between 1,200MW and 1,600MW. The national installed electricity generation capacity for both on-grid and off-grid is 2,962MW, with large hydro contributing 1,050MW (35.4%), coal contributing 1,680MW (56.7%), and small hydro, bagasse and solar IPPs contributing 232MW (7.8%). Despite the installed generation capacity exceeding peak demand of 2,000MW, the dependable capacity has remained constrained resulting in the need for imports and load shedding to ensure system stability.
- The Zimbabwe transmission network forms the Central Transmission Corridor (CTC) of the Southern African Power Pool (SAPP). However, the transmission and distribution networks consist of old equipment with inadequate transfer capacity which requires replacement, rehabilitation and expansion. It is therefore estimated that 80% of trading on SAPP is failing because of lack of transmission infrastructure.
- The distribution network needs reinforcement, expansion and rehabilitation to improve reliability of supply. The power utility has a backlog of 467,470 of client connections as of May 2025 characterized by high connection costs which the majority of customers cannot afford, leaving some clients in reticulated areas remaining unconnected.
- Over the years, uncoordinated planning has been a challenge in the sector which has seen fragmented planning by the national utility and the Rural Electrification Fund. The Government of Zimbabwe, through the ongoing development of the NIERP, will consolidate the Network Master Plan and the Rural Energy Master Plan aimed at examining available energy resources and determining the least-cost energy supply options, evaluating the security of supply options while providing information on the opportunities for investment into new energy projects. In view of this, the MoEPD is in the process of establishing an Energy Planning Unit to enhance leadership and coordination in selecting least-cost technology options for achieving universal access.



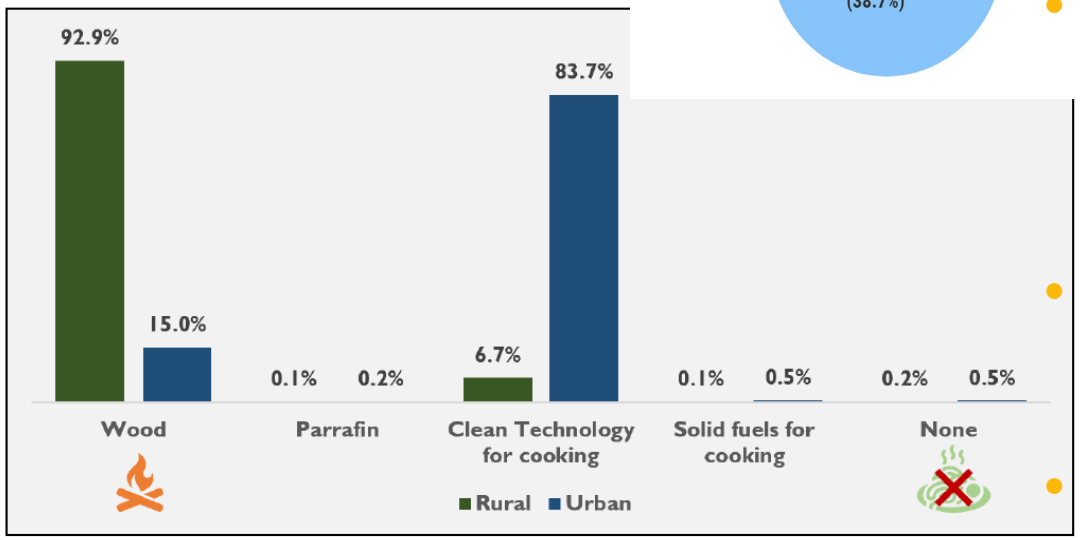


Figure 9.17: Main Sources of Energy for Cooking by Rural/Urban Areas

Energy Accessibility Indicators

- As of 2022 (Zimstat Census),62% of the population had access to electricity (33.7% on-grid, 28.3% off-grid), while 38.6% of households use clean cooking solutions. A more recent estimate of access as per National Electrification Strategy is 41% indicating a mismatch between the rate of connections and the rate of increase of households.
- Traditional cooking energy sources remain dominant in the country with firewood accounting for 61.2%, LPG 52%, Electricity 40.4% and charcoal 9% of household use. Other fuels used such as wood chips, biogas, coal and crop waste collectively constitute 7.6%
- Nationally an estimated 6 million tonne or more of fuelwood are consumed annually, while the sustainable output of natural forests is 4.6 million tonnes. This means the country is losing 330,000 ha of forest area – over 60 million trees – a year, yet the current planting rate is only 10 million trees.

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Energy Accessibility Indicators

Table 2: Electrification access in households until 2030.

Item	2024	2025	2026	2027	2028	2029	2030
Total households	4,314,815	4,401,112	4,489,134	4,578,917	4,670,495	4,763,905	4,859,183
ZETDC & Off-grid HH	1,762,000						
Unelectrified households	2,553,135	2,514,151	2,077,880	1,609,328	1,107,509	571,413	
Densification		24,791	75,847	135,384	203,656	280,924	367,455
Grid Expansion		70,446	344,905	630,314	927,002	1,235,304	1,555,568
Standalone solar systems		29.054	225,132	435,713	661,231	902,133	1,158,877
Mini grid		989	3,690	6,498	9,418	12,451	15,602
Total new HH access		125,280	649.574	1,207.91	1,801,306	2,430,812	3,097,503
Annual new connections		125,280	524,294	558,335	593,397	629,506	666,691
% Grid (Expansion & Densification		76%	65%	63%	63%	62%	62%
% Mini-grid and SHS Access		24%	35%	37%	37%	38%	38%
Access-percentage	41%	43%	54%	65%	76%	88%	100%

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Energy Accessibility Indicators…

ZERA has been reviewing the tariff and most customer categories are now on a cost-reflective tariff. The tariff increased from an average of 11.3 to 16.08 USc/kWh and customers can pay in both local and foreign currency. To improve revenue collection, the utility has rolled out prepayment and smart metering systems. Most domestic customers are on prepaid metering while at least 50% of customers eligible for smart metering have been connected.

As part of embracing the Distributed Renewable Energy , Government has installed a total of 502 solar mini grids and micro grids for rural public institutions. This comprises of 25 mini grids of sizes ranging from 5kW to 25kW, 8 community solar mini grids, with 4 already commissioned and the rest expected online in 2025.

To date, 333 biogas digesters have been constructed.

A Mini-Grid Regulatory Framework (MGRF) is under development to govern mini-grids development covering key issues such as licensing processes, technical requirements, and grid encroachment. The framework is expected to drive private sector participation and grow rural electrification rates in Zimbabwe.

The Presidential Rural Solarization Scheme, to be funded by the government set to begin in 2025, for five years, will see 1kW solar systems installed in over one million rural households, providing access to sustainable and reliable energy.

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3. Energy Efficiency Indicators

- According to the World Bank, Zimbabwe's energy intensity in 2023 was reported at 15 MJ per United States Dollar (USD) Purchase Price Parity (PPP) of Gross Domestic Product (GDP).This makes the country one of the top 3 worst performers in the SADC. The country has a long way to go if it intends to reach the global best practice figure of 3.4MJ per GDP PPP.

SECTOR	Energy Use Per Sector %	ELECTRICITY SAVINGS BY SECTOR %
Residential	84	40
Industrial	4	25
Agriculture, Mining, Energy Supply Sector	11	25
Transport	1	10
Overall Energy Saving	100	100

POLICY PROVISION/ GUIDELINE	ACTION POINTS/IMPLEMENTATION MEASURES
Energy Supply Sector	· Improve electricity generation efficiency · Improve transmission and distribution efficiency · Develop distributed generation and smart grids · Implement demand-side management (DSM) initiatives · Develop specific energy efficiency indicators at generation level
Residential Domestic Sector	· Promote more efficient cooking · Support the adoption of fuel-switching programmes · Introduce efficient heating and cooling technologies · Promote efficient lighting technologies · Develop Building energy efficiency Codes
Industrial Sector	· Establish an Industrial Energy Efficiency Programme (IEEP) · Introduce SME and informal Sector Energy Efficiency Programme · Develop capacity-building for Industry
Mining Sector	· Encourage the mining sector to improve its energy intensities · Artisanal and small-scale miners' energy-efficiency improvement
Agriculture Sector	· Encourage energy efficiency in irrigation, land preparation and farm technology
Transport Sector	· Promote energy-efficient modern vehicles with lower emissions · Promotion of non-motorised, e-mobility and eco-driving · Promotion and adoption of e-mobility · Strengthening sustainable mobility for goods through rail · Promote energy efficiency in air transportation
Commercial Sector	· Promote building codes and standards

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5. Energy Security Governance Indicators

The Ministry has policies and legislation in place to create a conducive environment for investment in the sector.

National Energy Policy 2012 Reviewed in 2024

- Use of all local resources (renewable and non-renewable) to provide energy savings
- Promote energy efficiency
- Promote uptake of renewable energy technologies

2012

Renewable Energy Policy 2019

- Targets 1100MW by 2025 and 2100MW by year 2030 for renewable energy
- Has a compendium of incentives for RE projects
- Proposes the setting up of Green Fund

2019

Bio- fuels Policy 2019

- Has targets for Bio fuels (ethanol and biodiesel) by 2030
- Removes monopoly on bio fuels supply, more players to participate in ethanol supply
- Advocates for community participation in the form of out growers as part of empowerment (Over 800 out growers in Chisumbanje and Triangle)

2019

National Energy Efficiency 2025

Targets Energy Efficiency in Households, Industry, Mining, Transport, Commerce and Agriculture.

Electric Vehicle Mobility Framework (under development)

MOEPD working with Ministry of Transport and Infrastructure Development, Ministry of Environment, Climate, Tourism and Hospitality Industry and partners

Targets improvements in EE in transport sector

To promote GREEN Electric Mobility

To have a compendium of incentives for E-Vehicles and its infrastructure

Key Planning Instruments

National Clean Cooking Strategy (2024-2030)

National Integrated Energy Resource Plan

National Energy Compact

National Electrification Strategy

Network Masterplan

Solar integration Plan

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Energy Security Governance Indicators

Zimbabwe's energy transition is guided by:

- National Integrated Energy Resource Plan (NIERP):A planning tool under development, to be finalized by December 2025, aimed at optimizing least-cost generation and transmission investments.
- National Electrification Strategy (NES): Provides a roadmap to achieve universal access by 2030, through on-grid, mini-grid, and standalone systems.
- National Clean Cooking Strategy (NCCS): A 2024–2030 roadmap to scale up clean cooking access.
- Government Project Support Agreement (GPSA): A policy tool to de-risk IPP investments through guarantees, cost-reflective tariffs, and currency convertibility provisions.
- Mini-Grid Regulatory Framework (MGRF): In progress,to standardize technical requirements, licensing, and grid encroachment terms for mini-grids.
- Updated National Energy Policy (NEP): Under review for consolidation and harmonization with sector-specific strategies by Q3 2025.
- The Electricity Act (Chapter 13:19) of 2002 offers opportunities for private sector investment in the energy sector, and by March 2025, the regulator had issued generation licenses to unsolicited private sector projects totaling 7,876 MW. The GoZ plans include the Batoka Gorge Hydropower Project (2,400 MW total, 1,200 MW for Zimbabwe), projected for post-2034 completion, and the Devil's Gorge Hydroelectric Project 1,200 MW by 2040. This indicates a bias towards greater private sector investment in the sector.

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Energy Security Governance Indicators

The GoZ has created an enabling environment that includes incentives such as cost-reflective tariffs, currency convertibility, government guarantees on power purchase agreements, insurance from reputable international companies, escrow account arrangements, and the possibility for IPPs to be accorded National Project Status with tax exemptions, as well as complementary investment from local pension funds and commercial banks.

The private sector can also invest in local and regional transmission infrastructure. Investments in the Southern African Power Pool (SAPP) would help insulate credit risk associated with one country, as the credit rating is tied to the entire region.

The GoZ has developed the NES 2025-2030 based on the Least Cost Geospatial Electrification Plan (LCGEP), which utilizes geospatial data to determine cost-effective infrastructure routes and prioritize electrification projects.

Accounting for 2024 estimated ZETDC domestic customers and off-grid households that own and use solar home systems, approximately 1.76 million urban and rural households had access to electricity service at the end of 2024.

ZIMSTAT population projections estimate the total number of households to be 4.3 million by 2024, resulting in an estimated balance of 2.55 million households that remain without electricity service.

Energy Supply Chain Resilience Indicators

- Zimbabwe, a member of the Southern African Power Pool (SAPP), actively participates in regional electricity trading by importing up to 500MW mainly from South Africa's Eskom, Mozambique's Hidroeléctrica de Cahora Bassa (HCB) and EDM while exporting approximately 204 MW mainly to Namibia, Zambia, and the Democratic Republic of Congo.
- Zimbabwe's strategic location at the heart of the SAPP facilitates seamless electricity trade with neighboring countries thus the country manages electricity shortages by importing power through bilateral agreements with regional utilities. Electricity imports remain an important component of total supply, but the potential for continued trade is constrained by regional shortages, ZETDC's ability to pay, and transmission capacity limitations.

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Energy Supply Chain Resilience Indicators

The planned ZIZABONA transmission project, involving Zimbabwe, Zambia, Botswana, and Namibia, would enhance regional trade by developing new transmission facilities, creating a western transmission corridor to alleviate congestion in the central corridor.

To support non-discriminatory access to the national grid, the Government undertook a study on the Tariff Review Methodology and third-party access code, which are currently being implemented by the energy regulator. Additionally, studies on protection coordination between the ZESA and SAPP grids were completed by March 2025, further enhancing regional grid integration and reliability.

GoZ also signed a bilateral agreement with the Mozambican Government through SPV PetroZim Line and CPMZ to run the pipeline from Beira to Feruka for the transportation of Diesel, Petrol and JetA1. The pipeline pumps 2 billion litres of fuel per month but is being upgraded to pump 5 billion litres and the project is at 65%. Feasibility studies for a second pipeline are also being carried out so as to export fuel to other countries in the region such as Zambia, Malawi, Botswana and DRC.

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Conclusion

- Zimbabwe is being assisted by AFREC under the Energy Sector Reform Support Project (ESRP) covering Energy Efficiency by enhancing sustainability and reducing GHG emissions in public infrastructure across the country.
- The project has two main components that is

I. Detailed energy audits of twenty public buildings including schools, hospitals, government offices and administrative centers

II. A comprehensive policy review of Zimbabwe's National Energy Efficiency Policy focusing on institutional, regulatory and implementation gaps.