



# ZAMBEZI RIVER AUTHORITY

**CORPORATE BROCHURE**

An aerial photograph of a large dam and reservoir. The dam is a long, curved concrete structure with a central spillway. The reservoir is a large, dark blue body of water. The surrounding landscape is lush green with dense vegetation. In the background, there are rolling hills and a clear blue sky with a few wispy clouds. The overall scene is bright and clear.

Water! Today, Tomorrow

**OVERVIEW OF THE ZAMBEZI RIVER AUTHORITY**

## ABOUT ZRA

The Zambezi River Authority (the Authority) is a binational organization mandated to contribute to the economic, industrial, and social development of the Republics of Zambia and Zimbabwe.

This mandate will be achieved by obtaining the greatest possible benefits from the natural advantages offered by the waters of the Zambezi River, through the most economical and effective means of providing water for generation of electricity and for other purposes which the Contracting States may decide upon.

It was established as a corporate body on 1st October 1987 by parallel legislation in the Parliaments of Zambia and Zimbabwe under the Zambezi River Authority Acts (Acts No. 17 & 19, respectively) to be responsible for the management of the section of the Zambezi River which flows between their common Borders (Kazungula to Luangwa in Zambia and Kazungula to Kanyemba in Zimbabwe).

The Authority is responsible for maintaining the Kariba Dam complex ('Kariba Complex') and any future dams or infrastructure on the river forming the border between the two countries.

### Our Mission

To encapsulate safety, professionalism, and respect in harnessing the water resource for socio-economic development, exhibiting integrity through honesty.

### Our Vision

To be the model organisation in dam and water resources management in the Zambezi River basin.

### Our Values

- **Safety** - Protection anchored on care, wellness, health, and peace of mind.
- **Honesty** - Trust premised on accountability and transparency.
- **Integrity** - Fairness encompassing justice as well as responsibility.
- **Professionalism** - Innovation for adaptability rooted in diligence, commitment, communication, and self-improvement.
- **Respect** - Love for teamwork and family with empathy.

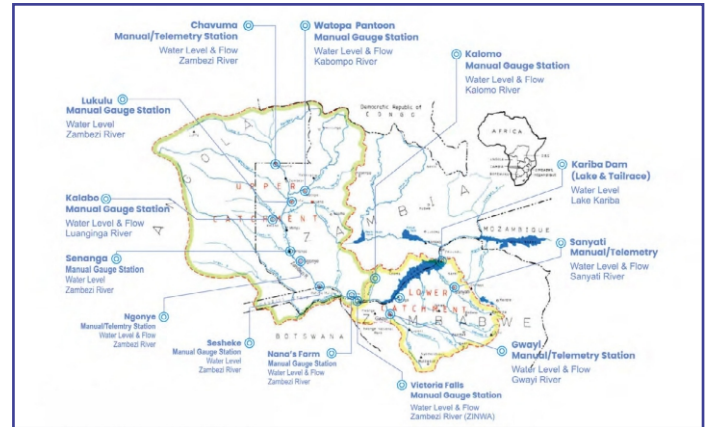


## KARIBA DAM OPERATIONS



Management of the Kariba reservoir is mainly influenced by factors such as rainfall over the Zambezi Basin, inflows from the Zambezi River and its tributaries, outflows which include discharges through turbines, spillway gates and evaporation.

A network of 13 gauging stations operated and maintained by ZRA, in the Upper and Lower Zambezi catchments, is used for inflow forecasting and flood management at Kariba.

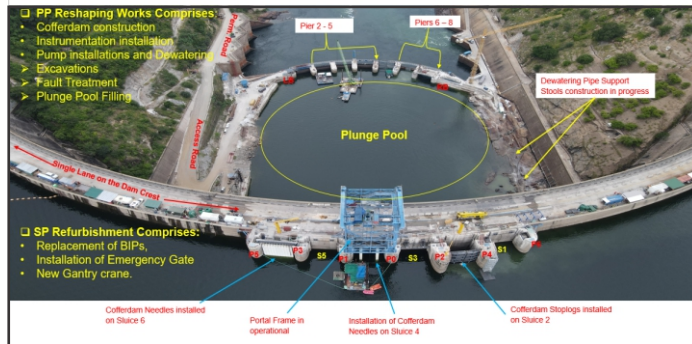


Zambezi River Upper and Lower catchment





## KARIBA DAM REHABILITATION PROJECT (KDRP)



After over 60 years of serving the people of Zimbabwe and Zambia, routine monitoring of the Kariba Dam identified the need for rehabilitation works to ensure its continued contribution to energy security and economic prosperity in both countries and the region. The Kariba Dam Rehabilitation Project (KDRP) comprises the reshaping of the plunge pool to limit the likelihood of scouring and preferential erosion particularly along the weak fault zone towards the dam foundations. On the other hand, the refurbishment of the spillway upstream control facility should improve the operation in accordance with international dam safety standards and prevent potential failure of the facility.

### What is the objective of the KDRP?

To improve the safety and reliability of the Kariba Dam.

Cost of Kariba Dam Rehabilitation Project USD 294million

## Why is the Spillway being refurbished?

To manage the reservoir water levels, the Kariba Dam spillway comprises six sluice gates in the upper part of the concrete wall. Over time, the cement has swelled due to Alkali Aggregate Reaction (AAR), a condition under which the aggregates in the concrete reacts with alkaline in the cement.

This swelling can affect the smooth opening and closing of the gates and could possibly cause the spillway gates to jam in either open or closed position.

Since the impoundment of the dam in 1958, the Zambezi River Authority has monitored the performance of the dam infrastructure in accordance with the Standing Operating Procedure (SOP). This routine monitoring and management of the spillway system has resulted in the recommendation that the six spillway gates be refurbished to ensure their continued full operability in the long term.

An emergency gate that can close off the sluices under flow conditions was also recommended for installation upstream of the dam.

Commencement Year

2019

Completion Year

2025

A new gantry crane with a capacity to handle this gate will also be installed. The works to replace the Built-In-Parts for the stop-beams on all water passages, new emergency gate that closes against water flow and the new gantry crane effectively forms the scope of the Spillway Rehabilitation Project.

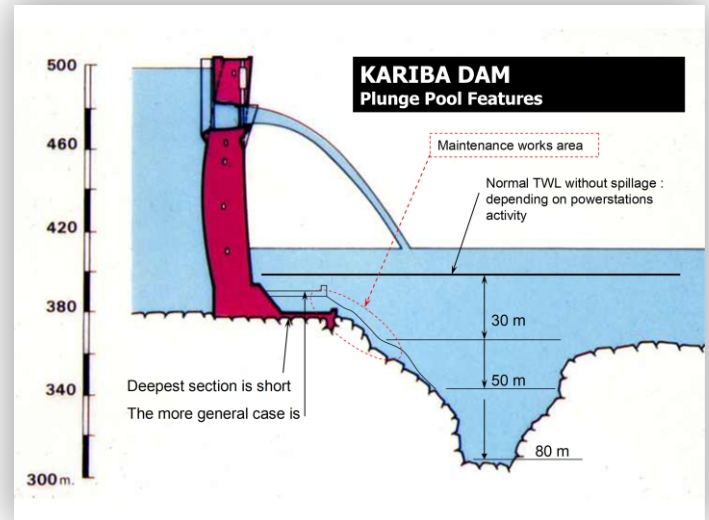
### Who is funding the Spillway Works?

The Spillway Rehabilitation Project is being funded by the World Bank, African Development Bank, the Government of Sweden and the Zambezi River Authority on behalf of the Governments of Zambia and Zimbabwe, through a combination of grants and loans.

### Development of the Plunge Pool

The natural riverbed downstream of the dam has eroded over time as a result of the heavy spillage of flood waters, particularly in the dam's early years, to form a deep plunge pool. The Zambezi River Authority has monitored the performance of the dam infrastructure, including the plunge pool, since its impoundment in 1958.

The Authority has implemented routine interventions to slow the expected erosion of the plunge pool's natural rock floor. This includes controlling the volume of spillage by not opening more than three adjacent spillway gates out of six but could be forced to open all gates in the case of potentially disastrous floods. The construction of the second power station in the late 1970s also reduced the spillage as more water was diverted for power generation than before. As a result, the natural erosion has slowed and no significant changes to the plunge pool floor have been recorded in the last 15 years.



## Why Reshape the Plunge Pool?

Excavating the downstream end of the plunge pool will increase its size and reduce the pressure that the water spilling into the plunge pool exerts on its base thereby slowing the erosion of the natural rock floor. Reshaping of the plunge pool through excavation of the rock from the downstream face, north and south bank sides of the pool will create a new stepped profile that will decrease the amount of swirling, improve energy dissipation and guide the spilling water in the downstream direction, away from the dam foundations. The replacement of the weak rock in fault zone with high performance abrasive resistant reinforced concrete will prevent scouring in the direction of the dam foundation.

## Who is funding the Plunge Pool Works?

The plunge pool reshaping is wholly funded by the European Union through a €72 million grant to the Government of the Republic of Zambia.

## What do the Plunge Pool Reshaping Works Entail?

The measures required to reshape the plunge pool include construction of a downstream cofferdam to enable the controlled blasting and excavation of an estimated volume of 300,000 m<sup>3</sup> of rock from the downstream face, that is, north and south bank sides of the pool under dry conditions.

Commencement Year

2017

Completion Year

2024





## BATOKA GORGE HYDRO-ELECTRIC SCHEME (BGHES)



Batoka Gorge Hydro-Electric Scheme site

### Project Background

The Batoka Gorge Hydro Electric Scheme (BGHES) is a proposed hydro power project being undertaken by the Zambezi River Authority.

Several studies and analyses were conducted in 1981; 1992-93; 1998 and 2019 which established the BGHES as the most economically viable option for immediate development because it offered the lowest specific generation cost and minimal negative environmental impacts. In February 2012, a

Memorandum of Understanding was signed between Zambia and Zimbabwe, paving way for the development of the BGHES Project.

### Project Location

The proposed Batoka Gorge Hydro-electric Scheme (BGHES) is located within the Batoka Gorge, about 47km downstream of the Victoria Falls along the Zambezi River on the common border between Zambia and Zimbabwe.

### Project Description

#### Dam

Roller Compacted Concrete Arch Gravity dam. The wall will be 175m high, with a crest length of 720m. Radial gated central crest type spillway;

#### Power Houses

- Two surface power plants, one on either side of the riverbank, each with a capacity of 1,200MW, giving a combined capacity of 2,400MW;
- 6 x 200MW Francis turbines in each powerhouse;
- Four water intakes delivering water through 4 tunnels (each approximately 1km in length) to the two surface power plants downstream the dam;
- Diversion tunnel;
- Switchyards for both power plants;

### **Transmission Lines - Batoka North:**

- a. BGHES to Mukuni Substation (2x330kV x 22km)
- b. BGHES to Muzuma in Choma (1x330kV x 151 km)
- c. Muzuma Substation in Choma to Nambala Substation in Mumbwa (2x330kV x 230)

### **Transmission Lines - Batoka South:**

- a. BGHES to Hwange (2 x 400kV x 70km)
- b. BGHES to Chakari (2 x 400kV x 400km)

### **Housing**

- Construction of the staff residential areas with social amenities and office complex.

### **Road Network**

- Road infrastructure for the Authority and Power Utilities on Batoka North (26.2km) and Batoka South (54km);

### **Project Benefits**

- Conjunctive operation of BGHES with Kariba Dam and other power plants will result in significant reduction of the cost of operating the power system.
- BGHES will significantly increase the renewable energy sources share in the energy mix, thereby moving Zambia and Zimbabwe towards a carbon emission compliance position.

- The BGHES project will use sustainable renewable hydropower energy which does not emit carbon dioxide and other environmentally toxic gases and waste which is in line with the greener world theme of the anti-global warming and pollution campaign.
- The reservoir will be fully contained in the gorge.
- There will, therefore, be no human displacements arising from the creation of the reservoir.
- The on-going planning follows a process of Integrated Environmental Management to ensure the least negative environmental and social impact.

### **Project Status**

- 2019 - completed Engineering Feasibility Studies
- 2021 – completed Environmental and Social Impact Assessment (ESIA) studies and the Legal and Financial Transaction Advisory (LFTA) services.
- 2021 - Developer completed updating the Feasibility studies in
- Discussions with the developer are currently ongoing to pave way for the negotiations.



## ZAMBEZI VALLEY DEVELOPMENT FUND (ZVDF)



### Overview

The Zambezi Valley Development Fund (ZVDF) is a Corporate Social Responsibility initiative. It is aimed at improving the well-being of the communities that were displaced during the construction of the Kariba Dam. The fund was set up by the Zambezi River Authority in 1997 to finance the implementation of sustainable infrastructural and developmental projects.

This was meant to alleviate the impact of the displacement of the Tonga/KoreKore people on both sides of the Zambezi River in Zambia and Zimbabwe.

### ZVDF Objectives

1. To raise funds for specific and sustainable projects meant to alleviate the impact of the displacement of people of the Zambezi River basin in Zambia and Zimbabwe who were displaced during the construction of Kariba Dam.
2. To address issues pertaining to ZVDF project financing, human resources training and project administration for the communities in Zambia and Zimbabwe.
3. To implement, administer and supervise the said specific and sustainable projects.

### Projects Funded to date

1. Procurement and installation of grinding mills
2. Sinking of boreholes
3. Construction of schools and houses for support staff in respective project sites
4. Construction of clinics and houses for support staff in respective project sites
5. Construction and rehabilitation of Irrigation Schemes
6. Supply of medical equipment
7. Construction of bridges
8. Rehabilitation of dams
9. Rehabilitation of water reticulation systems.



ZVDF has implemented projects in the following districts:

Zambia	Zimbabwe
Chirundu	Binga
Gwembe	Gokwe North
Kalomo	Hurungwe
Siavonga	Kariba
Sinazongwe	
Zimba	



School Project



Water Reticulation System Project



Health Centre Project



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