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ANNEX 13

to the Commission Implementing Decision on the financing of the multiannual action plan in favour of Sub-Saharan Africa for 2022-2026 Part 2

Action Document for “Kariba Dam Rehabilitation project (KDRP) - Reshaping of the plunge pool (PP) - 2nd phase (KDRP-PP-II)”

MULTIANNUAL PLAN

This document constitutes the multiannual work programme within the meaning of Article 110(2) of the Financial Regulation, within the meaning of Article 23 of the NDICI-Global Europe Regulation.

1 SYNOPSIS

1.1 Action Summary Table

1. Title CRIS/OPSYS business reference Basic Act	Kariba Dam Rehabilitation project (KDRP) - Reshaping of the plunge pool (PP) - 2 nd phase (KDRP-PP-II). OPSYS number: ACT-61056 Financed under the Neighbourhood, Development and International Cooperation Instrument (<u>NDICI-Global Europe</u>)
2. Team Europe Initiative	Yes - Africa-EU Green Energy Initiative (AEGEI)
3. Zone benefiting from the action	The action shall be carried out at Kariba Dam (Siavonga (Zambia) and Kariba (Zimbabwe))
4. Programming document	Multiannual Indicative Programme (MIP) for Sub-Saharan Africa for 2021-2027
5. Link with relevant MIP(s) objectives / expected results	Priority area 3: “Green Transition” Specific objective 2: “Support the development of an efficient, sustainable and resilient African energy sector” Result 2.1: “Higher share of renewable energy sources in primary energy production in SSA is promoted”
PRIORITY AREAS AND SECTOR INFORMATION	
6. Priority Area(s), sectors	Priority area 3: “Green Transition” (MIP) DAC sectors: 230 Energy and 430 Other multisector (Disaster Risk Reduction)
7. Sustainable Development Goals (SDGs)	Main SDG (1 only): Ensure access to affordable, reliable, sustainable and modern energy for all (SDG7) Other significant SDGs (up to 9) and where appropriate, targets: Build resilient infrastructure (SDG9) Climate action (SDG13)

8 a) DAC code(s)	23220 – Hydroelectric Power Plants – 50% 43060 – Disaster Risk Reduction – 50%			
8 b) Main Delivery Channel	12000 – Recipient government			
9. Targets	<input type="checkbox"/> Migration <input checked="" type="checkbox"/> Climate <input type="checkbox"/> Social inclusion and Human Development <input type="checkbox"/> Gender <input type="checkbox"/> Biodiversity <input type="checkbox"/> Education <input type="checkbox"/> Human Rights, Democracy and Governance			
10. Markers (from DAC form)	General policy objective @	Not targeted	Significant objective	Principal objective
	Participation development/good governance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Aid to environment @	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Gender equality and women's and girl's empowerment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Trade development	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Reproductive, maternal, new-born and child health	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Disaster Risk Reduction @	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Inclusion of persons with Disabilities @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Nutrition @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	RIO Convention markers	Not targeted	Significant objective	Principal objective
	Biological diversity @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Combat desertification @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Climate change mitigation @	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Climate change adaptation @	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	11. Internal markers and Tags	Policy objectives	Not targeted	Significant objective
	Digitalisation @	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	digital connectivity digital governance digital entrepreneurship digital skills/literacy digital services	YES <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	NO <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
	Connectivity @	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

	digital connectivity energy transport health education and research	YES <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	NO <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
	Migration @ (methodology for tagging under development)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Reduction of Inequalities @ (methodology for marker and tagging under development)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Covid-19	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BUDGET INFORMATION				
12. Amounts concerned	Budget line (article, item): BGUE-B2022-14.020122-C1-INTPA Total estimated cost: EUR 258 700 000 Total amount of EU budget contribution EUR 30 000 000 ¹ This action is co-financed in parallel co-financing by: - World Bank (WB) for an amount of USD 75 000 000 - African Development Bank (AfDB) for an amount of USD 75 000 000 - Swedish International Development Cooperation Agency (SIDA) for an amount of USD 25 000 000 - Zambezi River Authority for an amount of USD 19 200 000			
MANAGEMENT AND IMPLEMENTATION				
13. Type of financing	Indirect management with the Republic of Zambia.			

1.2 Summary of the Action

The purpose of this action (KDRP-PP-II) is to allow the completion of the action laid down in the 11th EDF Financing Agreement (FA)².

The proposed rehabilitation works of the Kariba Dam requires exceptional measures which have never been implemented before. There are no existing dam rehabilitation projects to draw experience from.

The Overall Objective of KDRP is to increase the reliability of supply and clean energy to Zambia and Zimbabwe and to minimise the risk of failure of the Kariba Dam. To do so, the project is supporting the Zambezi River Authority (ZRA) in carrying out the rehabilitation of the Kariba Dam through the stabilisation of its plunge pool³

¹ In addition, an amount of EUR 83 471 431 was committed from the 11th European Development fund (EDF), including the Bridging Facility.

² Financing Agreement ZM/FED/031-570 (Kariba Dam Rehabilitation Project, KDRP)

³ Natural riverbed has eroded over time as a result of the heavy spillage of flood waters from the spillgates, forming an 80 m deep pool, just below the dam and threatening its stability.

and refurbishment of its spillway⁴. Once the works are completed, the stability and proper functioning of the Kariba Dam will be ensured: the installed generation capacity of 2,130 MW will be maintained in the long term, while the risk of dam failure will be downgraded.

KDRP is a reputational safeguard and a relevant disaster risk reduction project: in case the dam collapses, it is estimated that more than 500 000 people would die, almost 3 million would be affected, and the economic impact would be more than USD 20 billion⁵.

KDRP is co-financed in parallel co-financing by the EU, WB, AfDB, SIDA and ZRA. The project has three distinct separate components, funded by different co-financing partners:

- (i) Component 1: Institutional support⁶ – WB/AfDB, SIDA and ZRA funded
- (ii) Component 2: Plunge Pool reshaping – EU funded
- (iii) Component 3: Refurbishment of the spillway – WB/AfDB and SIDA funded

The estimated cost at appraisal was USD 294 000 000. EUR 83 471 431 (11th EDF funds) are earmarked for the Component 2 of KDRP (Plunge Pool reshaping) through a Financing Agreement (FA)⁷.

Thus, in 2017, a EUR 49 277 479 works contract was signed to carry out the reshaping of the plunge pool. The provided engineering design included the construction of a cofferdam to dewater the plunge pool and allow for its reshaping in the dry through excavation operations and the construction of a concrete fault protection slab. Excavating the downstream end of the plunge pool would increase its size and reduce the pressure that the spilling water exerts on its base, thereby slowing the erosion of the rock floor.

Unfortunately, this engineering design was based on geological assumptions that have proven to be insufficient and different from the current situation during the execution of the works. This has led to a number of modifications and additional works which have caused large delays and cost overruns.

Due to the river bed rock conditions, which after recent investigations resulted highly permeable, the expected seepages in the plunge pool will be much higher than those foreseen in the works contract. In 2021, it was concluded that the construction of a grout curtain underneath the cofferdam by a specialised contractor was necessary to allow the execution of the remaining works in safe conditions. In April 2022, the Zambian Ministry of Finance and National Planning requested the WB/AfDB to mobilise funds from the Component 3 'Refurbishment of the spillway' to the Component 2 'Plunge Pool Reshaping' for the construction of the grout curtain.

After 5 years of works, and with a delay of more than 3 years, the cofferdam was completed in May 2022. The remaining works (excavations and construction of a concrete fault protection slab) could remain on stand-by during the construction of the required grout curtain, giving the Contractor the possibility to terminate the contract.

This action aims at reinforcing the financial resources needed to complete the 2nd component of KDRP. Thus, the funds requested will cover:

- a) Works:
 - a.1) Additional dewatering capacity, additional stabilisation works following further required geotechnical investigations, additional grouting works and Art. 35/55 claims under the current works contract. Thus, funds available under this action will top up the existing works contract⁸.
 - a.2) A new Design and Build (D&B) contract to be negotiated in case of termination of the current works contract.
- b) Supervisor Representative (SR) services: due to the shortcomings shown by the current SR financed by the WB/AfDB and the difficulties experienced because of the lack of contractual relationship with the

⁴ Concrete expansion, from a natural chemical reaction, over the last 60 years, has affected the smooth opening and closing of the gates.

⁵ Mott MacDonald - Dam Break Analysis for the Zambezi River (March 2020)

⁶ Engineering services for the implementation of works under components 2 and 3

⁷ Financing Agreement (FA) ZM/FED/031-570

⁸ Financing Agreement ZM/FED/031-570.

EU/the former National Authorising Officer (NAO); upon competition of the grout curtain, the SR, for solely the works in the plunge pool, will be replaced by a new Consultant to be procured.

c) Legal representation / Legal advice / Conciliation and/or Arbitration services.

The implementation modality, organisational set-up (including contractors and service providers) and responsibilities shall remain the same as set in the Financing Agreement ZM/FED/031-570, with the exception of the changes described in this document.

The request for EUR 30 000 000 of European Union additional financing was received from the Ministry of Finance and National Planning of the republic of Zambia on 20 April 2022⁹.

2 RATIONALE

2.1 Context

KDRP is an essential, strategic and extremely sensitive project: with 1,080 MW installed on the Zambian side and 1,050 MW installed on the Zimbabwean side, Kariba Dam represents more than one third of the Power generation capacity installed in Zambia and almost half of the Zimbabwe's. The Kariba dam generates 10,000 GWh of clean and renewable energy per year.

The regional benefits of KDRP are substantial to avoid catastrophe in the Zambezi River basin and continue power production. Kariba Dam Hydro-Electric Scheme contributes to the **Southern African Power Pool (SAPP)**, both in terms of generation capacity and stability of the system. The rehabilitation of the dam will ensure its continued safe operation to the economic benefit of the Southern African Development Community (SADC).

Recognizing the importance of the energy sector to regional growth prospects, the SADC has developed and implemented a comprehensive framework to facilitate integration. Energy plays a central role in this ambitious agenda through the SAPP. The SAPP was established in 1995 to provide a forum for regional solutions to electricity generation and provides for coordinated planning and operation of the regional power system. The current operations of the SAPP build on a concerted effort to establish a regional framework for energy security based on several regional strategic plans for energy development, like the SADC Regional Energy Access Strategy and Action Plan (2010) and the Regional Infrastructure Development Master Plan (2012).¹⁰

The long-term growth prospects and security of the SAPP are heavily dependent upon availability of the hydropower resources of the Zambezi River basin. Hydropower remains an important but under-represented contributor to the SAPP, accounting for around 20% of the overall generation capacity installed in 2020 in all 12 SAPP countries (81 GW). The Zambezi River basin accounts for roughly 50% of this. In addition to the provision of firm energy, the centrality of the Zambezi River basin within the SAPP means that the hydropower schemes provide an important balancing element in the overall regional energy mix. Securing these resources is therefore critical to ensuring regional energy security and stability, and avoiding the regional blackouts that have undermined growth prospects in recent years as demand exceeds supply.

In 2020, the peak demand of the SAPP was 55 GW, against an available capacity of 65 GW, resulting in an excess generation capacity of 10 GW (however more than 2 GW are located in Angola and therefore cannot be accessed). A total of 24.5 GW of new generation capacity have been installed in the SAPP region in the last 10 years.

In Zambia, in 2021, peak demand was estimated at 2,887 MW, with an installed generation capacity of 2,891 MW, of which only around 2,736 MW is presently available for production. The result is a supply/demand gap of around 151 MW.

In Zimbabwe, in 2021, peak demand was estimated at 1,896 MW, with an installed generation capacity of 2,412 MW, of which only around 1,400 MW is presently available for production. The result is a significant supply/demand gap of around 496 MW. There is also extensive suppressed energy demand that further dampens recovery and growth.

⁹ Ref. Ares(2022)3101323

¹⁰ Regional Infrastructure Development Master Plan Energy Sector Plan (2012) | SADC

Zambia's central development objectives are set out in its **Vision 2030**, which incorporates the objectives of the African Union's Agenda 2063¹¹ and the United Nations' Agenda 2030.¹² Zambia's Vision 2030 aims to transform Zambia into a prosperous middle-income nation by 2030 and to create a new Zambia which is a "strong and dynamic middle-income industrial nation that provides opportunities for improving the well-being of all, embodying values of socio-economic justice". KDRP is fully aligned with this strategy.

Vision 2030 articulates long-term plans for development to achieve desirable socio-economic outcomes by 2030. The Vision is operationalised through 5-year **National Development Plans** (NDPs). The 8th National Development Plan (2022-2026) was approved by Cabinet in April 2022 and was submitted for adoption by the National Assembly in mid-June 2022. KDRP will increase the reliability of supply and clean energy and mitigation and adaptation to climate change, which are embedded in the **Zambian Eights National Development Plan**, under the development outcomes "an industrialised and diversified economy" and "enhanced mitigation and adaptation to climate change".

Furthermore, by increasing the grant component of KDRP, the EU will contribute to easing Zambia's debt burden¹³, allowing the mobilisation of resources for other priority areas.

KDRP will contribute to SDG 7 (ensure access to affordable, reliable, sustainable and modern energy for all), SDG 9 (build resilient infrastructure) and SDG 13 (climate action) of the **2030 Agenda for Sustainable Development**.

KDRP will accelerate the implementation of the **Africa-EU Green Energy Initiative (AEGEI)**¹⁴ and avoid an abrupt coming back of 2.1 GW should the dam collapse; and a serious reputational risk for the EU partnerships in the whole African continent and above.

KDRP is aligned with the **EU Global Gateway**¹⁵ under the key area of partnership "Climate and Energy", the **European Consensus on Development**¹⁶ ("The EU and its Member States will pursue [...] increasing energy efficiency and renewable energy generation", "The EU and its Member States will support the poorest communities in improving access for all to land, food, water, and clean, affordable and sustainable energy"), the **Comprehensive Strategy with Africa**¹⁷ ("a partnership for green transition and energy access") and the **Green Deal**¹⁸ ("Supplying clean, affordable and secure energy").

2.2 Problem Analysis

Short problem analysis:

Project Background:

The Kariba Dam and Hydro-Electric Scheme, constructed across the Zambezi River between 1956 and 1959, is the largest hydro-electric scheme in the Zambezi River Basin, with an installed capacity of 2,130 MW. It is a double curvature concrete arch dam (128 m tall, crest length of 617 m) with a reservoir capacity of 181 km³, the largest in the world.

The Kariba Dam has been central to energy security and economic development in both Zambia and Zimbabwe, and has an important role in ensuring the stability of the SAPP and in regulating flows on the Zambezi River. The reservoir supplies water to two hydropower stations located on the North bank in Zambia (1,080 MW operated by ZESCO) and on the South bank in Zimbabwe (1,050 MW operated by ZPC).

¹¹ Agenda 2063 | African Union (au.int)

¹² <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>

¹³ As at end-June 2021, Zambia's total public debt was USD equiv. 26.44bn excluding interest arrears.

¹⁴ AEGEI is part of the EU-Africa Global Gateway Investment Package

¹⁵ JOIN(2021) 30 final of 1.12.2021

¹⁶ Joint statement by the Council and the representatives of the Governments of the Member States meeting within the Council, the European Parliament of the European Commission of 26/06/2017.

¹⁷ JOIN(2020) 4 final of 9.3.2020

¹⁸ COM(2019) 640 final of 11.12.2019

In the first 20 years after the dam was constructed, there was consistent heavy spilling through the six sluice gates. This has resulted in erosion of the bedrock, developing a scour plunge pool down to 80 m below the normal tail water level. There is a major concern regarding its further development from intense spillage which may occur in the case of exceptional floods.

In order to control its future development and avoid dam toe weakening, the studies came to the conclusion that the best solution consists in enlarging the plunge pool, mainly towards downstream but also towards both banks and protecting the fault in the downstream toe of the dam with a concrete lining. The reshaping shall indeed facilitate the evacuation of spillage flows in the downstream direction, and avoid the concentration of turbulence in a restricted and confined area.

Apart from the need to reshape the plunge pool, there is also need to rehabilitate the six sluice gates that constitutes the spillway. Indeed, concrete expansion, from a natural chemical reaction¹⁹, over the last 60 years, has affected the smooth opening and closing of the gates. Without effectively functional spillway (sluices), the reservoir level cannot be effectively maintained in respect to the flood regime of the Zambezi River.

Donor's intervention:

In 2017, under the 11th EDF FA ZM/FED/031-570, a EUR 49 277 479 works contract was signed to carry out the reshaping of the plunge pool. The engineering design provided the construction of a cofferdam in concrete and metallic structure to dewater the plunge pool and allow for its reshaping in the dry through excavation operations and the construction of a concrete fault protection slab.

The National Authorising Officer (NAO) of the EDF is the Contracting Authority (CA) of the works contract and the Zambezi River Authority (ZRA) the Supervisor (S). The Supervisor Representative (SR) is financed by the WB/AfDB/SIDA.

The works for the rehabilitation of the spillgates (Component 3 of KDRP) started in 2019 and will be completed in 2025, under WB/AfDB/SIDA financing.

Under this component, ZRA is the Employer and the Engineer (FIDIC Red Book 2017) is the same Consultant providing SR services for the reshaping of plunge pool.

Plunge pool's works - Poor design, delays and cost overruns:

Unfortunately, the original design²⁰ for the plunge pool works was based on geological assumptions that have eventually proved to be insufficient and different from the current situation during the execution of the works. This has led to a number of technical modifications and additional works which have caused large delays and cost overruns, that so far are estimated at nearly EUR 40 000 000²¹, but may increase further.

In 2021, an hydrogeological 3D model was developed by the SR, assessing that the most probable seepage discharge in the plunge pool may reach 400 to 800 l/s, and could even reach 1,200 l/s; much higher than the 100 l/s foreseen in the works' contract. These high seepages would not be managed by any pumping stations and not allow to carry out the excavation of the plunge pool in safe conditions. The dam's safety panel of experts (DSPoE), the SR and the EU technical auditors have proposed the construction of a grout curtain below the cofferdam (not foreseen in the initial works' contract) by a specialised contractor, to minimise seepages into the plunge pool and

¹⁹ Alkali-Silica Reaction (ASR): ASR causes a swelling of the concrete and an associated loss of mechanical resistance over time. The risk of dam failure due to this phenomenon was dismissed by Tractebel in their feasibility report and by an independent expert (Bernard Goguel) contracted by the EU (Cf. Annex 5 of the Action Document approved for KDRP).

²⁰ The feasibility study and detailed design commissioned by ZRA was completed by Tractebel in June 2012. A review (second opinion) of the design proposals for stabilisation of the Kariba Dam plunge pool and rehabilitation of the spillway up-stream hydro mechanical facility and associated civil works was conducted by an independent panel of experts. The final review report submitted in November 2012 confirmed the design as being the optimal solution.

²¹ EUR 13 300 000 (Addendum 4) + EUR 3 000 000 of AOs non included in Addendum 4 + EUR 3 000 000 of Claims accepted by supervisor + EUR 20 000 000 (estimated cost of the Grout Curtain to be built below the cofferdam, including EoT claimed by the Contractor). Claims not accepted by the supervisor (ZRA) and the Contracting Authority (NAO) are not included here, but amount to a further EUR 20 000 000. Nor are the SR's cost overruns (contract is financed by the WB/AfDB/SIDA).

allow the execution of the remaining works in safe conditions. It is estimated that this activity could last 14-18 months (4-6 months for procurement + 10-12 months for construction).

In April 2022 the Zambian Ministry of Finance and National Planning requested to the WB/AfDB to mobilise funds from the component 3 “Refurbishment of the spillway” to the component 2 “Plunge Pool Reshaping” for the construction of the grout curtain by a specialised contractor.

After 5 years of works, and with a delay of more than 3 years, the cofferdam was completed in May 2022. The remaining works (excavation and construction of a concrete fault protection slab) could remain on stand-by during the construction of the required grout curtain. The risk of termination following Art. 38.6 or 65.1.c of the General Conditions of the works’ contract is high, as confirmed by intense exchanges of letters²².

Thus, to allow the completion of the project, additional funds are required to cover additional dewatering capacity, additional stabilisation works, additional grouting works and Art. 35/55 claims. It is also necessary a complete review and update of the entire geotechnical design of the plunge pool, including the necessary studies on the stability of the slopes and the redefinition of the geometrical excavation, based on the findings of the latest geological investigations and relevant geotechnical/hydrogeological model.

Plunge pool’s works - S and SR poor performance:

So far both the S and the SR, have shown important weaknesses, inefficiencies and poor performance mainly due to a lack of experiences for such a project and a lack of decision-making within ZRA. Due to the shortcomings shown the SR, and considering the difficulties experienced during the last 5 years by the EU Delegation and the NAO to deal with a SR who has not any contractual relationship with us, it is proposed to replace the current Consultant acting as SR by a new Consultant financed by KDRP-PP-II. This has been also noticed through the problems largely affecting the project implementation due to the double role of the current Consultant under the Component 2 as SR and Component 3 as Engineer (FIDIC Red Book 2017). This has further weakened the already fragile internal organisation of ZRA in making decisions. (Cf. Section 3.4 – Lessons learnt).

Plunge pool’s works - Claims:

So far the works Contractor for the plunge pool has submitted more than 30 claims. Some of these claims have already escalated to amicable settlement without success. The Contractor has shown its willingness to go to conciliation²³. In May 2022 the Contractor submitted a notice of dispute and request for amicable settlement²⁴ on claims related to the first 3 years of implementation of the contract. The Contractor is claiming an Extension of Time of 634 days and EUR 18 600 000 of costs and damages.

Considering this, an initial budget is foreseen for Legal representation / Legal advice / Conciliation and/or Arbitration services (Cf. Section 4.5).

Risks without the project:

Given the large reservoir capacity (181 km³), a dam structural failure due to the toe erosion would have a catastrophic impact downstream in the Zambezi River. Quite a number of villages that reside along the Zambezi river would be flushed away and the wave would seriously affect the Cahora Bassa Dam in Mozambique, resulting in its collapsing and flood the Zambezi and Sofala provinces in Mozambique. It is estimated that more than 500,000 people would die, almost 3 million would be affected, and the economic impact would be more than USD 20 billion²⁵.

Additionally the regional power shortages and major floodings of low lying areas in Mozambique and Malawi, would result in a total loss of close to 40% of the SAPP installed generation capacity outside of South Africa.

A failure to invest in the timely rehabilitation of the dam will result in the gradual degradation of key safety features associated with the structure to a level that is not acceptable in accordance to international standards.

²² Letter from EUD to ST MoFNP Ref. Ares(2022)2746148, letter from the Contractor to NAO Ref. Ares(2022)2936402 and Minutes of the Monthly meeting with the Contractor held on 13/04/2022.

²³ Ref. Ares(2022)1953183 – 17/03/2022

²⁴ Ref. Ares(2022)3726583 – 12/05/2022

²⁵ Mott MacDonald - Dam Break Analysis for the Zambezi River (March 2020)

Such a failure will be a huge reputational risk for the EU if KDRP is abandoned.

Identification of main stakeholders and corresponding institutional and/or organisational issues (mandates, potential roles, and capacities) to be covered by the action:

KDRP involves numerous stakeholders:

Direct beneficiaries (rights holders): households and productive users in the entire Republic of Zambia and the Republic of Zimbabwe dependent on electricity supplies from the secure continued operation of the Kariba Dam; the Zambezi River Authority (ZRA); both power utilities, the Zambia Electricity Supply Corporation (ZESCO) and the Zimbabwe Power Company (ZPC); and downstream inhabitants living in the vicinity of the Zambezi River (mainly in Mozambique) secure from risk of catastrophic failure and also possible impact on the Cahora Bassa Dam downstream in Mozambique.

Indirect beneficiaries: mainly within the regional context of the Zambezi River basin, particularly to the downstream riparian states of Mozambique and Malawi. The Zambezi River basin is shared among eight riparian states, including Zambia and Zimbabwe. The Kariba Dam is part of an integrated infrastructure platform within the basin. The benefits through avoided disaster are substantial with an estimated 3 million people being affected and the total cost associated with flood losses would be more than USD 20 billion.

Financiers: WB, AfDB, SIDA, ZRA and EU.

Contracting authority for the EU funds: Ministry of Finance and National Planning (Zambia) - MoFNP.

Implementing partner, supervisor for the plunge pool's works and employer for the spillway works: Zambezi River Authority (ZRA). ZRA is the operator of Kariba Dam (owned by the governments of Zambia and Zimbabwe). ZRA was established as a corporate body through parallel legislation in the parliaments of Zambia and Zimbabwe on the 1 October 1987. The mandate given was to contribute to the economic, industrial and social development of the Republics of Zambia and Zimbabwe through: (i) obtaining the greatest possible benefit from the natural advantages offered by the waters of the Zambezi River; and (ii) improving and intensifying the utilisation of the waters for the production of hydropower and for any other purpose beneficial to the two countries.

The ZRA strategic functional objectives include to: (i) operate, monitor and maintain the Kariba Dam and any future dams on the Zambezi River; and (ii) manage the Kariba reservoir (Lake Kariba) and future dam reservoirs for hydropower generation taking cognisance of effects of operations to areas downstream. ZRA is financially autonomous. It gets its income from water tariffs for water used in the generation of power from ZESCO and ZPC. The formula for payments from the two electricity utilities ZESCO and ZPC to the ZRA is to give sufficient funds to carry out its mandate functions and not to generate any profit.

Permanent technical advisor to ZRA: Tractebel Engineering is the engineering consultancy company (ex Coyne et Belier). This company was the designer of the Kariba Dam when built and has continued to provide technical advice on operation and maintenance, including the 5 years dam safety reviews (which it has done ever since the dam was constructed). This company did the design of the on-going works under KDRP.

Dam Safety Panel of Experts: These experts provide review and advisory functions to ZRA during the implementation of KDRP.

Engineer/SR: As mentioned above and in section 3.2., this Consultant, currently financed by WB/AfDB, will be replaced as SR by another Consultant procured under KDRP-PP-II.

Works' Contractors: The Contractor for the plunge pool works is financed by the 11th EDF FA ZM/FED/031-570 and the Contractor for the spillway works is financed by WB/AfDB/SIDA.

EU Technical Auditors: Financed by the 11th EDF FA ZM/FED/031-570.

Communication and Visibility (C&V) consultants: Financed by the 11th EDF FA ZM/FED/031-570.

3 DESCRIPTION OF THE ACTION

3.1 Objectives and Expected Outputs

The **Overall Objective (Impact)** of this action is to increase the reliability of supply and clean energy to Zambia and Zimbabwe and to minimize the risk of dam failure.

The **Specific Objective (Outcome 1)** of this action is: Zambezi River Authority (ZRA) supported in carrying out the rehabilitation of the Kariba Dam through the stabilisation of its plunge pool and refurbishment of its spillway. The plant will then match international safety standards.

The **Outputs** to be delivered by this action contributing to the corresponding Specific Objective (Outcome 1) are

- 1.1 contributing to Outcome 1: Plunge pool downstream of the dam wall stabilised (Component 2 of KDRP, financed by EU).
- 1.2 contributing to Outcome 1: Spillway system refurbished (Component 3 of KDRP, financed by WB/AfDB/SIDA).

3.2 Indicative Activities

KDRP is co-financed by the EU, WB, AfDB, SIDA and ZRA. The project has three distinct separate components, funded by different co-financing partners:

- (i) Component 1: Institutional support – WB/AfDB, SIDA and ZRA funded
- (ii) Component 2: Plunge Pool reshaping – EU funded
- (iii) Component 3: Refurbishment of the spillway – WB/AfDB and SIDA funded

The engineering services required for the implementation of the works under Components 2 and 3 are provided through Component 1. EUR 83 471 431 are earmarked for the plunge pool works through the 11th EDF FA ZM/FED/031-570. The refurbishment of the spillway and the institutional support are financed by WB/AfDB/SIDA. ZRA contribution goes to the institutional support.

Activities relating to Output 1.1:

(a) Works for the Plunge Pool Reshaping:

- Construction of a cofferdam
- Construction of access roads
- Reshaping of the plunge pool in the dry through excavation of 300,000 m³ of rock using the drill and blast method and removal of spoils to designated dumpsite
- Installation of required monitoring instrumentation
- Construction of a concrete fault protection slab and related works

These works are financed by the 11th EDF FA ZM/FED/031-570. The amount requested in this action under “Works’ Contractor for Plunge Pool Reshaping” (Cf. Section 4.5.) will be added to the existing contract to cover anticipated additional dewatering capacity, additional stabilisation works following further required geotechnical investigations, additional grouting works and Art. 35/55 claims.

In case of termination of the existing works contract (cf. Section 2.2.), the funds available for works under this action would contribute, together with other financial sources, to the funding of a new Design and Build (D&B) contract to allow the completion of the works for the reshaping of the plunge pool.

(b) **Works for the construction of a grout curtain below cofferdam:** These new works are necessary to allow the completion of the excavation and the concrete fault protection slab in safe conditions (Cf. Section 2.2). This grout curtain will be financed by WB/AfDB through separate contract.

(c) **Technical services and supervision consultant:** The current Consultant (financed by WB/AfDB/SIDA/ZRA) serves as the SR for the reshaping of the plunge pool and as Engineer (FIDIC Red Book 2017) for the refurbishment of the spillway. Because of the issues mention in sections 2.2. and 3.4., this Consultant will be replaced as SR by a new SR financed by this action.

(d) **Dam Safety Panel of Experts (DSPoE):** Following WB Standards and due to the nature of the works foreseen in KDRP, a DSPoE was appointed in 2015. The DSPoE is a set of individual consultants with considerable experience in the rehabilitation of large dams. The financing of these experts comes from WB/AfDB/SIDA/ZRA.

The DSPoE is expected to visit the site at least twice a year for a period of two weeks and will review and assess the programme in order to provide advice to the ZRA.

(e) Technical Audit: Technical auditors are responsible for providing audit missions and technical advice to the EU regarding plunge pool reshaping works. This contract is financed through funds available under FA ZM/FED/031-570.

(f) Communication and Visibility (C&V): As per section 6 of the present Action Document no provision for C&V is included in KDRP-PP-II. However, there is an existing C&V contract financed by FA ZM/FED/031-570 which covers C&V activities for KDRP until 2023.

(g) Legal representation / Legal advice / Conciliation and/or Arbitration services: Cf. section 2.2 (Plunge pool's works - Claims).

(h) Final evaluation: A final evaluation will be carried out at the end of KDRP.

Activities relating to Output 1.2:

The works for the refurbishment of the spillway are financed by WB/AfDB/SIDA.
A works' contract was signed in 2019 and works will be completed by 2025.

The commitment of the EU's contribution to the Team Europe Initiatives foreseen under this action plan will be complemented by other contributions from Team Europe partners. It is subject to the formal confirmation of each respective partners' meaningful contribution as early as possible. In the event that the TEIs and/or these contributions do not materialise the EU action may continue outside a TEI framework.

3.3 Mainstreaming

Environmental Protection & Climate Change

Outcomes of the EIA (Environmental Impact Assessment) screening (relevant for projects and/or specific interventions within a project)

The EIA (Environment Impact Assessment) screening classified the action as Category B (project for which an EIA is required): an ESIA (Environmental and Social impact Assessment) and an ESMP (Environmental and Social Management Plan) were prepared in 2015. The ESMP is part of the works' contract. It was updated in 2020. According to the ESIA "there are no environmental or social fatal flaws which inhibit authorisation of the proposed Kariba Dam Rehabilitation Project". Impacts are highly site-specific and associated only with the construction period. If ESMP is implemented, all the possible impacts identified will remain "minor" or "negligible".

Outcome of the CRA (Climate Risk Assessment) screening (relevant for projects and/or specific interventions within a project)

The Climate Risk Assessment (CRA) screening concluded that this action is no or low risk (no need for further assessment).

Kariba Dam contributes to CC Mitigation because it generates 10,000 GWh of clean energy (hydropower) per year and CC Adaptation because it is an important infrastructure to control Zambezi river floodings.

Gender equality and empowerment of women and girls

As per the OECD Gender DAC codes identified in section 1.1, this action is labelled as G0 as it will be focused only in the rehabilitation of Kariba dam and will not have impact on the communities. Even though the Action is considered to be G0, the Contractors in charge of the on-going works will ensure decent employment (ILO decent job criteria) of women and men, and provide trainings in gender equality and mitigation measures for Gender Based Violence. This will be done continuously during the remaining works.

Human Rights

The works are located within the existing Kariba dam footprint and there is no need for resettlements.

On-going and planned works are not having and will not have negative impact on communities in the region of the dam. Rather, the works are bringing and will bring benefits to the communities stimulating local businesses and creating jobs for women and men. The Action will respect the 5 HRBA principles: respect to all human rights, inclusive participation, non-discrimination and equality, accountability and transparency. In addition, the action will implement the principles of no one left behind, do not harm, and will encourage the private sector to respect the guiding principles on Business and Human Rights.

Disability

As per OECD Disability DAC codes identified in section 1.1, this action is labelled as D0. This implies that the action is not considered relevant for inclusion of persons with disabilities.

Democracy

N/A

Conflict sensitivity, peace and resilience

N/A

Disaster Risk Reduction

KDRP is a disaster risk reduction project: by stabilising the plunge pool, further erosion that may compromise the stability of the Dam will be avoided. In case the Dam collapses, it is estimated that more than 500 000 people would die, almost 3 million would be affected and the economic impact would be more than USD 20 billion²⁶.

Specific shock-sensitive solutions, such as crisis modifiers, may be defined under the implementation contracts, wherever considered feasible and suitable. This will enable early action and rapid response to events that could occur during the implementation phase.

Other considerations if relevant

Civil society organizations and Local Authorities were consulted during the preparation of the KDRP.

KDRP is mainstreaming environmental protection and gender equality as crosscutting issues through the Environmental and Social Management Plan (ESMP). The ESMP incorporates aspects of both Occupational Health and Safety (OHS) as well as Community Health and Safety.

In 2019 the Grievance Redress Mechanism (GRM) of the KDRP was operationalised. A Grievance Redress Mechanism (GRM) is an organizational system established to receive, analyse and redress concerns about the impact or potential impact of the project on both internal and external stakeholders. The GRM is accessible to workers, civil society and communities for placing any claims in relation to Environment Health and Social aspects of the project.

3.4 Risks and Lessons Learnt

The main risks identified are related to events that may trigger additional costs, delays and claims from the Contractor, or even the impossibility to complete the project:

Category	Risks	Likelihood (High/ Medium/ Low)	Impact (High/ Medium/ Low)	Mitigating measures
	Unexpected ground conditions (e.g. high water	Medium	High	New geotechnical studies and update of the current design.

²⁶ Mott MacDonald - Dam Break Analysis for the Zambezi River (March 2020)

External environment	seepages during excavation, fractures on the foundation of the cofferdam or the main dam that would compromise its stability)			Construction of a grout curtain below the cofferdam or where needed.
	Hydrological risks (spillage episodes during works)	Low	Low	Measures have been identified during the design to mitigate adverse hydrological conditions. Protective structures and safety measures have to be in place during the operational implementation phase.
	COVID-19	Medium	Low	Mitigation measures have been so far successfully implemented by the project (so far no interruption of the works because of COVID-19).
People and the organisation	Lack of coordination between the different parties/stakeholders involved in the project (e.g. Contractor/Power Utilities).	Low	Medium	During the construction of the cofferdam there were some coordination issues between ZRA and the power utilities. Lessons have been learnt and such problems are less likely to occur in the future.
	ZRA's and SR's project management capacity, responsiveness and accountability.	High	High	Replacement of the SR to be funded by this action. Tractebel and the DSPoE provide advice to ZRA. Support provided to ZRA through the 1st Component of KDRP (Institutional Support).
	Corruption or malpractice	Low	Medium	Adherence to international procurement standards, supervision of works, technical and financial audits and evaluation can significantly reduce the scope of corruption. Measures to increase transparency and accountability are put in place.
Planning, processes and systems	Construction risks (rock-blasting near the foundations of the dam wall, variation of pore-water pressure during lowering of the water level in the plunge pool, etc.)	Medium	Medium	Works will be carried out according to the design, the ESMP and the works' method statements approved by the SR and endorsed by the DSPoE. Prior to dewatering dam monitoring instruments will be installed (piezometers, inclinometers, prisms+Total station, etc.), MODAP (numerical MODEL Accompanying the Project) calibrated and an Emergency Response Plan (ERP) will be in place.
	Safety risks due to works performed on the spillgates (e.g. danger of objects falling).	Low	Low	Strengthened coordination between contractors working in the plunge pool and the spillgates.
	Suppliers default on quality materials (e.g. aggregates for concrete).	Low	Medium	Foresee alternative suppliers.

	Lack of funding due to additional works (non foreseen in the original contracts)	Low	High	KDRP-PP-II is a mitigating measure to the lack of funds encountered under the original KDRP.
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Lessons Learnt:

Until works undertaken under KDRP started in 2017, ZRA's experience was limited to small maintenance works of the Kariba Dam and its operation. In 2017, the EU TAF SE4ALL Mission²⁷ pointed at "the problem of ZRA preparation with regards to the project management issues and readiness of ZRA for the management of KDRP". The experts identified problems that have been encountered on a daily basis since 2017: like complex decision making processes and absence of adequate project management structures and resources within ZRA.

Much has been invested to strengthen ZRA's project and contract management capabilities: technical assistance provided through the Engineer/SR, Tractebel, the DSPoE and the EU funded "Technical Support to ZRA in Project Management" from 2019 to 2022. However, it is still necessary to implement a Capacity Building Programme (ready to be financed by WB/AfDB), the operationalisation of an accountability and monitoring framework which cascades down from the Ministries to ZRA, and to ring-fence ZRA's project management team to ensure full commitment to project milestones and timelines.

Over the last 5 years the situation has improved (ZRA is learning by doing), but KDRP continues to suffer from ZRA's shortcomings, including for the management of the Engineer/SR contract (enforcement of contract's conditions), for which they are the employer. This is why the present action proposes to replace the SR with a new Consultant, with the same contracting authority as for the works contract (MoFNP).

The institutional set-up of KDRP is extremely complex, with too many stakeholders involved in the implementation of the project (Cf. Section 4.6). For example:

- There are 5 donors involved, with parallel co-financing.
- There are institutions playing different roles within the project: like ZRA (being the Employer (Contracting authority) for the refurbishment of the spillgates and the Supervisor for the plunge pool's works) and the same Consultant acting as Engineer (Supervisor) for the refurbishment of the spillgates and Supervisor Representative (SR) for the Plunge Pool Works. This is due to different General Conditions of FIDIC and EDF works contracts.
- Decisions of the S/SR are sometimes delayed because they seek "approval" of the DSPoE; with all the "expertise" involved in KDRP, there is, somehow, a dilution of responsibilities.

Aside from the technical and engineering complexities, some of the delays (and Contractor's claims) are attributable to the inefficient management of the multiple stakeholders and decision-making layers within and outside ZRA. In any case, the execution of the plunge pool works have been extremely inefficient (the cofferdam has been completed with a delay of more than 3 years).

As mentioned in Section 2.2., the design of the plunge pool works was based on geological assumptions that have proved to be insufficient and wrong: major unexpected ground conditions have been found, having led to large delays and cost overruns. It is necessary to carry out a complete review and update of the entire geotechnical design of the remaining works.

Considering past experiences, where S/SR have not been efficient providing design solutions to the Contractor, a design and build approach would be more appropriate in the context of this project. This is why, in case of termination of the current works contract, it is proposed to implement the remaining works through a D&B Contract, as mentioned in section 3.2 and 4.7.

²⁷ Cf. ATKINS, Final Report "Technical Assistance to ZRA for the Implementation of KDRP" (October 2017)

3.5 The Intervention Logic

The underlying intervention logic for KDRP is that by stabilising the plunge pool downstream of the dam wall (Output 1) and by refurbishing the spillway system (Output 2), it will be possible to open and close the spillgates in safety because the energy of the water hitting the plunge pool will be dissipated by the new shape of the Plunge Pool, which will evacuate the water according to the hydraulic models developed, the Kariba dam will be considered rehabilitated because it will match international safety standards (Outcome). By delivering this Outcome, KDRP will increase the reliability of supply and clean energy to Zambia and Zimbabwe and the risk of dam failure will be minimised (Impact).

Output 1: In the first 20 years after the dam was constructed, there was consistent heavy spilling through the six sluice gates. This has resulted in erosion of the bedrock, developing a scour plunge pool down to 80 m below the normal tail water level. There is a major concern regarding its further development from intense spillage which may occur in the case of exceptional floods.

In order to control its future development and avoid dam toe weakening, the studies came to the conclusion that the best solution consists in enlarging the plunge pool (excavation of 300,000 m³), mainly towards downstream, but also towards both banks; and protecting the fault in the downstream toe of the dam with a concrete lining. The reshaping shall indeed facilitate the evacuation of spillage flows in the downstream direction, and avoid the concentration of turbulence in a restricted and confined area. This will limit scouring and erosion that could potentially undermine the dam foundations, leading to dam failure.

Output 2: Concrete expansion (Alkali-Silica Reaction), over the last 60 years, has affected the smooth opening and closing of the sluice gates in the upper part of the concrete dam, through which the water is released into the plunge pool to manage the reservoir water levels. Without effectively functional spillway (sluice gates), the reservoir level cannot be effectively maintained in respect to the flood regime of the Zambezi River.

The purpose of the refurbishment and upgrading of the spillway system is to prevent uncontrolled loss of water in the event the gates get jammed in open position, which would result in water levels dropping below the minimum operating levels and interrupting power production; or overtopping of the dam, in case it was not possible to open the gates (with the associated risk of dam failure).

IF the required works (activities) for stabilising the plunge pool and refurbishing the spillway system are undertaken *AND* the following key assumptions, which underpin this change process, hold true:

- Sufficient funding is secured.
- Design is properly done and is consistent with geological and hydrogeological conditions.
- Successful tendering and efficient execution of works and services contracts.
- No major unexpected ground conditions (e.g. high water seepages during excavation, fractures on the foundation of the cofferdam or the main dam that would compromise its stability).
- No adverse climate conditions during construction phase.
- ZRA has the required project management capacity, responsiveness and accountability.

THEN the Outputs will be produced.

IF the Outputs are delivered *AND* the assumptions at the level of Outputs hold true (see above), *THEN* the Outcome will be realised, *BECAUSE* the dam will match international safety standards.

IF the Outcome is achieved *AND* the assumptions at this level hold true (Cf. Section 3.6.), *THEN* the action will contribute to the desired Impact. This is *BECAUSE* the risk of dam failure will be minimised.

3.6 Logical Framework Matrix²⁸

This indicative logframe constitutes the basis for the monitoring, reporting and evaluation of the intervention.

On the basis of this logframe matrix, a more detailed logframe (or several) may be developed at contracting stage. In case baselines and targets are not available for the action, they should be informed for each indicator at signature of the contract(s) linked to this AD, or in the first progress report at the latest. New columns may be added to set intermediary targets (milestones) for the Output and Outcome indicators whenever it is relevant.

- At inception, the first progress report should include the complete logframe (e.g. including baselines/targets).
- Progress reports should provide an updated logframe with current values for each indicator.
- The final report should enclose the logframe with baseline and final values for each indicator.

The indicative logical framework matrix may evolve during the lifetime of the action depending on the different implementation modalities of this action.

The activities, the expected Outputs and related indicators, targets and baselines included in the logframe matrix may be updated during the implementation of the action, no amendment being required to the Financing Decision.

PROJECT MODALITY (3 levels of results / indicators / Source of Data / Assumptions - no activities)

Results	Results chain (a): Main expected results (maximum 10)	Indicators (a): (at least one indicator per expected result)	Baselines (values and years)	Targets (values and years)	Sources of data	Assumptions
Impact	The Overall Objective (Impact) of this action is to increase the reliability of supply and clean energy to Zambia and Zimbabwe and to minimise the risk of dam failure.	1. MW of electricity generation capacity preserved in Zambia and Zimbabwe 2. Number of people benefitting in the project area through risk reduction and avoid disaster	1. 1,830 MW from Kariba Plant at Risk (2014) 2. 3,000,000 people at risk from dam failure (2014)	1. Long term reliability of 2,130 MW (2027) (includes power increase through a separate project on the Zimbabwean side) 2. 3,000,000 people no longer at risk from dam failure (2027)	1. Annual reports from line ministries and ZESCO/ZPC 1. Annual power generation figures 2. Dam 5-year safety report 2. ZRA emergency preparedness plan (EPP) for population	<i>Not applicable</i>
Outcome 1	Zambezi River Authority (ZRA) supported in carrying out the rehabilitation of the Kariba Dam through the stabilisation of its plunge pool and refurbishment of its spillway. The dam will then	1.1. Operating rule curve 1.2. % Level of risk attached to dam failure in the short and medium term	1.1. Rule curve lowered by 3.5 m by existing EPP 1.2. TBD	1.1. Rule curve restored to full supply level 1.2. TBD	1.1. Revision of the dam operational procedures showing the possibility to use the spillway system to its design value	1. Project Steering: <ul style="list-style-type: none"> • ZRA takes necessary steps to implement the project, including with governments of Zambia and Zimbabwe. • ZRA has the required project management capacity, responsiveness and accountability.

²⁸ This Logical Framework Matrix is the same revised logframe sent by the NAO to the EUD in its request for extension of the implementation period of the FA ZM/FED/031-570 (Ref. Ares(2022)4137249 – 03/06/2022)

	match international safety standards.				<p>1.1. Updated EPP reflecting successful rehabilitation adopted and implementing operating rule curve</p> <p>1.2. Dam 5-year safety report</p>	<p>2. Political aspects:</p> <ul style="list-style-type: none"> Political and macro-economic stability in the region. Commitment of Zambia and Zimbabwe towards the Zambezi River Authority remains firm (to that end a protocol supporting the project was signed in July 2014 between both governments). <p>3. Funding:</p> <ul style="list-style-type: none"> Sufficient funding is secured. ZRA takes measures to develop a security fund to cope with future rehabilitation works (those works outside of the usual maintenance works). Sufficient resources are allocated yearly by ZRA for maintenance of the Kariba Hydro-Electric Scheme.
Output 1 relating to Outcome 1	1.1 Plunge pool downstream of the dam wall stabilised (Component 2 of KDRP, financed by EU).	1.1.1. No further erosion towards the dam foundations when the spillway is used	1.1.1 Bathymetric survey of 2011	1.1.1 Plunge pool stabilised after civil works (300,000 m3 excavated)	<p>1.1.1. Certificate of final acceptance of civil works issued</p> <p>1.1.1 Monitoring reports of the plunge pool shape in time</p>	<ul style="list-style-type: none"> Sufficient funding is secured. Design is properly done and is consistent with geological and hydrogeological conditions. Successful tendering and efficient execution of works and services contracts. No major unexpected ground conditions (e.g. high water seepages during excavation, fractures on the foundation of the cofferdam or the main dam that would compromise its stability). No adverse climate conditions during construction phase. ZRA has the required project management capacity, responsiveness and accountability.
Output 2 relating to Outcome 1	1.2 Spillway system refurbished (Component 3 of KDRP, financed by WB/AfDB/SIDA).	1.2.1. Possibility to operate the spillway system at its full design capacity	1.2.1. 50% during the duration of KDRP (According to EPP)	1.2.1. 100%	1.2.1. In-Service Testing and Inspection reports of the spillway system	

4 IMPLEMENTATION ARRANGEMENTS

4.1 Financing Agreement

In order to implement this action, it is envisaged to conclude a financing agreement with the Government of the Republic of Zambia.

4.2 Indicative Implementation Period

The indicative operational implementation period of this action, during which the activities described in section 3 will be carried out and the corresponding contracts and agreements implemented, is 48 months from the date of entry into force of the financing agreement.

Extensions of the implementation period may be agreed by the Commission's responsible authorising officer by amending this Financing Decision and the relevant contracts and agreements.

4.3 Implementation of the Budget Support Component

N/A

4.4 Implementation Modalities

The Commission will ensure that the EU appropriate rules and procedures for providing financing to third parties are respected, including review procedures, where appropriate, and compliance of the action with EU restrictive measures²⁹.

4.4.1 Indirect Management with the Partner Country

This action, with the objective to increase the reliability of supply and clean energy to Zambia and Zimbabwe and to minimise the risk of dam failure, may be implemented in indirect management with the Republic of Zambia according to the following modalities:

The partner country will act as the contracting authority for the procurement and grant procedures. The Commission will control ex- ante all the procurement and grant procedures.

Payments are executed by the Commission.

The partner country shall apply the Commission's rules on procurement and grants. These rules will be laid down in the financing agreement to be concluded with the partner country.

4.4.2 Changes from indirect to direct management mode (and vice versa) due to exceptional circumstances (one alternative second option)

If the implementation of this action in indirect management with the Republic of Zambia is not possible, the action will be implemented in direct management (procurement).

The procurements would consist of:

- a) Additional works including possible redesign
- b) Services for: i) supervisor representative and, ii) legal services

These procurements will contribute to achieve the output 1 related to outcome 1 of this Action.

²⁹ www.sanctionsmap.eu. Please note that the sanctions map is an IT tool for identifying the sanctions regimes. The source of the sanctions stems from legal acts published in the Official Journal (OJ). In case of discrepancy between the published legal acts and the updates on the website it is the OJ version that prevails.

4.5. Scope of geographical eligibility for procurement and grants

The geographical eligibility in terms of place of establishment for participating in procurement and grant award procedures and in terms of origin of supplies purchased as established in the basic act and set out in the relevant contractual documents shall apply.

The Commission's authorising officer responsible may extend the geographical eligibility on the basis of urgency or of unavailability of services in the markets of the countries or territories concerned, or in other duly substantiated cases where application of the eligibility rules would make the realization of this action impossible or exceedingly difficult (Article 28(10) NDICI-Global Europe Regulation).

4.6 Indicative Budget

Indicative Budget components	EU contribution (amount in EUR)	Third-party contribution³⁰
Specific objective: Reshaping of the Plunge Pool composed of:	30 000 000	
Indirect management with the Republic of Zambia	30 000 000	
- Works' Contract for plunge pool reshaping, including design	26 000 000	
- SR for Plunge Pool Reshaping	3 000 000	
- Legal representation / Legal advice / Conciliation and/or Arbitration services	1 000 000	
Evaluation – cf. section 5.2 Audit – cf. section 5.3	Covered by FA ZM/FED/031-570	N/A
Contingencies	Covered by FA ZM/FED/031-570	N/A
Totals	30 000 000	EUR 258 700 000, incl: WB: USD 75 000 000 AfDB: USD 75 000 000 SIDA: USD 25 000 000 ZRA: USD 19 200 000 EU: EUR 83 471 431 from the 11th EDF ³¹

4.7 Organisational Set-up and Responsibilities

The organisational set-up and responsibilities shall remain the same as set up in the Financing Agreement ZM/FED/031-570 (Cf. section 2.9 of Annex I and Appendix 3), with the exception of changes regarding the SR and the clarification that the EU shall be invited to the project steering committee meetings as observer:

³⁰ Third-party funds mainly contribute to “Institutional support” (Component 1) and “refurbishment of the spillway” (Component 3).

³¹ Upon request of the Zambian Ministry of Finance and National Planning, the WB and AfDB have authorised the mobilisation of USD 20 000 000 from the Component 3 “Refurbishment of the spillway” to the Component 2 “Plunge Pool Reshaping”. However the amendment to the Financing Agreement is still not signed by the Zambian Ministry of Finance and National Planning.

The **Financing partners** are responsible for funding of KDRP according to the initial cost assessment and subsequent funding agreement. They also ensure the project implementation is sound and is done according to their respective procedures.

The **Governing Body** is in charge of formalising the high level implementation arrangements of KDRP. It is composed by the Council of Ministers: two Ministers from the Zambian Government and two Ministers from the Zimbabwean Government.

The Governing Body is supported by the **ZRA Board of Directors**, in charge of overseeing operations. The board is composed of the Permanent Secretaries of the Ministries of Energy and Finance, along with two independent Board members from each of the contracting states.

The **Project Steering Committee** is the ZRA Board, in charge of approving project plan and budget and of communicating with the governments of Zambia and Zimbabwe. The EU shall be invited to the project steering committee meetings as observer.

The **permanent technical advisor** to the ZRA is the engineering consultancy company Tractebel Engineering. This company was the designer of the Kariba Dam when built and has continued to provide technical advice on operation and maintenance, including the 5 year dam safety reviews.

The implementation technical advisor to the ZRA is made up of an independent **Dam Safety Panel of Experts** (financed by WB/AfDB/SIDA/ZRA), that provide review and advisory functions during implementation of KDRP.

The **Contracting authority for the plunge pool works and SR services** is the Ministry of Finances and National Planning of Zambia.

The **supervisor, implementing partner for the plunge pool works** and responsible for the overall implementation of KDRP is ZRA (Cf. Section 2.2 and 3.4).

The **SR** is financed by WB/AfDB/SIDA/ZRA. Upon completion of the grout curtain below the cofferdam, a new SR procured under this action will take over SR services (Cf. Sections 2.2 and 3.2).

The **works' Contractors** are responsible for the execution of the works on-site. The scope of the works is split between two large contracts: one for the plunge pool reshaping (financed by EU) and another one the refurbishment of the spillway (financed by WB/AfDB/SIDA).

The **technical audit consultant to the EU** is responsible for providing audit missions and technical advices to the EU regarding plunge pool reshaping works.

As part of its prerogative of budget implementation and to safeguard the financial interests of the Union, the Commission may participate in the above governance structures set up for governing the implementation of the action.

5 PERFORMANCE MEASUREMENT

5.1 Monitoring and Reporting

The day-to-day technical and financial monitoring of the implementation of this action will be a continuous process, and part of the implementing partner's responsibilities. To this aim, the implementing partner shall establish a permanent internal, technical and financial monitoring system for the action and elaborate regular progress reports (not less than annual) and final reports. Every report shall provide an accurate account of implementation of the action, difficulties encountered, changes introduced, as well as the degree of achievement of its results (Outputs and direct Outcomes) as measured by corresponding indicators, using as reference the logframe matrix.

The Commission may undertake additional project monitoring visits both through its own staff and through independent consultants recruited directly by the Commission for independent monitoring reviews (or recruited by the responsible agent contracted by the Commission for implementing such reviews).

Roles and responsibilities for data collection, analysis and monitoring:

The implementing partner shall be in charge of the data collection and reporting on the on indicators of the logframe matrix, including the collection of baselines and data collection. This will be done on an annual basis by the implementing partner with their own means.

It is foreseen that the day-to-day technical and financial monitoring will be a continuous process as part of the supervisor (Implementing partner) responsibilities.

An independent technical auditor has been contracted by the Commission under FA ZM/FED/031-570.

The design consultant, Tractebel Engineering France / Coyne et Bellier, will continue to be advisors to ZRA and carry out its own monitoring of the dam during the implementation of the project.

5.2 Evaluation

Having regard to the nature of the action, a final evaluation will be carried out for this action or its components via independent consultants contracted by the Commission.

This final evaluation will be carried out for accountability and learning purposes at various levels (including for policy revision), taking into account in particular the fact the uniqueness of the project and its sustainability.

The Commission shall inform the implementing partner at least one months in advance of the dates envisaged for the evaluation missions. The implementing partner shall collaborate efficiently and effectively with the evaluation experts, and inter alia provide them with all necessary information and documentation, as well as access to the project premises and activities.

The evaluation reports may be shared with the partners and other key stakeholders following the best practice of evaluation dissemination. The implementing partner and the Commission shall analyse the conclusions and recommendations of the evaluations and, where appropriate, apply the necessary adjustments.

The financing of the evaluation will be covered by FA ZM/FED/031-570.

5.3 Audit and Verifications

Without prejudice to the obligations applicable to contracts concluded for the implementation of this action, the Commission may, on the basis of a risk assessment, contract independent audit or verification assignments for one or several contracts or agreements.

The financing of any audits will be covered by FA ZM/FED/031-570.

6 STRATEGIC COMMUNICATION AND PUBLIC DIPLOMACY

The 2021-2027 programming cycle will adopt a new approach to pooling, programming and deploying strategic communication and public diplomacy resources.

It will remain a contractual obligation for all entities implementing EU-funded external actions to inform the relevant audiences of the Union's support for their work by displaying the EU emblem and a short funding statement as appropriate on all communication materials related to the actions concerned. This obligation will continue to apply equally, regardless of whether the actions concerned are implemented by the Commission, partner countries, service providers, grant beneficiaries or entrusted or delegated entities such as UN agencies, international financial institutions and agencies of EU member states.

However, action documents for specific sector programmes are in principle no longer required to include a provision for communication and visibility actions promoting the programmes concerned. These resources will instead be consolidated in Cooperation Facilities established by support measure action documents, allowing Delegations to plan and execute multiannual strategic communication and public diplomacy actions with sufficient critical mass to be effective on a national scale.

Appendix 1 REPORTING IN OPSYS

An Intervention (also generally called project/programme) is the operational entity associated to a coherent set of activities and results structured in a logical framework aiming at delivering development change or progress. Interventions are the most effective (hence optimal) entities for the operational follow-up by the Commission of its external development operations. As such, Interventions constitute the base unit for managing operational implementations, assessing performance, monitoring, evaluation, internal and external communication, reporting and aggregation.

Primary Interventions are those contracts or groups of contracts bearing reportable results and respecting the following business rule: ‘a given contract can only contribute to one primary intervention and not more than one’. An individual contract that does not produce direct reportable results and cannot be logically grouped with other result reportable contracts is considered a ‘support entities’. The addition of all primary interventions and support entities is equivalent to the full development portfolio of the Institution.

The present Action identifies as

Group of actions level		
<input checked="" type="checkbox"/>	Group of actions	Actions reference (CRIS#/OPSYS#): Present action: OPSYS number ACT-61056 Other action: CRIS number FED/031-570