THE ENERGY TRANSITION: EXPECTATIONS AND REALITIES IN AFRICA

Organised By

GROUPE DE LA BANQUE AFRICAINE DE DÉVELOPPEMENT
AFRICAN DEVELOPMENT BANK GROUP

KAPICHIRA DAM POWER STATION RESTORATION: RECOVERY FROM DISASTER- CEO'S PERCEPTION

Speaker:

ENG. WILLIAM LIABUNYA -EGENCO

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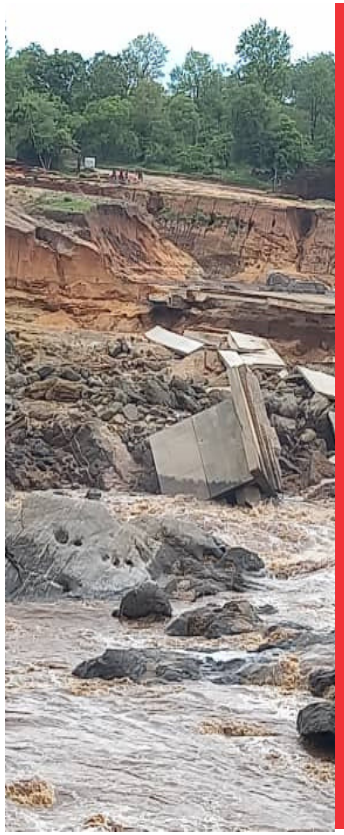
BACKGROUND



- Cyclone Ana struck the Southern part of Malawi Coming from the Indian Ocean across Mozambique, and affected one of our Hydro Power Station (129.6MW Kapichira Power Station). This was about 1/3 of the Company's installed generation capacity, and approximately 1/4 of the country's installed capacity
- With 30% of Malawi's installed generation capacity lost due to Kapichira being out, this had a significant effect on the national economy. Manufacturing suffered a lot

BACKGROUND

- SVTP (irrigation) intake (under construction was washed away upstream of the fuse
- Restricted fuse plug and inadequate spillway gates were operational prior to the cyclone
- Training Dike & Dam fuse were breached - left side of the dam (active storage zone) silted up and flow to its intake was curtailed
- Power station access road was washed away in three sections

BACKGROUND

Before

After

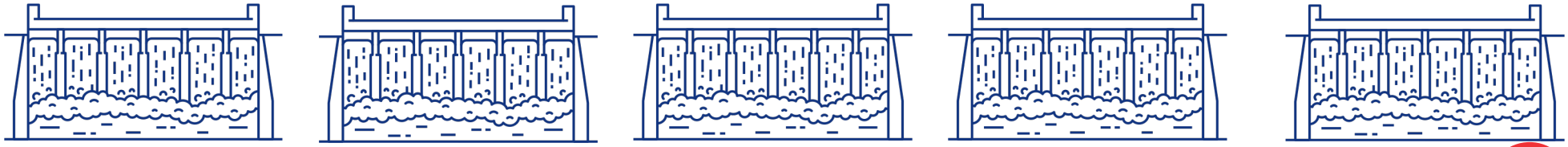
Emergency Response Procedures

#1

EGENCOs Business Continuity Management System had been developed but was yet to be rolled out.

#2

Chief Risk Management Officer alerted the Head of Business Continuity Control Center (BCCC) of the potential flooding. After being alerted by the Head of BCCC, CEO has activated the BCC and coopted additional members.



Immediate Actions

DAY 1

Powerhouse was sealed during storm to protect electromechanical equipment. Civil engineers conducted preliminary desk assessments.

DAY 14

Site assessments were conducted within 48 hours having crossed rivers on foot. Assessment reports (damage and cost to repair) were submitted to EGENCO Board and Government within two weeks.

>DAY 15

Appointed a PIU.

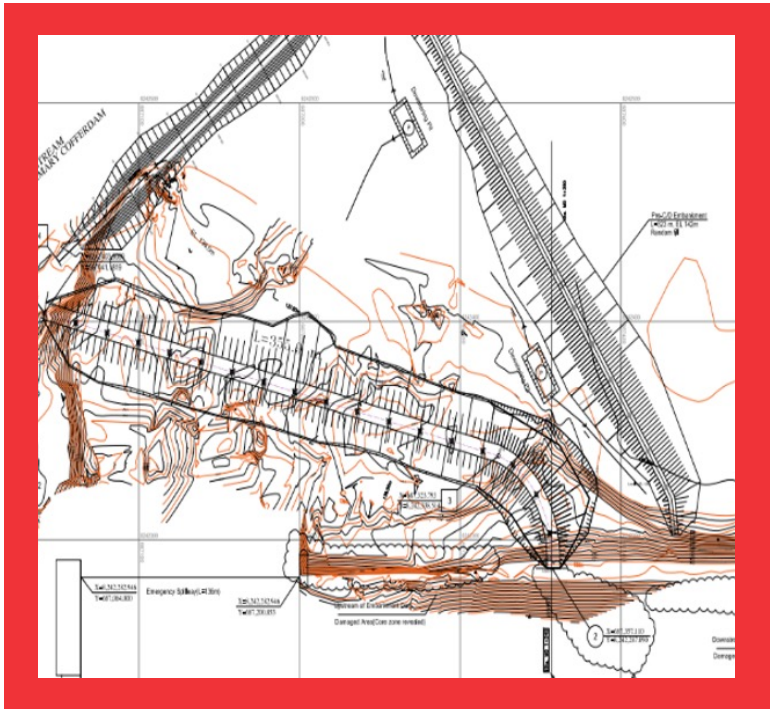
Recovery Option A

EGENCO developed following recovery schedule:

- Construction of random earth-fill Cofferdam (1000m long, 25m wide from an elevation of 132m.a.s.l. to 149m.a.s.l., rebuilding training dyke and upgrading of the Stage 1 Cofferdam)
- Repairing of the spillway gates
- Desilting of the left bank channel
- Repair of the eroded d/s and reinforcement of u/s slope of right dam embankment
- Upgrade of cooling water system

Estimated Duration: **7 Months** | Estimated cost **US$ 14 million**

Recovery Option B



World Bank assessment recommended the following:

- Construction of CSD Cofferdam (350m long, 40m wide from an elevation of 130masl to 148masl) through SVTP project
- Repairing of the spillway gates
- Desilting of the left bank channel
- Repair of the eroded d/s and reinforcement of u/s slope of right dam embankment
- Upgrade of cooling water system

Estimated Duration: **4 Months** | Estimated cost **US$ 3 million**

Project Realisation

- Govt chose option B as it was envisaged to be cheaper and had a shorter lead time
- WB offered financing
- Govt through Ministry of Finance entered into an agreement with World Bank for financing of the Malawi Emergency Power Restoration Project in June 2022 (**US$ 44.7 million**)

Project Implementation

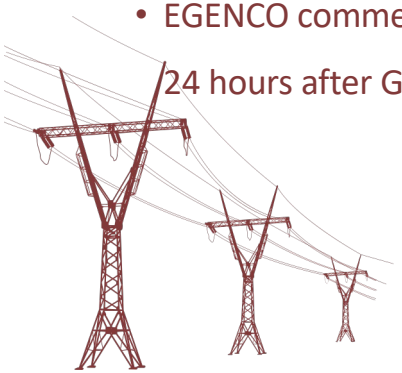
- Designing works for the CSD Cofferdam (SVTP project) commenced end July 2022
- Desilting works by EGENCO commenced in August and completed mid-October 2022
- Repair and restoration of Spillway Gates was completed by mid November 2022
- CSD foundation works commenced September 2022
- Access road bridge was constructed by EGENCO and completed mid-December 2022
- By mid-November, it was apparent that the CSD cofferdam would not meet the December 2022 deadline due to uncompleted designs and failure to map rock foundation by the Engineering Consultant
- Government of Malawi approved that EGENCO implements their originally proposed option although expensive. Option A (Construction of 1000m long earthfill Cofferdam)

Project Implementation

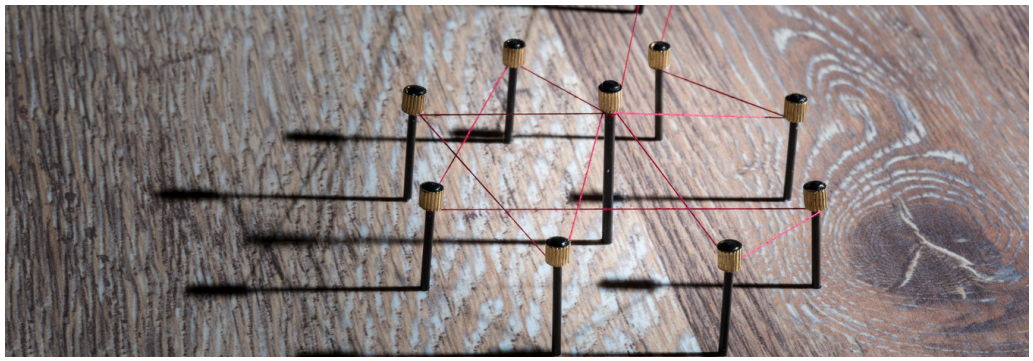
- Divided the Project into two Phases
  - Generation restoration
  - Complete Dam reconstruction
- Budget for modified Recovery Option A was US$ 11 million.
- World Bank objected implementation of Recovery Option A and threatened to pullout of the project
- Works set out on 29 November 2022 to 7 December 2022
- EGENCO commenced the construction works on 8 December 2022 working 24 hours after Govt approved night work in the reservoir

Financing:

- Required to borrow US$.5 million
- Government's Rural Electrificatyion Fund (MAREP) first Option
- Bank Loan and Overdraft too expensive
- Use internal resources and put on hold other Administrative procurements



Stakeholder Management



Public anger for continued blackouts after December 2022

President had announced more than twice to the nation that Blackouts will be over by December 2022. Involved Presidential Advisors and Minister and Principal Secretary in PIU

Weekly meetings have been planned and a communications plan has been developed

Remedial Works

14/02/23

Initial impoundment completed

Seepages observed on S2 and S4

04/04/23

Remedial works on S2 and S4

05/04/23

Successful impoundment and power restoration starting with 2 of 4 units

10/05/23

Complete restoration and kickoff of planning for complete reconstruction (Phase II)

The role of leadership in disaster recovery project management

Some of the key lessons learnt have included the following:

- Never surrogate control of projects to third parties
- For effective implementation of emergency projects, local operational expertise is crucial
- Frequent conflicts due to lack of separation of roles and responsibilities
- Need to have clear priorities . Conflicting priorities arise when objectives are not clear. World Bank treated project as green field project whereas EGENCO as emergency project
- Need for and strict implementation of comprehensive dam safety plans and procedures for handling floods

Managing Investor & Stakeholder Long-term Expectations

GoM had no direct funding for the project hence borrowing from World Bank. Implementing agency had to fulfil World Bank requirements.

- #1

Adherence to Safeguards instruments. EGENCO employed

- International Dam Expert
- Sediment Management Specialist
- Procurement Specialist
- Archaeologist
- Social Safeguard Specialist
- Owner's Engineer for Phase II
- ESIA Consultant for Phase II & Panel of Experts (POE)

- #2

Regular Stakeholder Engagement

- African Parks through SVTP on environment
- GoM (Weekly meetings)

CONCLUSION

Implementing emergency projects requires comprehensive assessment of the damage and prioritisation of repairs based on the implementing agency's needs. Success requires:

- Comprehensive communication and collaboration amongst all stakeholders
- Utilisation of local expertise and provide adequate resources
- Timely implementation of contingency plans to address unforeseen circumstances
- Morale Boost and confidence gained for using local resources

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KEY TAKEAWAYS/ RECOMMENDATIONS

- Utilities to develop skills and talent within themselves and take challenges to solve our problems
- Solutions are within ourselves and in our utilities
- While development patnerships are key to development of the utilities, in emmergency we have to still have to take the lead

THANK YOU

Global Energy Interconnection
Development and Cooperation Organization
全球能源互联网发展合作组织

For queries email at :ceo@egenco.mw

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