

Evaluation Summary

Kpong generating station retrofit project

Country: **Ghana**

Sector: **AFR**

Evaluator: **BRLi**

Date of the evaluation: **August 2022 to April 2023**

Key data on AFD's support

Projet numbers: CGH1098 01

Amount: 50 Millions €

Disbursement rate: 100%

Signature of financing agreement: 30/11/2012

Completion date: 06/02/2020 (Final installment)

Total duration: 8 Years from the signature of the loan agreement.
Actual construction time was 6 years

Context

In 1966, following the commissioning of the Akosombo Dam (1020 MW), Ghana's hydroelectric power covered all the country's electricity needs and ensured exports. In 1982, the Kpong Dam (160 MW) was added to this capacity. In recent years, however, Ghana's energy needs have increased significantly (+8% / year since 2017), in addition to the high cost of imported fossil fuel, making the country particularly vulnerable to the energy crisis.

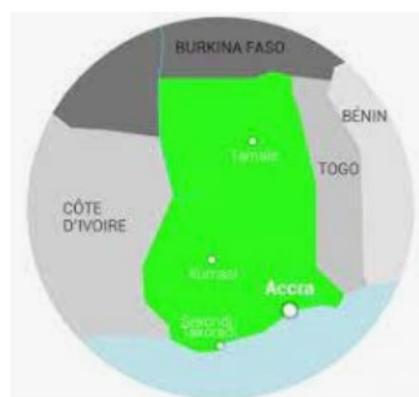
Actors and operating method

AFD granted a 50 million euro loan, in the form of a sovereign loan, to the Government of Ghana (GoG) for on-lending to the Volta River Authority (VRA). AFD has partnered VRA since 1990 and who has been the major electricity producer in Ghana. VRA is 100% State-owned and in charge of operating two of the three main hydroelectric dams in Ghana.

This loan aimed to finance the retrofitting of the Kpong dam; as well as conduct technical; environmental and social feasibility studies; and capacity building for VRA.

The project was embarked on by VRA, with the Engineering, Procurement & Construction (EPC) and Owners Engineers (OE) contracts awarded after an international competitive bidding process.

- Andritz Hydro was responsible for the Engineering, Procurement Construction (EPC), with Hatch Energy Ltd (OE) being in charge of the project supervision and reporting.
- Tractebel conducted the technical and economic feasibility studies for the new dams. Mott McDonald conducted the environmental and social studies and Société Canal de Provence conducted the irrigation studies.
- PWC designed and developed a financial modelling tool and built capacity for VRA.



Objectives

The main objective of the project was to contribute to the reliability and competitiveness of electricity in Ghana through the achievement of 3 specific objectives:

- The retrofitting of the Kpong Hydropower Plant
- The update of the feasibility studies for the construction of proposed dams
- The strengthening of VRA's financial modelling capabilities to enable it to borrow on non-sovereign loans in the future

Outputs

The rehabilitation of the Kpong hydropower plant has allowed, despite some challenges, the retrofitting and modernization of the four Kaplan turbines of 44 MVA, the four alternators and all the electrical and mechanical auxiliaries.

The feasibility studies for proposed dams carried out in 1993 on the Pwalugu, Kulpawn, Daboya and Juale sites, were updated and completed, in addition to environmental and social impact studies; preliminary and detailed designs for the Pwalugu site considered to be preferable (multi-purpose project, redesigned after environmental study).

VRA benefited from capacity building of some of its technical and financial personnel through knowledge transfer during the development of the financial modelling tool. The tool is still in use.

Performance assessment

Relevance

Highly satisfactory (A) The project is considered relevant as it was in line with the main objectives of national policies, notably the Ghana National Energy Policy, the priorities of AFD's Country Intervention Framework and AFD's 2019-2022 energy transition strategy. It also allowed to capitalize on studies previously financed by AFD and to materialize them through the financing of strategic infrastructures for the country.

Internal and external Coherence

Satisfactory (A-). The project was consistent with the needs of the sector. The project also is in alignment with AFD's intervention priorities in Ghana in the energy sector. Finally, the project contributes to five of the six pillars of VRA's BRAISE strategy (Human Capital Development; Financial Recovery; Improving Operational and Project Implementation Efficiency; Strengthening its Market Leadership; Ensuring Sustainable Business Development).

Effectiveness

Highly satisfactory (A). The objective of the rehabilitation of the Kpong Dam was to ensure reliable, affordable and low-carbon electricity for the next 30 years. The technical audit carried out in the 1990s with AFD funds raised awareness among the Ghanaian counterpart of the need to not only expand but also consolidate its existing hydroelectric infrastructure to prevent frequent breakdowns and ever-increasing maintenance costs.

Efficiency

Moderately satisfactory (B). While the project was generally on budget, it was delayed by almost two years, mainly due to technical difficulties (equipment were more damaged than expected), resulting in additional costs and delays. It was also partly due to the COVID 19 epidemic. The sovereign loan instrument was limited to show flexibility by AFD increasing its participation when necessary.

Impact

Very Satisfactory (A) The positive impacts linked to the project are significant both in terms of the rehabilitation of the power plant due to its automation, and the improved reliability of the infrastructure, thereby securing its contribution to VRA's added value and its continued development, within the framework of its public service mission. It also enables Ghana to contribute to the reduction of greenhouse gas emissions.

Sustainability

Satisfactory (A). The project resolved all technical difficulties and ensure the proper functioning of the infrastructure in a sustainable manner to provide reliable, affordable and low-carbon electricity for the next 30 years. This will allow VRA to consolidate its leading position in the electricity market which is open to competition which is open to competition from independent power producers. However, the implementation of the Pwalugu component of the project due to lack of funding.

Added value of AFD's contribution

Satisfactory (A). AFD contributed 50 millions to the implementation of the project and provided support to VRA both in the management of its Owners Engineer (Hatch) and EPC (Andritz) contracts. It also accompanied VRA in the search for additional funding to complete the Kpong rehabilitation project and played an important role as a catalyst for the Pwalugu studies, leading to improved technical and environmental design. All of the actors interviewed emphasized the quality of the cooperation with AFD, which appears to be a partner recognized by the various stakeholders.

Conclusions and lessons learnt

This project can be considered a success on all its components. Although the execution of the project was longer and more expensive than expected, the rehabilitation of the Kpong Hydro Plant will secure a source of green electricity for several decades for Ghana. It also provides VRA with a more efficient Plant and modernized tools to manage the plant's operations.

Prospective studies conducted by Tractebel to identify new sites for dam construction, as well as feasibility studies, have led to the identification of the site for the Pwalugu multi-purpose dam (power generation, flood management and irrigation) and the selection of the technical option with the lowest environmental impact.

For future projects, the following recommendations can be made:

- Develop AFD's expertise in hydroelectric dam rehabilitation in order to refine the upstream definition of the projects and anticipate the risks (particularly financial) associated with the occurrence of technical problems.
- Further define the mechanisms for releasing funds in future loan contracts in order to secure the timeframe for on-lending.
- Identify other methods of intervention that allow greater flexibility and anticipation of additional project costs
- Improve gender mainstreaming at all stages of the projects (systematize the consideration of gender issues in the preparatory phase, monitor it during the implementation phase), promote gender equality for the local people and women's empowerment through the projects and incorporate funding from the gender analysis into VRA's Gender Action Plan. This requires gender-focal persons within VRA with the necessary skills.
- Ensure sufficient training to guarantee the sustainability of the financial tools developed.
- Based on the feasibility and environmental studies, support VRA in the search for funding for the Pwalugu multi-purpose project and position AFD in the monitoring of this project.
- Finally, the establishment of an arbitration structure by an independent expert between VRA and the contracting companies was a very positive and facilitating element in the implementation of the Kpong project, and can be retained for similar projects.