

Evaluation Summary

Project Name: 22 MW HPP Jabban

Country: **Pakistan**

Sector: **Energy**

Evaluator: **INTEGRATION environment & energy**

Date of the evaluation: June 2021 to September 2021

Key data on AFD's support

Project number: CPK 1006

Amount: € 26.5 mill

Disbursement rate: 100%

Signature of financing agreement: July 26, 2010

Completion date: 2014

Total duration: 3.5 years

Context

The Pakistani energy sector suffers under insufficient installed capacities leading to power shutdowns and respective economic losses. The high portion of thermal power puts high burden on the nations debt as the tariffs are high and with it the subsidies and the import of considerable amounts of fossil fuel. The thermal stations generate a substantial amount of greenhouse gases.'.

AFD offered the GoP to support its efforts in increasing the renewable energy portion in the energy mix and the generation capacity in the national grid through funding of the rehabilitation of 22 MW Jabban hydropower station, which was severely damaged by a fire incident in 2006.

The project aimed to increase the capacity of Jabban hydropower station from 19.6 to 22 MW, generate about 122 GWh/a of clean energy and to reduce greenhouse emissions by about 51,000 tons/a.

In addition, the project intended to create 500 direct jobs during construction, and 80 permanent jobs in operation of the plant. Creation of another 500 formal and informal jobs was assumed in the vicinity of the power stations and due to the availability of more power in the grid.

Actors and operating method

Main actors were Water and Power Development Authority (WAPDA) and AFD. WAPDA was responsible for the planning and supervision of the project while AFD provided the funding.



Objectives

- To rehabilitate the existing Jabban hydropower station to maintain the utilization of cheap hydropower potential at Jabban site and to provide more reliable and consistent power to the National Grid for at least another 50 years (at another place 30 years of project lifetime as mentioned, which seems not very realistic)
- To enhance the capacity of the Power Station from 19.6 MW to 22.0 MW by using more efficient turbines and other electromechanical equipment.
- Later, additional objectives were added by AFD:
- Contribute to greenhouse gases reduction within the energy sector
- Set up a long-term partnership relation between AFD and public entities in energy and hydroelectric sector in Pakistan.

Expected outputs

- Rehabilitate infrastructures (more than 70 years old)
- Increase generation capacity from 19.6 MW to 22 MW, using new generation turbines

Performance assessment

Relevance

The Pakistani energy sector suffers under insufficient installed capacities leading to power shutdowns and respective economic losses. The high portion of thermal power puts high burden on the nations debt as the tariffs are high and with it the subsidies and the import of considerable amounts of fossil fuel. The thermal stations generate a substantial amount of greenhouse gases. Relevance of the project is valued at being ‘**Highly Satisfactory**’.

Effectiveness

The project succeeded in achieving all expected results on all log-frame levels. With respect to the defined purpose, the respective indicator was even exceeded. The project provides clean electric energy on reliable basis. Balancing the achievements against deficits leads to a rating of ‘**Highly Satisfactory**’.

Efficiency

Overall, the project implementation, management, and monitoring went well. In addition, the project was managed efficiently by WAPDA. Problematic was the planning stage which negatively influenced the subsequent phases. The CBA indicates positive results with main risk factors of lower revenues due to lower generation or lower feed-in tariff. The final rating is ‘**Satisfactory**’.

Impact

The most positive impacts of the project are related to socio-economic benefits and socio-environmental benefits. Apart from the avoidance of about 78,535 t of greenhouse gases per year, the station reduces the electricity cost by about 493.8 Mill. PKR/a and provided accessibility to energy for about 242,302 people. Another important direct impact is creation of jobs (500 in construction, 101 in operation and about 500 in the informal and formal sector). The project's impact is rated ‘**Satisfactory**’.

Sustainability

WAPDA has the technical capacity to sustainably operate a smaller project like 22 MW Jabban. The CBA proves its economic and financial sustainability. The set mechanism, of determining the PPA and related tariff ensures financial and commercial sustainability. There are no imminent prospects of changing impacts such as exploitation of other energy sources, re-Talibanization and/or change of irrigation pattern, therefore there is less likely that the current benefits would change due to external factors in near future. The overall score arrives at ‘**Satisfactory**’.

Added value of AFD's contribution

The comprehensive design of rehabilitation including high-quality equipment resulted in higher generation capacity and demonstrated ways of how to rehabilitate outaged hydropower stations.

Conclusions and lessons learnt

Conclusions

- The project is full in line with AFDs country strategy, the strategy of the GoP and other international Donors engaged in the sector.
- The expected capacity increase has been achieved, the expected generation output is even exceeded. This leads also to a higher avoidance rate of CO₂ emissions
- The financial analysis outcome is indicating that the project is financially viable and sustainable. The breakeven point (BEP) reaches on completion of 12th year of the lifetime of the project including carbon revenue. The BEP is in the year 14 of the lifetime without carbon revenues
- The socio-economic indicators have been achieved

Lessons learnt

- The importance of proper planning and preparation of a project cannot be overestimated.
- The project demonstrated in a good way that rehabilitation of outdated stations is possible, can save money and contributes to avoid greenhouse gases (e.g., usage of less concrete and steel).
- A project needs a sound environmental analysis to avoid or mitigate environmental damages.
- Sound implementation documentation helps to analyse project performance
- A project monitoring Consultant may have helped to streamline the implementation, to identify shortcomings and to ensure a proper documentation of the implementation

Recommendations

- Project planning and design should be initiated and executed in parallel with the arrangement of the funding
 - Jabban canal should be equipped with a skimmer to avoid trash entering the intake area.
 - Collected trash should not be returned to the canal but disposed off in a proper way. Financing and equipment should be provided by WAPDA
- The intake should be equipped with automatic cleaner for the trash rakes to avoid blocking of the trash rakes which causes considerable losses in energy generation and revenues.