



Report Number : ICRR0021062

1. Project Data

Project ID P132289	Project Name Kali Gandaki Rehab	
Country Nepal	Practice Area(Lead) Energy & Extractives	
L/C/TF Number(s) IDA-52460	Closing Date (Original) 30-Jun-2017	Total Project Cost (USD) 30,364,600.00
Bank Approval Date 15-May-2013	Closing Date (Actual) 30-Jun-2017	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	27,260,000.00	0.00
Revised Commitment	19,708,497.66	0.00
Actual	4,852,393.72	0.00

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2. Project Objectives and Components

a. Objectives

The objectives of the project in the Financing Agreement (page 5) and in the project appraisal document (PAD, page 6) is to “improve the reliability of power supply of Kali Gandaki A Hydropower Plant through rehabilitation and safety measures, and to improve the response capacity of the Recipient in case of an emergency.”

b. Were the project objectives/key associated outcome targets revised during implementation?



No

c. Will a split evaluation be undertaken?

No

d. Components

Component A: Civil Works (estimated cost at appraisal – US\$9.09 million, at project close – US\$0) – 1) Headworks modification through installation of curtain wall at intake, and deflector at desander basin for improved uniformity of velocity in desander basin for reduction in sedimentation flow into power house, 2) Dam safety monitoring and instrumentation improvement (including real-time sediment monitoring and expanded siren system), 3) Maintenance works for slope stabilization, rock scour rehabilitation below dam, and tailrace improvement for reducing cavitation in turbines.

Component B: Electro-Mechanical Works (estimated cost at appraisal – US\$16.6 million, at project close – US\$3.98) – 1) Mechanical works to repair main inlet valves and turbines to improve overall plant operation, trash rack machine supplied and fitted to reduce floating debris, and decrease maximum water level difference between intake and desander for reduction in cavitation, 2) Electrical works repaired and control system of powerhouse and dam upgraded for improvement of overall plant operation.

Component C: Technical Assistance & Capacity Building (estimated cost at appraisal – US\$4.70 million, at project close – US\$0.87) – 1) Consulting services for preparing studies and technical design for civil works and electro-mechanical components, assist with implementation and procurement as well as finalization of Operations Manual, support preparation of emergency preparedness plans, and implementation plans, 2) Capacity development for training NEA employees for hydropower operations and management, 3) Catchment area treatment plan to address work related to sedimentation, 4) Asset management to help upgrade implementation agency systems.

Component D: Contingent Emergency Response (estimated cost at appraisal – US\$0 million, at project close – US\$0) – Funding facility to GoN for supporting reconstruction in the event of an emergency.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost. The total project cost including contingencies estimated at appraisal was US\$30.36 million. The actual costs incurred by project closing is US\$ 6.3 million. This significantly lower actual project expenditure is primarily due to: a) significantly incomplete activities at project closing, which were part of the original design, b) formal cancellation of several activities under Component C, and c) cost-savings resulting from the procurement approach for parts of component B. The project was formally restructured on March 23, 2016, when the activity – Asset Management to help upgrade implementation agency systems, under Component C – was dropped from the project, and the loan amount was further adjusted to reflect cost savings under Component B. The resulting reduction in total project is estimated in the ICR at US\$ 9.02 million.



Financing and Borrower Commitment. The IDA Credit approved by the Board on May 15, 2013 was for US\$27.26 million, with the remainder of the project cost of US\$ 3.11 million funded by the borrower, the Government of Nepal (GoN), through its National Electricity Authority (NEA). The project restructuring of March 23, 2016 resulted in the cancellation of US\$ 7.5 million of the IDA credit (of the US\$ 9.02 of reduction in total project costs). The restructured IDA credit following the partial cancellation was US\$ 19.76 million. The undisbursed IDA allocation at project closing (adjusted for the restructuring) was US\$14.86 million. The cancellation of the project costs and change in the project scope did not change the project objectives or the results framework.

Dates. The IDA credit closed on June 30, 2017, which was the original closing date established at appraisal, although a substantial amount of activities that were included in the project design were not completed by the project closing date.

3. Relevance of Objectives

Rationale

The relevance of the objectives remained high throughout the duration of the project. Based on the project documents, Nepal's total installed power generation capacity in 2013 was 714 megawatts (MW), of which over 90 percent was based on hydropower (PAD, pg. 2). While the country has considerable estimated hydropower potential of some 43,000 MW, less than 1.5 percent had been developed to produce electricity (PAD, pg. 3). Of the resources developed, the 144 MW Kali Gandaki hydropower plant was a significant operation that represented 40 percent of the electricity supplied by the project implementing agency, National Electricity Authority (NEA), or 25 percent of the country's total power production (PAD, pg. 5).

At the time of appraisal, Nepal was struggling to make investments in generation capacity. According to project documents, a large number of generation licenses that were issued primarily to the private sector (91%) for developing hydropower only resulted in 92 MW of additional capacity by Independent Power Producers (IPPs) since 2001 (PAD, pg. 3). Furthermore, evidence indicates that no significant generation capacity was added since a 2008 commissioning of a 70 MW power plant (Marshyangdi). The World Bank team also identified at the time of appraisal that no major projects had advanced beyond the preparation stage. These supply-side issues, in the face of electricity demand growth at 9 percent over the previous decade (driven by economic growth and increase in access), led to 12 to shortages that resulted in 18 hours of load shedding per day during the peak-demand winter months (PAD, pg. 2).

Considering the above circumstances, Nepal had a limited set of options to address the capacity shortfall in the near to medium term, and improve the reliability of the power system. Therefore, the importance of maintaining existing generation assets, and optimizing their utilization were identified as essential strategic actions that must be undertaken in order to bridge the immediate shortfall until additional generation capacity is brought on-line. The Kali-Gandaki A power plant was identified as a "prime example" (PAD pg. 4), since it made-up a sizable proportion of the generation assets in Nepal (largest power station in the country) and had fallen into disrepair. Therefore, the urgent rehabilitation and repair of the Kali-Gandaki A power plant was a



strategic priority. This would buy time reducing disruptions to electricity services until the construction of additional capacity.

The project continued to be well aligned through its duration with higher level objective established by both the Government of Nepal (GoN) and the World Bank. The GoN's 2016 note 'National Energy Crisis Mitigation and Electricity Development Decade' not only highlighted the additional generation capacity requirements, but also emphasized the need to ensure efficiency and reliability of existing power plants (ICR pg. 10). The World Bank's interim strategies from 2009-11 and 2012-13 included, among other things, a focus on improving the reliability of power supply and enhancing generation capacity (PAD pg. 5, ICR pg. 10). Originally, Kali Gandaki A Hydropower Plant Rehabilitation Project was part of the World Bank-supported Power Development Project (P043311), which was restructured in 2012, and activities related to Kali Gandaki A rehabilitation, which were identified to be substantial, were therefore, organized under a stand-alone project.

In addition to the directly related issues indicated above, Nepal is also at risk for extreme natural events such as earthquakes, which can then trigger mudslides and avalanches due to the mountainous topography of the country. The earthquakes are primarily the result of Nepal's geographical location where the Indian and Euroasian tectonic plates meet, which gives rise to the Himalayan mountain range. In addition to the loss of human life and injury, these natural disasters can also cause significant damages to power systems and other infrastructure. In fact, Nepal was struck by two major earthquakes in 2015 which caused damages, among other things, to some of the power plants (ICR pg. 12).

On the basis of the evidence provided, the relevance of the project continued to be high at the time of appraisal and at project close.

Rating

High

4. Achievement of Objectives (Efficacy)

Objective 1

Objective

To improve the reliability of the power supply of the Kali Gandaki A Hydropower Plant through rehabilitation and safety measures.

Rationale

Based on the theory of change (ToC) in the ICR, one of the key contributors to the poor reliability of electricity services in Nepal is the performance of the Kali-Gandaki A hydropower plant, especially given its importance to meeting the power demand needs of the country. It was identified at appraisal that the less than listed plant performance and outages were due to severe damages caused to the turbines, main inlet valves (MIVs), and other critical equipment and systems as a result of issues related to sedimentation, cavitation and floating debris. Furthermore, the need to replace outdated instrumentation and control



systems were noted as affecting plant efficiency and safety. It is indicated that the project design reflected a holistic analysis of the entire power plant configuration, which is important for optimizing the operations of projects that experience hydro-abrasive erosion. This included the consideration of key factors such as intake configuration, design parameters for demanders and the choice of turbines. The resulting rehabilitation program focused beyond just repairing the damages to the power house and aimed to address the causes of these damages by: a) decreasing the total quantity of sediments entering the powerhouse, b) reducing the cavitation in the turbine in the dry season, c) improving the safety of the plant through improved operation of the MIVs, d) improving the safety of the plant through repairs to the control systems, and, e) improving the safety management of the dam (PAD page 10).

Outputs

- The planned headworks modification did not take place during the project.
- Improved uniformity of the velocity distribution in the desander basin, which was targeted to achieve a ratio of 1.80 from a baseline of 3.70 was not achieved by project close.
- Two (2) units of dam instrumentation (including Real-Time Sediment Monitoring) were not installed, and therefore, not operationalized by project close.
- While the consultants submitted design reports and bidding documents for the maintenance works for slope stabilization, rock scour rehabilitation below dam and tail race improvements, the physical works did not begin by project close.
- Maximum water level difference between intake and desander during the monsoon did not decrease to the target one (1) meter, and instead remained at the baseline of three (3) meters.
- Two (2) of the three (3) Main Inlet Valves were modified and repaired, while the procurement for the third one was completed. It is expected to be completed by mid-2018 during scheduled shutdown of machines.
- The procurement of the trash rack raking machine was completed, but the equipment was yet to arrive at project site at closing, and therefore, it was not fitted.
- The draft Operation Manual was submitted by consultant, although it was not formally operationalized by client at project close.
- Number of NEA employees trained for hydropower operations and management at sixty one (61) officials exceeded the target of sixty (60).
- Three planned siren systems were not extended, and therefore, not operational by project close.

Outcome

- Hours of Non-scheduled outage reduced or number of generation hours lost reduced from 312 hours to 268 hours surpassing the target of 270 hours.
- The Dam Safety Plan was prepared, and was operationalized following project close.
- The generation capacity of the hydropower plant was rehabilitated from a baseline of 0 MW rehabilitated to 144 MW rehabilitated under the project.

SUMMARY: The sustainable achievement of this PDO was predicated on the rehabilitation of the entire power plant configuration through multiple project components that included the civil works, electro-mechanical works, and technical assistance and capacity building at NEA (Components A, B and C) (ICR pg. 11). At the conclusion of the project, only a subset of activities was completed according to the ICR: (a) the repair and replacement of three turbine units and two MIVs (under Component B); (b) preparation of reports, studies, bidding documents, and so on for the implementation of electromechanical and civil works; (c) preparation and adoption of the Dam Safety Plan; and (d) training to the NEA's employees (all three



under Component C). Critical activities remained incomplete, with some not even started by project close. This include all civil works under component A; the repair, upgrade, and installation of control and safety monitoring information necessary for efficient plant operation; and, activities that enable plant personnel to operate and respond effectively to various normal and emergency situations were not operationalized. These incomplete activities were due to various reasons that included delays in the preparation of reports, studies and bidding documents, according to the ICR. It represents over 75% of the restructured project costs. The ICR indicates that these reports and documents were completed only by project close, and therefore, the corresponding activities could not be started under the project due to its culmination.

Despite the rehabilitation proposed under the project being considerably incomplete, the project was able to meet all three of its PDO indicators. The ICR indicates that the scheduled outages were reduced below the target level and the list installed capacity of the power plant was rehabilitated in-line with the established target. This was primarily due to the repair and replacement of the turbines and MIVs that were achieved under component B, which directly contributed to the targets. However, the ICR correctly notes that these achievements should be considered “temporary”, as the project did not address some of the major underlying causes of the “operational difficulties” and “damages to the critical plant equipment”, as per the project design, due to the incomplete activities. The ICR continues to correctly identify that there is “substantial risk of further damage and degradation to the replaced/modified plant equipment” in the absence of the incomplete project activities, and can lead to the reemergence of loss of plant capacity and unscheduled outages. Moreover, further costly repairs could be in order should the replaced/modified equipment need to be rehabilitated again as a result. The third indicator, which was not fully met at the time of project close, has been subsequently achieved according to the World Bank team. The Dam Safety Plan was fully prepared by project close with various staff trained, but it was formally adopted afterwards and is now operational. Taken as a whole, this PDO is only partially achieved due to the significant incomplete outputs that are essential to sustainably achieving the outcomes, as per the project design.

Rating
Modest

Objective 2

Objective

To improve the response capacity of Nepal in case of an emergency.

Rationale

According to the ToC, the goal of the project was to have a funding facility to support the response and reconstruction in the case of an emergency. By including a component (D) that initially has a zero dollar (\$0) allocation, it was designed to be a conduit for channeling either existing, un-utilized funds, or additional financing that may be required in the event of an emergency. It would enable a quick response by the World Bank, if assistance was requested by the GoN. While the ICR notes that it was the first such arrangement



applied in Nepal, the practice of including such facilities have become a common feature within World Bank projects in countries that are prone to such emergencies (example: Bangladesh).

Outputs

- There were no formal output indicators included in the project for assessing improvements to the response capacity of Nepal in the case of an emergency.

Outcome

- There were no formal outcome indicators included in the project for assessing improvements to the response capacity of Nepal in the case of an emergency.

SUMMARY: Nepal faced significant emergencies during the project, when in 2015, the country was struck by two substantial earthquakes causing damages to some NEA and IPP power plants (ICR pg. 12). The World Bank team indicated that they immediately met with GoN and NEA officials to explore whether the emergency response facility would be necessary. The World Bank Team confirmed through their interactions that the damages from the earthquakes to the NEA hydropower facilities were modest. Therefore, NEA decided to undertake the repairs with their own funds, and not call on the project funds for this purpose. However, the project funds were available should NEA were to require such support, and successfully served the purpose of supporting the response capacity to the natural disasters that occurred. The World Bank team confirmed that there was one IPP that sustained heavy damages as a result of the earthquakes. The ICR indicates that there weren't adequate mechanisms identified in advance to transfer funds from the GoN to assist the private sector (unlike with NEA where there already existed a subsidiary loan agreement for channeling the World Bank funds), and the IPPs also displayed a preference for receiving grants instead of loans. Pre-identifying a mechanism to channel project funds to potential private sector entities could have expanded the coverage of the emergency response facility beyond NEA, which would have had greater impact, although whether the funds are on-lent as a grant or a loan is a policy choice that is up to the GoN (in this instance, GoN decided not to treat the funds as a grant). Therefore, it can be concluded that the capacity to respond to an emergency within NEA did exist as a result of the project should it have been necessary, although this was not the case if such a request were to come from any of the IPPs. This PDO was partially achieved.

Rating

Substantial

Rationale

The project, shortly after close, was able to achieve its development objective, although the various incomplete tasks place considerable risks regarding the sustainability of these achievements. The rehabilitation of the power plant led to the reduction of outages below the target level and re-established the list capacity of the power plant units. However, the substantial number of incomplete activities are vital to sustaining these results, as they were designed to address the root cause of the previous underperformance of the power plant; thus creating a significant risk to the sustainability of project outcome. The Dam Safety Plan, which was completed at project closure along with capacity building of NEA personnel, has subsequently been operationalized. This is a key



demonstration of implementing dam safety practices in-line with international standards. Finally, the project also enhanced NEA's ability to respond to an emergency, as evidenced by the option that was made available to them during the two earthquakes. However, if the component was designed with coverage broader than NEA, it could have extended the security to private IPPs as well. Taken as a whole, while the project was able to successfully meet the outcome indicators, the outcome rating is modest.

Overall Efficacy Rating
Modest

Primary reason
Low achievement

5. Efficiency

An economic analysis was carried out “with” and “without” project, at both the appraisal and ex-post stages of evaluating the project. The analysis at appraisal indicated an EIRR of 22.5% and an NPV of \$21.4 million at a 12 percent discount rate. The analysis applied a degradation in efficiency and production capacity to simulate the counterfactual scenario without project, and for valuing the additional electricity that is produced as a result of the rehabilitation, the avoided cost of electricity imports from India (8.69 US cents/kWh) and self-generation from diesel (32 US cents/kWh) are assumed at a 50/50 share respectively. A Monte Carlo risk analysis further confirmed at appraisal that the probability of a negative NPV is less than 5 percent. The analyses at appraisal also assessed the project returns with the additional benefits of avoided local and global pollution (\$30/ton of CO₂). The results indicate that including the estimated value of these externalities can further increase the EIRR to as much as 27.3% and the NPV to \$31.9 million.

As previously noted, the project considerably underutilized the project funds since many of the key activities were not implemented, whereby the efficiency of the rehabilitation was substantially undermined. The total project cost at closing was estimated at \$6.31 million, or 28% of the total restructured project cost at closing of \$22.81 million. However, the restructured project cost from the appraised \$30.37 million to \$22.81 million reflect a number of savings that reflect positively on project efficiency. According to the ICR, \$2.2 million of this loan cancellation at restructuring reflected a useful cost savings due to the fact that the MIVs were still under warranty and the original equipment manufacturer agreed to work on them without added costs. The remainder reflected cost savings that can be attributed to the selection of a lower-cost qualified equipment suppliers through internationally competitive bidding (ICB).

In the economic analysis, the baseline forecast for power production from the Kali-Gandaki A was assumed to be the same as the appraisal estimate following rehabilitation for the purposes of the analysis, although an unusually favorable monsoon resulted in the project performance exceeding the designed capacity of 842 GWh following the project. However, the improvement in maintenance hours was assumed to decline by 1.5 percent per annum due to the incomplete works; and a degradation of turbine efficiency was also assumed. Such an approach is methodologically correct for reflecting the impact of the investments that were not completed. The result of the ex-post economic analysis is that the EIRR for the project is estimated in the ICR



at 10 percent and a NPV of \$0.2 million at a discount rate of 10 percent (applying the current World Bank guidelines on discount rates). The estimated EIRR at project close is significantly lower than the EIRR estimated at appraisal of 22.5% or more. Moreover, the EIRR estimate at completion being just barely above the discount (hurdle) rate implies a very marginal economic return under the circumstances. Furthermore, if the reliability of the power plant were to decrease at a faster than the anticipated rate of decline due to factors such as sedimentation, floating debris, and cavitation as a result of the incomplete activities, then the returns would even lower (i.e. the NPV would be negative).

A financial analysis that was carried out at appraisal indicated that the additional revenue produced by the increase in electricity generated from the rehabilitation would yield a real return of 7 percent. However, the same calculation carried out following project closure indicates a negative return, although the ICRR does not indicate a specific value. Various sensitivity assessments carried out at appraisal did suggest that a delay in implementation of around four years would cause the project to have a negative financial return.

The project also faced considerable inefficiencies in management and decision-making, which were major causes for the substantial project delays that ultimately led to the key rehabilitation works not being completed by project close. According to the ICR, the NEA established a centralized project Steering Committee, while the Project Management Unit (PMU) was based at the project site. This disconnected structure together with poor communication between groups, according to the ICR, was a key reason that led to poor and slow decision-making. Furthermore, the Managing Director of NEA had very limited discretion to approve much of the procurement related decisions, and instead, had to secure approval from the Steering Committee for most project related decisions, which only met on an ad-hoc basis. One of the most significant outcomes of these impediments was the protracted delay of almost two years since loan signing before the key technical assistance consultants were procured (ICR pg. 16). Since the design of a significant number of rehabilitation activities under the project were based on the consultant's report and studies, the impact of this delay reverberated throughout the project.

Efficiency Rating

Modest

- a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	23.20	100.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	10.00	100.00 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.



6. Outcome

The relevance of the proposed project continued to be high as rehabilitating the Kali Gandaki hydropower plant was one of a limited set of options that would have a significant impact on the power system in Nepal. The efficacy is modest because, despite meeting all three outcome objectives due to completion of two MIVs, repairs to the turbines and the operationalization of the Dam Safety Plan, a majority of the underlying causes of the poor performance of the power plant was not addressed through the project as intended due to the delays stemming primarily from the weak institutional structure for decision-making. The efficiency was also undermined for the same reasons where a significant portion of the loan funds was not utilized. However, there were also some important efficiency gains due to cost savings from applying existing warranties with the original manufacturer and through lower costs as a result of competitive bidding. Thus, the overall project outcomes is rated moderately unsatisfactory, in accordance with the guidelines.

a. Outcome Rating

Moderately Unsatisfactory

7. Risk to Development Outcome

There is considerable risk to sustaining the development outcome given the substantial amount of rehabilitation works and other activities that make-up 72% of the restructured project costs were not completed or even initiated at project close. The rehabilitation was considered urgent at appraisal, with the PAD noting the likelihood of increasing outages, and even catastrophic failure, if a proactive sediment management program designed under the project would not be in place. The ICR also clearly notes that, the repairs that were implemented under the project should be considered “temporary,” as the project did not address some of the major underlying causes of the “operational difficulties” and “damages to the critical plant equipment”, as per the project design. While the repair and replacement of the turbines and MIVs may have increased the operational capacity of the power plant and reduced outages for the moment, the newly rehabilitated equipment could quickly fall into disrepair if the remaining rehabilitation activities are not completed in a timely manner. Therefore, the completion of the remaining project activities are even more urgent given that the turbines and MIVs have now been rehabilitated.

Despite the implementation and force majeure challenges faced by the project, the ICR indicates that much of the detailed design work was eventually completed by project close. While the ICR notes that there were some informal discussions between the GoN and the World Bank, a formal agreement was not reached for extending the project closing date, so that the important remaining activities, which were now designed and ready to implement, could be undertaken. The World Bank team also helped by carrying out a trust funded TA directly (i.e., Bank-executed) to identify the priority investment areas for sediment retention in order to expedite the civil works. In the absence of a closing date extension, NEA would be compelled to seek alternate financing sources, which could lead to further delays causing greater risks to the outcome. Alternately, NEA may opt to forego some of the critical investments that are pending due to a lack of financing and only undertake what it can self-fund (for example, they had indicated that they my install a new control system and trash rack from its own budget), which would also place the development at risk. The decision not to extend the availability of



project funds to complete the outstanding tasks, especially considering that the detailed design work was completed, could expose the assets already funded by the World Bank to considerable risk if they incurred damages and fell into disrepair as a result. Therefore, the project being closed before some of the key activities were completed, particularly after the MIVs and turbines were rehabilitated, significantly increases the risk to the safe and sustained operation of the Kali-Gandaki A power plant going forward.

8. Assessment of Bank Performance

a. Quality-at-Entry

The selection of the Kali-Gandaki A power plant for rehabilitation was highly strategic given the importance of its contribution to the power system in Nepal, and the successful achievement of the PDOs is highly relevant to improving electricity supply in the country. The approach to rehabilitation (to consider holistically the entire power generation structure) and the technical design (developed with the assistance of international consultants and WB specialists on subjects covering electro mechanical equipment, sediment management, geology, and geotechnical (PAD pg. 12)) is in-line with industry practices and standards. The World Bank team carried out due diligence on an Environmental Impact Assessment (EIA), a Social Action Plan (SAP), a Vulnerable Community Development Plan (VCDP), and a Gender Action Plan. Taken together, these were accepted as meeting the World Bank safeguard requirements, and also went beyond especially with gender and social development activities that were specifically designed to support the Bote indigenous community that lived in the project area. The ICR indicates that limited preparation design was carried out on the emergency response component (D) with regards to fund flow mechanisms and fund administration procedures. However, the existing funding mechanism with NEA was available for utilization when the two earthquakes occurred in 2015, but it was never tested since the GoN or NEA did not make an actual request for support despite its availability.

The major area that could have benefitted from more rigor in analysis and design is the arrangements for project implementation. In the PAD, it is recognized based on experience with ongoing projects that NEA has “limited technical capacity”, low reactivity in project management”, and “an extended decision-making process.” Despite this knowledge, the NEA decision-making structure that was accepted by the World Bank turned out to be disjointed leading to protracted delays instead of the “smoother decision process” that was envisaged. Although the implementation risks were identified, the consultants to help prepare the final technical design, which is necessary to begin the physical rehabilitation works, were not hired for nearly two years since loan signing due to various delays. The PAD anticipated that the major procurement processes for the project activities would be completed in little over a year (by July, 2014). This project never recovered from the cascading delays that resulted from this over optimistic assessment, as much of the physical rehabilitation was contingent upon the consultants completing the technical designs and associated bidding documents.

Quality-at-Entry Rating

Moderately Unsatisfactory



b. Quality of supervision

The ICR indicates that the World Bank team regularly interacted with the GoN and implementing agencies through formal missions as well as other informal means. The core team that remained intact throughout the project carried out regular implementation support missions, and the results of which were documented through aide memoires and ISRs. Through these interactions, the World Bank team was able to support and provide guidance to the implementing agencies on aspects such as project implementation, financial management, procurement, and environment and social safeguards, according to the ICR. As NEA faced increasing implementation delays, the World Bank team also intervened with specific actions to help turn things around. A direct (World Bank-executed) TA was carried out to identify priority investment areas for sediment retention with the intention of expediting the civil works. The World Bank also formally requested jointly with the Asian Development Bank (ADB) for the GoN and NEA to change its cumbersome and ineffective decision-making structure. An eventual decision to empower the Managing Director of NEA to make all investment decisions was made only after the close of the Kali Gandaki A Hydropower Project, yet could considerably improve the implementation of future projects by NEA. The ICR does indicate that, despite the many difficulties and delays (including the impact of two earthquakes and political unrest/border blockade), that progress began to pick-up as the project progressed, and the consultants were able to deliver the key reports and documents that were requisites for proceeding with the key rehabilitation works. Despite this eventual progress, the decision not to extend the project might set-back the rehabilitation of the Kali-Gandaki A project that has been carried out to date, as it compels NEA to seek and secure alternate sources of funding that may cause further delays exposing the equipment that is already rehabilitated to greater risk of damage.

Quality of Supervision Rating

Moderately Unsatisfactory

Overall Bank Performance Rating

Moderately Unsatisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The project's development objectives were clearly defined, and the M&E framework was a straightforward one that adequately reflected the project outcomes. The indicators for improved power plant capacity availability following the rehabilitation and the resulting reduction in outages that reflect improvements to reliability were adequate indicators to assess the project's outcome. This is the case even though the indicators may not adequately capture the risk to outcome due to the rehabilitation works that did not take place. It is not the purpose of the outcome indicator to capture such risks, which should be assessed by alternate means.

The project included a comprehensive list of output indicators that were essential to measuring progress with various key activities, and determine the contributions made by each activity towards ultimately achieving the PDO. In fact, it is this comprehensive list of indicators (along with disbursement numbers), when measured, that points to the substantial risks to sustaining the PDO as a result of the incomplete rehabilitation activities despite "temporarily" achieving two of the three outcomes. In addition, the output indicators for the project also included



two social development indicators for measuring results of activities that went beyond compliance with World Bank safeguard policies, to assist the Bote indigenous community. Overall, the results framework was well developed, appropriate to the task, and useful in determining project progress.

b. M&E Implementation

The ICR indicates that the NEA formed a M&E unit at the institutional level that covered all projects, which supported the NEA project team and monitored progress. The formal reports on implementation progress covering project performance including fiduciary and safeguards compliance were submitted to the World Bank through the PMU. The ICR does not provide information on the timeliness of submission of the reporting, which included monthly summaries as well as a yearly report, except to indicate that the documents were submitted.

c. M&E Utilization

The ICR indicates that the World Bank and NEA teams assessed progress during the biannual project implementation support (supervision) missions, and were documented through aide memoires and the Implementation Status and Results Reports (ISRs). It notes that the information provided the basis for the project restructuring including the assessment of the cost savings. However, there is little information provided on how the monthly and annual progress reports were utilized by the team to attempt to progressively address the major delays in making key decisions and with procurement that resulted in a majority of the key activities not being completed by project close.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project was classified as a Category "B" under OP/BP 4.01 (Environmental Assessment), and OP/BP 4.04 (Natural Habitats), OP/BP 4.10 (Indigenous Peoples), OP/BP 4.11 (Physical Cultural Resources), OP/BP 4.37 (Safety of Dams) and OP/BP 7.50 (Projects on International Waterways) were triggered (PAD, page 27).

According to the PAD, the borrower prepared an EA of the project during appraisal, and categorized the environmental concerns into three groups: A) issues that were outstanding from the original plant, B) newly emerged issues in the area of the existing plan, and C) potential impacts of the proposed rehabilitation project. The issues around groups A and B were not a direct result of the project, but the World Bank agreed to include them in the project Environmental Management Plan (EMP)/SAP/VCDP, as to goodwill gesture and that it was an opportunity to help improve the livelihoods of local communities, according to the



ICR. The EA confirmed that a vast majority of mitigation measures were satisfactorily complied with in the original Asian Development Bank (ADB)- funded project constructing Kali-Gandaki A. Temporary and long-term impacts grouped as C were directly due to the proposed project activities, and they were to be addressed through measures in the EMP.

Since most of the impacts identified in the EIA were related to the construction activities that did not take place by the close of project, the ICR notes that the potential adverse environmental and social impacts that could have directly resulted from the project did not materialize. With regards supporting local communities, the SAP consisted of activities that were “an integral part of the project” to be implemented in conjunction with the VCDP and the Gender Action Plan according to the PAD (PAD pg. 64). In particular, many of the activities were designed through consultation to support the Bote indigenous group, whose livelihood and culture were identified as being closely associated with the river (ICR pg. 5). While not all of the legacy issues were successfully addressed (i.e. transfer of land titles), the ICR notes that the use of project-distributed fishing boats and nets (10 exceeding the target of 2) to the Bote communities had contributed to the increase in fishing yield and augmented their income. Monitoring indicators also confirm that the fish hatcheries were scaled-up with additional ponds and water filtration unit. Furthermore, the project sponsored some repairs and upgrades for local community houses that were damaged due to the 2015 earthquakes. The ICR also indicates that, as a result of the Gender Action Plan, female members of the Bote households that the project provided support to, directly benefited from improved living conditions and reduced drudgery. However, the document does not provide any evidence or examples to substantiate this claim.

While the project triggered OP 4.37 on Safety of Dams, the PAD notes that Kali-Gandaki A was designed and constructed by reputed international firms with the support of an international panel of safety and technical experts during and after construction. The World Bank funded project was to rehabilitate the existing power plant along with addressing some of the underlying causes for the drop in performance, and does not rehabilitate the dam. However, the project did include key activities that would enhance dam safety through: a) operationalization of a dam safety plan along with procedures for emergency preparedness, b) installation of dam safety instrumentation with software modifications, and c) training of NEA staff of dam safety. A dam safety plan with emergency preparedness procedures was prepared with the support of international consultants by project close, but it was not formally adopted or operationalized at the time. NEA carried out the training of 61 staff exceeding the target of 60, and while dam safety was covered, it is not clear how many of the staff were trained specifically on dam safety. There are no indications that the dam safety instrumentation was implemented.

b. Fiduciary Compliance

Financial Management (FM): Based on information in the ICR, the FM challenges were concluded to be at the institutional level at NEA rather than at the project level. At the project level, there appear to have been dedicated staff that made sure that the various FM related requirements were met. However, entity level audit reports for NEA were submitted with substantial delay and with various qualifications related to accounting, asset management, and internal controls, according to the ICR. The ICR also notes that NEA appropriated staff



(where there was considerable turnover) to address the issues and that the timeliness and quality of financial reporting improved substantially over the course of the project.

Procurement: The ICR notes that, despite having experienced procurement staff and support of consultants, the NEA's overall decision-making process had significant shortcomings, and coupled with frequent leadership changes, they turned out to be a major cause of the high risk to project outcome. In fact, the significant delay of nearly two years for procuring the key international consultant that were to assist NEA with the detailed technical design triggered a cascade of delays with initiating the major civil works (which were dependent on the detailed designs), from which project implementation never recovered by the project closing date. While the ICR states that the World Bank "organized an information-sharing session with NEA on its procurement guidelines and policies".

c. Unintended impacts (Positive or Negative)

There were a number of un-intended and un-anticipated impacts on the project:

The agreement that was reached between NEA and the original manufacturer to repair and replace the turbines under the equipment warranty led to a significant cost savings.

d. Other

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Unsatisfactory	Moderately Unsatisfactory	---
Bank Performance	Moderately Unsatisfactory	Moderately Unsatisfactory	---
Quality of M&E	Substantial	Substantial	---
Quality of ICR		Substantial	---

12. Lessons

1 . The sequencing of preparation activities made it necessary to secure the services of consultants to develop the detailed technical design of the project before proceeding with the major rehabilitation works. The delay in procuring these consultants led to a cascade of project delays that eventually resulted in the project closing before the major activities were completed. While the consultancy was essential since the rehabilitation could not begin without the technical designs, the process may have been expedited if NEA carried out advance procurement for the consultants prior to Board approval. This could have enabled the consultancy to be in place



by the time the project was approved/made effective, or at least provide a head start to the process which may have limited the delays.

2 . When an interdependent set of investments are being made, it is important to maintain financial support until completion of all tasks or projects can be exposed to considerable risks to achieving or sustaining results. From an investment perspective, once the MIVs and the turbines were rehabilitated, the project reached a stage where the remaining activities had to be completed or it would expose the project to greater risks of sustaining damages to the newly installed assets. Given these circumstances, the decision not to extend the project closing date, especially considering that the detailed project designs were completed by closing, could lead to additional delays as NEA was placed in a position where it has to seek alternative sources of funding. Such delays can expose the newly installed assets to further damage from sedimentation, cavitation and floating debris, since these interdependent issues are not addressed sufficiently addressed as intended by the project.

13. Assessment Recommended?

Yes

Please explain

Yes. It is important to identify whether NEA was able to secure funding to complete the rehabilitation and address the underlying causes for the inefficient and unreliable operation at Kali Gandaki A power plant. If these rehabilitation works are delayed, then it is highly likely that the rehabilitated and repaired power plant units and the MIVs could again fall into disrepair due to damages from sedimentation, cavitation and floating debris. Such an outcome would be highly unfortunate and could be avoided.

14. Comments on Quality of ICR

The ICR was of substantial quality, with a candid assessment of the project that was well designed, but was a struggle for the client to implement in a timely manner. The ICR correctly notes the underlying risks that are posed as a result of incomplete works even though the outcome indicators were met. The ICR also includes a well-developed theory of change, which clearly identifies the linkages between project inputs and outputs and outcomes. The document also includes considerable evidence, although there are some areas where the conclusions could be better served if they included supporting information. In fact, the ICR appears to be over critical in the projects response to the 2015 earthquakes, when the project did make funds available meeting resilience obligations although the GoN decided not to access them for such purposes.

a. Quality of ICR Rating



Substantial