

Environmental and Social Data Sheet

Overview

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| Project Name: | NEPAL TANAHU HYDROPOWER PROJECT |
| Project Number: | 2012-0278 |
| Country: | Nepal |
| Project Description: | The project comprises the construction and operation of a 140 MW _e storage hydroelectric power scheme on the Upper Seti River, in Tanahu District in the central part of Nepal, 2 km upstream of the confluence with the Madi River and around 155 km northwest of Kathmandu. The project will include a concrete gravity dam 140 m in height which will create a storage reservoir with an area of 7.3 km ² . Electricity will be generated by two 70 MW _e Francis turbines and will be evacuated via a 37 km long 220 kV double circuit overhead transmission line to the Bharatpur Substation, which is connected to the national grid. A 3 km long access road will link the dam site to the nearest existing road at the village of Patan. The project will contribute to meeting peak electricity demand in Nepal during the dry winter season and will operate as a base-load power plant during the remainder of the year. The project also includes a programme of rural electrification to supply power to 17 villages in and adjacent to areas affected by the project. A Community Development Programme will be implemented for people living in the area. |

EIA required: yes

Project included in Carbon Footprint Exercise¹: yes

Summary of Environmental and Social Assessment, including key issues and overall conclusion and recommendation

The project will generate up to 585 GWh/a of renewable (hydroelectric) power and will help to avoid thermal generation from oil-fired diesel generator units that is associated with high emissions of CO₂ and other harmful atmospheric pollutants. It is estimated that the project will result in a net reduction in emission of greenhouse gases equivalent to 345 ktCO₂/a during the first 10 years of operation and 288 ktCO₂/a from the 11th year on. The project will, however, have a significant social and environmental impact and is likely to affect around 3 000 people, of which some 2 500 people will lose more than 10% of their productive agricultural land. Around 500 people (86 households) will be subject to physical displacement. The project will also affect communal facilities, including roads, footpaths and pedestrian bridges. Additional temporary impacts will occur during construction. Compensation will be provided for all types of losses incurred due to project activities, with physical assets being compensated for on the basis of the current market replacement cost. In addition to compensation for lost assets, households that are physically displaced will receive displacement allowances. Severely affected and vulnerable households will be provided with training and counselling services, and where possible will be given preferential access to project construction employment opportunities. A livelihood restoration programme will be implemented to prevent impoverishment, restore incomes and build viable communities. Activities within the programme include employment, occupational training, direct credit, small

¹ Only projects that meet the scope of the Pilot Exercise, as defined in the EIB draft Carbon Footprint Methodologies, are included, provided estimated emissions exceed the methodology thresholds: above 100,000 tons CO₂e/year absolute (gross) or 20,000 tons CO₂e/year relative (net) – both increases and savings.

business and enterprise development for job creation. The broader interests of stakeholders living within the project area of influence, including both those persons directly affected by the project as well as indirectly affected households and community groups, have been addressed in a Community Development Strategy (CDS) that targets education, health, gender development, social inclusion, economic development and livelihood activities of all people living in the area.

Impacts on the natural environment include disturbance and reduction of habitats due to creation of the reservoir and site clearance activities. The barrier effect of the dam, reservoir and associated infrastructure may adversely affect aquatic and terrestrial fauna, including a number of vulnerable and near-threatened species and one endangered species: Tor Putitora, a fish that is also found in a number of other rivers and lakes in Nepal. An Environmental Impact Assessment and Initial Environmental Examinations were carried out for the hydropower, transmission and rural electrification components respectively, as required by national legislation. These were subsequently complemented by an Environmental Addendum prepared to meet ADB safeguard requirements and which included further studies addressing water quality, water sources, fisheries, forestry/botany, terrestrial fauna, land instability and erosion mapping. A resettlement framework and indigenous peoples' planning framework have been formulated and used to prepare a draft resettlement and indigenous people's plan for the hydropower scheme which formulates appropriate mitigating actions. Resettlement plans covering the transmission line and rural electrification programme will be prepared prior to the commencement of works for each of these components. Environmental Management Plans have been prepared for the hydropower scheme and transmission line. These encompass an extensive range of mitigation and monitoring activities, including internal and external monitoring of the resettlement plan, environmental quality monitoring, physical mitigation measures to deal with erosion risk, and mitigation programmes for aquatic and terrestrial fauna and flora in both upstream and downstream areas. Some of these activities are planned to be implemented in collaboration with international NGOs, including IUCN and WWF. The promoter will appoint an independent panel of experts to review social and environmental aspects of the project, to be in place before tenders for construction are issued, with reports to be made available to the Bank and other co-financiers on a regular basis. An Environmental and Social Monitoring Unit within the promoter's organisation will be responsible for ensuring that mitigating and monitoring actions are duly implemented. The promoter will prepare annual social and environmental monitoring reports to be submitted to the lenders in an agreed format. An environmental audit will be conducted by the Ministry of Environment two years after the start of project operation.

The social and environmental management and plans will be closely monitored by the Bank in co-operation with the other co-financiers, in particular with the ADB. To ensure that the Bank's environmental and social standards and requirements are met and that the impacts are appropriately mitigated the following conditions have been included in the Bank's Finance Contract:

Disbursement conditions

1. Preparation by THL and/or NEA of an Environmental Management, Resettlement and Indigenous Peoples Plan acceptable to the Bank.
2. Provision of evidence in form and substance satisfactory to the Bank that all compensation payments and other measures that are identified in the Resettlement and Indigenous Peoples Plan as being due for payment or completion at the date of the disbursement request have been made.
3. Appointment of an Independent Environmental and Social Panel, to be maintained in place throughout the period of implementation of the project. The panel shall be comprised of international experts having qualifications and experience acceptable to the Bank and shall operate under Terms of Reference approved by the Bank in order to provide advice and recommendations on all environmental and social aspects of the Project.
4. Establishment by THL of an Environmental and Social Management Unit staffed with suitably qualified and experienced personnel.

Undertakings

1. The Government of Nepal (GoN) shall ensure that THL and/or NEA implement all necessary social and environmental impact mitigation measures in accordance with the Environmental Management Plans and provide environmental monitoring reports to the Bank on a quarterly basis from the start of construction until 2 years after project completion.

2. GoN shall ensure that THL implements the Resettlement and Indigenous Peoples Plans with assistance as required from a suitably qualified and experienced NGO or consulting firm, retaining external monitoring experts to carry out an independent semi-annual review of implementation of the Plans up until project completion as well as a post-project evaluation of the Plan.

Under these conditions, the project is considered to comply with the Bank's environmental and social standards and principles and to be acceptable for part-financing by the Bank.

Environmental and Social Assessment

Environmental Assessment

The Environmental Impact assessment (EIA) for this hydropower project has been conducted by the promoter, the Nepal Electricity Authority (NEA) in accordance with national legislation including: the Environment Protection Rules (EPR), 1997; the Environment Protection Act (EPA), 1997 and recent amendments; and the National EIA Guidelines, 1993. NEA first prepared a draft EIA report in 2004; however, during the upgrade of the feasibility study, which was carried out with support from the Japan International Co-operation Agency (JICA) in 2007, additional environmental studies were carried and a revised EIA was prepared, incorporating the additional studies. The revised EIA was approved by the Government of Nepal (GoN) in July 2009. The transmission line did not require a full EIA and was approved by GoN in April 2009 on the basis of an Initial Environmental Examination submitted by NEA. Following the intervention of the Asian Development Bank (ADB) in the project, an Environmental Addendum was prepared to provide the additional information and clarification required to meet the ADB's environmental safeguards. The Addendum is supported by 5 further studies completed since 2009 covering water quality, water sources, fisheries, forestry/botany, terrestrial fauna, and land instability and erosion mapping. A review has been conducted by an experienced international consultant to ensure that the social and environmental procedures applied for the project also comply with the EIB's standards and principles. A number of shortcomings have been identified²; however, these are not associated with a significant environmental or social impact and may be addressed through further studies and mitigation developed during the early stages of project implementation, and by relatively simple operational procedures. The additional measures will be required to be incorporated in the environmental management, resettlement and indigenous peoples plans to the satisfaction of the Bank

The project involves interrupting the flow of the Seti River and creating a seasonal storage reservoir with an area of 7.3 km² and a length of approximately 18 km. The flow regime and associated river morphology will be significantly affected and there is a risk of shoreline erosion at vulnerable locations. The main impact during operation will be on the 2 km stretch of river between the dam site and the confluence with the Madi River, where the flow in the riverbed will be reduced to a minimum of 2.4 m³/s, which is 10% of the minimum monthly average flow. Thereafter the impact will be mitigated by the influx from the Madi River, which has a flow regime equivalent to 75% of the Seti River flow. Temperature stratification and eutrophication is expected to occur in the storage reservoir, which may have an adverse impact on water quality downstream of the project.

Impacts on Biodiversity: Creation of the reservoir and site clearing activities will result in the loss of 430 ha of forest. All project sites are located outside of any areas designated as protected areas by the department of National Parks and Wildlife Conservation (DNPWC,

² Recommendations have been made by the consultant in the following areas: compliance with EU standards and management/monitoring; downstream receptor impacts and adaptive management; climate change impact of project and vulnerability of project to climate change; ecological issues; afforestation programme; resettlement planning; indigenous peoples and vulnerable groups; and cultural heritage. All gaps with EIB Standards and Principles have been classified as manageable.

GoN); however, the project will cause the loss of natural vegetation and will also destroy some natural habitat for wildlife, which may affect a number of species classified as vulnerable or near threatened by the International Union for the Conservation of Nature (IUCN). Noise and pollution may also disturb wildlife in the area, and the increased ease of access brought about by the project roads may increase the incidence of poaching activity. The key impacts on the aquatic ecosystems will be the creation of a physical barrier preventing the upstream and downstream migration of fish in the Seti River, resulting in long term effects on fish populations and species diversity. The changed water conditions in the storage reservoir will cause a replacement of fish species and the downstream water quality change, primarily a reduction in temperature and suspended sediment levels due to reservoir operation, has implications for fish population and species diversity.

In order to prevent the upper level of the reservoir from becoming overloaded with nutrients, a fraction fence will be installed at the inlet end of the reservoir, suspended from floats, to direct nutrient-rich inflow water from the surface to a greater depth and thereby decrease phytoplankton growth by controlling the rate of photosynthesis. The nutrient-rich water will be more likely to be drawn off via the intake and released downstream. The downstream water quality will be monitored and if necessary mixing apparatus will be considered at the intake to improve the quality of generation releases.

Local extinction of fish species in the Seti River, in particular 2 species that, although also present in other major river systems in Nepal, have been listed in the IUCN³ 2012 “red book” as fishes of conservation significance, will be prevented by restocking from a fish hatchery, combined with a fish habitat management programme. Consideration will also be given to physical relocation of adult migrating fish and examination of the technical feasibility of a “switchback” fish pass system.

In compensation for trees that need to be cleared to make way for the project, a re-forestation programme will be carried out on a 25:1 basis, as required by national legislation⁴. Species with a particular conservation significance will be propagated in a nursery from seeds collected from the trees some 6-12 months before they are removed.

Detailed surveys of terrestrial fauna have been conducted. A total of 27 mammalian species and 17 species of reptiles and amphibians have been reported in the project area, including a number that are protected under local law. Local people have previously reported the presence of an endangered species, the Royal Bengal tiger; however, the most recent survey, which is corroborated by information from the WWF⁵ indicates that the dam and reservoir lie approximately 28 km north of the nearest core area where tigers are known to occur and 16 km north of the nearest tiger habitat corridor, which is defined as a habitat link between 2 core areas. The southern 7.5 km of the transmission line does, however, cross a tiger habitat corridor. Mitigating measures to be applied in this area include strict control of vegetation clearance and re-vegetation around transmission tower foundations, which may increase the grazing habitat of tiger prey species and therefore be of benefit to the tiger. The environmental management plan includes a programme for the capture and release of wildlife in the reservoir area prior to inundation as well as minimising the destruction of habitat during construction.

Soil and Erosion: Operation of the reservoir is liable to cause erosion, slumpage and landslides along the foreshore, particularly where the overlying soil structure is weak. A landslide instability and soil erosion study completed in 2012 identified vulnerable areas and a programme of protection works and bioengineering will be carried out prior to inundation to improve the stability of these areas. Where any private land is identified as being at risk, the land boundaries will be surveyed and photographed so that any project-induced land loss can be accurately compensated after it has occurred.

An estimated 2.0 M m³ of rock and 0.3 M m³ of low grade soil will be excavated during construction. Part of the rock will be used as aggregate for civil works, while the remaining

³ International Union for the Conservation of Nature

⁴ Nepal Forest Guidelines (2006)

⁵ WWF Tigers Alive Landscape; Action Plan for Tx2, Draft Report, Terai Arc Landscape, 2012)

material will be discharged to disposal areas that have been identified in close proximity to the works. A detailed spoil disposal plan will be developed prior to the start of civil works and will provide for landscaping and re-vegetation of the final landform.

Use of Water Resources: The Seti River is used on a seasonal basis for commercial rafting, mainly from Damauli, 3 km downstream of the dam site, to the Seti-Trishuli confluence some 25 km further downstream. Around 200 persons raft the Seti River each day during the dry season, from late September until May. The flushing regime from the reservoir will not affect rafting activities as this is planned to occur during the monsoon period, in June and July. The Nepal Association of Rafting Operators has been consulted and raised 3 main concerns about project-altered river flows: the sudden release of water may affect daily rafting activities; the rafting season may be shortened; and rafting gear may be washed away. Prior to operation of the project, briefings will be held with rafting operators to explain the likely daily and seasonal variation in river flows and to identify when this would make rafting activities unsafe. Compensation will be provided by the promoter where justified, taking into account the actual period when project-related flow variations place constraints on rafting and the availability of alternative rafting sites in the region. Automatic sirens and signage will be installed at key locations between the dam site and the Seti-Trishuli confluence.

EIB Carbon Footprint Exercise

It is estimated that the project will supply 588 GWh/a of electricity to the public grid during the first 10 years of operation. Thereafter, with the annual reservoir flushing period being extended to avoid sediment build-up in the reservoir, output is expected to be reduced to 490 GWh/a. Given the lack of indigenous energy sources in Nepal and the current constraints in the transmission network that prevent the import of additional power from neighbouring countries, the baseline alternative to the electricity generated by the project is to supply power from oil-fired diesel generator units or from other hydroelectric schemes. Assuming a weighted carbon dioxide emission factor of 0.59 t/MWh, the project will generate emissions savings of 345 ktCO₂/a during the first 10 years of operation and 288 ktCO₂/a from the 11th year on.

“Leakage” emissions from the reservoir due to decomposing organic matter will reduce the carbon savings generated by the project to a limited extent; however, given the reservoir surface area of 7.3 km² and its installed capacity of 140 MW_e, these are expected to be relatively insignificant⁶. The estimated total volume of greenhouse gases that will be released as a consequence of biomass clearance from 423 ha of forest land during the 5-year construction period is 87 kt.

For the annual accounting purposes of the EIB Carbon Footprint, the avoided emissions from the project will be entered on a pro rata basis according to the EIB lending amount for the project signed in that year, as a proportion of total project cost.

Social Assessment

Involuntary Resettlement and Livelihood Compensation: The project is located in a relatively densely populated and predominantly agrarian district, with over 90% of the people dependent upon agriculture for their livelihood. Construction of the storage reservoir, access roads, power generation facilities and associated works will require the temporary and permanent acquisition of private and public land, public infrastructure and community forest land. A census survey was undertaken in early 2012 to quantify the households and assets likely to be affected by the hydropower scheme. It is currently estimated that there will be a total of 758 affected households, of whom 86 are likely to be physically displaced. All households incurring severe impacts on their residential structures have expressed a preference for self-relocation, either within their existing village communities or elsewhere, rather than receiving physical assistance with relocation from the promoter. Apart from

⁶ The project has a power density of 19.2 W/m² and according to the threshold values promulgated by the CDM Executive Board, greenhouse gas emissions from the reservoirs of hydroelectric power plants with a power density of greater than 10 W/m² may be neglected when accounting for net emissions for CDM purposes (c.f. Annex 5 of CDM EB 23).

agricultural land and residential and commercial structures, the project will also affect common property such as cremation grounds (ghats), wells and rest areas⁷. A total of 7 pedestrian bridges as well as 11 foot trails and some sections of roads in the area will also be affected by inundation. The detailed planning of infrastructure reinstatement will be carried out during the first year of project construction, in consultation with affected communities. The required works will be installed over the following 2 years, so as to be in place well before the reservoir is impounded.

Impacts on Communities: Apart from the disruption to livelihoods resulting from the acquisition of land and relocation of people, the project is likely to increase the pressure on resources used by local communities such as firewood and drinking water. The influx of personnel involved in construction and operation of the project may cause health and sanitation problems, and risks overburdening the limited social infrastructure in the area, including health services and schools. The majority of the affected population belongs to indigenous groups, whose social and cultural ways of life may be compromised by the project. Appropriate compensation and support will be provided to all people affected by the project in accordance with national legislation.

Vulnerable and Indigenous Peoples: The promoter has developed a Resettlement Framework covering the entire project and has completed a draft Resettlement and Indigenous People's Plan (RIPP) for the hydropower component which identifies the adverse social impact of the scheme and sets out the mitigating measures to be applied. Approval of the RIPP by the Bank and other lenders will be required prior to first disbursement of loan funds. Compensation will be provided for all types of losses incurred due to project activities, with physical assets being compensated for on the basis of the current market replacement cost. In addition to compensation for lost assets, households that are physically displaced will receive displacement allowances. Severely affected and vulnerable households will also be provided with training and counselling services, and where possible will be given preferential access to project construction employment opportunities. The RIPP includes a livelihood restoration programme designed to prevent impoverishment, restore incomes and build viable communities. Activities within the programme include employment, occupational training, direct credit, small business and enterprise development for job creation. The implementation schedule for the RIPP will closely follow the civil works schedule for the project. All compensation payments will be made at least 3 months prior to the start of construction. The RIPP also establishes a grievance redress mechanism which allows project affected persons to appeal against any decisions regarding compensation of land or other assets.

Around 75% of the affected households belong to indigenous/tribal communities known popularly as *Janajati*. Among the key characteristics of these communities are a distinctive collective identity, their own language (other than Nepali), distinct traditions and cultures, including written or oral histories, and an egalitarian social structure which is distinct from the mainstream caste system that is prevalent in Nepal. An Indigenous People's Planning Framework has been prepared to screen project impacts on *Janajati* communities and to ensure that their rights are safeguarded in accordance with national legislation and relevant international guidelines. In this case, as indigenous groups form the majority of the project affected population and they are largely assimilated with the mainstream population, mitigation of the negative impacts has been incorporated in a combined Resettlement and Indigenous People's Plan. Special provisions have nevertheless been included in the RIPP for the affected indigenous households in the project area. A Gender and Social Inclusion Action Plan (GESIAP) has been prepared to address the needs of women and socially excluded persons (SEPs) and to increase their level of participation in the project, including through skills training to improve employment opportunities.

At this stage, the RIPP has not yet been extended to cover the Transmission Line and Rural Electrification components; however, the promoter will carry out social impact assessments and a census survey in the areas impacted by these components, in accordance with the guidelines established in the Resettlement Framework for the project. The RIPP will be revised, or separate plan(s) will be prepared, based on the findings of the SIA and census survey and will be submitted to the Bank. No civil works activities will commence in relation to

⁷ Thanti's, which are common in hilly areas of Nepal and provide resting places for travellers

these components until full compensation has been paid to project affected persons in these areas.

The broader interests of stakeholders living within the project area of influence, including both those directly affected persons covered by the RIPP as well as indirectly affected households and community groups, have been addressed in a Community Development Strategy (CDS) that targets education, health, gender development, social inclusion, economic development and livelihood activities of all people living in the area. Implementation of the CDS will be carried out under the supervision of the promoter by a lead service provider, which will be an experienced consulting firm or competent national level NGO, working through field NGOs with prior experience of working with communities in the Tanahu district. The CDS will be implemented over the 6 years of the project construction period and will culminate in an evaluation process that will enable the promoter to continue its role in facilitating community development during the operating period.

Labour Standards and Occupational Health and Safety: During the project implementation period, all contracts for construction or civil works will contain appropriate provisions requiring contractors to comply with applicable core labour standards, national labour laws and to incorporate applicable occupational and health and safety requirements.

Public Consultation and Stakeholder Engagement

Public consultation during the EIA process started at the scoping phase with a series of meetings that were conducted with project-affected people, NGOs and representatives from local administrative bodies, in accordance with the EPR. A formal Public Hearing was subsequently held at Vyas (Damauli) Municipality, on 25/01/2004, to inform stakeholders about the project and to solicit opinions, suggestions and public concerns. The notice of the Public Hearing was published in the national press and a project brief was prepared in Nepali language and distributed to participants. During the upgrade of the feasibility study in 2007, a further 3 stakeholder meetings were conducted by JICA, with the assistance of NEA. The main concerns raised by the public during these consultation meetings were related to compensation procedures, loss of forest resources, safety issues, employment opportunities and infrastructure development.

More recently, a programme of consultations was held with key stakeholders during preparation of the RIPP. A total of 12 consultations in the form of informal discussions, meetings and group discussions were conducted in affected villages, the Vyas municipality and the Tanahu district headquarters over the period October 2011 to February 2012, as recorded in the RIPP. The affected people viewed the project as generating a number of positive impacts, including opportunities for employment and increased income, an increase in the value of their land and other assets, better mobility and education facilities. One of the main issues for concern was the need for fair and timely compensation to be paid for losses incurred as a consequence of project implementation. Appropriate procedures and entitlements have been integrated into the RIPP to ensure fair valuation of affected assets at the market replacement cost. All civil works related to the project will only commence after compensation payments have been made to affected persons. Community members participating in the consultation meetings stressed their wish for preference to be given to local people during construction work and the need to provide skills training to local communities, especially women and youth. These suggestions have been incorporated in the RIPP and the CDS. Tender documents will include the requirement to give preference to the employment of local people wherever possible. Vulnerable groups such as female-headed households, the elderly, the disabled and socially excluded indigenous people will be further assisted with training in technical skills and financial literacy in order to assist them in developing income-generating activities. On approval of the RIPP, disclosure workshops will be held in all of the affected villages to disclose the RIPP to the local community, with dissemination of hard copies in Nepali language. Consultations and discussions with affected people will be continued throughout the project implementation period. NEA will be responsible for ensuring that communities are kept informed of the project impacts, the compensation and assistance proposed and to facilitate addressing any grievances.

Other Environmental and Social Aspects

Environmental and Social Management: A dedicated Environmental and Social Monitoring Unit (ESMU) will be established within the promoter's organisational structure to deal with all social and environmental safeguard issues. Responsibilities of the ESMU will include the following: : (i) ensuring that the RIPP/RPs are updated based on detailed designs, if required; (ii) engaging in on-going consultations with stakeholders and affected persons; (iii) implementing the RIPP/RPs with support from NGOs, consultants and support staff; (iv) providing timely payments to affected persons before displacement occurs in sections ready for construction; (v) ensuring all training and capacity building support is provided to project affected persons in accordance with the RIPP/RPs; (vi) ensuring all grievances are addressed, and when necessary, activating the grievance redress committee; and (vii) submitting quarterly monitoring reports and clearly communicating the implementation status of RIPP/RP implementation throughout the construction period.

The ESMU will have a Resettlement and Rehabilitation Officer, supported by a Resettlement Coordinator and an Environment Officer. The ESMU will be supported and work closely with the Land Acquisition Officer, the Chief District Officer and the Compensation Determination Committee. Local Consultative Groups at each of the affected Village Development Committees will facilitate implementation of the RIPP/RPs at the village level, with support from an experienced consulting firm/national level NGO to be hired by the ESMU. The ESMU will also engage the services of a resettlement specialist and external monitor, who will review implementation of the RIPP/RPs and assess the achievement of resettlement objectives, the changes in living standards and livelihoods, restoration of the economic and social base of the affected people, the effectiveness, impact and sustainability of entitlements, the need for further mitigation measures if any, and identify strategic lessons for future policy formulation and planning.

Monitoring and Evaluation: An independent panel of social and environmental experts will be appointed to provide guidance to the promoter during project implementation. The panel will comprise specialists with expertise in resettlement and development processes. The panel will undertake regular evaluations of the resettlement and livelihood restoration programme and will be responsible for closely monitoring the performance of the project, reviewing internal and external monitoring reports, analysing budgets and expenditure in relation to the implementation plan, undertaking site visits and consulting with the affected population, paying special attention to vulnerable groups, verifying the success of implementation, and advising on corrective measures.

The promoter will prepare annual social and environmental monitoring reports to be submitted to the lenders in an agreed format. An environmental audit will be conducted by the Ministry of Environment two years after the start of project operation.