Tumatumari Hydroelectric Redevelopment Project

Project Summary (Revised)

1.0 Introduction

TUMATUMARI HYDRO INC, (THI) a Guyana registered limited liability company, (Company No. 6600) incorporated in year 2010, was granted in year 2013, lease No. A 24195 for the existing Tumatumari Hydroelectric Power Station on 20.55 acres of surrounding land, as shown on GL&SC Plan No. 54813. THI is a Special Purpose Vehicle (SPV), undertaking the business of an Independent Power Producer (IPP) as provided for, under the Electricity Sector Reform Act (ESRA).

The lease of the facility by the Government, is for a term of fifty (50) years, and renewable for another term of fifty (50) years, and has been granted for the purpose of the full rehabilitation, operation and maintenance of the **existing** Tumatumari Hydroelectric Power Station at Tumatumari in the Potaro river, to generate and sell bulk electricity to two extant corporate off-takers, for residential, commercial and industrial renewable energy consumption.

The hydroelectric power station was originally constructed by the BG Consolidated Goldmining Company Limited to provide power to its gold mining operations in the Potaro, and was commissioned in year 1956. It operated until year 1959, when the company closed down its operations. It was re-commissioned in year 1969 by the Guyana National Service to provide electricity to its National Services Camps at Tumatumari and Konawaruk, and nearby communities, and was closed down in year 1990, and its plant and equipment left abandoned, and subsequently vandalized.

THI has developed a financially viable project which will rehabilitate the existing Tumatumari Hydroelectric Power Station. The development of this project has benefited from an independent technical and economic review by a team of experts financed by the Development Agency of the German Government (GIZ) through facilitation by the Regional Energy and Energy Efficiency Technical Assistance Project (REETA), under the aegis of the CARICOM Secretariat. This review has pronounced most positively on the viability of this project.

THI will shortly be completing negotiations with MASSY ENERGY of Trinidad and Tobago for their equal shareholding in this project, as its strategic investment partner. The total Capex projected is ≈US$ 3.7 million, and implementation is projected to commence in June 2017. Commissioning and initial commercial operations are projected for April, 2018. The duration of the project is for 25 years, in the first instance.

The project will afford long term employment for up to 15 persons, directly, and approximately 40 persons during the construction phase; approximately 25 persons may be indirectly employed from the early operations phase, progressively incremental.

2.0 Site, Design, and Size of Project

2.1 Site of Project

The Tumatumari Hydroelectric Power Station is located at Tumatumari in the Potaro River, in Region 8A, Potaro-Siparuni. Its co-ordinates are 59^0 1" W, 5^0 52" N. It is accessible by 225 kilometers of road from Georgetown (5-6 hours travel). The works are at the head of the Tumatumari Falls where the river, flowing in an easterly direction turns southeasterly and drops approximately 22 feet, as it proceeds to its mouth at the Essequibo River.

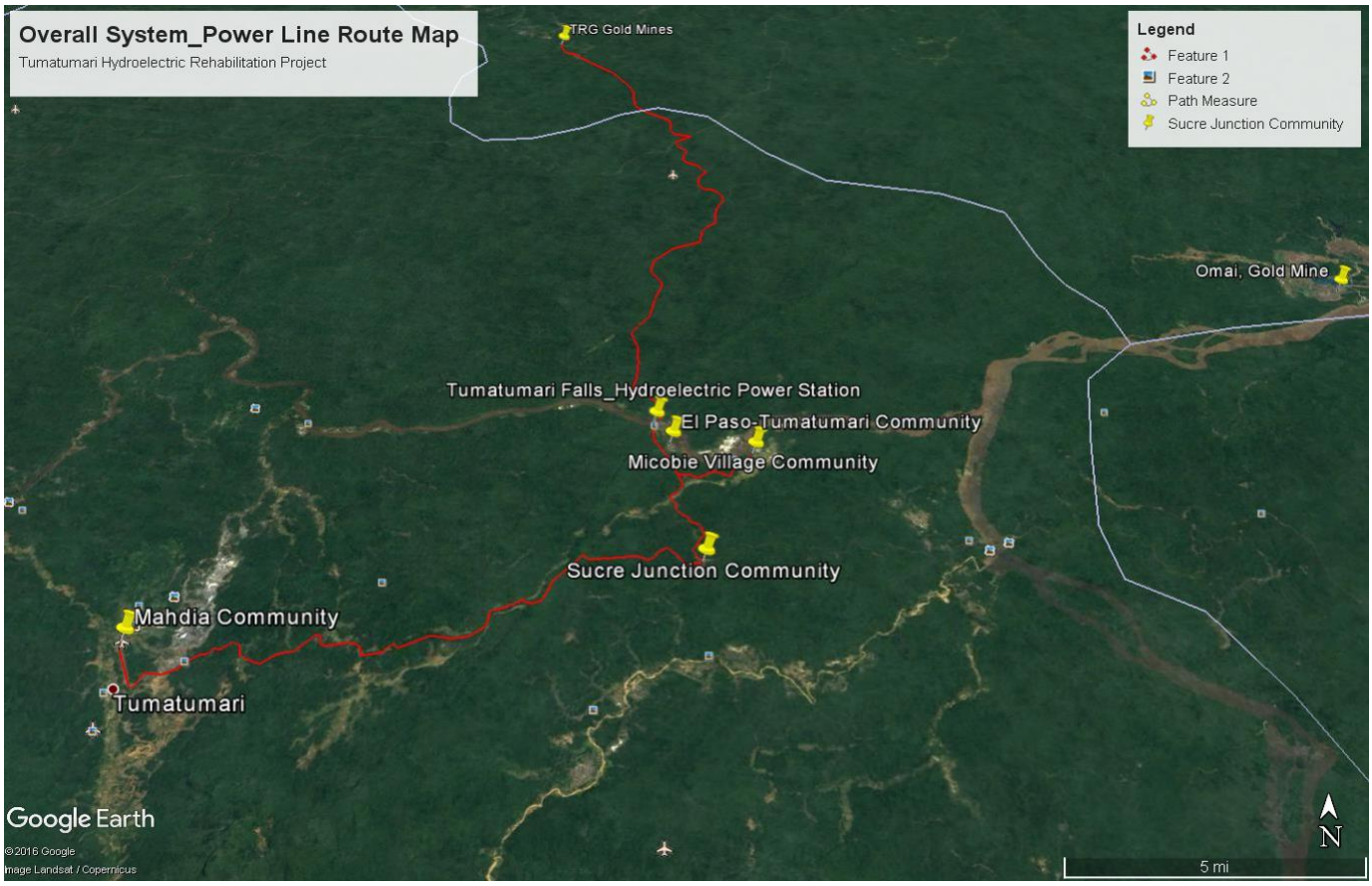
As previously stated, in the introduction, the project is situated on 20.55 acres of surrounding land, as shown on GL&SC plan No. 54813

Project Location Map

Tumatumari, Potaro river, Region 8 (sub-region A)

geographical co-ords:

- 59° 0' 32" W; 5° 21' 46" N
- 225 km by road from Georgetown (5-6 hours travel)
- 25 km from nearest air-strip at Mahdia (1 hour by air + 3/4 hour by road)
- 14 km by river from the mouth of the Potaro river at Mango-landing (1/2 hour by speed boat)



2.2 Design and Size of Project

2.2.1 Brief Description of the Originally Installed Works

The Tumatumari hydro-electric plant is a run of river scheme, and consists of a series of head works that cross the entire width of the Potaro River at the top of the falls. Starting from the North Bank there is first a spillway section with crest at 116 feet elevation, which is 322 feet in length, and reaches to an island in the midstream. This spillway incorporates seven sluices of special design with 10 feet openings, closed by stop logs.

Only the aperture for the sluices now exists and reconstruction is required.

From the island a second spillway (overflowing) with crest at 115 feet elevation, but without any sluices, crosses the main river channel for a length of 419 feet tying into the power house and power house extension structures.

A sub-section measuring approximately 300 feet of this structure was damaged and reconstruction is required.

A non-over flowing rock fill dam with a crest at 127 feet elevation joins the end of the overflowing weir to power house, on the south bank. The average height of the dam above the river is 16 feet.
Below the power house a tailrace trench 50 feet wide and 400 feet long has been excavated to obtain the required operating head during low water periods.

The sluice section mentioned at the beginning is intended as a water diversion during construction and for such future maintenance that might require dewatering of the intakes, an operation that would be possible only during the low water season. It is also intended for flood relief control in the event of unusually high rainfall conditions.

The average head at the turbines is 22 feet, however, there will be some periods with reduced head during peak flow, when the tail water level is influenced by the high elevation in the Essequibo River downstream, thus reducing the head across the falls.

The power house is a two-bay structure with a rack protected intake that houses two power units, each consisting of a Gilkes Francis type turbine with a vertical shaft and David Brown gear box rated at 1100 horse power under the design head of 22 feet.
The dimensions of the power house building are 88ft. in length, 25ft. 4 inches in width, and 24ft. high, with reinforced concrete walls and floor, and a corrugated aluminum roof.

The water requirement for each turbine-generator unit is 550cfs (16m3/sec.), and during most years the flow in the river, with an average annual flow of 475m3/sec., is more than sufficient for the operation of the two units.

Note

a) **The General Lay out of the Headworks and Weir Sections is attached as File named 05-W-01_r 02_20160831**
b) **Attachment, File named 05_r02_20160831 gives details of the Reconstruction of the Weir**


Project Site: Spillway

Damaged Section (left top) and Sluice Aperture Section (right top) of Spillway Weir

Upstream of Potaro river at Tumatumari (low water)

2.2.2 Purpose and Scope of the Project

***This project will fully rehabilitate, operate and maintain the existing hydroelectric plant for the purpose of reliable generation and economical bulk sales of electricity, for the benefit of the adjacent communities*.**

The scope of the project includes:-

- Complete replacement of the two (2) existing 0.75Mw hydroelectric generator units with two (2) new 1.1Mw units, and installation of new electro-mechanical/hydraulic controls, instrumentation, protection and switchgear.
  Kindly refer to attachment File named 011-Study Report A3-Tech Specs., which details specifications of various design and equipment options, out of which design option 2a (but with 100% new E&M equipment) has been selected for implementation._
- Minor repairs/rehabilitation of the powerhouse, trash screens, penstock gantry & gates and final access roadway.
- Reconductoring of the existing power line (on steel towers) from Tumatumari to Sucre Junction (8km) and construction of a new power line extension from Sucre Junction to Madhia (24km) along existing roadway**.**
- Construction of a new 30km power line from Tumatumari to TRG gold mining operations at Karouni (Kaburi, Region 7) along existing roadway.
  Kindly refer to attachment, File named Power Lines Construction, which gives the routing of the power lines.
- Rehabilitation of damaged section of the colarated concrete gabion spillway and the restoration of sluice gates, which will be remotely controlled and electro-mechanically actuated.
- Construction of quarters to accommodate visitors, duty personnel, and offices.

3.0 Possible Effects of the Project on the Environment

The original operations of this run of river facility caused little, if any, negative disruption to the environment. There is no history, during its 60 years existence , of environmental issues or such negative occurrences, and this project will rehabilitate and improve operations of the hydroelectric plant by the employment of improved modern day technologies. Environmental and Social Impacts which THI have identified to be worthy of investigation, and those which the EPA considers necessary to be investigated are, identified below as:-

- The social impact: on the immediately adjacent community, and those also served by the project further afield.
- The biodiversity impact: any possible negative impact during the operational phase which could occur to flora and fauna and possible endangerment of mainly aquatic species, if closed off from

upstream or downstream spawning and feeding grounds. No negative impact on the avian, ground water or fresh air components of the environment is distinguished.

- Climate change mitigation impact:

- The noise and human waste pollution impact: usage of lubricants and fuel oils is minuscule.

- Hydrological impact: during operations, conditions such as minimum percentile flow, and anti-flood control measures will be assessed.

- Land stability and erosion impact: While the actual works are situated on granite bedrock, impact on the stability of lands surrounding the project`s installation works will be assessed.

- Power lines installation impact: no new forest road or road reconstruction would be required for the erection of power poles and stringing of lines, as works will be effected on the easement of the existing roadway, and any incremental disruption or habitat fragmentation would be minimal.

4.0 Application for Environmental Authorization

THI by way of letter dated July 15, 2015 to the Environmental Protection Agency (EPA), applied for processing of Environmental Authorization for the implementation of the project. This process progressed to the half-way point, before being reformulated by the EPA, in accordance with the stipulations outlined in the EPA`s letter of February 21, 2017. The restarted process has since been embarked upon, with due dispatch. However, given the projected early implementation schedule and the nature of this project (which is the rehabilitation of a small run of river hydroelectric plant that was constructed sixty (60) years ago, and operational for over 24 years of those) it is not envisaged that the undertaking of an Environmental Impact Assessment (EIA) and the preparation of an Environmental and Social Impact Management Plan (ESMP) will be an onerous, inordinately time consuming, and costly undertaking.

Accordingly, the EPA proposes to grant THI's request for an interim Environmental Authorization (IEA) for a period of one year, on application, subject to the EPA's acceptance of the updated Project Summary to be resubmitted by THI. The IEA will facilitate the early implementation of the project, namely the construction, commissioning and initial operation, pending achievement of full environmental authorization status within the stipulated period of one year of its issue

The Draft Terms of Reference for the EIA and related ESMP are the immediate next steps to be addressed. This will facilitate the engagement of the Environmental Consultants for undertaking the work, in coordination with the EPA. Accordingly THI projects that its application for the IEA will be submitted by May, 2017, given that project works will commence (on the ground) by July, 2017.

Please refer to copy of Project Implementation Schedule, attached as File: THI Implementation Schedule.

This schedule indicates the activities that will be undertaken during the period of the IEA, during which time full compliance with and issuance of Environmental Authorization by the EPA is envisioned.

5.0 Application for Hydroelectric License

Application for the requisite Hydroelectric License, which covers the authority to use the water resource and the fees and other conditionalities associated therewith, has also commenced and progressed to the point of clearly outlined steps to be followed to the point of an Interim License; an acceptable state of progress.

Further progress rests primarily with the state of the associated Environmental Authorization accreditation and the executed MOU (done) with THI's Investment Partner (for securing project financing), matters that are all advanced and well in hand.