

Draft Terms of Reference (TOR)
Consultancy Services
for
Detailed Residual Life Assessment (RLA) of Ghorashal Unit 6 of BPDB

A. Background

BPDB has Six Gas-fired steam turbine generating units at Ghorashal Power Station premises. Out of Six units, four nos. of 210 MW capacity each and two nos. of 55 MW units. The 210 MW units were installed with Russian technical cooperation during 1984-1999. Presently, 3 nos. 210 MW Units (3, 4 &5) are running at de-rated condition and Unit no. 6 is out of order. The overall efficiency of the existing plants is around 31%. Re-powering or converting these steam units to combined cycle power plants will improve the efficiency to around 54-56 %. Under the plan, the Steam Turbines will be re-powered with new Gas Turbines and HRSGs and converted to combined cycle that will provide more gain in energy and efficiency. It will help better utilize the natural gas which is in short supply.

An accident was occurred on 18.07.2010 due to failure of 230 kV breaker of Unit no. 6 of Ghorashal Power Station. Due to this accident Steam turbine, Generator & other major auxiliary systems were damaged. Since then, this unit is under shut down condition. Government of Bangladesh (GOB) has therefore decided to do a detailed residual life assessment (RLA) of the Unit-6 to understand whether the unit 6 is suitable for a repowering project or building a new plant at the location of unit 6 would be a better option. A consulting firm will be appointed to carry out the task.

B. Objectives

- a) Assess the condition of the existing steam turbine, generator and auxiliaries to provide an opinion on the remaining life of Unit-6 at Ghorashal;
- b) Assess the foundation of the current location of unit 6 and the surrounding structures to provide an opinion whether a new combined cycle plant can be built at that location;
- c) Based on the assessments, recommend the best option and accordingly determine an optimal configuration (either for repowering or a new CCPP), with the economic justification

C. Scope of Service

Phase 1:

- Assess technical design and present conditions of ST, STG, and Auxiliaries of the Ghorashal Unit-6;
- Conduct a detailed RLA Scan including necessary test/inspection of the ST, STG and Auxiliaries and determine the remaining life time of the Unit.
- Literature study concerning the risk of crack forming inside the LMZ 200 steam turbine;
- Conduct the NDT tests on the turbine Rotor, Blade, Nozzle, Diaphragm, Connecting pipelines, Bearings, Rotor Internal and valves.
- Recommendation for Upgrades, improvements or replacements of the other mechanical main equipment & auxiliaries;

- Recommendation for Upgrades, improvements or replacements of the major electrical system such as Transformers, Circuit Breakers, Bus bar, Battery/DC Systems, 6.6 kV & 0.4 kV Switchgear and so on;
- Identify required improvements of ST, STG, Auxiliaries including replacement or upgrade of steam path; provide costs for the upgrading/ improvements/ replacements;
- Carry out the inspection of the foundation of the Steam Turbine & Generator;
- Finalize technical design and optimal configuration for the CCPP (Repowering or Greenfield);
- Overall recommendation of the existing unit no 6: repowering or new-built.

Phase 2:

Task 1:

Carry out a market Analysis to know the names of the potential bidders (including the manufacturers of the major equipment) who would participate in the project. The market analysis will include:

- Market capability to meet the Borrower's needs including typical experience levels, package sizes and financial performance. If the market analysis requires early market engagement, this deliverable will include providing inputs into the Market Engagement Strategy.
- Previous experiences in the market by the Borrower and other agencies including on World Bank and non-World Bank projects as appropriate.
- Market view of the Borrower (from a supplier's perspective) in terms of attractiveness for contracting with (e.g. reliability of payment, procurement capability, complaints handling) i.e. are they likely to bid.
- Current practice in procuring from the market including pricing methods, risk allocation and benchmarks of performance and cost.

Task2:

Develop the bidding documents based on the outcome of market analysis and considering the value for money.

D. Responsibility of Power Cell/BPDB

Power Cell/BPDB will provide the consultants with access to the steam turbine and generator and components including necessary opening up of equipment, removal of insulation, dismantling of outer casing/rotors, and necessary cleaning prior to NDE/NDT; and refitting of the equipment. BPDB will provide key support personnel and historical O&M data for the Unit. The consultants will be responsible for the necessary NDE/NDT equipment and consumables.

E. Competency / Skill requirement

The consultant team should have mix of Electrical, Mechanical and Civil Engineering background having sufficient experience/expertise in planning, design, plant maintenance, overhauling of steam turbine and executing large scale CCPP/re-powering power plants. The key person should have experience in design and configuration of combined cycle and re-powering project with at least 15 years working experience in thermal power stations both in GT and Steam Turbine. The team may be supported by inspectors.

F. Proposal

This is a work for altogether 33 days. In Phase 1: For detailed RLA and foundation assessment -18 days; For final report including economic justification of the investment -7 days; In Phase 2: 3 days for market survey and 5 days for the preparation of the bidding documents. The consultants will provide a proposal to Power Cell giving a work plan on various activities such as- inspection program; list of tests; estimation of consumed life; recording and reporting of results; evaluation of results; final report on remaining potential for ST Unit-6 and recommendations for its future operation/ upgrading /maintenance.

G. Deliverables with Timeline

- Inception Report : within 3 days from start of assignment
- Draft RLA Report : within 25 days of assignment
- Final RLA Report : within 30 days of assignment
- Market survey report: within 30 days of assignment
- Final bidding documents: within 33 days of assignment