Terms of reference (ToRs) for the procurement of services below the EU threshold

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Techno-economic review on flexibility potential of hydro power in India to adapt to fluctuating power generation from renewable energy sources

Project number/ cost centre:

18.9022.7-003.00

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0. List of abbreviations

AVB	General Terms and Conditions of Contract (AVB) for supplying services and work 2018
ToRs	Terms of reference

1. Context

Introduction to IGEF:

To enhance and deepen the strategic political dialogue about the ongoing energy transition in both countries, the German Chancellor and the Indian Prime Minister established the Indo-German Energy Forum (IGEF) in April 2006. Strategic cooperation projects between the German and the Indian government, research institutions, and the private sector are the major objectives of the IGEF.

The focus areas of this high-level bilateral forum are energy efficiency, renewable energy, and energy security, investment in energy projects as well as collaborative research and development, considering environmental and social challenges of a sustainable development.

Pumped storage hydropower plants (PSPs) have been used in power systems to satisfy growing demands for large, highly variable electricity supplies. A renaissance of PSPs occurred at the beginning of the 21st century, when many such plants were built, particularly in countries where large quantities of wind and solar facilities had been installed (such as Austria and Switzerland), to deal with the intermittent nature of their generation. Hydropower plants have a life time of 100 plus years whereas all other sources have 30-40 years of project life and less. The use of PSPs has risen quickly, as it is practically the preferred technology capable of ensuring the large-scale integration of electricity from such variable generation technologies into national power grids.

The Government of India (GoI) has set an ambitious plan of achieving 175 GW Renewable Energy (RE) by 2022 and a further target of 450 GW by 2030 and policies are being developed and implemented for achieving the same. India being a geographically diverse country, the RE sources are not equally well distributed. For example, India has wind energy potential in only six states i.e. Tamil Nadu, Karnataka, Maharashtra, Gujarat, Rajasthan and Andhra Pradesh. Solar capacity addition target of 100 GW includes setting up plants with a capacity of 500 to 1000 MW each (as ultra-mega solar power projects) along with several distributed sources of energy.

While increase in transmission capacities are one of the most important enablers, the power generation from wind and solar varies with wind speed, direction of wind and atmospheric temperature and solar insolation. This variability affects the operation of power systems with high penetrations of RE sources. The ambitious goals to promote renewables in India in the recent years has necessitated to look at alternatives for storage solutions to balance the intermittency of RE generation and matching demand with supply.

Pumped-storage hydropower project (PSP) is one of the options, whereby, pumping water from a lower reservoir to an upper reservoir provides for storage as well as generation. It is estimated that India will need large number of storage options until 2030 with a significant potential share coming from PSP. Besides a renewable form of energy, PSP facilitates grid stabilization allowing a high penetration of variable renewables such as wind and solar into existing electricity grids.

According to the Central Electricity Authority (CEA) report on Flexible Operation of Thermal Power Plant for Integration of Renewable Energy released in January 2019, Hydro power

plants are especially suitable for quick supply of flexible power. Coordination with state operated hydro plants would play an important role in re-allocation of hydro generation. Pumped storage, existing and under-construction, may be used for peaking or balancing of system on the direction of regional/ national level system operator only.

2. Tasks to be performed by the contractor

The contractor is responsible for providing the following services:

Considering the above recommendations of CEA, the proposed study will examine the following:

- **Ramping capability of existing hydro power plants in India**
- **Ramping capability of existing PSP hydro power plants in India**
- **Potential for improvement of ramping capability of existing hydro power plants in India**
- **Potential for converting existing hydro power plants to PSP in India**
- **Potential for further PSP hydro power plants in India**
- **Potential for commissioning RE power plants especially floating solar PV near PSP hydropower and Hydropower plants**
- **Overall cost estimation (i) retrofitting to improve ramping capacity, (ii) converting existing storage hydro to pumped storage scheme, (iii) developing new PSP hydropower project**
- **Regulatory and market framework for PSP hydropower**
- **Economic assessment of PSP hydropower and options for incentivizing PSP hydro**
- **Absolute amount and percentage of hydropower traded on IEX etc if any from inception of IEX etc**

Certain milestones, as laid out in the table below, are to be achieved by certain dates during the contract term, and at particular locations:

Milestone	**Deadline/place/person responsible**
Inception workshop and presentation of methodology and sectors	May 2020
Presentation of first draft of the study	September 2020
Final Techno Economic Assessment Report	October 2020

Period of assignment: From April 2020 until October 2020.

3. Concept

In the bid, the bidder is required to show how the objectives defined in Chapter 2 are to be achieved, if applicable under consideration of further specific method-related requirements (technical-methodological concept). In addition, the bidder must describe the project management system for service provision.

Technical-methodological concept

Strategy: The bidder is required to consider the tasks to be performed with reference to the objectives of the services put out to tender (see Chapter 1). Following this, the bidder presents and justifies the strategy with which it intends to provide the services for which it is responsible (see Chapter 2).

The bidder is required to present the actors relevant for the services for which it is responsible and describe the **cooperation** with them.

The bidder is required to present and explain its approach to **steering** the measures with the project partners and its contribution to the results-based monitoring system.

The bidder is required to describe the key **processes** for the services for which it is responsible and create a schedule that describes how the services according to Chapter 2 are to be provided. In particular, the bidder is required to describe the necessary work steps and, if applicable, take account of the milestones and contributions of other actors in accordance with Chapter 2.

The bidder is required to describe its contribution to knowledge management for the partner and GIZ and promote scaling-up effects (**learning and innovation**).

Other specific requirements

None

The bidder is required to explain its approach for coordination with the GIZ project.

- The contractor is responsible for selecting, preparing, training and steering the experts (international and national, short and long term) assigned to perform the advisory tasks.
- The contractor makes available equipment and supplies (consumables) and assumes the associated operating and administrative costs.
- The contractor manages costs and expenditures, accounting processes and invoicing in line with the requirements of GIZ.
  The contractor reports regularly to GIZ in accordance with the AVB of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH from 2018.

In addition to the reports required by GIZ in accordance with AVB, the contractor submits the following reports:

- Inception report
- Contributions to reports to GIZ's commissioning party
- Brief quarterly or half-yearly reports on the implementation status of the project (5-7 pages)

The bidder is required to draw up a **personnel assignment plan** with explanatory notes that lists all the experts proposed in the bid; the plan includes information on assignment dates (duration and expert days) and locations of the individual members of the team complete with the allocation of work steps as set out in the schedule.

The bidder is required to describe its backstopping concept. The following services are part of the standard backstopping package, which (like ancillary personnel costs) must be factored into the fee schedules of the staff listed in the bid in accordance with section 5.4 of the AVB:

- Service-delivery control
- Managing adaptations to changing conditions
- Ensuring the flow of information between GIZ and field staff
- Contractor's responsibility for seconded personnel
- Process-oriented technical-conceptual steering of the consultancy inputs
- Securing the administrative conclusion of the project
- Ensuring compliance with reporting requirements
- Providing specialist support for the on-site team by staff at company headquarters
- Sharing the lessons learned by the contractor and leveraging the value of lessons learned on site

4. Personnel concept

Eligibility of Consulting Firm.

1. **Only companies registered in India are eligible to bid.**
2. **Average annual turnover for the last three financial years should be at least Euro 1,00,000/-**
3. **Number of employees as at 31.12. of the previous year should be at least 20 persons**
4. **Technical assessment is only based on reference project(s) provided with minimum commission value of Euro 25,000/-**
5. **Provide at least one reference project in the technical field of pumped storage power generation**

The bidders must be able to demonstrate

a) Experience in monitoring and evaluation of projects - at least five years
b) Experience in organisational and institutional development – at least five years
c) Experience in public management and business management – at least five years
d) Experience in development studies – at least five years
e) Experience in implementing projects in India – at least five years

The bidder is required to provide personnel who are suited to filling the positions described, on the basis of their CVs (see Chapter 7), the range of tasks involved and the required qualifications.

The below specified qualifications represent the requirements to reach the maximum number of points.

Team leader

Tasks of the team leader

- Overall responsibility for the advisory packages of the contractor (quality and deadlines)
- Coordinating and ensuring communication with GIZ, partners and others involved in the project

- Personnel management, in particular identifying the need for short-term assignments within the available budget, as well as planning and steering assignments and supporting local and international short-term experts
- Regular reporting in accordance with deadlines

Qualifications of the team leader
- Education/training (2.1.1): University qualification in Power / Civil engineering
- Language (2.1.2): Good business language skills in English
- General professional experience (2.1.3): 20 years of professional experience in the power and water sector
- Specific professional experience (2.1.4): 10 years in power generation
- Leadership/management experience (2.1.5): 6 years of management/leadership experience as project team leader or manager in a company
- Regional experience (2.1.6): 5 years of experience in projects anywhere in India
- Development Cooperation (DC) experience (2.1.7): Preferred
- Other (2.1.8): *NA*

Expert 1

i. In depth expertise of RE topics including market and technology in India with access to specific data in different states
ii. In depth expertise of RE and Grid topics including technology in India and new global technologies in the PSP hydro sector
iii. Good understanding of the Energy Landscape in India and relevant actors and contacts

Tasks of expert 1
- Making technical assessment
- Making operational assessment
- Making regulatory assessment
- Making financing assessment

Qualifications of experts 1 & 2 (**2.2 & 2.3**)
- Education/training (2.2.1): Qualified in power / energy engineering and related subjects
- Language (2.2.2): English
- General professional experience (2.2.3): 10 to 15 years
- Specific professional experience (2.2.4): 5 years
- Leadership/management experience (2.2.5): 5 years
- Regional experience (2.2.6): NA
- Development Cooperation (DC) experience (2.2.7): Preferred
- Other (2.2.8): NA

Soft skills of team members
In addition to their specialist qualifications, the following qualifications are required of team members:
- Team skills
- Initiative
- Communication skills
- Sociocultural competence
- Efficient, partner- and client-focused working methods
- Interdisciplinary thinking

Short-term expert pool with minimum two, maximum three members

Tasks of the short-term expert pool

- Analysis and preparation of assessments on different topics

Qualifications of the short-term expert pool

- Education/training (2.6.1): all experts with university qualification in power/energy engineering or sciences experts
- Language (2.6.2): all experts with very good language skills in English required
- General professional experience (2.6.3): at least 20 years of experience in the industrial / power engineering sector, at least 10 years of professional experience in the power / water sector
- Specific professional experience (2.6.4): at least 10 years of experience in energy / power sector
- Regional experience (2.6.5): with at least 5 years of experience in India (country)
- Development Cooperation (DC) experience (2.6.6): Preferred
- Other (2.6.7): NA

The bidder must provide a clear overview of all proposed short-term experts and their individual qualifications.

5. Costing requirements

Assignment of personnel

Team leader: Assignment in country of assignment for 45 expert days

Expert 1: Assignment in country of assignment for 75 expert days
Expert 2: Assignment in country of assignment for 75 expert days
Expert 3: Short-term expert pool: total 30 expert days

Travel

The bidder is required to calculate the travel by the specified experts and the experts it has proposed based on the places of performance stipulated in Chapter 2 and list the expenses separately by daily allowance, accommodation expenses, flight costs and other travel expenses.

No travel budget is provided for.

6. Inputs of GIZ or other actors

GIZ and/or other actors are expected to make the following available:

NA

7. Requirements on the format of the bid

The structure of the bid must correspond to the structure of the ToRs. In particular, the detailed structure of the concept (Chapter 3) is to be organised in accordance with the positively

weighted criteria in the assessment grid (not with zero). It must be legible (font size 11 or larger) and clearly formulated. The bid is drawn up in English (language).

The complete bid shall not exceed 10 pages (excluding CVs).

The CVs of the personnel proposed in accordance with Chapter 4 of the ToRs must be submitted using the format specified in the terms and conditions for application. The CVs shall not exceed 4 pages. The CVs must clearly show the position and job the proposed person held in the reference project and for how long. If one of the maximum page lengths is exceeded, the content appearing after the cut-off point will not be included in the assessment.

8. Option

NA

9. Annexes

None