



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

FORUM OF REGULATORS (FOR)

TERMS OF REFERENCE

A Study on “Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential”

1.0 Introduction:

1.1 The Forum of Regulators (FOR) has been constituted by the Government of India in terms of Section 166 (2) of the Electricity Act, 2003. The Forum consists of Chairperson of the Central Commission and the Chairpersons of the State Commissions. Chairperson of the Central Commission is the Chairperson of the Forum of Regulators and secretarial assistance to the Forum is provided by the Central Commission. The Forum is responsible for harmonization, coordination and ensuring uniformity of approach amongst the Electricity Regulatory Commissions across the country, in order to achieve greater regulatory certainty in the electricity sector.

FOR has been taking steps towards ensuring that the provisions in the Electricity Act and the policies i.e. National Electricity Policy (NEP) and Tariff Policy are well implemented. The responsibility of promoting cogeneration and generation of electricity from renewable sources of energy has been entrusted on the Appropriate Commission in section 61 and in particular to the state commissions under section 86 (1) (e) of the Electricity Act 2003. Pursuant to this provision of the Act, the National Electricity Policy stipulates that the Appropriate Commission shall promote co-generation and generation of electricity from non-conventional sources would be promoted by the SERCs by

- 1) Providing suitable measures for connectivity to the grid;
- 2) Sale of electricity to any person;
- 3) Specifying, for purchase of electricity from such sources, a percentage of



the total consumption of electricity in the area of a distribution licensee.

Most SERCs have put significant emphasis on the last part of this important subsection, namely specifying a percentage of electricity to be procured by the distribution licensees from renewable sources of energy, while virtually ignoring the first part i.e. providing suitable measures for connectivity with grid.

- 1.2** The renewable energy resources are generally located in remote locations. Grid infrastructure is needed to be sufficient to transport the renewable energy to the load centres. Construction of new long distance transmission lines to meet the needs of large scale renewable energy development are thus extremely necessary, and the lack of adequate evacuation capacity is one of the major issues that needs to be addressed in transmission network planning. It is essential for the transmission capacity planning process to incorporate a long term vision of renewable energy based generation additions. Transmission network planning must involve renewable energy sector players at the planning stage, in order to minimize bottlenecks arising from the lack of evacuation capacity.
- 1.3** The IEGC also mandate states that interstate transmission system planning and development should take into account the needs of renewable energy sources and the renewable capacity addition plan (as issued by the MNRE). To make this goal a reality, all state transmission utilities should prepare a comprehensive five-year transmission plan with appropriate consideration of renewable generation projects based on load flow studies and location of generation projects. State nodal agencies should take a lead role in coordinating and providing information to state transmission utilities on new renewable energy generation capacity.



- 1.4 According to the Electricity Act, 2003. integrating renewable energy generation resources is the primary responsibility of State Transmission Utilities (STU). However, due to the poor financial health of the STUs, they are often not in a position to invest the necessary capital for the required transmission upgrades. Therefore, some STUs are demanding prior payment for transmission augmentation carried out upstream of interconnection point or demand renewable energy project developer to put such evacuation infrastructure at their cost. Grid upgrades and enhancements are needed for integrating planned large scale renewable energy capacity addition. Without significant increases in the transmission capacity all the renewable energy generated cannot be accommodated in the power system. This lack of sufficient transmission capacity acts as a dis-incentive that could result in less than expected additions in renewable energy generation.
- 1.5 Recognizing the criticality of the issue, the National Clean Energy Fund could be used for providing Support creation of transmission infrastructure for high renewable energy potential zones and thus help make renewable energy a preferred power generating source for local and regional grid operators.
- 1.1 For this purpose it is decided to engage a consultant to study these issues with detailed analysis and come out with a comprehensive report with estimation of capex requirement for the upgradation/development of transmission infrastructure in renewable energy resources rich states and also provide strategy framework for incentivizing/financially supporting these states for facilitating upgradation/development of transmission infrastructure.

Objectives of the study:

- 1.2 To prepare a comprehensive report to include



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

- i. Assessment of required development of transmission infrastructure in these states, considering the likely capacity additions of RE based power during the 12th Plan period.
- ii. Estimation of capex requirement for the development of transmission infrastructure in these states.
- iii. Providing strategy framework for financially supporting these states for facilitating development of transmission infrastructure.
- iv. Transmission planning for resources rich State for future.

2.0 Scope of Work:

The Consultant is required to prepare the report by carrying out the study with detailed analysis of achievable potential of various RE technologies in different states and possible RPO trajectory and its impact on tariff. Detailed Scope should include following:

- 2.1** Assessment of existing transmission infrastructure in select 7-8 states rich in RE potential. These states would be selected mutually after discussion with MNRE and CERC/FOR team members.
- 2.2** Assessment of required upgradation/development of transmission infrastructure in these states, considering the likely capacity additions of RE based power during the 12th Plan period in consultation with respective STU and CTU
- 2.3** Estimation of capex requirement and basis thereof for the upgradation/development of transmission infrastructure in these states.
- 2.4** Providing strategy framework for incentivizing/financially supporting these states for facilitating upgradation/development of transmission infrastructure in consultation with MNRE/CERC/FOR.
- 2.5** The power evacuation studies include the following analysis:



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

- 2.5.1 To model the STUs/CTUs Grid of 400 kV, 220 kV, 132/ 110 kV and 66 kV buses in the vicinity of renewable energy generation in detail along with modeling the concerned region interconnected system.
- 2.5.2 To examine the adequacy of the existing Grid infrastructure to evacuate the as on renewable energy generation.
- 2.5.3 To suggest immediate requirement in the Grid as a short term planning measure to evacuate the power.
- 2.5.4 To design suitable evacuation scheme taking into consideration the additional renewable energy in case of normal loading conditions and peak load conditions and during outage of one or two lines in the evacuation region.
- 2.5.5 Load flow studies under various i.e. peak load and off peak load under contingency conditions.
- 2.5.6 Short circuit studies to arrive at fault levels at RE generation stations.
- 2.5.7 Suggesting any dynamic compensation requirement, if any in the region for smooth voltage control for full evacuation from the wind facility.
- 2.5.8 To arrive at the extent of renewable energy penetration possible in renewable energy resources rich State.
- 2.5.9 Comprehensive scheme to evacuate renewable energy in the next 5 year plan from all renewable energy resources rich states.
- 2.5.10 The maximum generation of renewable energy possible from each region.
- 2.5.11 Any augmentations necessary on the basis of the proposed renewable energy substations on utility side.
- 2.5.12 Estimation of total investment required in each renewable energy resources rich states and basis thereof.



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

2.5.13 Presentations before Forum of regulators and STUs on transmission infrastructure required in such states.

2.6 Considering the above scope of work, system studies to be carried out and submit final report.

3.0 Recommendations & Way forward

Based on the findings of the study on each of the above aspects the consultant should make suitable recommendations:

- a) With regard to the implementation strategy and to the commitment that may be desirable on the part of the State Transmission Utilities to plan evacuation infrastructure and strengthening of existing network to foster development of RE sources.
- b) On the role of the respective SERC and CERC to direct concern STUs/CTU to take suitable action on the findings of the study.
- c) With regard to the strategy framework for incentivizing/financially supporting the STUs for facilitating upgradation/development of transmission infrastructure by MNRE.

4.0 Deliverables and Duration of Assignment

The assignment shall be completed within a period of 150 days from the date of award of consultancy. The Consultant will be required to:

- 4.1 Submit Inception Report at the end of 30 days from the date of award of assignment;
- 4.2 Submit draft report at the end of 120 days from the date of award of assignment followed by a presentation before Forum of Regulators;



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

4.3 Submit a Final Report at the end of 150 days from the date of award of assignment;

5.0 Payment Schedule:

5.1 15% advance of the total fee of the study at the time of signing agreement/acceptance of the offer;

5.2 15% on submission of the inception report;

5.3 30% on submission of the draft report;

5.4 30% on submission of the final report; and

5.5 balance 10% on successful completion and acceptance of the final report by the 'FOR'.

6.0 Qualification Criteria:

6.1 The Consultant, besides being conversant with the working and role of CERC/SERCs and having completed or assisted them at least for 2 assignments on regulatory matters, should have sufficient exposure in the area of renewable energy and done at least one assignment for ERC or any other organisation on renewables.

6.2 In addition the consultant has successfully completed at least 2 assignments for different STUs or CTU on power system design and studies upto the level of 400 kV transmission systems or above.

7.0 Application and Evaluation Criteria:

7.1 The format of application is at Annexure-I and Annexure-II.



- 7.2 The Consultant is required to submit four (4) copies of bids for Technical offer (each of which will be treated as original) and one copy of Financial offer, duly sealed in separate envelopes.
- 7.3 Technical component will carry 70% weightage and Finance component 30% weightage.
- 7.4 The bids of the eligible bidders as per Clause 6 will be scrutinized by Consultancy Evaluation Committee (CEC) and shortlisted bidders will be called for interaction with the CEC and their technical performance will be evaluated based on the following criteria:

Technical Parameters	Weights
The Consultants relevant experience for the assignment	0.3
Understanding of the issues and approach to be followed	0.3
The qualifications and experience of the key staff proposed	0.4

- 7.5 The minimum qualifying marks in the Technical Evaluation is 50% of the total score for technical component.
- 7.6 Only those bidders, who qualify technically as per Clause 7.5, would be considered for Financial Evaluation.
- 7.7 Weight for Financial parameters: Proposal with the lowest cost will be given a financial score of 100 and other proposals given financial scores that are inversely proportional to their prices.
- 7.8 The total score will be obtained by weighting the Technical and Financial scores.
- 7.9 Only successful bidder would be communicated the award of consultancy assignment.
- 7.10 The right to reject any or all bids rests with the FOR Secretariat without assigning any reason.



- 7.11** The 'FOR' and the Consultant both would have option to terminate the contract by giving a notice of one month or the equivalent remuneration in lieu thereof. In such cases, the Consultant shall be paid fees after taking into consideration the part of work completed prior to such foreclosure, termination or cancellation of the engagement as may be decided by the 'FOR', and the decision of the 'FOR' shall be conclusive and binding. The fees so fixed and paid shall be deemed to be final payment in such cases.
- 7.12** The consultant shall abide with the contract as per Annexure-III.



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

7.13 /ANNEXURE - I/

DETAILED PROPOSAL FOR STUDY

(TECHNICAL)

Four (4) copies of the proposal along with project summary to be submitted to Secretary, CERC/FOR.

I. GENERAL INFORMATION:

01. Title of the Proposed Study:
02. Name and address of the Organization/ :
Institution
03. Name & Designation of the Key Person :
04. Contact address of the Key Person :
(e-mail/fax/telephone)
05. Net-worth/Turnover of the Organization/ :
Institution



II. TECHNICAL SPECIFICATIONS:

06. i. Department(s) of the organization/Institution(s) where the study will be carried out

ii. Other department(s), if any, which will collaborate in this study

07. Brief review of the state-of-art in the field (National and International)

08. Detailed Approach & Methodology for undertaking the assignment

09. Facilities available for the proposed work in the applicant's organization/institution

10. Previous experience of the proposer in this or related field

11. Biographical sketch of the Study Team

(i) Name

(ii) Designation

(iii) Date of Birth

(iv) Education and Experience

(a) Academic Qualifications

Degree	University	Field(s)	Year



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

(b) Experience

Institution	Topic of work done	Period

(v) Field of major interest

(vi) Additional information (if any)

12. Capacity to impart training/transfer of knowledge



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

/ ANNEXURE - II /

DETAILED PROPOSAL FOR STUDY
(FINANCIAL)

I. GENERAL INFORMATION:

01. Title of the Proposed Study :

02. Name and address of the Organization/ :
Institution

03. Name & Designation of the Key Person :

04. Contact address of the Key Person :
(e-mail/ fax/ telephone)

05. Net-worth/Turnover of the Organization/ :
Institution

06. Certificate of authorization in case of Institutes/other organizations (Format enclosed at **Appendix-'A'**).



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

II. Fee Proposed:

07. Amount of Fee proposed for:

Components	Basis	Amount (in Rs.)
(I) Consultant Charges		
(II) Misc./Others (if any)		
<i>Total</i>		

(RUPEES _____)

Signature of the Principal Investigator /
Head of the Study Team



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

/ Appendix-'A' /

CERTIFICATE

The undersigned agree to abide by the conditions of the grants and certify that available facilities for proposed work shall be extended to the investigator/study team.

Signature of Executive Authority
Investigator/of the Organisation

Signature of the Principal
Head of the Study Team

Name and Designation

Name and Designation

Date

Date

Signature of Co-investigator

Name and Designation

Date

Official stamp of

Organization/Institution



AGREEMENT

ARTICLES OF AGREEMENT made on this day of BETWEEN M/s _____ of one part and the Forum of Regulators (herein after called "the FOR") of the other part.

WHEREAS the FOR has engaged the party of the first part to conduct a Study on "Assessment of achievable potential of New and Renewable Energy resources in different States during the 12th Plan Period, determination of RPO trajectory and its impact on Tariff" and the party of the first part has agreed, to conduct the said study and submit the report to the FOR, on the terms and conditions hereinafter contained.

NOW THESE PRESENTS WITNESS and the parties hereto respectively agree as follows:

1. The party of the first part shall complete the assignment as contained in Annexure-I (TOR) within a period of 3 (Three) months commencing from, 2009.

2. The party of the first part shall be paid as under:
 - a) 15% advance of the total fee of the study at the time of signing agreement/acceptance of the offer;
 - b) 15% on submission of the inception report;
 - c) 30% on submission of the draft report;
 - d) 30% on submission of the final report; and
 - e) Balance 10% on successful completion and acceptance of the final report by the 'FOR'.

The total fee for the study has been fixed at Rs..... (exclusive of taxes, if any).



3. The schedule of payment shall be as under:

As per clause 2 above.

4. The party of the first part shall not disclose to any unauthorized person any information and data that may be supplied to him by the FOR or by any other organization, under the direction of the FOR. All such documents shall be the property of the FOR or any information that may have come to their knowledge directly or indirectly by virtue of the assignment.

5. The party of the first part undertakes that this assignment shall not be in conflict with their prior or current obligation to other clients nor shall it place them a position of not being able to carry out the assignments objectively and impartially.

6. In case of any default on the part of the party of the first part in completion of the study within the time schedule agreed to between the parties as herein above, the party of the second part shall be at liberty to get the study completed from any other agency at the risk and cost of the party of first part.

7. In case of any differences or disputes between the parties arising out of this Agreement, it shall be referred for arbitration as per the provisions of Arbitration and Conciliation Act, 1996, as amended from time to time. The venue of the arbitration shall be Delhi.

8. The 'FOR' and the Consultant would both have option to terminate the contract by giving a notice of one month or the equivalent remuneration in lieu thereof. In such cases party of the first part shall be paid fees after taking into consideration the part of work completed prior to such foreclosure, termination or cancellation of the engagement as may be decided by the 'FOR', and the decision of the 'FOR' shall be conclusive and binding. The fees so fixed and paid shall be deemed to be final payment in such cases.



TOR- study on Preparing plan for transmission infrastructure development for the likely capacity additions of RE based power plants in the states rich in RE potential

9. In respect of any matter for which no provision has been made in this Agreement, the provisions contained in the general instructions of the Government on the subject of engagement for study shall apply.

In witness whereof the party of the first part and _____ to the FOR on behalf of the FOR have hereto put their hand the day and the year first above written.

Signed by, the party of the first part in the presence of

Signed by, the said to the 'FOR' for and on behalf of the FOR in the presence of