NTPC Limited

(A Government of India Enterprise)

invites

Expression of Interest

(EOI)

for setting up

A pilot project for the capture of CO_2, SO_2 and NOx (if possible) from the flue gas of a coal-fired unit, utilizing a non-amine-based technology which will be capable of using the existing wet limestone based FGD system infrastructure without any major modifications for full scale plant.

DOCUMENTS OF EOI

This EOI document comprises of the following sections:

(i)	Section I	: EOI Information
(ii)	Section II	: Introduction
(iii)	Section III	: Instructions to the Applicants
(iv)	Section IV	: Consideration of Response
(v)	Section V	: Application Form and Annexures

Section – I

EOI Information

DETAILED NOTICE INVITING EXPRESSION OF INTEREST (EOI)

EOI No. NTPC/PE/ET&PR/EOI-05/2025-26 **Date: 09.05.2025**

NTPC is Inviting Expression of Interest for setting up a pilot project for the capture of CO_2, SO_2 and NOx (if possible) from the flue gas of a coal-fired unit, utilizing a non-amine-based technology which will be capable using the existing wet limestone based FGD system infrastructure without any major modifications for full scale plant.

DOWNLOAD AND TIMELINES FOR SUBMISSION OF EOI

a. Interested APPLICANTs may download the documents of EOI free of cost from https://ntpctender.ntpc.co.in

b.	**Last date for submission of EOI**	**:**	**15.07.2025**
c.	**Last date for queries/ seeking clarifications**	**:**	**08.07.2025**
d.	**Date of opening of EoI response**	**:**	**18.07.2025**
e.	**Response Validity**	**:**	**6 months from the last date for EOI Submission**

1.0 For consideration of EOI, APPLICANTs are required to e-mail signed and scanned copy of EOI duly filled and completed in all respects, through e-mail mentioned hereunder. Email: abdulshaheedpk@ntpc.co.in / dipankarhalder@ntpc.co.in

2.0 NTPC shall not be liable for any postal/ Mail delivery issue delays whatsoever in receipt of EOI documents and EOI received after the stipulated date and time shall not be entertained. EOIs submitted without supporting document will summarily be rejected.

3.0 NTPC reserves the right to reject or accept any or all applications, cancel/withdraw the EOI process without assigning any reason whatsoever and in such case, APPLICANT shall not have any claim arising out of such action. NTPC bears no responsibility or liability of any kind in reference to the EOI.

Section - II

Introduction

INTRODUCTION

1.0 ABOUT NTPC

NTPC is India's largest energy conglomerate with roots planted way back in 1975 to accelerate power development in India. Since then, it has established itself as the dominant power major with presence in the entire value chain of the power generation business. From fossil fuels it has forayed into generating electricity via hydro, nuclear and renewable energy sources. This foray will play a major role in lowering its carbon footprint by reducing greenhouse gas emissions.

The total installed capacity of the company is 80,020 MW (including JVs) own stations include 27 coals based, 7 gas based, 1 Hydro, 17 Solar PV and 1 Small hydro plant. Under JV, NTPC has 10 coals based, 4 gas based, 8 hydro, 5 Wind, 22 Solar PV and 1 Small hydro plant. The capacity will have a diversified fuel mix and by 2032, non-fossil fuel-based generation capacity shall make up nearly 30% of NTPC's portfolio. NTPC Limited produces around 440 billion units of electricity annually.

NTPC Limited has reported a total income INR 1811.66 billion in the financial year 2023-24. NTPC group achieved a net profit of INR 213.32 billion in the financial year 2023-24 and has been consistently paying dividends to its shareholders.

2.0 INTENT OF THE EXPRESSION OF INTEREST (EOI)

2.1 CCUS has an important role to play in decarbonizing the power sector, given India's present reliance on coal for meeting over 70% of its electricity needs. Around the world, approximately 40 Carbon Capture plants are actively engaged in capturing around 45 million tonnes of CO2 annually. Among these, NTPC has taken a significant stride by installing a 20-tonnes-per-day Carbon Capture facility at the NTPC Vindhyachal power plant, employing an amine-based carbon capture process. Further, NTPC is also in the process of installing 25TPD carbon capturing plant at Simhadri along with sustainable aviation plant at Pudimadka, Andhra Pradesh. In addition, NTPC is also working to install 2x425 TPD carbon capture plant in Simhadri along with green urea plant at Pudimadka, Andhra Pradesh.

2.2 As the power sector seeks cost-effective decarbonization pathways, there is a pressing need for innovative and scalable solutions to reduce the cost of carbon capture. In this context, the widespread deployment of limestone based wet Flue Gas Desulphurization (FGD) systems across coal-fired thermal power plants offers a unique opportunity. By

enabling the integrated capture of carbon dioxide (CO_2), sulfur dioxide (SO_2) and Nox (if possible) and converting CO2 to solid carbonates using the existing FGD infrastructure, the overall economics of integrated carbon capture and utilization can be significantly enhanced. This synergistic approach could be a game-changer in making CCU more viable and accelerating its adoption at large scale.

2.3 Accordingly, NTPC is inviting expressing of interest from Indian/foreign companies who may set up a pilot project for the capture of CO_2 , SO_2 and Nox (if possible) from the flue gas of coal-fired unit along with integrated CO2 utilization, by deploying a non-amine-based technology, which will be capable of using the existing wet limestone based FGD system infrastructure without any major modifications for full scale plant.

2.4 To evaluate different technologies on the same platform, various design parameters, operational data and other information sought in EOI may be furnished considering reference data of Coal analysis and Flue gas analysis enclosed as Annexure-5. The evaluation will also consider the capital and operational expenditures per ton of CO_2 captured. For evaluation purposes, data furnished for 5 TPD plant by EoI applicant shall be considered.

2.5 The initiative intends to demonstrate the CO2, SO2 and Nox (If possible) capture (other than amine based technology) along with integrated CO2 utilization, analyze the suitability of using existing FGD infrastructure of NTPC plants and techno-commercial feasibility, validate the performance, and subsequently develop product/solutions which can be a pathway for large scale CO2 capture and integrate utilization technology in coal based thermal power plants that is commercially viable and sustainable. Applicants must submit detailed schemes along with write up and technical parameter showing how proposed technology is fit for deployment using the existing wet FGD equipment and systems.

2.6 As the technology is still in its nascent stage, the EOI has been categorized based on Technology Readiness Levels (TRL). For proposals involving technologies at TRL 4 (validation in laboratory setup) and TRL 5 (model/prototype demonstration in relevant environment), the participating party shall bear a minimum of 60% of the total project cost as their financial contribution. For technologies at TRL 6 (prototype demonstration in industrial environment) and above, the financial contribution shall be determined on mutually agreeable terms. The capacity of the pilot plant and the mode of execution shall be finalized based on the evaluation of the proposed technology and their TRL level. Proposals involving technologies below TRL 4 shall not be considered. Preference will be given to applicants who offer a higher financial contribution to the pilot project. In the case of TRL 4 or 5, NTPC may return the financial contribution made by the EoI applicant upon the successful demonstration of the pilot project, subject to mutually agreed terms and conditions.

2.7 The interested applicants will submit technical data/ information, guarantee parameters, the total estimated project cost and shall propose the financial contribution to be shared by themselves and by NTPC and other information as sought in Section-V. Also, the applicants will indicate the Technology Readiness Level (TRL) to which this proposal is being submitted and shall submit the relevant supporting documents for the same.

2.8 Based on techno-commercial analysis of the responses in the EOI and further discussions with interested parties, if it is found commercially feasible and suitable for using existing FGD equipment and system, NTPC may go for pilot installation / may not proceed with any project at this stage.

2.9 NTPC reserves the right to implement the project either on nomination basis or through Request for Proposal (RFP) process amongst the shortlisted parties identified through this EOI Process.

2.10 IPR Rights

a) Applicable for all EOI applicants: IPR for technology will remain with technology provider only. However, intellectual property rights generated based on the pilot plant for the application of technology for flue gas from thermal power plants will be co-owned by NTPC and the applicant after successful demonstration of the pilot project. Further, NTPC shall be granted the right of first refusal for the installation of commercial-scale plants for a mutually agreed period.

b) Applicable additionally for EOI applicants with TRL level 4-5: If as per the mutually agreed terms and conditions, the financial contribution made by the EoI applicant is returned by NTPC following the successful demonstration of the pilot project, the intellectual property rights may be monetized separately during the commercialization phase of the technologies subject to mutually agreed terms and conditions.

2.11 The response(s) received in the EOI/ information received post feasibility study will be utilized by NTPC for:

a. Identification for suitable technologies which fits the intended use cases

AND/OR

b. Formulation of specifications for various systems/stages required for execution of demonstration/commercial project(s)

AND/OR

c. Shortlisting of parties for forthcoming Request for Proposals (RFP) / tenders by NTPC for undertaking demonstration/commercial project(s)

The Applicants may express their interest in respect of their offerings along with other inputs as indicated in relevant Annexures/formats.

3.0 Broad Scope of Work

The key roles and responsibilities of the stakeholders under the project shall include but not limited to the following:

3.1 NTPC's Role:

- Land for installation and commissioning of the system within NTPC premises.
- NTPC shall provide necessary permission to connect with flue gas duct (Before FGD system) for supply of flue gas from its thermal power unit for the pilot project.
- Necessary support during operation and maintenance (O&M) of the pilot project.
- NTPC shall provide power supply feeder from the nearest available switchgear. However, the complete electrical system including cabling, termination etc., from terminal point (power supply feeder at switchgear) onward shall be in the scope of vendor.
- NTPC shall provide water (if required) from the nearest available terminal point. However, water treatment (if required), connections, piping and system from terminal points onward shall be in the scope of vendor.
- Facilitate the applicant in applying for statutory clearances for the project.
- Facilitate the installation and commissioning of the system.
- Support in Data collection and analyzing the performance of the system during testing and subsequent operation.

3.2 Applicant's Role

Design, engineering, manufacture, supply, erection, commissioning, and testing of complete CO2, SO2, Mox (if possible) capture plant, associated electrical, civil/ structural, control and instrumentation and other accessories required for completion of the pilot project. The scope also includes all the facilities required for storage, handling, pre-processing etc. at NTPC premises.

- Ensuring that the complete plant shall be applicable emission norm compliant, having an aesthetic environment with noise level in permissible limits.
- Providing all treatment systems to prevent discharge of harmful substances
- Providing enough automation to prevent human exposure to messy areas during O&M of the plant.
- O&M of the entire plant (including supply of materials/consumables etc.) for a period of 3 years from the date of commissioning
- Data collection and analyzing the performance of the system during testing and subsequent operation
- Getting required statutory clearances for installation and operation of the system
- Sharing the stack and system level information for comprehensive understanding of the system
- Providing service air, instrument air and any other utility as per the requirement of the proposed system
- Complete civil, structural, architectural works including survey, drainage, fencing/ boundary wall etc.

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Section - III

Instructions to the Applicants

INSTRUCTIONS TO THE APPLICANTS

1.0 The Applicants should note that:

a. Language of the responses to EOI or any query/clarifications/correspondences shall be in English only.

b. For expression of interest, Application Form and Annexures given in Section-V shall be duly filled and sent to NTPC by the APPLICANT in soft copy.

c. Applicants should go through Section-I and Section-II thoroughly before filling and submitting the application form and annexures in Section-V.

d. Applicants shall mention the name and contact details of two persons, with complete address, phone number and email id.

e. NTPC Ltd. may, at its sole discretion, ask for additional information/ documents and/ or seek clarifications from the Applicant(s) after the Deadline for submission of response, inter alia, for the purpose of removal of inconsistencies or infirmities in their responses.

2.0 Enquiries and clarifications

Any clarifications on the EOI may be sought to the following via e-mail:

To: abdulshaheedpk@ntpc.co.in
CC to: dipankarhalder@ntpc.co.in

3.0 Corrigendum

At any time before the last date of submission of EOIs, NTPC may, for any reason, whether at its own initiative or in response to a clarification requested by an Applicant, modify the EOI document. The amendment will be posted on the website and will be binding on the Applicants and the Applicant will give due consideration to the same, while they submit their EOIs, and would invariably enclose documents/ information, as required,

on account of the amendment, as a part of the EOI. NTPC may, at its discretion, extend the deadline for the submission of EOIs.

4.0 Preparation of the response to EOI

The application of EOI shall consist of Annexure-1, 2, 3 and 4 of Section-V.

5.0 Validity of the responses

The Applicant shall submit the responses which shall remain valid up to six (6) months after the response Deadline ("Response Validity"). NTPC reserves the right to reject any response, which does not meet the above-mentioned validity requirement.

NTPC may solicit the Applicant's consent for an extension of the period of validity of the response. The request and the response in this regard shall be in writing. In the event any Applicant refuses to extend its response validity as requested by NTPC, NTPC shall terminate processing of such Applicant's responses. An Applicant accepting NTPC request for validity extension shall not be permitted to modify its response.

6.0 Submission of the response to EOI

The responses to the EOI are to be submitted in soft copy via below e-mail format-

To: abdulshaheedpk@ntpc.co.in
CC to: dipankarhalder@ntpc.co.in

Ref. EOI No. **Dated**

Submitted to:
Name, designation & address of the concerned officer of NTPC
Submitted by:
Name, address & contact no. of the Applicant

All the pages of the response should be duly stamped and signed by the authorized signatory. The responses to the EOI should be submitted within the deadline at the e-mail address provided in the Section-I of this EOI.

7.0 Costs and expenses towards response to EOI

The Applicants shall be responsible for all the costs associated with the preparation of the response and participation in discussions and finalization & execution of the documents related to this EOI, NTPC shall not be responsible in any way for such costs, regardless of the conduct or outcome of this short-listing/ selection process.

8.0 Disclaimer

This Expression of Interest (EOI) has been prepared by NTPC Ltd. for response from Indian/Global Company/their Consortium/Affiliates/Representatives for setting up a pilot project for the capture of CO_2 and SO_2 from the flue gas of a approx. 200/500/660 MW coal-fired unit, utilizing a non-amine-based technology, which will be capable of using the existing wet limestone based FGD system infrastructure without any major modifications for full scale plant .

In submitting the response to the EOI, the applicant certifies that it understands, accepts, and agrees to the disclaimers on this page. Nothing contained in any other provision of the EOI, nor any statements made orally or in writing by any person or party shall have the effect of negating or superseding any of the disclaimers set forth herewith.

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Section-IV

Consideration of Response

CONSIDERATION OF RESPONSE

Responsiveness check

The responses submitted by Applicants shall be scrutinized and may be rejected in following conditions-to establish interest in setting up a pilot project for the capture of CO_2 and SO_2 from the flue gas of a 500 MW coal-fired unit, utilizing a non-amine-based technology, which will be capable of using the existing wet limestone based FGD system infrastructure without any major modifications for full scale plant. Responses shall be deemed non-responsive for the following reasons:

- Responses that are incomplete, i.e., not accompanied by any of the applicable formats inter-alia covering letter power of attorney, applicable undertakings, provided in more detail at annexure in Section-V.
- Responses not signed by authorized signatory and / or stamped in the manner indicated in this EOI.
- Material inconsistencies in the information/ documents submitted by the Applicant
- An Applicant submitting more than one response to this EOI either itself or through an affiliate or subsidiary company.
- Response validity being less than that required as per Clause 5 of section-III of this EOI.
- Response being conditional in nature.
- Response not received by the response Deadline.
- Response having Conflict of Interest.
- Applicant delaying in submission of additional information or clarifications sought by NTPC, as applicable.

All bids that shall meet the responsive check requirements set out above in this section of the EOI document shall be considered as responsive. In case of non-submission of relevant details as above, the responses may be considered as "**non-responsive**", at the sole discretion of NTPC and will not be considered further.

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Section-V

Application Form & Annexures

Annexure-1

FORMAT FOR COVERING LETTER CUM UNDERTAKING

(The covering letter should be on the Letter Head of the Applicant)

Date : _____ Place : _____

To,

…….

Sub.: (INVITATION FOR EXPRESSION OF INTEREST)

Ref.: EOI No._____, dated_____(the "EOI")

Dear Sir,

We, the undersigned ……. [insert name of the "Applicant"] having read, examined, and understood in detail the **(INVITATION FOR EXPRESSION OF INTEREST).**

We confirm that neither we nor any of our Parent Company/ Affiliate/ Ultimate Parent Company has submitted response other than this response directly or indirectly in response to the aforesaid EOI.

1. We give our unconditional acceptance to the EOI, issued by NTPC, as amended. In token of our acceptance to the EOI, the same have been signed & stamped by us and enclosed to the response. We hereby confirm that the provisions of the EOI shall be binding on us.

2. We have submitted our response strictly as per provisions and formats of the EOI, without any deviations, conditions and without mentioning any assumptions or notes.

3. We hereby unconditionally and irrevocably agree and accept that the decision made by NTPC in respect of any matter regarding or arising out of the EOI shall be binding on us. We hereby expressly waive any or all claims in respect of EOI process. We confirm that there are no litigations or disputes against us, which materially affect our ability to participate or function under the obligations regarding EOI.

4. Details of the contact person are furnished as below:
   Name:
   Designation:
   Address:
   Contact numbers:
   email id:

5. We are enclosing herewith the entire response containing duly signed formats in electronic format sent via email to: abdulshaheedpk@ntpc.co.in as per the EOI for consideration.

6. It is confirmed that our response is consistent with all the requirements of submission as stated in the EOI and subsequent communications from NTPC, if any.

7. The information submitted in our response is complete, strictly as per the requirements stipulated in the EOI and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our response.

   We confirm that all the terms and conditions of our response are valid for acceptance for a period of six (6) months from the response Deadline.

8. We confirm that we have not taken any deviation so as to be deemed "**Non-Responsive**" as stipulated in Section-IV of this EOI.

9. We understand that you are not bound to accept any response you receive.

10. We declare that our firm is neither put on Holiday or Black-listed by any Government / PSU / Private firm or Financial Institution.

11. We understand that you are not bound to accept any response you receive.

We remain,

Yours sincerely

(Name, Designation and Signature of Authorized Person in whose name Power of Attorney is issued)

Annexure-2

APPLICANT'S ORGANIZATION DETAILS TO BE SUBMITTED BY APPLICANT

(**Note: Documents in support of meeting the respective requirement shall be submitted by the Applicant.)**

1) Name of the Company
2) Legal status of the Company
3) Brief description of the Company including details of its business groups/subsidiaries/ affiliates:
4) Existing Manufacturing facilities – Locations, Capacity
5) Date of Incorporation:
6) Date of Commencement of Business:
7) Full address including Telephone nos. / Fax nos.:
    a. Registered Office:
    b. Head Office:
    c. Address for communication:
    d. Contact Details:
    e. Office Address in India, if any:
8) Indicate the Technology Readiness Level (TRL) at which this proposal is being submitted
9) Collaborations/tie-ups with manufacturer (if applicable),
10) Details of Indian parties, if any, for installation, supply, services, and collaboration
11) Financial Data of Organization (Attach Relevant document in proof of same)

    Applicant is requested to submit Annual financial turnover during the last three (3) preceding financial year. Applicant to submit audited Balance Sheet and Profit & Loss account for the above three financial years.

	Financial year 2023-24	Financial year 2022-23	Financial year 2021-22
Turnover			
Net worth			
Profit			

Include financial data of both applicant and collaborator, if any (Turn over, PAT, balance sheet, Contract value of executed projects (Cumulative and single largest contract) for last 3 years)

Annexure-3

TECHNICAL INFORMATION TO BE SUBMITTED BY APPLICANT

Applicant shall duly furnish following information.

1.0 About the Technology and Technology Provider

Applicant shall fill the required details and attach relevant documents as per Table-1, Clause-A and Clause-B, Annexure-4.

2.0 About the Reference Plant

Applicant shall fill the required details and attach relevant documents as per Table-1, Clause-C, Annexure-4.

3.0 About Proposed Pilot Project

Applicant shall fill the required details and attach relevant documents as per Table-1, Clause-D, Annexure-4.

4.0 Budgetary Cost:

4.1 **Estimated total capital investment** for the proposed pilot project with cost breakup of all major components preferably as listed below along with scope of supply and services, inclusions, exclusions, terminal points, facilities required at site, tentative project schedule:

- CO_2 , SO_2 and NOX (if possible) capture with integrated utilization system and associated equipment
- Flue gas handling, pre-treatment and associated equipment
- Civil/Infrastructure requirement
- Control System
- Installation and Commissioning
- Miscellaneous Items
- Package BOP, as applicable (Transformer / Inverters/ control systems etc. as required for completion of the pilot project)
- Safety and protection systems

4.2 Estimated Annual O&M cost with spares and consumables.

Note:

- Applicant shall separately mention taxes, duties, freight, insurance applicable for above items/project.
- Applicant shall mention budgetary cost equipment supply for Indian item and imported item separately.
- Financial contribution by the party/ proposed mode of project execution

5.0 Project Timeline:

Applicant shall mention project completion period from award of job till Commissioning and Guarantee Test Run with necessary details.

(Sign & Company Seal)

Authorized signatory

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Annexure-4

(Technical Data)

Note: Applicant to attach relevant/supporting documents

Sl. No.	Description	Applicant to fill
(A) About the Technology Provider		
1.	Type of CO2 and SO2 capture technology proposed by Applicant	
2.	Whether Technology is owned by Applicant	Yes/No
a.	If no, Name of Technology owner/ developer/ IP Owner	
b.	Whether Applicant has technology tie up/ collaboration with Technology owner/developer/ IP Owner	Yes/No (Attached copy of Technology tie up/ collaboration agreement)
c.	Validity period of agreement	
d.	If applicant is not Technology owner, role of applicant	
e.	Registered office of Technology owner/ developer/ IP Owner	
f.	In case applicant is technology owner, execution of pilot will be done by himself	Yes/No
g.	If no, name of EPC partner and its details including registered office, past experience of EPC contractor, contract value of largest project executed in past 5 years	
(B) About the Technology		
1.	Type of Technology	
2.	Write up the proposed technology detailing the working principle, major operating parameters/ conditions (Temperature & Pressure requirements of flue gas, Flue gas composition at inlet and outlet of the process, power consumption, utility requirements), effect of varying flue gas composition, any other input requirements, startup time, integration with existing FGD etc.	
3.	Process flow diagram with write up	
4.	Detail schematic diagram integrating with existing FGD System and equipment along with write up and technical parameters showing how proposed technology is fit for deployment using the existing wet FGD equipment and systems.	
5.	Technology Readiness Level along with supporting documents	
6.	Energy and mass balance for typical 1TPD of CO2 capturing	
7.	Catalyst used, if any (Yes/No)	
8.	Residence time (Both gas and liquid)	
9.	CO2 capturing efficiency	
10.	Sox and Nox removal efficiency	
11.	Prerequisite: Inlet flue gas to parameter (pressure, temp., etc.), permissible range and best efficient point.	
12.	Flue constituent (%) e.g % range of CO2, SOx, NOx, suspended solids, heavy metals etc. (Permissible range and efficient points)	

13.	Impact of suspended solids and how impact will be taken care in system design	
14.	Products from capturing CO2, SOx and NOX and its purity	
15.	Best use case, Merits and Demerits and limitations of the technology	
16.	Comparison with amine-based CO2 capture technologies	
17.	Process flow diagram with Write up for BOP system if any	
18.	Scalability and Modularity aspect	
19.	Utility requirement per ton of CO2 capture and integrated utilization.	
20.	Details of effluent generation (liquids, chemicals, any other emissions) per ton of CO2 capture	
21.	Overall Efficiency and parameters affecting efficiency/ performance	
22.	Any other relevant details (as applicable)	
(C) Details of reference pilot/commercial Installations		
1.	Name of project where Applicant/ Its Collaborator/ associate installed / is installing the proposed CO2 capture and integrated utilization	
2.	Name and address of owner of plant	
3.	Scale of plant	(Commercial/ pilot plant)
4.	Design capacity (CO2 capture in ton/day)	
5.	Flow rate of Flue gas/inlet gas in m3/hr	
6.	Flue gas source and Composition of inlet flue gas	
7.	Date of award	
8.	Date of completion of plant	
9.	If installation not yet completed, Present status and date of expected completion	
10.	Scope of work of Applicant (Furnish copy of LOA)	
11.	Prerequisite: Inlet flue gas to the capture system (pressure, temp., impurities etc.)	
12.	Mass and Energy Balance Diagram	
13.	P &ID of main system and BOP	
14.	Residence time of liquid and gas	
15.	Equipment wise Break up of Power consumption (kWh) of main system and BOP	
16.	List of other utilities with quantity	
17.	Land footprint,	
18.	Carbon capture Efficiency achieved	
19.	Products from capturing CO2 and its purity	

(D) Details of the Proposed Pilot Plant (Flue gas Composition as attached)			
		For 5 TPD CO2 Capture	Design Capacity Proposed
1.	Design capacity of proposed pilot (CO2 capture in ton/day)	**5 TPD**	
2.	Required Flow rate of Flue gas/inlet gas in m3/hr		
3.	Prerequisite: Inlet flue gas to the capture system (pressure, temp., impurities etc.)		
4.	Mass and Energy Balance Diagram		
5.	Process flow diagram indicating parameters (Temp. Pressure, flow rate etc.) at inlet and outlet of each stage of process (equipment-wise including BoP)		
6.	CO2 capture efficiency, Sox and Nox removal efficiency		
7.	List of equipment with rated capacity		
8.	Electrical load list of each equipment		
9.	**Utility**		
(a)	Equipment-wise power consumption and Total Power consumption (kWh) and Installed load of Plant		
(b)	Water Requirement (m3/hr) and quality of water		
(c)	Instrument Air (Nm3/hr)		
(d)	Service Air (Nm3/hr)		
10.	Effluent/Byproduct Generation data (per ton of CO2) with Quality: - Solid (if any - Liquid (if any) - Gaseous (if any) In case of any effluent, include details of treatment required. Energy for effluent removal		
11.	Land Area Required (m2)		
12.	P &ID of main system and BOP		
13.	Startup time		
14.	Residence time of liquid and gas		
15.	Expected life of entire project as a whole (Years)		
16.	Annual maintenance requirement Maintenance Activities with frequency.		
17.	No. of shutdown days per year		
18.	Terminal Points and Exclusions		
19.	O&M details		
20.	Safety Aspects		
21.	Spares and Consumables		
22.	Guarantee/Warranty offered for the proposed pilot plant		
23.	Previous experience in implementing the proposed technology		
24.	Engineering strength of Applicant		
25.	Any other technical details, applicant would like to highlight about the proposed technology		
26.	Input data (if any) required from NTPC		

Guarantee Conditions			
26.	CO2 composition in FG at outlet of the system (mg/Nm3)		
27.	SO2 composition in FG at outlet of the system (mg/Nm3)		
Other Data			
28.	Operational expenditure of CO2 capture (detailed breakdown of opex components)		
29.	Detail write-up of execution methodology including scope of different agencies.		
30.	% of Indian content of equipment supply		
31.	% of Imported content of equipment supply and source of country		
32.	Completion schedule of project (in month)		
33.	Financial contribution to be shared by Applicant (% of total Project cost)/proposed mode of execution		
34.	In case Applicant has technology tie up/collaboration with technology owner/ developer/IP Owner, detail scope of technology support from collaborator to be indicated		
35.	Details of clearances and approvals required prior to implementation		

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Annexure-5

(Reference Data for Flue Gas)

Flue Gas Composition (before FGD)		
CO_2	% Vol	12.7
N_2	% Vol	70.2
O_2	% Vol	5.5
Moisture	%	11.5
SO_2	mg/Nm^3	1000-1200
SO_3	mg/Nm^3	25
NO_x	mg/Nm^3	350
Hg	micro g/Nm^3	0.03
SPM	mg/Nm^3	100
CO	mg/Nm^3	200