NTPC Limited

(A Government of India Enterprise)

Invites

Expression of Interest

(EOI)

for setting up

A pilot/utility scale project for Compressed Air based including Liquified Air based Long Duration Energy Storage System (LDES)

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-06/2025-26 **Date: 21.01.2026**

NTPC is Inviting Expression of Interest to set up set up a pilot/utility scale project for compressed air based including liquified Air-Based Long Duration Energy Storage System.

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**	:	**23.02.2026**
c.	**Last date for queries/ seeking clarifications**	:	**10.02.2026**
d.	**Date of opening of EoI response**	:	**24.02.2026**
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 respect, through e-mail mentioned hereunder. Email: sankardask@ntpc.co.in / lalitgupta@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 85,637 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 11 coals based, 4 gas based, 8 hydro, 5 Wind and 25 Solar PV Plants. 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.

2.0 INTENT OF THE EXPRESSION OF INTEREST (EOI)

2.1 India's electricity system is undergoing a structural transition driven by rising demand and rapid renewable energy expansion, fundamentally altering grid planning and operations. As higher shares of variable generation increase the need for system flexibility, energy storage systems have become essential for ensuring grid reliability and effective renewable integration. Also, national projections indicate a sharp rise in storage requirements - about 8.68 GW/34.72 GWh by 2027 and nearly 47 GW/236 GWh by 2032. While energy storage is increasingly recognized as a key enabler of this transition, current deployment and planning are largely centered on short-duration storage solutions. As the share of variable renewable energy grows, this approach may be insufficient for a large power system like India's that has traditionally relied on coal-based generation to provide round-the-clock reliability. To ensure a secure and orderly transition toward a low- and net-zero-emissions power system, there is a growing need to study and explore Long Duration Energy Storage (LDES) options with storage durations exceeding six hours. The recent assessment by NITI Aayog indicates a growing reliance on longer-duration storage solutions to accommodate rising demand, effectively utilize surplus renewable generation, and strengthen system flexibility across RE-rich states like Karnataka, Gujrat, Tamil Nadu, Telangana, Maharashtra and Rajasthan.

2.2 Recognizing this need, NTPC has been actively exploring various Long Duration Energy Storage (LDES) technologies. In this context, earlier, NTPC published a global Expression of Interest (EoI) for establishing a pilot Long Duration Energy Storage System during November 2022. Based on the responses received, CO_2-based energy storage was identified as a promising LDES option for pilot implementation. Accordingly, NTPC is currently implementing a CO_2-based energy storage project at Kudgi, with a capacity of 160 MWh (20 MW for 8 hours), to gain operational experience in utility-scale long-duration energy storage. NTPC R&D division is also working on Vanadium Redox Flow battery (VRFB) and has already demonstrated a pilot plant.

2.3 Building on this experience, Compressed air Energy Storage system including Liquid Air Energy Storage and other form of advanced compressed air-based Long Duration Energy Storage (LDES) with 8 or more than 8-hour storage technologies represents another promising option that warrant deeper examination as a complementary and potentially strategic LDES option. These LDES technologies are inherently suited for long-duration applications, offering discharge durations of 8 hours and more. This capability is particularly relevant for effectively utilizing excess renewable generation during solar hours, while providing sufficiently long discharge to manage evening peaks and prolonged non-solar period demand that cannot be effectively addressed by short-duration storage systems.

2.4 Compressed Air-based Long Duration Energy Storage (LDES) comprises different technologies which store energy using compressed or liquefied air and generate electricity during discharge. Compression of air may be using compressor or by other compression system like liquid piston. These technologies involve diverse design configurations and operating concepts, with varying system layouts, storage durations, scales, and site requirements, and are presently at different stages of development and demonstration. In view of this diversity, there is a need to obtain structured inputs on technology design, development maturity, and deployment considerations.

2.5 In view of above, NTPC intends to invite Expressions of Interest (EOI) from technology providers, developers, system integrators, and solution providers for participation in the setting up of a pilot / utility scale plant on Compressed air Energy Storage system including Liquid Air Energy Storage and other form of advanced compressed air-based Long Duration Energy Storage (LDES) with 8 hours or more than 8-hour storage technologies. Compression of air using either compressor or any other compression system will also be acceptable. The objective of this EOI is to evaluate the current market landscape, technology readiness, technical performance, and operational characteristics of the technologies, and to assess their suitability and techno-commercial viability for pilot / utility scale plant implementation under Indian grid and site conditions.

2.6 Through this EOI, NTPC seeks to assess the suitability of compressed air based or liquified air-Based or other form of advanced compressed air-based LDES system for large-scale and long duration energy storage applications for 8-hours or more than 8-hour storage, its ability to support renewable energy integration, and its contribution to grid stability through inherent mechanical inertia and operational flexibility. The EOI also aims to gather industry inputs on system configurations, capacity ranges, site requirements, scalability, cost structure, and implementation timelines, with a view to enabling pilot/utility scale deployment of Compressed Air-Based / Liquified Air-Based / Advance Compressed Air Based LDES projects in India.

2.7 Accordingly, NTPC is inviting expressing of interest from Indian/foreign companies who may set up a pilot/utility scale on compressed air based or liquified Air-Based or and other Advanced Compressed Air Based Long Duration Energy Storage project with 8-hour or more than 8-hour storage.

2.8 To evaluate different Compressed Air-Based / Liquified Air-Based / Advance Compressed Air Based LDES technologies on the same platform, applicants are requested to provide details on various design capacity parameters, operational data, and other information outlined in this EOI.

2.9 The interested applicants will submit the 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.

2.10 The possibility of implementation of pilot/utility-scale projects may also be explored under any of the following project implementation models, based on the techno-commercial viability of the technologies.

i. **EPC + O&M:** Project executed on EPC basis with ownership retained by NTPC, and Complete Engineering, Procurement & Construction and Operation & Maintenance carried out by the contractor for a defined period.

ii. **Build, Own, Operate (BOO):** Developer finances, owns, and operates the project and provides storage services to NTPC under a long-term agreement.

iii. **Build, Own, Operate & Transfer (BOOT):** Developer builds and operates the project for a concession period, after which the asset is transferred to NTPC.

iv. **Shared / Hybrid Model:** Project is implemented with shared investment, ownership, and/or operational responsibilities between NTPC and Developer.

2.11 Based on techno-commercial analysis of the responses in the EOI and further discussions with interested parties, if it is found commercially feasible, NTPC may go for utility scale pilot project installation / may not proceed with any project at this stage.

2.12 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.

2.13 IPR Rights

a) **Applicable for all EOI applicants (TRL 6 and above)**: IPR for technology will remain with technology provider only. However, intellectual property rights generated based on the pilot/utility scale plant for the application of technology will be co-owned by NTPC and the applicant after successful demonstration of the project.

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.

2.14 The response(s) received in the EOI/ information received in the EOI 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 on lease basis for installation and commissioning of the system.

3.2 Applicant's Role

- Installation of Complete plant and Operation & Maintenance based on the implementation model selected under clause no. 2.10 above excluding land.

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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 (EOI Information) and Section-II (Introduction) thoroughly before filling in 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 address.

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: sankardask@ntpc.co.in
CC to: lalitgupta@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 Applicant(s), 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 consists of Section-V comprising the following annexures, which are required to be duly filled and submitted by the Applicant as part of their response to this EOI:

Annexure-1	FORMAT FOR COVERING LETTER CUM UNDERTAKING
Annexure-2	APPLICANT'S ORGANIZATION DETAILS TO BE SUBMITTED BY APPLICANT
Annexure-3	TECHNICAL INFORMATION TO BE SUBMITTED BY APPLICANT
Annexure-4	TECHNICAL DATA
Annexure-5	DECLARATION FOR TRL VALIDATION

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 reserve 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:	sankardask@ntpc.co.in
CC to:	lalitgupta@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 addresses provided in 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/utility scale project for Compressed Air based including Liquified Air based Long Duration Energy Storage System (LDES) .

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/utility scale project for Compressed Air based including Liquified Air based Long Duration Energy Storage System (LDES). Responses shall be deemed non-responsive for 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 details at annexures 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: sankardask@ntpc.co.in CC to: lalitgupta@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.

8. 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.

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

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)

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) Collaborations/tie-ups with manufacturer (if applicable),
9) Details of Indian parties, if any, for installation, supply, services, and collaboration
10) 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 years. Applicant to submit audited Balance Sheet and Profit & Loss account for the last three financial years.

	Financial year 2024-25	Financial year 2023-24	Financial year 2022-23
Turnover			
Net worth			
Profit			

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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:

- Energy Storage System and Associated Equipment
- Civil/Structure/Infrastructure requirement
- Control System
- Installation and Commissioning
- Miscellaneous Items
- Package BOP, as applicable (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 technology proposed by Applicant	
2.	Whether Technology is owned by Applicant	Yes/No
a	If no, Name of Technology owner/ developer/ IP Owner	
b	Registered office of Technology owner/ developer/ IP Owner	
c	Whether Applicant has technology tie up/ collaboration with Technology owner/developer/ IP Owner	Yes/No (Attached copy of Technology tie up/ collaboration agreement)
d	Validity period of agreement	
(B)	**About the Technology**	
1.	Write up of the proposed technology • Working principle • Key Components and subsystems involved- Mechanical, Electrical, Civil and Control and Instrumentation system, • Operating parameters for different components (Such as Operating pressure, temperature ranges, flow rate etc.)	
2.	• Process flow diagram with write up including Balance of Plant (BOP) • General Arrangement (GA) Drawing	
3.	Technology Readiness Level along with supporting documents (Certificate from end-user/industry/laboratory/third party reputed organization/institute to be submitted. Suggested format attached as Annexure-5)	
4.	Round-trip efficiency (design and expected at site conditions)	
5.	Response time, Ramp rate	
6.	Charge and Discharge Rate Control mechanism	
7.	Details of Energy Management system	
8.	Power Evacuation scheme	
9.	Site requirements (land, underground storage/caverns if any, auxiliary systems)	
10.	Expected system life	
11.	Major degradation factors (if any)	
12.	Scalability and modularity aspect	
13.	Performance parameters, guarantees and factors affecting performance parameters	
14.	Codes and standard details	

15.	O&M and Safety Aspects	
17.	Details of Effluent generation if any Hazardous material, if any, after end of life. Disposal method after end of life	
18.	Recycling Aspect/ encouragement to circular economy if any	
19.	Estimated Harness Potential in India	
20.	Expected future cost reduction and justification of the same	
21.	Cost Components of proposed technology, factors affecting cost and scope of cost optimization	
22.	Capex, Opex, LCOS projections (year wise)	
23.	Effect of discharge duration on Capex, space requirement and energy density (Attach Curve)	
24.	Effect of system capacity on Capex, space requirement and energy density (Attach Curve)	
25.	Share of Imported and local content on total project cost	
26.	Potential for make in India utilizing majorly indigenous resources	
27.	Expected Cost Reduction due to make in India and govt. policy support required if any	
28.	Comparison with other energy storage systems for similar application	
29.	Best use case, Merits and Demerits and limitations of the technology	
30.	Details of investors, if any, for the technology and certificates	
31.	Details of awards/ accolades, if any, given for technology/ innovation	
32.	Any other relevant details (as applicable)	
(C)	**Details of reference pilot/commercial Installation(s)**	
1.	Name of project where Applicant/ Its Collaborator/ associate installed / is installing the proposed Air-Based LDES Project	
2.	Name and address of owner of plant	
3.	Scale of plant	(Commercial/ pilot plant)
4.	Design capacity (MW/MWh)	
5.	Type of Facility where reference pilot / commercial installation is installed (e.g., Research Lab / Industrial Plant / Utility)	
6.	Duration of Testing Period	
7.	Objective of Demonstration	
8.	Capacity (MW/MWh) Demonstrated	
9.	Date of award	
10.	Date of commissioning of plant	
11.	If installation not yet completed, Present status and date of expected completion	
12.	Scope of work of Applicant (Furnish copy of LOA)	
13.	Mass and Energy Balance Diagram	
14.	Operating parameters for different components (Such as Operating pressure, temperature ranges, flow rate etc.)	
15.	P &ID of main system & BOP and General Arrangement (GA) Drawing	
16.	Round Trip Efficiency (Predicted)	

17.	Round Trip Efficiency (Actual achieved)	
18.	Energy Density (Wh/m^3)	
19.	Start-Up Time (Minutes)	
20.	Response Time (Seconds)	
21.	Ramp Rate (MW/Minute)	
22.	Daily Self Discharge (%)	
23.	Depth of Discharge (%)	
24.	% Degradation (Yearly)	
25.	Design Life (Years)	
26.	Cycle Life (Numbers of charge - discharge cycle)	
27.	Annual availability (Days per Year)	
28.	Annual Down time (Days per Year)	
29.	Fixed rate of charge and Discharge or variable?	
30.	Land footprint (Square Metre)	
31.	**Utility**	
a	List of equipment with rated capacity	
b	Equipment-wise power consumption and Total Power consumption (kWh) and Installed load of Plant	
c	Water Requirement (m3/hr) and quality of water	
d	Instrument Air (Nm3/hr)	
e	Service Air (Nm3/hr)	

(D)	Details of the Proposed Pilot Plant		
		Data for 200 MWh (25 MW X 8h)	**Data for 800 MWh (100 MW X 8h)**
1.	Proposed capacity of the Project/Pilot Plant (MWh)	**200**	**800**
2.	Discharge Duration (Hours)	**8**	**8**
3.	Mass & Energy Balance Diagram		
4.	Process flow diagram indicating parameters		
5.	Round Trip Efficiency (AC-AC)		
6.	Energy Density (Wh/m^3)		
7.	Operating parameters for different components (Such as Operating pressure, temperature ranges, flow rate etc.)		
8.	Start-Up Time (Minutes)		
9.	Response Time (Seconds)		
10.	Ramp Rate (MW/Minute)		
11.	Daily Self Discharge (%)		
12.	Depth of Discharge (%)		
13.	% Degradation (Yearly)		
14.	Design Life (Years)		
15.	Cycle Life (Numbers of charge - discharge cycle)		
16.	Annual availability (Days per Year)		
17.	Annual Down time (Days per Year)		
18.	Fixed rate of Charge and Discharge or variable?		
19.	Total Land Requirement (Square Metre)		
20.	**Utility**		
a	List of equipment with rated capacity		
b	Equipment-wise power consumption and Total Power consumption (kWh) and Installed load of Plant		
c	Water Requirement (m3/hr) and quality of water		
d	Instrument Air (Nm3/hr)		
e	Service Air (Nm3/hr)		
21.	Voltage Level (KV)		
a	Charging		
b	Discharging/Generation		
22.	Terminal Points and Exclusions		
23.	O&M details		
24.	Safety Aspects		
25.	Spares and Consumables		
26.	Guarantee/Warranty offered for the proposed pilot plant		
27.	Previous experience in implementing the proposed technology		
28.	Engineering strength of Applicant		
29.	Any other technical details, applicant would like to highlight about the proposed technology		

30.	Specific Geographic Location Required (Yes/No) If Yes, Provide details		
31.	Input data (if any) required from NTPC		

32.	Project Costing	200 MWh (25 MW X 8h)	800 MWh (100 MW X 8h)
I.	**Total Capital Cost**		
a	Energy Storage System and Associated Equipment		
b	Civil/Structure/Infrastructure requirement		
c	Control System		
d	Installation and Commissioning		
e	Balance of Plant, as applicable (as required for completion of the pilot project)		
f	Safety and protection systems		
g	Miscellaneous Items		
II.	**Operational expenditure** (detailed breakdown of Opex components)		
33.	**Other Data**		
i.	Detailed write-up of execution methodology including scope of different agencies		
ii.	% of Indian content of equipment supply		
iii.	• % of Imported content of equipment supply • Source Country		
iv.	Completion schedule of project (in months)		
v.	Financial contribution to be shared by Applicant (% of total Project cost)		
vi.	Proposed mode of execution (EPC+O&M, B.O.O, B.O.O.T, Shared)		
vii.	In case Applicant has technology tie up/collaboration with technology owner/ developer/IP Owner, detail scope of technology support from collaborator to be indicated		
viii.	Details of clearances and approvals required prior to implementation		

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ANNEXURE-5

Declaration for TRL Validation

(To be certified by the end-user/3rd party reputed organization/institute (in case of lab-scale/ own premises) where the technology was tested/ demonstrated/ witnessed)

Purpose:

This template is to be filled by the end-user/3rd party reputed organization/institute (in case of lab-scale/ own premises) that provided the testing facility and/or observed the pilot testing of the proposed technology. It confirms whether the technology, developed by M/s _____, has been **successfully validated under laboratory environment/model or prototype installed, and trial carried out at relevant environment/ full prototype installed, and trial carried out at industrial environment** as per **TRL-_____** criteria.

A. General Information of End-User/Certifying Organization/Institute

Field	Details
1. Name of Organization/Institute	
2. Address of Facility	
3. Name of Contact Person	
4. Designation	
5. Email / Phone	
6. Type of Facility (e.g., Research Lab / Industrial Plant / Utility)	
7. Duration of Testing Period	From: _____ To: _____

B. Data to be certified

Sl. No.	Validation Criteria	Response	Remarks
1	a. Validation under laboratory environment OR b. Model/prototype installed, and trial carried out at relevant environment OR c. Full prototype installed, and trial carried out at industrial environment		Mark only those applicable
2.	Capacity of plant/model/prototype		
3.	a. Round Trip efficiency (actual)		
	b. Round Trip efficiency (predicted)		
4.	Duration of Continuous operation that demonstrated (Hours)		
5.	Operational safety and system integrity assessed and confirmed during testing	**(Yes/No)**	
6.	Testing witnessed or supervised by qualified personnel	**(Yes/No)**	
7.	Whether any major failure or unresolved technical issue observed during test	**(Yes/No)**	

C. Declaration

We hereby confirm that the above-mentioned technology developed by M/s _____ was successfully validated under laboratory environment/model or prototype installed, and trial carried out at relevant environment/ full prototype installed, and trial carried out at industrial environment. Based on our observation and available data, we confirm that the system has demonstrated consistent performance with
Technology Readiness Level _____ (TRL-___).

Signature	Designation	Date	Official Stamp

Notes:

- This document must be printed on the host organization's letterhead.
- All fields are mandatory unless marked otherwise.
- NTPC reserves the right to independently verify the claims through a technical evaluation committee.