Project Design Document (PDD) Form

A. Project description

A.1. Title and reference number of the project idea note (PIN) of the JCM project

Title	
PIN Reference Number	
PDD Version Number and Date	

A.2. Explain how the project falls under India's finalized list of activities to be considered for Article 6.2.

A.3. General description of project and applied technologies and/or measures

Describe the technologies/measures existing prior to the implementation of the proposed project at the same site, as applicable, including:

1. *Existing facilities, systems, practices and/or equipment:*
    - *List the facilities, systems, practices and/or equipment existing prior to the implementation of the proposed project at the same site.*
2. *Types and levels of services:*
    - *Specify the services provided by the existing facilities, systems, practices and/or equipment (such as the amount of a certain type of cement produced, the amount of electricity fed into the electricity grid, the production of timber, fuelwood or other biomass/bio-based products, provision of ecosystem/ ecological services such as watershed protection, habitat conservation, combating land degradation/ desertification, etc.).*
    - *Describe their relation, if any, to other facilities, systems and/or equipment outside the project boundary.*
3. *Arrangement of existing facilities:*

- *Explain the arrangement of the existing facilities, systems, practices and/or equipment.*

4. *Age and lifetime of existing equipment:*
   - *Provide the age and average lifetime of the existing equipment based on the manufacturer's specifications and industry standards.*
5. *Installed capacities, load factors and efficiencies:*
   - *Provide the installed capacities, load factors and efficiencies of the existing equipment.*
6. *Energy and mass flows:*
   - *Describe the energy and mass flows and balances of the existing facilities, systems and/or equipment, if necessary.*
7. *Monitoring equipment:*
   - *Specify the monitoring equipment and their location in the systems.*

A.4. Describe the existing technologies/measures in the country prior to project implementation (business as usual scenario)

A.5. Provide reasons and rationale for implementing the project under the JCM

Explain why the Project Participants propose to implement the project under the JCM, instead of a purely commercial project. Please also describe how the proposed project provides any benefits to the Republic of India, including contribution to sustainable development and any adaptation efforts in the Republic of India.

A.6. Location of project, including coordinates

Country	
Region/State/Province etc.:	
City/Town/Community etc:	

Latitude, longitude	
Map of project location	

A.7. Name of Project Participants

India	
Japan	

A.8. Ownership and other roles

Ownership of the project	
Managing entity	
Other entities Involved in the Project	

A.9. Duration

Starting date of project operation	
Expected operational lifetime of project	
Type and duration of crediting period	
Starting date of crediting period (input the information when requesting a renewal of crediting period)	

A.10. Contribution from Japan

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	

Version number	
Selected approved methodology No.	
Version number	
Selected approved methodology No.	
Version number	

B.2. Explanation of how the project meets eligibility criteria of the approved methodology

Eligibility criteria	Descriptions specified in the methodology	Does the project satisfy the criterion (Yes/No)	Describe how the project satisfies the criterion
Criterion 1		☐ Yes ☐ No	
Criterion 2		☐ Yes ☐ No	
Criterion 3		☐ Yes ☐ No	
…			

C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions		Consideration for reference emission calculations under JCM	
Emission sources	GHG type	Inclusion for	Justification

		calculation under JCM	
Project emissions		**Consideration for project emission calculations under JCM**	
Emission sources	**GHG type**	**Inclusion for calculation under JCM**	**Justification**

C.2. Figure of all emission sources and monitoring points relevant to the JCM project

C.3. Estimated emissions reductions in each year

Year	**(A)** **Estimated Reference emissions (tCO_2eq), after downward adjustment**	**(B)** **Estimated Project Emissions (tCO_2eq)**	**(C)** **Leakage of Emissions (tCO2eq)**	**(D)** **Estimated Emission Reductions (tCO_2eq)** **(D = A - B - C)**

Total (tCO_2eq)				

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

Describe the steps/actions taken to invite comments, taking into account local and national circumstances.

Indicate how the consultation was conducted, including the date of the consultation and taking into account means that are appropriate for the local and national circumstances.

Describe how comments were received (e.g. in writing, orally, etc).

E.2. Summary of comments received and their consideration

Date of Consultation	**Stakeholders**	**Mode of Receiving Comments** (Written, Oral, etc.)	**Comments received**	**Consideration of comments received in the PDD**

F. Double counting and participation under other programs.	
Is the project receiving or seeking credits under another carbon crediting mechanism?	☐ Yes ☐ No If yes, provide details of the other carbon crediting mechanism (program name, registration number, date of inactivity; active status?), the volume of credits to be issued to the project under that mechanism. Justify how this will not lead to double issuance or double claiming.
Was the Project rejected by other programs?	☐ Yes ☐ No ☐ Not applicable If yes, provide details of the program, date of rejection and reasons for rejection.
Does the project ensure no double claiming compliance with carbon pricing mechanisms or legally binding emission limits?	☐ Yes
Is the project participating or intends to participate in any environmental credit systems?	☐ Yes ☐ No If yes, explain how the project will ensure no double claiming

G. References

Reference lists to support descriptions in the PDD, if any.

H. Annex

I. Revision History of PDD		
Version	**Date**	**Contents revised**

Annexure to PDD: Minimum Contents of the Feasibility Study

The feasibility study submitted with the PDD covers, at a minimum, the following topics and sub-topics. The study is prepared by a qualified independent party or, where prepared in-house, clearly discloses the authorship and any conflict of interest. The financial model underlying the study is submitted as a separate working Excel file alongside the feasibility study document.

The Feasibility Study submitted to the Joint Committee through the Secretariat is treated as strictly confidential. It will not be disclosed to any third party and will be used solely by the Secretariat and the Joint Committee for the purpose of evaluating the project's eligibility for approval and authorization under the India-Japan Joint Crediting Mechanism.

1. Market Analysis

1.1. Description of the primary output market (e.g. power, hydrogen, compressed bio-gas, sustainable aviation fuel, captured CO_2), including current and projected demand, pricing, and competitive landscape in India and if exports are planned then competitive landscape in foreign markets.

2. Raw Materials, Feedstock, Input Supply and Local Procurement

1.2. Classification and specification of all material inputs required (raw materials, components, factory supplies, utilities including power and water)

1.3. For feedstock-dependent technologies (e.g. compressed bio-gas, sustainable aviation fuel, green hydrogen, green ammonia, fuel cells): feedstock type, annual quantity, seasonal variations, quality specifications, and supply arrangements (contracted, Memorandum of Understanding/ Letter of Intent, or spot), with names of potential/current suppliers and contract tenure where applicable

1.4. For green hydrogen and green ammonia projects: status of captive renewable energy or renewable energy procurement arrangements
1.5. Assessment of supply risk, including alternative sourcing strategies and price volatility exposure
1.6. Estimated share of total procurement value (CAPEX and OPEX) sourced from domestic Tier 1 suppliers

3. Location, Site and Environment

1.7. Description and justification of the selected location and site, shown on appropriate maps
1.8. Site suitability assessment including geotechnical, hydrological, meteorological, and environmental baseline data as applicable to the technology
1.9. Site-specific risk assessment (seismic, flood, cyclone, and other natural hazards). The site-specific seismic hazard assessment should, at a minimum, correspond to the seismic zone assigned to the location and comply with the applicable provisions of the relevant Bureau of Indian Standards (BIS) codes. Where required, a more stringent, site-specific seismic hazard assessment may also be undertaken.
1.10. Status of land acquisition or lease
1.11. Infrastructure assessment, grid connectivity, road and port access, water supply, effluent disposal, and any other infrastructure critical to operations

4. Engineering and Technology

1.12. Plant rated/installed capacity; expected annual output and capacity factor/utilization rate with basis for assumption; production programme over the project lifetime including ramp-up and degradation profile
1.13. Description of the selected technology, including process flow, key technical parameters, and performance specifications
1.14. Technology Readiness Level in the Indian and global contexts, with reference to demonstrated deployments in India and globally
1.15. Assessment of at least three alternative technologies for achieving the same emission reduction objective, evaluated against Indian operating conditions, with quantified comparison of emission reduction potential and cost per tCO_2eq reduced/removed, and justification for the selection
1.16. Technology modularity, upgrade pathways with expected technology lifecycle
1.17. Identification of the technology provider(s) and means of acquisition (licensing, purchase, joint venture, or turnkey import)
1.18. Description of any formal technology transfer agreement, including coverage of: operating know-how and process documentation; training obligations with defined person-hours; rights to local adaptation or

modification; duration and post-agreement knowledge retention rights; and any other relevant details on the extent and nature of the technology transfer

1.19. Disaggregation of the technology package; sources of project elements (foreign, domestic, developed in-house)

1.20. Major equipment items with specifications and sources (domestic vs. imported); performance parameters under Indian operating conditions linked to emission-reduction-relevant parameters (e.g. electrolyser efficiency, turbine availability, capture rate); degradation profile and its impact on year-by-year emission reduction projections. The performance parameters *are* supported by test reports from NABL-accredited laboratories. Where Indian-accredited laboratory testing of the relevant technology is not feasible at the time of submission, a written explanation along with test reports from internationally accredited laboratories with a description of the accreditation standard applied are submitted.

5. Commissioning and Maintenance

1.21. Major replacement CAPEX expected during the crediting period (e.g. battery cells, electrolyzer stacks, catalysts), with estimated cost and timing

1.22. Outline of the maintenance system, preventive maintenance schedule, spare parts strategy, and requirements for specialist technical support from technology provider(s)

6. Organization and Human Resources

1.23. Organizational structure of the project entity, with an organogram

1.24. Estimated staffing levels by category (managerial, technical/engineering, skilled production, unskilled, etc.), and breakdown of local vs. expatriate personnel.

1.25. Training plan: curriculum scope, person-hours, qualified personnel for training delivery, timelines, and location (in-plant, at the technology provider’s facility, or at external training institutes); whether the training plan is embedded in the technology agreement or EPC contract.

7. Project Implementation Schedule

1.26. Implementation timeline from financial close to commercial operation, broken into key phases

1.27. Identification of critical path activities and key milestone dates

1.28. Estimated pre-production expenditures, classified by phase

8. Financial Analysis and Investment Appraisal

The developer submits the financial model as a working Excel file with all formulae intact and assumptions clearly labelled. The feasibility study document contains a narrative discussion of the financial analysis for the

points given below. Data points mentioned in the “Summary of Financial Analysis” table given below are to be derived from the submitted financial model and are to be clearly mentioned in the financial model.

Note: Here, the term ‘carbon credit revenue’ or ‘carbon revenue’ refers to the revenue generated from the sale of India’s share of JCM credits.

1.29. Provide a narrative discussion of the total project CAPEX, explaining the basis for the cost estimates (e.g. supplier quotations, EPC bids, feasibility-level estimates, or analogous project benchmarks)

1.30. Describe the composition of annual fixed and variable operating expenditure, identifying the principal cost drivers (e.g. feedstock, power, maintenance, personnel, insurance, land lease). Where major replacement CAPEX is expected during the crediting period (e.g. battery cells, electrolyser stacks, catalysts), discuss the basis for cost and timing estimates and confirm that such replacement costs are incorporated in the financial model used for Internal Rate of Return (IRR) and Net Present Value (NPV) calculations.

1.31. Provide a narrative interpretation of the base case IRR (unlevered and levered) and NPV results, both with and without carbon revenue. Discuss the magnitude of the carbon revenue uplift and what it implies for the project's dependence on carbon credit income. Where the project IRR without carbon revenue exceeds the hurdle rate, explain the financial additionality rationale for the project.

1.32. Hurdle rate; explicit build-up (risk-free rate, equity risk premium, technology/country premium, etc.) and justification with reference to comparable projects, Weighted Average Cost of Capital (WACC), or investor requirements.

1.33. Describe the project's revenue composition, identifying the primary activity revenue, carbon credit revenue, and any subsidies, incentives, or renewable energy certificates. For carbon credit revenue, state the price assumption used, the source of the price assumption, and the share of carbon revenue as a percentage of total annual revenue. Describe the status of offtake arrangements for the primary output (contracted, under negotiation). Where the project operates on a merchant or open-market basis for any portion of its output, discuss the revenue risk and the basis for the price assumptions used.

1.34. State the equity return expectation of the proponent or equity investor(s), expressed as a target nominal post-tax Return on Equity (RoE). Where multiple equity investors participate, state the range of return expectations across the investor group. Explain the basis for the stated expectation, with reference to investor-stated requirements,

comparable project benchmarks in the same technology or sector, or established sector conventions.

1.35. Escalation assumptions; basis for CAPEX (if phased), OPEX, and revenue/tariff escalation rates (Wholesale Price Index/ Consumer Price Index, contractual terms, etc.)

1.36. Financing plan narrative; rationale for the proposed capital structure; description of financing sources and terms; status of lender engagement; justification for the use of concessional capital or capital from governments/ development finance institutions within the proposed capital structure; description of any first loss facility

1.37. If applicable - Describe the nature, provider, and terms of any concessional finance or government involvement in the project's financing structure.

1.38. If applicable - discuss the projected debt service coverage ratio (DSCR) profile over the loan tenure, including the minimum and average DSCR. Where the minimum DSCR falls below 1.20x, explain how the project intends to achieve bankability and whether any credit enhancement or cash sweep mechanism is contemplated.

1.39. Describe all risk mitigation instruments in place, under negotiation, or planned in connection with the project, including but not limited to: construction all-risks insurance; operational all-risks and business interruption insurance; performance guarantees from equipment suppliers or EPC contractors (including liquidated damages provisions); political risk insurance or investment guarantees; payment security mechanisms or offtake guarantees; currency hedging arrangements, and any other contractual risk allocation mechanism that materially affects the project's financial resilience.

1.40. Discussion of sensitivity and stress test results; for each of the ten mandatory scenarios specified in Part C of the Summary of Financial Analysis, along with a narrative interpretation of the results and identification of risk mitigation strategies for any scenario where the project fails or severe flags are raised.

1.41. Discussion of break-even capacity utilization under base case assumptions

1.42. Quantify and justify the viability gap in this project and explain how it will be addressed through the contributions by Project Participants and governments of India and Japan respectively under the JCM. Accordingly, provide estimates of the following, clearly and explicitly stating and explaining all calculations and assumptions:

1.42.1. The cost of the mitigation outcomes generated by the project (in INR/tCO2eq, JPY/tCO2eq and USD/tCO2eq), and

1.42.2. The effective price of ITMOs (in INR/tCO2eq, JPY/tCO2eq and USD/tCO2eq) which will be acquired by the Japanese Project

Participant(s) and/or the Government of Japan, considering their respective contributions to the project.

9. Summary of Financial Analysis

PART A Capital Costs & Financial Indicators	
Total Project CAPEX (INR Crore) Breakdown required. Consistent with India technology benchmarks within +/- 15%. State source of cost estimates (e.g. supplier quotes, feasibility study, EPC bid).	Total CAPEX: INR [_____] Crore (a) Equipment & technology: INR [_____] Cr (b) Civil & construction: INR [_____] Cr (c) Development & permitting: INR [_____] Cr (d) Land & site acquisition: INR [_____] Cr (e) Any other: _____ INR [_____] Cr (f) Contingency: INR [_____] ([_____] % of total CAPEX) Source of cost estimates: [_____]
Major Replacement CAPEX (if applicable) Significant capital replacements expected during crediting period ; e.g. battery replacement, electrolyzer stack overhaul, catalyst replacement. Exclude routine maintenance captured in OPEX.	☐ No major replacement CAPEX expected during crediting period. ☐ Yes; provide details below: **Item:** [_____] Estimated cost (₹): ₹ [_____] **Expected timing:** Year [_____] of operation Add rows if there are multiple replacement items. Include replacement CAPEX in the financial model used for IRR/NPV calculations.
CAPEX per Unit Output	CAPEX per unit: ₹ [_____] per [_____]

Total annualised CAPEX ÷ Annual output volume. State the unit clearly (e.g. ₹/MWh, ₹/kg H_2, ₹/tonne CBG, ₹/tCO_2eq captured).	Annualised CAPEX: ₹ [_____] Cr ÷ Annual output: [_____] = ₹ [_____] / [_____]
Annual Fixed OPEX (INR Crore / year)	INR [_____] Cr / year
OPEX per Unit Output Total annual OPEX ÷ Annual output volume. State unit clearly (e.g. ₹/MWh, ₹/kg H_2, ₹/tonne CBG, ₹/tCO_2eq captured).	OPEX per unit: ₹ [_____] per [_____] Annual OPEX: ₹ [_____] Cr ÷ Annual output: [_____] = ₹ [_____] / [_____]
Project Lifetime (years) Technical lifetime per manufacturer specification	[_____] years Source: [_____]
Carbon Abatement Cost (INR / tCO2eq) Formula: (NPV of CAPEX + NPV of total OPEX over project lifetime) / Total lifetime	Carbon abatement cost: INR [_____] / tCO2eq JPY [_____] / tCO2eq USD [_____] / tCO2eq Working:

tCO2eq emission reductions.	NPV of CAPEX: INR [_____] Cr + NPV of OPEX ([_____] yr horizon): INR [_____] Cr = Lifecycle cost: INR [_____] Cr Total lifetime emission reductions: [_____] tCO2eq over [_____] years
Effective Price of ITMOs to be acquired by Japan The effective price of ITMOs which will be acquired by the Japanese Project Participant(s) and/or the Government of Japan, considering their respective contributions to the project.	Effective Price of ITMOs to be acquired by Japan: INR [_____] / tCO2eq JPY [_____] / tCO2eq USD [_____] / tCO2eq
Hurdle Rate Used Technology-specific. Justify with reference to comparable projects, WACC, or investor requirements. State explicit build-up.	Hurdle rate: [_____] % Build-up: Risk-free rate: [_____] % + Equity risk premium: [_____] % + Country risk: [_____] % + Sector premium: [_____] %
Escalation Assumptions Annual escalation rates assumed in financial model. State basis.	**CAPEX escalation (if phased):** [_____] % p.a. Basis: [_____] **OPEX escalation:** [_____] % p.a. Basis: [_____] **Revenue/tariff escalation:** [_____] % p.a. Basis: [_____]

<table>
<tr><td>IRR and NPV -- Base Case

Fill BOTH columns.</td><td>
<table>
<tr><th>Metric</th><th>WITHOUT carbon revenue</th><th>WITH carbon revenue</th><th>Uplift</th></tr>
<tr><td>IRR (Unlevered)</td><td>[_____] %</td><td>[_____] %</td><td>[_____] pp</td></tr>
<tr><td>IRR (Levered)</td><td>[_____] %</td><td>[_____] %</td><td>[_____] pp</td></tr>
<tr><td>NPV (INR Cr)</td><td>INR [_____]</td><td>INR [_____]</td><td>[_____] %</td></tr>
<tr><td>Payback (years)</td><td>[_____] yrs</td><td>[_____] yrs</td><td>---</td></tr>
</table>
</td></tr>
<tr><td>Debt : Equity Ratio

If applicable</td><td>[_____] / [_____]</td></tr>
<tr><td>Cost of Debt (interest rate)

Weighted average if multiple facilities – If applicable</td><td>Rate: [_____] % p.a.

Basis:

(term sheet/ assumption)</td></tr>
<tr><td>Moratorium Period

Period of moratorium on principal repayment, if any - If applicable</td><td>Moratorium: [_____] months from financial close

☐ No moratorium ☐ Interest-only during moratorium
☐ Full moratorium</td></tr>
<tr><td>Loan Tenor

If applicable</td><td>[_____] years</td></tr>
<tr><td>Minimum DSCR

Minimum debt service coverage</td><td>Min. DSCR: [_____] x

Typically lender-required minimum. DSCR < 1.2x is a bankability concern.</td></tr>
</table>

ratio over loan tenor - If applicable	
Average DSCR Average debt service coverage ratio over loan tenor - If applicable	**Avg. DSCR:** [_____] x
Payback Period Simple payback on total project cost (undiscounted) - If applicable	**Payback:** [_____] years
Financing Status	☐ Uncommitted / pre-mandate ☐ Term sheet received or MOU signed (attach redacted copy as annex) ☐ Financial close achieved ☐ Fully equity-funded (no debt) Name of lead lender (if applicable): [_____]
Sources of Finance in Total Project Funding	Total project capital: INR [_____] Cr Of which: (a) Equity financing: INR [_____] Cr (b) Commercial private debt (non-concessional): INR [_____] Cr (c) Concessional / DFI debt: INR [_____] Cr (d) Public / government capital (e.g. grants, viability gap funding, equity): INR [_____] Cr (e) Advance carbon financing by Japanese Project Participant(s): INR [_____] Cr

	(f) Advance carbon financing by Government of Japan: INR [_____] Cr Name principal commercial lenders / equity investors if known:

PART B Revenue Structure

Revenue Source	Description	Unit Price	Volume / Year	Annual Amount (INR Cr)
(a) Primary activity revenue	[_____] specify	INR [_____] / [_____]	[_____] units/yr	INR [_____] Cr/ year
(b) Carbon credit revenue	[_____] specify	USD [_____] / tCO2eq	[_____] tCO2eq/yr	INR [_____] Cr/ year
(c) Subsidies / incentives / RECs	[_____] specify	---	---	INR [_____] Cr/ year
(d) Other	[_____] specify	---	[_____] specify	INR [_____] Cr/ year
TOTAL ANNUAL REVENUE				INR [_____] Cr/ year

Carbon Revenue as % of Total Annual Revenue	[_____] %

PART C Sensitivity Analysis

All ten scenarios are mandatory. Project Participants do not substitute alternative scenarios. All scenarios refer to IRR calculation with carbon revenue unless otherwise mentioned.

Stress Scenario	Project IRR (Unlevered)	Equity IRR (Levered)	NPV @ hurdle rate	Min DSCR
S1. CAPEX (+20%)	[_____] %	[_____] %	₹ [_____] Cr	[_____] x
S2. OPEX (+20%)	[_____] %	[_____] %	₹ [_____] Cr	[_____] x
S3. Primary revenue price (–20%)	[_____] %	[_____] %	₹ [_____] Cr	[_____] x
S4. Carbon price (–50%)	[_____] %	[_____] %	₹ [_____] Cr	[_____] x
S5. Combined 1: CAPEX (+20%) & carbon price (–50%)	[_____] %	[_____] %	₹ [_____] Cr	[_____] x

S6. Commissioning delay (+18 months)	[_____] %	[_____] %	₹ [_____] Cr	[_____] x
S7. Combined 2: CAPEX (+20%) + Commissioning delay (+12 months).	[_____] %	[_____] %	₹ [_____] Cr	[_____] x
S8. Interest rate (+200 bps) *(If applicable)*	[_____] %	[_____] %	₹ [_____] Cr	[_____] x
S9. Output / generation (–15%)	[_____] %	[_____] %	₹ [_____] Cr	[_____] x
S10. Feedstock price (+25%) *(If applicable)*	[_____] %	[_____] %	₹ [_____] Cr	[_____] x