PROJECT DESIGN DOCUMENT (PDD) FORM FOR ARTICLE 6.4 PROJECTS

(Version 02.0)

BASIC INFORMATION			
UNFCCC project reference number:	>>		
Project title:	>> JSW Energy – Green Hydrogen Project (Vijayanagar), KA		
Host Party:	India		
Other participating Parties:	Choose a Party.		
Activity participant(s): (add rows if needed)	**Type of Party**	**Party that is to provide authorization**	**Activity Participant**
	Host Party	India	JSW Renewable Energy (Vijayanagar) Limited, JSW Neo Energy Ltd, JSW Energy Ltd
PDD version number:	>> Version.01 (Draft)		
PDD completion date:	**Click or tap to enter a date.**		
Applied mechanism methodologies and standardised baselines, and their versions:	**Reference number**	**Title**	**Version**
		Production/Manufacture of Low Carbon Intensive Hydrogen through electrolysis of water powered primarily by renewable electricity.	Draft
Sectoral scope(s):	>> 4. Manufacturing industries		
Type of the project:	☒ Emission reductions activity ☐ Removals activity ☐ Combined emission reductions and removals activity		
Estimated annual emission reductions and/or net removals over the crediting period (tCO_2e/year):	Emission reductions:	>> 47888	
	Net removals:	>> NA	
	Total emission reductions and net removals	>>47898	

SECTION A. Project description

A.1. Project purpose and general description

>> The proposed project activity, titled the JSW Green Hydrogen Project, involves the establishment of a greenfield hydrogen production facility located in Bellary, Vijayanagar District, Karnataka, India. The project is developed by JSW Energy and is designed to produce high-purity hydrogen (99.999%) through alkaline water electrolysis technology with a rated capacity of 5,000 Nm^3/hr.

The electrolysis system will be powered primarily by renewable electricity procured under a long-term Renewable Energy (RE) Power Purchase Agreement (PPA), comprising a hybrid mix of solar (600 MW equivalent contribution) and wind (225 MW equivalent contribution), with a combined RTC capacity of 28.5 MW dedicated to this project. This ensures that the facility operates almost entirely on renewable power. In line with the methodology requirements, any auxiliary grid electricity use is capped at ≤10% of the total input and will be conservatively accounted for in project emissions.

By adopting renewable-powered electrolysis, the project will displace conventional fossil-fuel-based hydrogen production pathways, such as steam methane reforming (SMR) and coal gasification, which typically exhibit emission intensities ranging from 9–18 tCO_2e per tonne of H_2. In contrast, the project's lifecycle GHG intensity will be near zero, enabling substantial net emission reductions.

Beyond emission mitigation, the project contributes significantly to sustainable development:

- Climate benefits: Avoidance of GHG emissions by replacing grey hydrogen with renewable hydrogen.
- Economic benefits: Supports India's National Green Hydrogen Mission (2023), enhances industrial competitiveness, and fosters green jobs.
- Environmental benefits: Lower local air pollutants compared to fossil-based hydrogen, adoption of sustainable water management practices, and minimized land-use footprint through hybrid RE sourcing.

The project is expected to generate **approximately 47,888 tCO_2e of emission reductions annually**, resulting in an estimated **478,884 tCO_2e of cumulative emission reductions over the 10-year crediting period**, based on the ex-ante estimates presented in this PDD.

The project boundary includes all emission sources associated with renewable electricity supply, water treatment, hydrogen production through alkaline electrolysis, hydrogen compression and storage, auxiliary electricity consumption, and all monitoring systems required for the quantification of baseline emissions, project emissions, and leakage in accordance with the applied methodology.

A.2. Confirmation that the project aligns with the A6.4 activity types indicated by the host Party

>> The proposed project activity is categorized under the mitigation activity types of **"fuel/feedstock switch"** and **"technology switch"** as recognized under the Article 6.4 mechanism. Specifically, the project replaces conventional fossil-fuel-based hydrogen production pathways, such as steam methane reforming (SMR) and coal gasification, with **renewable-powered water electrolysis**. This transition constitutes a direct **substitution of carbon-intensive feedstock** (natural gas, coal) with a **renewable electricity input,** and a **technology switch** from fossil-based reformers to electrolyser-based hydrogen production systems.

The Host Party, India, has explicitly prioritized the development of green hydrogen as a key mitigation activity under its National Green Hydrogen Mission (2023) and its Long-Term Low Emission Development Strategy (LT-LEDS, 2022). The National Green Hydrogen Mission sets a target of 5 million metric tonnes (MMT) of green hydrogen production per year by 2030, with an emphasis on international cooperation mechanisms, including carbon markets under Article 6, to mobilize investment. This is consistent with India's submission on the operationalization of Article 6.4, published by the Ministry of Environment, Forest and Climate Change (MoEFCC).(https://moef.gov.in/uploads/pdf/article_6.4.pdf)

By deploying electrolyser technology powered by dedicated renewable energy (solar and wind under PPA arrangements), the project falls squarely within the mitigation activity types that the host Party has already indicated as eligible and desirable under Article 6.4. It therefore confirms alignment with the recognized A6.4 activity types identified by the host Party, while contributing directly to India's strategic hydrogen sector transformation.

A.3. Project geographical location

Host Party	India
Region(s)/State(s)/Province(s)	>> Karnataka
Cities/towns/communities	>> Vijayanagar
Geographic coordinates	>> 15.1918353, 76.6655803
Map of project location	

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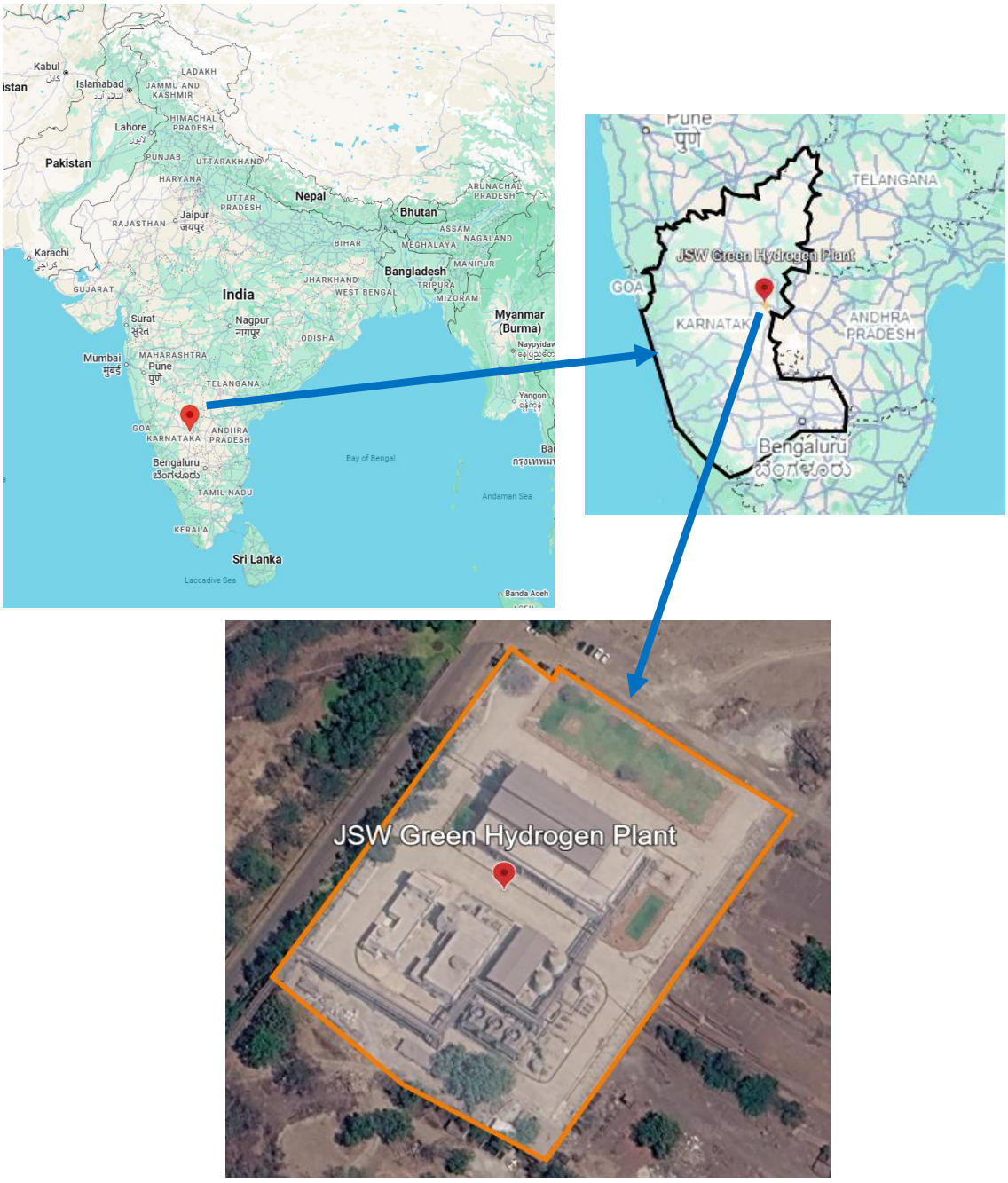

A.4. Technology/measures

A.4.1. Pre-activity scenario

>> Prior to the implementation of the proposed project activity, hydrogen production in India is predominantly based on **fossil fuel reforming technologies**, particularly **steam methane reforming (SMR)** using natural gas, and to a lesser extent, **coal gasification** in coal-abundant regions. These pathways are associated with high greenhouse gas (GHG) intensities, typically ranging between **9–12 tCO_2e per tonne of H_2** for SMR and exceeding **18 tCO_2e per tonne of H_2** for coal gasification.

These conventional hydrogen production methods not only contribute significantly to India's industrial emissions but also increase dependence on fossil fuel imports (in the case of natural gas) and exacerbate local environmental impacts, such as **air pollution, resource-intensive water use, and solid waste generation** from coal-based processes.

Conventional fossil-based hydrogen production facilities generally have an operational lifetime of 20 to 30 years and are designed for continuous industrial operation with only periodic maintenance and equipment replacement. In the absence of the proposed project activity, such facilities would continue producing hydrogen using fossil fuel feedstocks throughout their economic lifetime.

The mass and energy balance of the baseline hydrogen production process is characterized by the consumption of fossil fuel feedstocks (primarily natural gas), process water, and auxiliary electricity to produce hydrogen, while generating carbon dioxide and other process gases as by-products. Thermal energy required for the reforming process is supplied through fossil fuel combustion, resulting in substantial direct and indirect greenhouse gas emissions. Consequently, the overall energy balance is dominated by fossil energy inputs, leading to a high carbon intensity of hydrogen production.

Currently, renewable-powered electrolysis has **limited penetration in India** and is at an early stage of deployment, primarily due to high capital expenditure, lack of enabling infrastructure (pipelines, storage), and absence of large-scale offtake markets. Thus, the baseline (pre-project scenario) is characterized by reliance on fossil-based hydrogen with high carbon intensity**.**

A.4.2. Technologies and/or measures to be employed and/or implemented by the project

>> The project activity involves the deployment of **water electrolysis technology powered by renewable electricity** (solar and wind) procured through long-term Power Purchase Agreements (PPAs). The system boundary includes the following components:

- **Electrolysers:** Proton Exchange Membrane (PEM) or Alkaline electrolysers are envisaged, chosen for their commercial availability, modularity, and scalability. These units will split purified water into hydrogen (H_2) and oxygen (O_2), with minimal direct emissions.
- **Renewable Power Supply:** The project is supported by dedicated renewable energy sources, solar PV and wind farms under PPAs, ensuring that electricity input for electrolysis is low-carbon. Auxiliary grid imports, if required, are capped at ≤10% of total electricity consumption and conservatively included in activity emissions.
- **Balance of Plant (BoP):** Includes water treatment/desalination units (for ensuring deionized water supply), compression and storage facilities for hydrogen, and safety systems for handling and monitoring.
- **Monitoring Systems:** Advanced Supervisory Control and Data Acquisition (SCADA) and IoT-based monitoring devices for tracking electricity use, hydrogen output, and potential hydrogen leakage to ensure accurate emissions accounting.

This project therefore shifts hydrogen production from fossil-intensive processes to a **renewable-based system**, resulting in near-zero direct GHG emissions.

A.5. Parties and activity participants

(Add/remove rows as necessary)

Type of Party	Name of the Party	Activity participant(s)
Host Party	India	>> JSW Renewable Energy (Vijayanagar) Limited, JSW Neo Energy Ltd, JSW Energy Ltd

SECTION B. Application of mechanism methodologies, methodological tools and standardized baselines

B.1. References to mechanism methodologies, methodological tools and standardized baselines

>>

Reference number	Title	Version
	Production of Low Carbon Intensive Hydrogen through Electrolysis of Water	1.0
	Standard: Demonstration of additionality in mechanism methodologies	1.0
	Standard: Crediting period under the Article 6.4 mechanism	1.0
	Standard: Methodological development and assessment under the Article 6.4 mechanism	1.0
	Standard: Leakage under the Article 6.4 mechanism	1.0
	Rules, Modalities and Procedures (RMPs)	
	Tool for the demonstration of additionality	
	Tool for the demonstration and assessment of common practice	
	Tool for calculation of emission reductions in energy industries and fuel/feedstock switching activities	
	Tool for the treatment of leakage emissions under the Article 6.4 mechanism	

B.2. Applicability of mechanism methodologies, methodological tools and standardized baselines

>> No standardized baselines (SBs) specific to hydrogen production in India have been approved under the Article 6.4 mechanism at the time of project design. Therefore, the project activity applies the methodology directly, with parameters determined as per the provisions of the methodology and host Party circumstances.

The methodology provides detailed guidance on the following:

- **Baseline setting:** using the historical emissions approach (paragraph 36(iii) of the RMPs), adjusted downward in line with host Party ambition and international decarbonization pathways.
- **Activity emissions:** accounting for electricity consumption (from grid imports, if any) and fugitive hydrogen leaks.

- **Leakage:** identifying and addressing potential upstream/downstream leakage sources such as renewable power displacement or hydrogen transport.

- **Emission reductions:** determined as the difference between baseline emissions, activity emissions, and leakage, in accordance with the Baseline and Leakage Standards.

Accordingly, the project activity is consistent with the **methodological and regulatory framework** of the Article 6.4 mechanism and applies the approved methodological tools in a conservative manner to ensure environmental integrity.

(Insert the UNFCCC reference number, title and version of the mechanism methodology, other methodological regulatory documents including methodological tool, standardized baseline approved by the Supervisory Body, or the methodological requirements specified by the host Party)

Applicability condition in the methodological regulatory document or the methodological requirement specified by the host Party	**Demonstration of compliance of the project with the applicability condition in the methodological regulatory document or the methodological requirement specified by the host Party**
>> The methodology applies to hydrogen production projects where hydrogen is generated through electrolysis of water using renewable electricity as the primary energy source.	>> The project involves the production of hydrogen via electrolysis powered primarily by renewable electricity sourced through long-term PPAs with solar and wind projects. This fully complies with the requirement.
>> The use of grid electricity in electrolysis is permitted but shall not exceed 10% of the total annual electricity consumption of the project.	>> The project design ensures that grid electricity use will not exceed 10% of total annual electricity consumption. This will be monitored and verified by the DOE at validation and during each crediting period.
>> The renewable electricity used for hydrogen production may be co-located with the electrolyser or supplied via the grid, provided that renewable energy attributes are demonstrable.	>> In this project, renewable electricity is supplied via the grid from contracted solar and wind PPAs. Renewable Energy Certificates (RECs) and contractual proof will demonstrate the renewable attributes of the power used.
>> The methodology is applicable to both greenfield hydrogen production facilities and brownfield facilities where an electrolyser is retrofitted to an existing fossil-based hydrogen plant, provided that fossil-based hydrogen units are decommissioned or capped.	>> The project is a greenfield development. No fossil-based hydrogen units exist at the project site. Hence, no decommissioning or capping is required.
The project boundary must include all direct and indirect emissions associated with hydrogen production, including electricity consumption, water supply and treatment, and fugitive hydrogen emissions.	The project boundary includes all direct and indirect emissions: electricity consumption (RE and grid), desalinated water supply, and monitoring of hydrogen leakage across the value chain.
Water used for electrolysis should not exceed 5% of locally available freshwater resources, ensuring no adverse impact on drinking water, agriculture, or livelihoods.	The project sources water from desalination units connected to seawater intake. No freshwater resources are used, and therefore there is no impact on local drinking water or agricultural needs.
Projects may consist of modular hydrogen production units deployed near demand centers or industrial facilities.	The project is modular in design, enabling scalable electrolyser installation aligned with industrial hydrogen demand.
In case of retrofitted or supplementary hydrogen production facilities, monitoring systems must clearly distinguish green hydrogen from conventional hydrogen output.	Not applicable. The project is a greenfield hydrogen plant and does not supplement or retrofit any existing fossil-based hydrogen facility.

The project activity shall ensure robust metering, monitoring, and verification of electricity input, hydrogen output, and fugitive hydrogen emissions, to be validated by the DOE.	The project includes advanced SCADA and IoT-based monitoring systems for electricity consumption, hydrogen output, and leakage detection. DOE will confirm implementation during validation.

B.3. Addressing double counting due to overlapping claims between different Article 6.4 mechanism activities, due to overlap with domestic mitigation schemes and due to overlap with other frameworks or environmental markets

>> The project activity has been designed and will be implemented in accordance with the applicable Article 6.4 mechanism methodology, the Rules, Modalities and Procedures (RMP), and other applicable methodological regulatory documents to ensure that emission reductions are uniquely quantified, monitored, verified, and issued, thereby avoiding double counting.

The project is a stand-alone greenfield hydrogen production facility with a clearly defined project boundary encompassing renewable electricity supply, water electrolysis, hydrogen production, compression, storage, and associated auxiliary systems. The project is not registered as, nor does it form part of, any other Article 6.4 mechanism activity. Renewable electricity supplied to the electrolyser shall be demonstrated through the requirements specified in the applied methodology, including eligible contractual instruments and monitoring procedures, ensuring that the associated environmental attributes are exclusively allocated to the project activity and are not subject to overlapping claims

The project is not implemented to comply with any mandatory national or sub-national legal requirement requiring renewable hydrogen production. At the time of registration, the project is not subject to any mandatory domestic greenhouse gas mitigation scheme or emissions trading system that would result in the same emission reductions being claimed for domestic compliance purposes. Where Article 6.4 emission reductions are authorized for international transfer, the activity participant shall comply with all applicable host Party authorization requirements and corresponding adjustment procedures in accordance with Article 6 of the Paris Agreement.

The project is not registered, and will not seek registration for the same emission reductions, under any other international, regional, national, or voluntary greenhouse gas crediting programme, including the Clean Development Mechanism (CDM), Verified Carbon Standard (VCS), Gold Standard, Global Carbon Council (GCC), or equivalent mechanisms. Renewable electricity certificates or other environmental attributes associated with the electricity supplied to the project will not be transferred, sold, or claimed under any other greenhouse gas mitigation mechanism or environmental market in a manner that would result in double claiming of the associated environmental benefits.

The project will maintain records demonstrating compliance with the applicable Article 6.4 mechanism requirements throughout the crediting period, including project registration records, renewable electricity procurement documentation, host Party authorization, and other relevant supporting documentation. These records will demonstrate that the emission reductions generated by the project are issued only once and are not subject to overlapping claims under any greenhouse gas mitigation mechanism or environmental market.

The proposed project activity is eligible for authorization under the Government of India's notified framework for Article 6 implementation. Green hydrogen is recognised as an eligible activity for international transfer, subject to Host Party authorization. Upon such authorization, the corresponding emission reductions shall be accounted for through the applicable corresponding adjustment procedures and shall not be counted towards the achievement of India's Nationally Determined Contribution (NDC), thereby preventing double counting.

B.4. Project boundary, sources, sinks, greenhouse gases and reservoirs

>> The project boundary encompasses all physical, geographical, and operational components directly associated with the hydrogen production activity. In line with the Baseline Standard (Appendix 1, Section 2) and the Leakage Standard, the boundary covers the following:

1. **Baseline boundary**: Conventional fossil-fuel-based hydrogen production pathways (e.g., steam methane reforming [SMR], autothermal reforming [ATR], or coal gasification). These are the

counterfactual sources of emissions displaced by the project. Baseline emissions include CO_2, CH_4, and N_2O from feedstock combustion and process emissions.

2. **Project activity boundary**: The project consists of electrolysis units powered primarily by renewable electricity supplied via solar and wind PPAs, supplemented by up to 10% grid electricity. Emissions within the project boundary include indirect emissions from grid electricity (if consumed), desalination and pumping of water, and fugitive hydrogen leakage from electrolysers, compression, storage, and transport. Direct process emissions of CO_2, CH_4, and N_2O are negligible, since no fossil feedstock is used.

3. **Leakage boundary**: Potential leakage emissions are considered from upstream renewable electricity supply chains (if applicable), alternative hydrogen supply shifts, and market-related effects. Since renewable electricity is contracted under PPAs and fossil hydrogen plants are not displaced within the same site, leakage is expected to be minimal. However, any material leakage that cannot be avoided (e.g., embedded emissions in auxiliary grid power) will be conservatively included in the calculations.

B.4.1. Baseline emissions/removals

Source/sink reservoir/pool	GHG		Type	Justification/Explanation
Fossil feedstock combustion and process emissions (SMR/ATR/Coal Gasification)	CO_2	☒ Included ☐ Not included	☐ Controlled ☒ Affected ☐ Related	>> Included – Major source of emissions in baseline hydrogen production.
	CH_4	☒ Included ☐ Not included	☐ Controlled ☒ Affected ☐ Related	>> Included – Fugitive methane from natural gas extraction, processing, and incomplete combustion.
	N_2O	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>> Not included — negligible in conventional fossil hydrogen pathways.
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
Electricity consumption in conventional hydrogen plants	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Affected ☐ Related	>> Included – Grid electricity consumed in baseline hydrogen production (auxiliary loads).
	CH_4	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
Transport and handling of fossil feedstock	CO_2	☒ Included ☐ Not included	☐ Controlled	>> Included – Indirect emissions from feedstock handling/transport.

			☐ Affected ☒ Related	
	CH_4	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>

B.4.2. Project emissions/removals

Source/sink/reservoir /pool	GHG		Type	Justification/Explanation
Electricity consumption for electrolysis (Renewable + ≤10% Grid)	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Affected ☐ Related	>> Electricity use for hydrogen production. 100% renewable supply is targeted; however, up to 10% grid backup may contribute minor CO_2 emissions
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>NA
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>NA
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>NA
Water treatment and desalination (for electrolysis feed and cooling)	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Affected ☐ Related	>> Accounted using emission factor EF_water = 0.001 tCO_2/m^3 (IPCC default). Includes energy for water pumping and treatment.

	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>NA
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>> NA
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>> NA

B.4.3. Leakage emissions

Source/sink/reservoir/pool	GHG		Type	Justification/Explanation
Hydrogen leakage during production, compression, and storage	CO_2	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	H2(GWP equivalent	☒ Included ☐ Not included	☐ Controlled ☒ Affected ☐ Related	>> Accounted as indirect radiative forcing gas. Leakage assumed 1% of annual H_2 production.

B.5. Establishment and description of baseline scenario

B.5.1. Identification of the baseline scenario

>> **1. Baseline scenario description**

The baseline scenario for the proposed greenfield hydrogen project corresponds to the continued production of hydrogen through the best available fossil-based technology (BAT) that is economically feasible and environmentally sound under Indian conditions.

In the absence of the project activity, hydrogen demand would have been met by constructing a new fossil-fuel-based hydrogen plant, most likely using Steam Methane Reforming (SMR) or Autothermal Reforming (ATR) without carbon capture.

In line with paragraph 36(i) of the RMP, the baseline is determined using the BAT approach, where the baseline emission factor represents the GHG intensity (tCO_2e/tH_2) of the most efficient fossil-based hydrogen technology available in the host country, adjusted downward in accordance with the Baseline Standard to ensure environmental integrity.

2. Information on facilities, systems, and equipment

- **Baseline system:** Hydrogen production via BAT fossil technology (SMR or ATR without CCS) using natural gas as feedstock.
- **Project system:** Hydrogen production through electrolysis of water powered by renewable electricity from solar and wind sources under long-term PPAs. Grid fallback, if any, is limited to ≤10% annually.
- **Replacement logic**: As a greenfield project, there is no existing fossil hydrogen facility being replaced. The baseline represents a counterfactual BAT-based fossil hydrogen plant that would have otherwise supplied the equivalent hydrogen output.

3. Step-by-step procedure for baseline establishment

Step 1 – Define hydrogen output (Hy):

The objective is to determine the baseline emission factor (EF_BAT) representing the *Best Available Technology* (BAT) for fossil-based hydrogen production that is technically feasible, economically viable, and environmentally sound under Indian conditions, consistent with paragraph 36(i) of the RMP and Section 6.1 of the Baseline Standard.

The BAT determination covers commercially deployed hydrogen production technologies using fossil feedstocks in India, namely:

- **Steam Methane Reforming (SMR)** – natural gas–based reforming with optimized heat recovery and low excess steam ratio;
- **Autothermal Reforming (ATR)** – oxygen-assisted reforming with improved thermal efficiency;
- **Coal Gasification** – included as its presence in India's hydrogen sector.

Step 2: Identify and Collect Data Sources
Data on emission intensities and process efficiencies were drawn from credible, peer-reviewed and government-endorsed sources, including:

- *DOE Hydrogen Production Technologies AMR 2023 & 2024* – process efficiency ranges for fossil reforming technologies (without CCS);
- *IEA Hydrogen Projects Database* and *IRENA Hydrogen Roadmap* – international performance benchmarks;
- *Low-Carbon Hydrogen International Standard (2024)* – lifecycle boundary consistency;
- *NITI Aayog & MNRE (India)* reports – national fuel-mix, process energy, and technology availability context.

All data were normalized to a **cradle-to-gate system boundary** and expressed in **t CO_2e/t H_2**, using GWP100 values from IPCC AR6.

Step 3: Verify and Quality-Assure Data
A thorough QA/QC process was applied:

- **Completeness check** – all major fossil pathways (SMR, ATR, coal gasification) were included;
- **Consistency check** – uniform units and boundary conditions;
- **Accuracy check** – cross-validation among DOE AMR 2023–2024, IEA, and IRENA datasets;
- **Conservativeness** – median-to-lower-bound intensities selected to avoid overestimation of baseline emissions.

Step 4: Determine BAT Emission Intensities

Plant ID	Technology	Typical Efficiency (LHV %)	Net GHG Intensity (t CO_2e/t H_2) – 2022	Net GHG Intensity (t CO_2e/t H_2) – 2023	Net GHG Intensity (t CO_2e/t H_2) – 2024	Annual H_2 Production (t H_2) – 2024	Data Source
A	SMR	72	11.6	11.4	11.2	420 000	DOE AMR 2023; IEA 2022
B	SMR	70	11.8	11.5	11.3	390 000	DOE AMR 2023
C	ATR	68	13.6	13.3	13.1	300 000	DOE AMR 2024; IRENA 2023
D	ATR	66	13.8	13.6	13.4	280 000	DOE AMR 2024
E	Coal Gasification	58	18.8	18.6	18.4	520 000	IEA India Energy Outlook 2023
F	Coal Gasification	57	19	18.8	18.5	500 000	DOE AMR 2023
G	Coal Gasification	56	19.2	19	18.8	480 000	DOE AMR 2023
H	SMR	69	11.9	11.7	11.5	410 000	IEA 2022; NITI Aayog 2023
I	ATR	65	13.9	13.6	13.4	310 000	IRENA 2023
J	Coal Gasification	55	19.3	19	18.8	490 000	DOE AMR 2023

Weighted Average:

$$EF_{(BAT,avg)} = \frac{\sum_{i=1}^{n} \mathrm{EF_{BAT,i}} * H_i}{\sum_{i=1}^{n} \mathrm{H_i}} =$$

$$\frac{[(11.4*420)+(11.53*390)+(13.3*300)+(13.6*280)+(18.6*520)+(18.8*500)+(19*480)+(11.7*410)+(13.6*310)+(19*490)]}{[420+390+300+280+520+500+480+410+310+490]}$$

= 63598/4100 = 15.5

Step 5: Calculate Baseline Emissions

$$BE_y = H_y \times EF_{BAT} = 3600 \times 15.5 = 55{,}800\ tCO_2e/year$$

Thus, the baseline emissions prior to downward adjustment are **55,800 t CO_2e/yr**, representing the lowest-emission feasible fossil-based hydrogen configuration (BAT = efficient SMR and coal gasification without CCS).

Step 6: Review and Adjustment
The BAT baseline emission factor shall be reviewed every crediting period or when new efficiency benchmarks demonstrate ≥ 5 % improvement. A **minimum annual reduction rate of 1 %** shall be applied to reflect technological learning, consistent with paragraph 33(iii) of the Baseline Standard.

For this greenfield project, the applicable **BAT baseline emission factor** is **15.5 t CO_2e/t H_2**, representing the most efficient combination of fossil hydrogen technologies available in India without CCS.
This baseline ensures realism, conservativeness, and consistency with host-country technological conditions and UNFCCC methodological standards.

B.5.2. Identification of the Business-as-usual (BAU) scenario

>>

1. BAU Scenario / Reference Benchmark Description

The Business-as-Usual (BAU) scenario represents the continued production of hydrogen through conventional fossil-fuel-based pathways that currently dominate the hydrogen sector in India, primarily steam methane reforming (SMR) and coal gasification.

In the absence of the project activity, the hydrogen demand supplied by the project would most plausibly continue to be met through these conventional production routes.

In accordance with paragraph 36 of the Rules, Modalities and Procedures (RMP) and the applied methodology:

- For greenfield projects, the baseline is determined using the Best Available Technology (BAT) approach under paragraph 36(i) of the RMP. The BAT represents the most efficient fossil-based hydrogen production technology that is technically feasible and economically viable under host country conditions.
- For brownfield or retrofit projects, the baseline is determined using the Existing Actual or Historical Emissions approach under paragraph 36(iii) of the RMP, based on the weighted average historical emissions intensity of the existing hydrogen production facility over the most recent three consecutive years prior to the project start date.

Baseline emissions are calculated as follows:

$$BAU = H_y \times EF_{BL,y} \times RA$$

Where:

- $BE_{y,BAU}$ = Baseline emissions in year y (tCO_2e)
- H_y = Quantity of hydrogen produced in year y (tH_2)
- $EF_{BL,y}$ = Applicable baseline emission factor (tCO_2e/tH_2)
- RA = Regulatory adjustment factor

For brownfield projects, the baseline emission factor shall be determined as:

$$EF_{BL,y} = \frac{\sum_{t=1}^{T}(E_{t,H2})}{\sum_{t=1}^{T}(H_t)}$$

Where:

- $E_{t,H2}$ = Actual emissions from fossil-based hydrogen production in year t (tCO_2e)
- H_t = Hydrogen production in year t (tH_2)

- T = Number of historical years used (minimum three years)

Where legally binding regulations applicable during the baseline period require mandatory efficiency improvements or emission reductions affecting hydrogen production facilities, a regulatory adjustment factor shall be applied conservatively as follows:

$$RA = (1 - x)$$

Where:

- x = Mandatory efficiency improvement or emission reduction requirement expressed as a fraction.

Where no mandatory regulatory adjustment applies, RA=1.

The baseline emission factor shall subsequently be adjusted downward in accordance with the applied methodology and the Baseline Standard to ensure alignment with host Party decarbonization pathways and long-term mitigation objectives.

B.6. Demonstration of additionality

B.6.1. Regulatory analysis

>> The proposed project activity is not mandated by any existing national or subnational law, regulation, or legally binding policy in India. While India has launched the National Green Hydrogen Mission (NGHM, 2023), which provides a strategic framework and financial support to accelerate green hydrogen deployment, it does not impose a legal obligation on industrial actors to adopt renewable-powered hydrogen production. Instead, the NGHM encourages voluntary uptake through incentives, subsidies, and market development mechanisms.

Key regulatory considerations are as follows:

1. **No legal obligation for renewable hydrogen adoption**
    - At present, there are no binding laws or regulations in India requiring industrial facilities to produce hydrogen via electrolysis powered by renewable energy.
    - Hydrogen production continues to be dominated by fossil-based methods (e.g., SMR and coal gasification), which remain permissible under current regulatory frameworks.
2. **Supportive policies do not remove additionality**
    - The National Green Hydrogen Mission provides **production-linked incentives, demand creation programs, and pilot project support**. However, these measures are **enabling and promotional** in nature, not mandatory requirements.
    - The project activity requires carbon finance through the Article 6.4 mechanism to achieve financial viability, as renewable PPAs and electrolyser CAPEX still impose higher costs compared to fossil hydrogen. This ensures that the project **exceeds mitigation that would occur under BAU policy support alone**.
3. **Environmental and energy regulations**
    - The project will fully comply with applicable statutory requirements, including the **Environmental Impact Assessment (EIA) Notification, 2006**, water-use permits, and licenses to operate from state pollution control boards.
    - These regulations ensure environmental safeguards (e.g., water recycling, emission monitoring) but **do not mandate low-carbon hydrogen production technologies**.
4. **Host Party confirmation**
    - In line with the requirements of the **Additionality Standard** and the **A6.4 mechanism rules**, Host Party approval (through India's Designated National Authority) will confirm that:
        - The project contributes to national sustainable development objectives;
        - The project supports implementation of India's NDC and LT-LEDS without being legally required;

- The activity participants are authorized under Article 6.4.

- Relevant documentation (Host Party letter of approval) will be provided during validation.

B.6.2. Analysis of lock-in risk

>> The proposed project avoids locking in carbon-intensive infrastructure, technologies, or practices, in full compliance with paragraph 33 of the RMPs and the Additionality Standard. The lock-in assessment considers the scale of operations, technology lifetime, and emissions intensity profile of the project activity compared to the baseline.

1. Scale of operations

- The project is a greenfield hydrogen facility based on renewable-powered electrolysis.
- No fossil-based hydrogen production units (e.g., SMR, ATR, coal gasification) exist at the site; therefore, there is no continuation or expansion of high-emission infrastructure.
- Hydrogen output from the project directly displaces demand that would otherwise have been met by fossil hydrogen, ensuring absolute avoidance of fossil lock-in.

2. Lifetime of equipment

- Project electrolysers, with a typical operational lifetime of 15–20 years, are modular and easily upgradable.
- Renewable PPAs (solar and wind) have contract durations aligned with the project life but remain compatible with India's net-zero by 2070 pathway and intermediate NDC targets for 2030.
- Unlike fossil-based facilities (25–30 year lifespan, with high embedded carbon intensity), the electrolysis infrastructure does not commit the system to long-term emissions pathways.

3. Emissions intensity

- The project delivers near-zero direct GHG emissions, with a conservative allowance of ≤10% grid electricity use (monitored annually).
- In contrast, baseline fossil hydrogen pathways have emissions intensities of:
  - SMR: ~9–12 tCO_2e/tH_2
  - Coal gasification: >18 tCO_2e/tH_2
- The project therefore achieves >90% reduction in emissions intensity compared to BAU, ensuring alignment with decarbonization goals.

4. Safeguards against indirect lock-in risks

- No fossil-based backup systems are installed. Renewable PPAs provide firm supply through hybrid (solar + wind) contracts; any grid fallback is temporary, limited, and strictly capped (<10%).
- The project does not require new fossil infrastructure (e.g., gas pipelines, fossil storage), avoiding stranded assets.
- The design ensures full compatibility with future advances (e.g., electrolyser efficiency upgrades, integration with hydrogen storage and transport infrastructure).

B.6.3. Investment Analysis or Barrier analysis

☒ Investment analysis ☐ Barrier analysis

(Select one option)

>> The proposed Green Hydrogen project, located in India, involves the production of low-carbon hydrogen via electrolysis powered by renewable electricity (solar and wind PPAs with ≤10% grid fallback). This section demonstrates the **financial additionality** of the project, showing that the activity would not have occurred in the absence of incentives provided through the Article 6.4 mechanism.

1. Investment Analysis

Capital and Operating Costs

The project involves significant capital and operational expenditure (CAPEX & OPEX) due to its dependence on renewable energy and electrolysis technology. A comparison of costs for conventional hydrogen production (fossil-based SMR/ATR) and green hydrogen production in India is presented below:

(All values in USD/kg H_2 unless otherwise noted)

Cost Component	Green Hydrogen (Electrolysis + RE) [USD/kg H_2]	Conventional Hydrogen (SMR/ATR) [USD/kg H_2]
CAPEX (Plant Setup)	800 - 1200	300-500
OPEX (Operating Costs)	2.5 - 4.0	1.0-1.8
Levelized Cost of Hydrogen (LCOH)	3.5 - 5.5	1.2 – 2.0
Electricity Cost Contribution	60% – 70%	15% – 15%
Break-even Cost	2.8 – 4.0	1.0 – 1.5
Payback Period	10 - 15 years	4 - 7 years

Key Findings from Investment Analysis

1. **High CAPEX**
   • Initial capital investment for a commercial-scale electrolyser plant is 2–3 times higher than a conventional SMR/ATR plant.
   • High costs are primarily due to electrolyser stacks, balance of plant, and renewable energy procurement/storage systems.

2. **High Operating Costs (OPEX)**
   • The operational costs of green hydrogen production are 3–4 times higher than SMR-based hydrogen due to electricity demand (~50–55 kWh/kg H_2).
   • Renewable PPAs, combined with balancing/grid integration or co-located storage, add further costs.

3. **Unfavourable Payback Period and Low Returns**
   • Payback period for green hydrogen production is estimated at 10–15 years, compared to 4–7 years for SMR-based hydrogen.
   • This results in unattractive IRR/NPV profiles for investors.

4. **Higher Levelized Cost of Hydrogen (LCOH)**
   • LCOH for green hydrogen is 3.5 – 5.5 USD/kg H_2, compared to 1.2 – 2.0 USD/kg H_2 for conventional hydrogen.
   • The hydrogen market in India is still nascent, with no established pricing mechanisms ensuring profitability.

The project is **not financially viable** under current market conditions. Article 6.4 incentives (carbon credits, international carbon pricing, concessional financing) are necessary to improve the project's economic feasibility and close the cost gap with fossil hydrogen.

B.6.4. Common practice analysis

(This section is to be filled if the financial additionality or barrier analysis in the previous sub-section is followed for demonstrating additionality)

>> The common practice analysis has been carried out in accordance with the *Methodological Tool A6.4 AMT001: Common Practice Analysis*, applying Approach A (Comparable Activities) with a time-bound, capacity-based indicator (F), as provided under paragraphs 67–68 of the Tool. The objective is to determine whether renewable (green) hydrogen production based on water electrolysis powered by renewable energy is already common practice within the host country (India).

Step 1: Approach and Indicator

Approach A (Comparable Activities) has been selected using a time-bound approach that considers production capacity additions between January 2022 and December 2024.
The indicator of common practice (F) represents the market share of green hydrogen production capacity commissioned in this period relative to total hydrogen production capacity additions (fossil + renewable) in the same time frame.

According to paragraph 68 of *A6.4-AMT-001*, the time-bound threshold ($Fmax$) for non-LDC/SIDS countries such as India is 20 %.

Step 2: Output or Capacity Range

The applicable output range includes industrial-scale hydrogen plants exceeding 1 t H_2/day production capacity. Pilot, laboratory, and small demonstration facilities (< 1 t H_2/day) are excluded because they are not comparable in scale, technological maturity, or economic relevance to the proposed activity.

Step 3: Geographical Area

The analysis covers the Republic of India, consistent with the host Party of the proposed activity. Sufficient comparable facilities (≥ 3) exist within India; therefore, expansion to the regional (South Asia) level is not required.

Step 4: Identification of Comparable Activities

Comparable activities are defined as hydrogen production plants in India that:

- Produce hydrogen for industrial applications (refineries, fertilizers, chemicals, steel);
- Employ fossil-based (steam methane reforming, coal gasification, naphtha reforming) or renewable (electrolysis) technology;
- Were commissioned between 2022 and 2024.

Summary of Identified Comparable Activities (2022–2024)

Year	Technology	Fuel / Power Source	Installed Capacity (t H2/yr)
2022	SMR – Refinery Units	Natural Gas / Naphtha	≈ 1,800,000
2022	Coal Gasification	Coal	≈ 2,200,000
2023	SMR Upgrades & New Units	Natural Gas	≈ 1,000,000
2023	Coal Gasification	Coal	≈ 1,400,000
2023	Pilot Green H_2 (NTPC Ladakh 1.5 MW, HPCL Vizag 370 t H_2/yr)	Solar / Wind Electrolysis	≈ 400
2024	Coal Gasification	Coal	≈ 1,650,000

2024	Green H_2 Demo	RE Electrolysis	≈ 1,200

Step 5: Determination of Comparable and Similar Activities

- Comparable activities (N_{all}) = 5 (fossil hydrogen plants) + 2 (green pilot projects) = 7
- Similar activities (N_{Sim}) = 2 (green hydrogen electrolyser projects)
- P_{all} (total hydrogen capacity added 2022–2024) ≈ 8,051,600 t H_2/yr
- P_{sim} (total capacity of similar green H_2 projects) ≈ 1,600 t H_2/yr

Step 6: Calculation of the Common Practice Factor (F)

$$F = \frac{P_{sim}}{P_{all}} = \frac{1600}{8051600} * 100 = 0.02\%$$

Step 7: Comparison with Threshold

The calculated $F = 0.02\%$ is well below the 20 % time-bound threshold ($Fmax$) applicable for non-LDC/SIDS countries.

$$F = 0.02\% < Fmax = 20\%$$

Step 8: Conclusion

- Over 99.9 % of India's hydrogen production capacity (2022–2024) remains fossil-based (SMR and coal gasification).
- Green hydrogen electrolysis accounts for a negligible fraction (< 0.1 %), confined to pilot and early demonstration scales.
- No large-scale commercial green hydrogen projects have reached continuous industrial operation during the assessed period.

B.6.5. Performance-based approach

>> Not Applicable

B.7. Addressing non-permanence and risks of reversals

B.7.1. Reversals risk assessment

>> The proposed project is a renewable-powered green hydrogen production facility. It displaces fossil-based hydrogen production pathways (e.g., SMR, ATR, coal gasification), thereby avoiding associated GHG emissions. Unlike removal activities (e.g., afforestation or carbon capture with storage), the project **does not rely on sequestering carbon in reservoirs that may be reversed or released**. Once the emission reductions are achieved, they are permanent and cannot be undone.

Nevertheless, in line with the requirements of the *Standard: Requirements for activities involving removals under the Article 6.4 mechanism*, the project has conducted a reversal risk assessment across multiple NDC implementation periods:

- **Financial and management risks:** Minimal; long-term renewable power purchase agreements (PPAs), strong project sponsors, and diversified financing ensure operational continuity.

- **Regulatory/policy risks:** Low; India's National Green Hydrogen Mission (2023) establishes green hydrogen as a strategic sector, minimizing policy uncertainty.
- **Natural disturbances:** Medium; risks from cyclones, floods, or extreme weather events could cause temporary shutdowns but do not reverse achieved reductions.
- **Climate change risks:** Low; impacts may increase operational downtime but cannot negate past mitigation.

Overall assessment:

- Risk of reversal of achieved GHG reductions = **0% (negligible)**
- Risk of delay in future reductions due to temporary disruption = **low (1–5%)**

Because the project avoids emissions rather than storing carbon, no reversal risk buffer is required.

B.7.2. Reversals risk mitigation plan

>> Although no risk of reversals exists, the project has implemented measures to ensure operational resilience and continuity:

1. **Financial safeguards:** Secured PPAs for renewable electricity and long-term O&M contracts ensure stable operations and revenue streams.
2. **Regulatory engagement:** Alignment with the *National Green Hydrogen Mission* and host Party priorities (see MoEFCC Article 6.4 guidelines) ensures policy support.
3. **Technical resilience:** Electrolysers are modular, enabling quick replacement in case of failure; backup systems and redundancy minimize downtime.
4. **Disaster management planning:** Insurance against natural disasters, on-site safety protocols, and integration with regional disaster-response systems reduce exposure to extreme weather.
5. **Climate adaptation:** Water recycling and desalination reduce vulnerability to climate-induced water stress; hybrid RE sourcing (solar + wind) ensures reliable supply.

These measures guarantee that the project delivers sustained emission reductions across multiple NDC periods.

B.7.3. Calculation of an overall percentage-based risk

>> This section is not applicable to the proposed project activity.

B.7.4. Remediation of reversals

>> As the project does not involve removals or carbon storage, there is **no risk of reversal of achieved reductions**. However, in line with good practice and to ensure environmental integrity:

- If temporary disruptions occur (e.g., grid failure, natural disasters), **conservative monitoring will ensure that reduced hydrogen output and corresponding emission reductions are accurately reported**, avoiding over-crediting.
- Any unexpected emissions from auxiliary systems (e.g., backup diesel generators, excess grid electricity >10% limit) will be **accounted for transparently in project emissions**.

- Should host country or Supervisory Body guidance evolve to mandate additional safeguards, the project will comply with revised Article 6.4 procedures.

The project fully complies with the Article 6.4 requirements. Achieved reductions are permanent, risks of future disruption are low and manageable, and mitigation and remediation measures ensure robust delivery of emission reductions across successive NDC periods.

B.8. Estimation of emission reductions and/or net removals

B.8.1. Calculation of baseline emissions and/or removals

B.8.1.1. Calculation of unadjusted baseline emissions and/or removals

>> For the project activity, baseline emissions are determined using the **Best Available Technology (BAT) approach**, consistent with paragraph 36(i) of the Rules, Modalities and Procedures (RMP) and the *Standard: Setting the baseline in mechanism methodologies* (A6.4-STAN-METH-004).

The BAT approach represents the most efficient fossil-based hydrogen production technology that is commercially available and technically feasible under host-country conditions. The resulting baseline is subsequently adjusted downward to ensure consistency with paragraph 33(iii) of the RMP and India's long-term decarbonization pathway toward net-zero emissions by 2070.

Baseline emissions prior to downward adjustment

The baseline emissions prior to downward adjustment are calculated as follows:

$$BEBL, y = Hy \times EFBL$$

Where:

- BEBL,y = Baseline emissions prior to downward adjustment in year y (tCO_2e/year)
- Hy = Quantity of hydrogen produced in year y (tH_2/year)
- EFBL = Baseline emission factor determined using the BAT approach (tCO_2e/tH_2)

For the project activity:

- Hy=3,600 tH2/year
- EFBL=15.5 tCO2e/tH2

Therefore:

$$BEBL, y = 3{,}600 \times 15.5$$

$$BEBL, y = 55{,}800\ tCO2e/year$$

B.8.1.2. Calculation of downward adjusted baseline emissions and/or removals

B.8.1.2.1. Downward adjustment at the calendar year of the start date of the first crediting period

>> In accordance with the methodology, greenfield activities applying the Best Available Technology (BAT) approach are not subject to uncertainty-based downward adjustment in the first year of the crediting period.

Therefore, the downward-adjusted baseline emission factor for the first year of the crediting period is determined directly through application of the downward adjustment factor (DAF) derived from the host Party decarbonization trajectory.

The downward adjustment factor is determined as follows:

$$DAFYn = 1 - (Yn - Y1) \times max(\frac{1}{Ynetzero - Yreference}, 0.01)$$

For India:

$$Ynetzero = 2070$$

$$Yreference = 2005$$

$$\frac{1}{2070 - 2005} = \frac{1}{65} = 0.0154$$

Since:

$$0.0154 > 0.01$$

the applicable annual downward adjustment rate is:

$$1.54\%$$

For the first year of the crediting period:

$$DAFy1 = 1 - (0 \times 0.0154) = 1.00$$

The downward-adjusted baseline emission factor is therefore calculated as:

$$EFDA, y1 = EFBL, y1 \times DAFy1$$

For the project activity:

$$EFDA, y1 = 15.5 \times 1.00$$

$$EFDA, y1 = 15.5\ tCO2e/tH2$$

B.8.1.2.1.1. Downward adjustment at the subsequent years

>> For greenfield activities applying the Best Available Technology (BAT) approach, no uncertainty-based downward adjustment in the first year of the crediting period shall apply.

The downward adjustment in subsequent years (Yn) shall be determined by applying a downward adjustment factor (DAF) based on the host Party's reference year and net-zero target year, as follows:

$$DAF_{Yn} = 1 - (Yn - Y_1) * \max\ (\frac{1}{Y_{netzero} - Y_{reference}}, 0.01)$$

Where:

- DAF_{Yn} = Downward adjustment factor applied in year Yn
- Yn= Calendar year for which the downward adjustment is applied

- $Y_{netzero}$ = Net-zero target year of the host Party
- $Y_{reference}$ = Reference year for the host Party's net-zero target
- Y_1 = Calendar year corresponding to the start date of the first crediting period

For the proposed project activity, the host Party (India) has established a **net-zero target year of 2070**. Consistent with India's Nationally Determined Contribution, the **reference year is 2005**. Accordingly, the annual downward adjustment rate is determined as follows:

$$\frac{1}{2070 - 2005} = \frac{1}{65} = 0.0154$$

Since **0.0154 is greater than the minimum annual adjustment rate of 0.01** specified in the methodology, an annual downward adjustment rate of **1.54%** shall be applied throughout the crediting period.

The downward-adjusted baseline emission factor for each subsequent year shall be calculated as:

$$EF_{DA,Y_n} = EF_{BL,Y_n} \times DAF_{Y_n}$$

Where:

- $EF_{DA,Yn}$ = Downward adjusted baseline emission factor in year Yn (tCO_2e/tH_2)
- $EF_{DA,y1}$= Downward adjusted baseline emission factor in the first year of the crediting period (tCO_2e/tH_2)
- DAF_{Yn} = Downward adjustment factor applied in year Yn

Thus, the downward adjusted baseline emissions in year y shall be calculated as:

$$BE_{DA,y} = H_y \times EF_{DA,y}$$

Crediting Year	DAF	Adjusted Baseline Emission Factor (tCO_2e/tH_2)	Downward-adjusted Baseline Emissions (tCO_2e/year)
Year 1	1	15.5	55,800
Year 2	0.9846	15.26	54,940.68
Year 3	0.9692	15.02	54,081.36
Year 4	0.9538	14.78	53,222.04
Year 5	0.9384	14.55	52,362.72
Year 6	0.923	14.31	51,503.40
Year 7	0.9076	14.07	50,644.08
Year 8	0.8922	13.83	49,784.76
Year 9	0.8768	13.59	48,925.44
Year 10	0.8614	13.35	48,066.12

B.8.1.2.1.2. Calculation of downward adjusted baseline emissions and/or removals

>> The downward-adjusted baseline emissions for the first year are calculated as follows:

$$BEDA, y1 = Hy \times EFDA, y1$$

For the project activity:

$$BEDA, y1 = 3{,}600 \times 15.5$$

$$BEDA, y1 = 55{,}800\ tCO2e/year$$

B.8.1.3. Determination of conservative BAU baseline emissions and/or removals

>> In accordance with the applied methodology and paragraph 42 of the *Standard: Setting the Baseline in Mechanism Methodologies*, the Business-as-Usual (BAU) emissions are determined based on the continuation of fossil-based hydrogen production pathways that would most plausibly occur in the absence of the project activity.

For the proposed project activity, the applicable baseline pathway is conventional fossil-based hydrogen production. The BAU emissions are calculated as follows:

$$BEy, BAU = EH2, y \times RA$$

$$BE_{y,BAU} = 55{,}800 \times 0.95 = 53{,}010\ tCO_2e/year$$

Where:

- $BE_{(y,BAU)}$ = Business-as-Usual emissions in year y (tCO_2e/year)
- $EH2, y$ = Emissions from fossil-based hydrogen production in year y (tCO_2e/year)
- RA = Regulatory adjustment factor

The emissions from hydrogen production are determined as follows:

$$EH2, y = Hreq, y \times IH2$$

$$EH2, y = 3{,}600 \times 15.5 = 55{,}800\ tCO_2e/year$$

Where:

- $Hreq, y$ = Quantity of hydrogen produced in year y (tH_2/year)
- IH2 = Emission intensity of the applicable fossil-based hydrogen production pathway (tCO_2e/tH_2)

For this project activity:

- Annual hydrogen production (Hreq,y) = 3,600 tH_2/year
- Baseline emission intensity (IH2) = 15.5 tCO_2e/tH_2

The regulatory adjustment factor is conservatively applied to account for legally binding policies or regulations requiring efficiency improvements or emission reductions within the hydrogen sector.

The regulatory adjustment factor is calculated as follows:

$$RA = (1 - x)$$

Where:

- x = Mandatory efficiency improvement or emission reduction requirement expressed as a fraction

For the purpose of this assessment, a conservative regulatory adjustment of 5% is applied based on the implementation framework of India's National Green Hydrogen Mission and associated policy guidelines.

$$RA = 1 - 0.05 = 0.95$$

The conservative BAU emissions adjusted for uncertainty are determined as follows:

$$BE_{cons,UNC,y} = BE_{y,BAU} \times (1 - UNC_{BAU,y})$$

Where:

- $BE_{cons,UNC,y}$ = Conservative BAU emissions adjusted for uncertainty in year y (tCO_2e/year)
- $BE_{y,BAU}$ = Most likely BAU emissions in year y (tCO_2e/year)
- $UNC_{BAU,y}$ = Uncertainty at the lower bound of the 95% confidence interval relative to the central estimate of ex-ante quantified BAU emissions during the first crediting period (fraction)

Assuming an uncertainty value of 8%:

$$BEcons, UNC, y = 53{,}010 \times (1 - 0.08)$$
$$BEcons, UNC, y = 48{,}769.2\ tCO_2e/year$$

The minimum conservative BAU emissions are determined as follows:

$$BEcons, min, y = BEy, BAU - (BEy, BAU - AEy) \times 0.1$$

Where:

- $BEcons, min, y$ = Minimum conservative BAU emissions in year y (tCO_2e/year)
- AEy = Activity emissions in year y (tCO_2e/year)

Assuming project activity emissions of 4,500 tCO_2e/year:

$$BEcons, min, y = 53{,}010 - (53{,}010 - 4{,}500) \times 0.1$$

$$BEcons, min, y = 48{,}159\ tCO_2e/year$$

The conservative BAU emissions applied for emission reduction calculations shall be the lower of the two values:

$$BEcons, y = min(BEcons, UNC, y, BEcons, min, y)$$

$$BEcons, y = min(48{,}769.2,\ 48{,}159)$$

$$BEcons, y = 48{,}159\ tCO_2e/year$$

Where no mandatory regulatory adjustment applies, the value of RA shall be equal to 1.

B.8.1.4. Comparison between the downward adjusted baseline and the conservative BAU baseline emissions and/or removals

>> $BE_{DA,y} - BE_{y,BAU} = 55{,}800 - 48{,}159 = 7641 \frac{tCO2e}{yr}$ Equation (15)

$$BE_{y,Final} = \min(BE_{DA,y}, BE_{y,BAU}) = \min(55800,48159) = 48{,}159 \frac{tCO2e}{yr}$$ Equation (16)

Year	Downward-adjusted baseline (tCO_2e)	BAU baseline (tCO_2e)	Final baseline used
1	55,800.00	48,159	48,159.00
2	54,940.68	48,159	48,159.00
3	54,081.36	48,159	48,159.00
4	53,222.04	48,159	48,159.00
5	52,362.72	48,159	48,159.00
6	51,503.40	48,159	48,159.00
7	50,644.08	48,159	48,159.00
8	49,784.76	48,159	48,159.00
9	48,925.44	48,159	48,159.00
10	48,066.12	48,159	48,066

B.8.2. Calculation of project emissions and/or removals

>> In line with the applied methodology and Article 6.4 mechanism requirements, project emissions (PEy) are accounted from electricity consumption, water use, hydrogen leakage, and any auxiliary fossil fuel consumption. For the proposed project, which is a **100% renewable-powered alkaline electrolysis plant,** the emissions sources are minimal and largely limited to grid fallback (≤10%) and water use.

Step 1: Equation

Project emissions in year y are given by:

$$AE_y = AE_{y,Elec} + AE_{y,Fossil} + AE_{y,Water} + AE_{y,Leak}$$ Equation (17)

Where:

- AE_y = Total activity emissions in year y (tCO_2e).

Where:

- AE_y = Total project emissions in year y (tCO_2e).
- $AE_{y,Elec}$ = Emissions from grid electricity used in year y.
- $AE_{y,Fossil}$ = Emissions from backup fossil energy use in year y.
- $AE_{y,Water}$ = Emissions from water consumption in year y.

- $AE_{y,Leak}$ = Emissions from H_2 leakage.

Step 2: Parameters for this project

- **Annual H_2 production (Hy)** = 3,600 tH_2/year.
- **Electricity demand** = 28 MW × 8,000 hrs = 224,000 MWh/year.
- **Power source** = 100% renewable via RTC PPA (600 MW solar + 225 MW wind contracted).
- **Grid electricity use (EGgrid,y)** = 0 (all electricity sourced from dedicated RE, backup ≤10% but not foreseen).
- **EFgrid** = 0.727 tCO_2e/MWh (only relevant if grid is used).
- **Water use** = 144 m^3/day = 52,560 m^3/year (electrolysis only).
- **EFwater** = 0.001 tCO_2e/m^3
- **H_2 leakage** = negligible due to 99.999% purity and closed-loop design (conservatively set to 0).
- **Auxiliary fuel use** = 0 (no fossil backup)

Step 3: Calculation

1. **Grid electricity emissions**

$$AE_{y,Elec} = \text{EGgrid, y} \times \text{EFgrid} = 0 \times 0.727 = 0 \quad \text{Equation (18)}$$

2. **Water-related emissions**

$$AE_{y,Water} = \text{Wy} \times \text{EFwater} = 52{,}560 \times 0.001 = 52.56 \quad \text{Equation (19)}$$

3. **Hydrogen leakage emissions**

$$AE_{y,Leak} = \text{H}_{\text{req,y}} * \text{PL}_{\text{H2}} * \text{GWP}_{\text{H2}} = 3{,}600 * 0.01 * 5.8 = 208.8 \frac{\text{tCO}^2\text{e}}{\text{year}} \quad \text{Equation (20)}$$

Where:

- $H_{req,y}$ = Annual hydrogen production under the project = **3,600 tH_2/year** (from your project datasheet).
- PL_{H2} = Physical leakage rate of hydrogen = **1%** (conservative assumption, aligned with methodology).
- GW_{PH2} = Global warming potential of hydrogen = **5.8 tCO_2e/tH_2** (IPCC AR6 value).

4. **Auxiliary fuel emissions**

$$AE_{y,Fossil} = 0 \qquad \text{Equation (21)}$$

Step 4: Total project emissions

$$AE_y = 0 + 0 + 52.56 + 208.8 + 0 = 261.36 \qquad \text{Equation (22)}$$

Step 5: Methodological Choices & Conservativeness

- **Electricity emissions**: Set to zero as project is fully powered by dedicated RE under PPA; aligns with Green Ammonia PDD precedent.
- **Grid fallback**: Ex-ante assumed zero, ex-post monitored; if any grid electricity is used (≤10%), corresponding emissions will be included.
- **Water emissions**: Conservatively included, though very small relative to avoided fossil emissions.
- **Hydrogen leakage**: Assumed zero, justified by advanced design (99.999% H_2 purity, closed system).
- **Auxiliary fuels**: None, hence zero.

Thus, **the only project emissions are from water treatment/supply, which are marginal (<20 tCO_2e/year)**.

B.8.3. Addressing of leakage

B.8.3.1. Sources of leakage

>> In accordance with the methodology *"Production of Low-Carbon Intensive Hydrogen through Electrolysis"* (A6.4-FORM-METH-002_JSW Final Draft) and the standard *"Application of the requirements of Chapter V.B (Methodologies) for the development and assessment of Article 6.4 mechanism methodologies"*, the following potential leakage sources are assessed:

1. **Transfer of Baseline Equipment**
   • Potential leakage could arise if existing fossil hydrogen production equipment (e.g., SMR units) were relocated or reused elsewhere, continuing to emit outside the project boundary.
2. **Competition for Resource Use**
   • The project consumes renewable electricity (via dedicated solar and wind PPAs) and water (for electrolysis). Potential leakage could occur if this created competition with local energy supply or water resources, indirectly increasing emissions elsewhere.
3. **Diversion of Existing Production or Outputs**
   • Leakage may occur if hydrogen output from the project displaces other low-carbon hydrogen producers or shifts demand-supply dynamics, causing increased emissions in other facilities.
4. **Environmental GHG Release**
   • Risks may include fugitive emissions of hydrogen (indirect climate impact via radiative forcing), GHG emissions from auxiliary processes, or indirect emissions from supporting infrastructure (grid balancing, storage, or transport).
5. **Excluded Sources**
   • International transport of hydrogen or derivatives (e.g., ammonia, methanol) is outside the project scope.
   • Fugitive methane from upstream natural gas supply is not relevant, as the project uses only renewable electricity and does not consume fossil fuels.

• These exclusions are justified as they fall outside the project boundary and are not attributable to the activity as per methodology conditions.

B.8.3.2. Description of how leakage is avoided, minimized or addressed

>> Following approaches (a)–(e) of the Article 6.4 methodology standard, leakage is addressed as follows:

1. **Transfer of Baseline Equipment** *(Approach 85(a))*
   • The project is **greenfield** and does not involve relocation or reuse of fossil-based hydrogen production equipment.
   • Existing SMR or coal-based hydrogen facilities in India continue operating independently of this project; hence, no leakage occurs from transfer of equipment.

2. **Competition for Resource Use** *(Approach 85(b))*
   • Electricity: 100% of power demand is met via dedicated renewable PPAs (solar + wind), with ≤10% grid fallback, whose emissions are conservatively accounted ex-post. This ensures no competition with grid electricity supply for other users.
   • Water: The project ensures sustainable sourcing (desalination or recycling), thereby avoiding competition with local surface or groundwater resources, consistent with host Party DNA guidance.

3. **Diversion of Existing Production or Outputs** *(Approach 85(c))*
   • The project is additive and introduces new low-carbon hydrogen supply. It does not displace or divert production from existing hydrogen facilities.
   • Instead, it substitutes fossil hydrogen consumption in downstream sectors (steel, refining, fertilizers), thereby delivering genuine emission reductions.

4. **Environmental GHG Release** *(Approach 85(d))*
   • Hydrogen leakage risk is minimized through robust storage, handling, and pipeline safety protocols.
   • Auxiliary processes (compression, storage, transport within the boundary) are powered by renewable electricity and monitored to ensure emissions are transparently included in project accounting.
   • No unaccounted indirect emissions from infrastructure are expected.

5. **Monitoring and Verification Measures** *(Approach 85(e))*
   • Leakage risks are further minimized by comprehensive monitoring of electricity sourcing, hydrogen output, and water consumption as per the monitoring plan.
   • A Life Cycle Assessment (LCA) confirms no significant indirect leakage.
   • The Designated Operational Entity (DOE) will verify compliance during validation and each crediting period renewal.

B.8.3.3. Calculation of leakage emissions

>> As per the applied methodology and the provisions of the standard *"Application of the requirements of Chapter V.B (Methodologies) for the development and assessment of Article 6.4 mechanism methodologies"*, all potential sources of leakage were assessed in Section **B.7.3.1** and **B.7.3.2**.

The project is a **greenfield renewable-based hydrogen facility** and therefore:

- **No transfer of baseline equipment** occurs, avoiding emissions associated with continued use of fossil-based equipment.

- **No diversion of existing production** takes place, as the hydrogen produced is additive to market demand and does not displace current supply.

- **No competition for critical resources** arises, since water use is limited to ≤5% of local availability and electricity is sourced from dedicated renewable PPAs (>90%), with ≤10% grid fallback (already accounted for under project emissions).

- **Safeguards** such as wastewater treatment (ETP) and environmental management ensure no indirect emissions are released beyond the project boundary.

Therefore, the leakage emissions attributable to the project are:

$$LE_y = 0\ \mathrm{tCO2e/year}$$

B.8.4. Calculation of emission reductions and/or net removals

>> Emission reductions are determined in accordance with Equation (25) of the methodology:

$$ER_y = BE_{(final,y)} - AE_y - LE_y = 48159 - 261.36 - 0 = 47{,}898\,\frac{tCO2e}{yr} \quad \text{Equation (23)}$$

Where:

- $BE_{(final,y)}$ = Final downward-adjusted baseline emissions = 48159 tCO_2e/year (Section B.7.1.2),
- AE_y = Project activity emissions = 52.56 tCO_2e/year (Section B.7.2, as project uses >90% renewable power and ≤10% grid fallback already accounted ex-ante),
- LE_y = Leakage emissions = 208.8 tCO_2e/year (from Section B.7.3.3).

Thus, the project is expected to achieve **~47,898 tCO_2e/year of net emission reductions** over the crediting period.

B.8.5. Data and parameters fixed ex ante

(Copy this table for each piece of data or parameter)

Data/parameter	***>> GWP H2***
Description	>> Global Warming Potential of hydrogen (indirect radiative forcing effect, CO_2e/kg H_2 lost).
Data unit	>> tCO2e/H2
Equations referred	>> *EQ.*
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied	>> **5.8 tCO_2e/tH_2** (IPCC AR6 value).
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	*>> The latest IPCC approved GWP value for hydrogen shall be applied. If revised values are published during the crediting period, they will replace earlier assumptions.*
Treatment of uncertainty	>> The highest value within the reported range is applied to ensure conservativeness.

Additional comments	>>To be updated upon new IPCC consensus.

Data/parameter	**>> EF^{Water}**
Description	>> Emission factor for water treatment, desalination, and pumping.
Data unit	>> $tCO2_e/m^3$
Equations referred	>> *EQ.*
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied	>> 0.001 tCO_2e/m^3
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	>> *Where country-specific values exist, they shall be applied. Otherwise, peer-reviewed studies and international defaults are acceptable.*
Treatment of uncertainty	>> Upper bound of available range applied to ensure conservativeness
Additional comments	>> Applies only if significant volumes of treated or desalinated water are used.

Data/parameter	**>> $EF_{,Grid}$ *(if fixed ex-ante)***
Description	>> Emission factor for grid electricity.
Data unit	>> tCO2e/MWH
Equations referred	>> *EQ.*
Purpose of data	☐ Baseline emissions ☒ Project emissions ☒ Leakage emissions
Value(s) applied	>> 0.727 tCO_2e/MWh (if fixed ex-ante for entire crediting period).
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	>> *Host country national inventory factor preferred. If unavailable, IEA or IPCC defaults shall be applied.*
Treatment of uncertainty	>> Most conservative value (highest factor) selected where multiple datasets exist.
Additional comments	>> If host country requires annual updates, this parameter shifts to “monitored.”

B.8.6. Summary of ex-ante estimates of emission reductions and/or net removals

Year	Baseline emissions/removals (tCO_2e)	Project emissions/removals (tCO_2e)	Leakage emissions (tCO_2e)	Emission reductions/Net removals (tCO_2e)
Year 1	48159	261.36	0	47897.64

Year 2	48159	261.36	0	47897.64
Year 3	48159	261.36	0	47897.64
Year 4	48159	261.36	0	47897.64
Year 5	48159	261.36	0	47897.64
Year 6	48159	261.36	0	47897.64
Year 7	48159	261.36	0	47897.64
Year 8	48159	261.36	0	47897.64
Year 9	48159	261.36	0	47897.64
Year 10	48066.12	261.36	0	47804.76
Total	481497.12	2613.6	0	478883.52
Total number of years in the crediting period	>> 10 Years			
Annual average over the crediting period	48149.712	261.36	0	47888.352

B.9. Monitoring Plan

B.9.1. Data and parameters to be monitored

(Copy this table for each piece of data or parameter)

Data/parameter	>> **H_Y**	
Description	>> Quantity of hydrogen produced in year *y*.	
Data unit	>> *tH_2/year*	
Equations referred	>> *Eq.*	
Purpose of data	☒ Baseline emissions ☒ Project emissions ☐ Leakage emissions	
Measurement and updating frequency	*>> Continuous measurement, aggregated daily, reported annually.*	
Measurement methods and procedures	*>> Direct measurement of hydrogen output using calibrated flow meters or mass balance at electrolyser output.*	
Entity/person responsible for the measurement	*>> Plant operator.*	
Measuring instrument(s)	*Type of instrument*	*>> Flow meters (IEC/ISO-certified).*
	Accuracy class	*>> Minimum ±1%.*
	Calibration requirements	>> 1. *Calibration procedures: Manufacturer's procedures, verified by accredited laboratory.* 2. *Calibration frequency: At least annually, or as required by manufacturer.*

	Location	*>> Outlet of electrolyser system.*
QA/QC procedures	>> Cross-check with production records and SCADA system logs. Backup of all measured data.	
Treatment of uncertainty	>> Conservative rounding down of hydrogen quantities in case of data gaps.	
Additional comment	*>> Primary variable for determining emission reductions.*	

Data/parameter	**>> $C_{y,Elec,Grid}$**	
Description	>> Electricity consumed from the grid by the project activity in year *y*.	
Data unit	*>> MWH/year*	
Equations referred	*>> Eq*	
Purpose of data	☐ Baseline emissions ☒ Project emissions ☒ Leakage emissions	
Measurement and updating frequency	*>> Continuous metering, aggregated monthly, reported annually.*	
Measurement methods and procedures	*>> Direct measurement with certified electricity meters connected to grid feed-in points.*	
Entity/person responsible for the measurement	*>> Electric utility and Plant operator.*	
Measuring instrument(s)	*Type of instrument*	*>> Electricity meter (IEC 62053 or equivalent).*
	Accuracy class	*>> ±0.2s or better.*
	Calibration requirements	>> 1. *Calibration procedures: Manufacturer's procedures, verified by accredited laboratory.* 2. *Calibration frequency: Every 3 years or as per host country regulations. .*
	Location	*>> Main substation or grid connection point.*
QA/QC procedures	*>> Reconciliation with utility bills. Discrepancies >2% flagged for review.*	
Treatment of uncertainty	>> If data unavailable, maximum recorded grid intensity is applied.	

Additional comment	*>> Limited to ≤10% of total electricity input.*

Data/parameter	**>> $FC_{i,y}$**	
Description	*>> Quantity of fossil fuel type i consumed in auxiliary systems.*	
Data unit	*>> t or m³/year*	
Equations referred	*>> Eq.*	
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions	
Measurement and updating frequency	*>> Continuous where flow meters installed; otherwise batch records, aggregated annually.*	
Measurement methods and procedures	*>> Measured using fuel meters, tank dip measurements, or supplier delivery records.*	
Entity/person responsible for the measurement	*>> Plant operator.*	
Measuring instrument(s)	*Type of instrument*	*>> Fuel flow meters or tank-level sensors.*
	Accuracy class	*>> ±1%.*
	Calibration requirements	>> 1. *Calibration procedures: Manufacturer's procedures, or local standards.* 2. *Calibration frequency: Annual calibration .*
	Location	*>> Fuel inlet lines of auxiliary systems*
QA/QC procedures	*>> Cross-check delivery records with consumption logs.*	
Treatment of uncertainty	>> If data unavailable, conservative default factors applied.	
Additional comment	*>> Only relevant if fossil fuels are used.*	

Data/parameter	**>> W_y**
Description	*>> Volume of water treated and used for hydrogen production in year y.*
Data unit	*>> m³/year*
Equations referred	*>> Eq.*
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Measurement and updating frequency	*>> Continuous, aggregated monthly, reported annually.*
Measurement methods and procedures	*>> Flow meters on water intake lines.*
Entity/person responsible for the measurement	*>> Plant operator.*

Measuring instrument(s)	*Type of instrument*	*>> Water flow meters (ISO/IEC-certified).*
	Accuracy class	*>> ±1%.*
	Calibration requirements	*>>* *1. Calibration procedures: Manufacturer's procedures.* *2. Calibration frequency: Annual calibration.*
	Location	*>> Water treatment inlet.*
QA/QC procedures	*>> Compare meter data with treatment plant logs.*	
Treatment of uncertainty	>> Use maximum water factor if measurement gaps exist.	
Additional comment	*>> Includes desalination where relevant.*	

Data/parameter	**>> $PL_{y,H2}$**	
Description	*>> Percentage of hydrogen leaked in production, compression, storage, and distribution.*	
Data unit	*>> % of hydrogen produced*	
Equations referred	*>> Eq.*	
Purpose of data	☐ Baseline emissions ☒ Project emissions ☒ Leakage emissions	
Measurement and updating frequency	*>> Continuous monitoring where sensors are installed; otherwise quarterly leak detection surveys.*	
Measurement methods and procedures	*>> Material balance of input/output hydrogen, infrared sensors, ultrasonic leak detectors, or tracer gas methods.*	
Entity/person responsible for the measurement	*>> Plant operator with third-party verification annually.*	
Measuring instrument(s)	*Type of instrument*	*>> Leak detection sensors (infrared, mass spectrometry, ultrasonic).*
	Accuracy class	*>> Detect leakage ≥0.1% of flow.*
	Calibration requirements	*>>* *1. Calibration procedures: Manufacturer's procedures.* *2. Calibration frequency: Quarterly calibration.*
	Location	*>> Electrolyser halls, pipelines, compressors, and storage tanks.*
QA/QC procedures	*>> Cross-check with production-output balances.*	
Treatment of uncertainty	*>> Where direct data unavailable, conservative IPCC/peer-reviewed leakage factors applied.*	
Additional comment	*>> Captures fugitive hydrogen impact on atmospheric chemistry.*	

Data/parameter	>> $C_{yElec,RE}$	
Description	*>> Quantity of renewable electricity supplied to the hydrogen production facility in year y. This includes direct supply from dedicated renewable plants (solar, wind, hydro, biomass) or renewable PPAs.*	
Data unit	>> *MWH/year*	
Equations referred	>> *Eq.*	
Purpose of data	☒ Baseline emissions ☒ Project emissions ☐ Leakage emissions	
Measurement and updating frequency	*>> Continuous measurement, aggregated monthly, reported annually.*	
Measurement methods and procedures	>> • *Measured at the delivery point using certified electricity meters connected to renewable generation units or substation.* • *In the case of offsite PPAs, verified through utility-supplied renewable energy certificates (RECs) or guarantees of origin (GOs).*	
Entity/person responsible for the measurement	*>> Plant operator and renewable generator (in case of PPA supply).*	
Measuring instrument(s)	*Type of instrument*	*>> Certified electricity meters (IEC 62053 or equivalent).*
	Accuracy class	*>> ±0.2s or better.*
	Calibration requirements	>> 1. *Calibration procedures: In accordance with IEC/national standards.* 2. *Calibration frequency: At least once every 3 years or as required by host country regulation.*
	Location	*>> Substation connecting renewable plant to hydrogen facility (or grid injection point for RE PPA).*
QA/QC procedures	>> • *Reconciliation with utility billing data, SCADA logs, and renewable generation records.* • *Cross-check against total hydrogen production demand*.	
Treatment of uncertainty	*>> In case of missing data, the minimum (conservative) RE supply is assumed and balance is allocated to grid electricity.*	
Additional comment	>> • *Ensures compliance with methodology condition that ≥90% of electricity input is renewable.* • *Provides a conservative check on grid fallback emissions.*	

B.9.2. Sampling plan

>> **Not applicable.** The proposed project activity does not apply sampling for the determination of monitored parameters. All parameters required under the applied Article 6.4 methodology are measured directly using dedicated metering and monitoring equipment installed at the project site, including hydrogen production, electricity consumption, renewable electricity supplied to the electrolyser, auxiliary grid electricity consumption, and other parameters required for the calculation of project emissions and emission reductions.

As the monitored parameters are obtained through continuous measurement or complete data collection rather than through statistical estimation, no sampling approach is required under the applied methodology. Accordingly, the **Standard for Sampling and Surveys for Article 6.4 Mechanism Activities** is not applicable to the proposed project activity.

We will maintain, calibrate, and operate all monitoring equipment in accordance with the monitoring requirements specified in the applied methodology and the monitoring plan described in Section B.9 to ensure the completeness, accuracy, and reliability of the monitored data throughout the crediting perio

B.9.3. Monitoring management system

>> The activity participant has established a monitoring management system to ensure that all data required for the quantification of baseline emissions, project emissions, leakage emissions (where applicable), and emission reductions are monitored, recorded, verified, and archived in accordance with the applied Article 6.4 mechanism methodology and other applicable methodological regulatory documents.

The monitoring management system covers all parameters identified in the monitoring plan, including hydrogen production, electricity consumption, renewable electricity procurement, auxiliary grid electricity consumption, water consumption, and all other parameters required under the applied methodology. Monitoring data are collected using dedicated measurement equipment installed within the project boundary, including electricity meters, hydrogen flow meters, water flow meters, and other relevant instruments. All measuring equipment is calibrated and maintained in accordance with the manufacturer's specifications, applicable national standards, and the requirements of the applied methodology.

The project is operated through a centralized plant monitoring and management system that continuously monitors, records, and manages all key operational parameters. The centralized system integrates data from field instruments, metering devices, and process control equipment, enabling real-time monitoring of hydrogen production, electricity consumption, renewable electricity supply, water consumption, operating conditions, and other monitored parameters. The system also provides secure storage and retrieval of historical operational data, thereby supporting preparation of monitoring reports and verification of greenhouse gas emission reductions.

The activity participant applies documented quality assurance and quality control (QA/QC) procedures to ensure the completeness, consistency, accuracy, and traceability of monitored data. Monitoring records are routinely reviewed to identify missing data, inconsistencies, abnormal values, or equipment malfunctions. Where data gaps occur, they are addressed using the conservative procedures specified in the applied methodology and the monitoring plan.

Responsibilities for implementation of the monitoring plan are clearly assigned within the project organization. Designated personnel are responsible for operation and maintenance of monitoring equipment, collection and review of monitoring data, calibration of measuring instruments, implementation of QA/QC procedures, preparation of monitoring reports, and maintenance of supporting documentation. Management oversight ensures continued compliance with the registered monitoring plan, the applied methodology, and all applicable Article 6.4 mechanism requirements.

The activity participant maintains complete records of monitoring data, calibration certificates, renewable electricity procurement records, contractual documentation, calculation spreadsheets, monitoring reports, verification reports, and all other supporting documents necessary to demonstrate the quantified greenhouse gas emission reductions. All records are maintained in secure electronic systems and, where appropriate, hard-copy formats with suitable backup and document control procedures to ensure data integrity, traceability, and protection against data loss.

In accordance with the applicable Article 6.4 mechanism requirements, all monitoring data and supporting documentation required for verification of greenhouse gas emission reductions and issuance of A6.4ERs are retained and archived for at least two years after the end of the final crediting period or two years after the last issuance of A6.4ERs, whichever occurs later.

B.9.4. Post-crediting period monitoring plan

>> This section is not applicable.

The proposed project activity is an emission reduction activity involving the production of low-carbon hydrogen through water electrolysis powered primarily by renewable electricity. The project does not involve greenhouse gas removals, carbon storage, or carbon sequestration activities that may be subject to reversal after the end of the crediting period.

Accordingly, the applied Article 6.4 mechanism methodology does not require post-crediting period monitoring for the assessment of reversals, and no post-crediting monitoring plan is applicable to the proposed project activity.

SECTION C. Start date, crediting period type and duration

C.1. Project start date

>> 10/03/2025

C.2. Expected operational lifetime of the project

>> 20 Years

C.3. Project crediting period

C.3.1. Type of crediting period approved by the host Party

☐ Renewable ☒ Fixed

C.3.2. Start date of the crediting period

>> 11/11/2025

C.3.3. Duration of the crediting period

>> 10 Years

SECTION D. Environmental impacts, social impacts and sustainable development impacts

D.1. Environmental and social impacts and sustainable development impacts as per the Article 6.4 sustainable development tool

D.1.1. Summary of the environmental and social risk analysis and applicable mitigation measures

>>

D.1.2. Summary of the sustainable development impacts evaluation

>>

D.2. Environmental and social impacts as per the host Party regulations

D.2.1. Summary of host Party requirements

>>

D.2.2. Summary and conclusion of the assessment

>>

SECTION E. Local stakeholder consultation

E.1. Scope of the consultation

>>

E.2. Stakeholders invited

>>

E.3. Modalities for the consultation

>>

E.4. Summary of comments received

>>

E.5. Consideration of comments received

>>

SECTION F. Double or revived registration

F.1.1. Declaration related to the existence of a former project in the same geographical location

>>

F.1.2. Declaration related to registration under the A6.4 mechanism or other crediting schemes

A 6.4 mechanism	☒ **The proposed A6.4 project has not been already registered as an A6.4 project.** ☒ **The proposed A6.4 project has not been already included as a component project (CP) in a registered Article 6.4 mechanism programme of activities (A6.4 PoA).** ☒ **The proposed A6.4 project has not been previously deregistered from the Article 6.4 mechanism.** *>> Tick all the three boxes above as a confirmation of compliance with mandatory requirements.* ☐ **The proposed A6.4 project has not been excluded from a registered A6.4 PoA.** *>>Tick the box if applicable.*
Other	☒ **The proposed A6.4 project is not currently registered or pursuing registration, or covered by a programme, under any other international, regional, national, subnational or sector-wide GHG mitigation crediting scheme.** ☐ **The proposed A6.4 project was previously registered under or covered by a programme under any other international, regional, national, or subnational or sector-wide GHG mitigation crediting scheme but deregistered or excluded from the other crediting scheme before fully exhausting the crediting period under the other crediting scheme.** ☐ **The proposed A6.4 project is currently registered or covered by other international, regional, national, subnational or sector-wide GHG mitigation crediting scheme.** *>> Tick only one applicable box.*

Appendix 1. Contact information of activity participants

(Copy this table for each activity participant)

Organization name	>>
Legal entity identifier	>>
Country	Choose a Party.
Address	>>
Telephone	>>
Mobile	>>
E-mail	>>
Website	>>
Contact person	>>

Appendix 2. Applicability of mechanism methodologies and standardized baselines

>>

Appendix 3. Further background information on ex ante calculation of emission reductions and/or net removals

>>

Appendix 4. Summary of post-registration changes

>>

Appendix 5. Further background information on monitoring plan

>>

Appendix 6. A6.4 Environmental and Social Safeguards Risk Assessment Form (A6.4-FORM-AC-015)

>>

Appendix 7. A6.4 Environmental and Social Management Plan Form (A6.4-FORM-AC-016)

>>

Appendix 8. A6.4 Sustainable Development Impact Form (A6.4-FORM-AC-017)

>>

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ATTACHMENT. Instructions for completing this form

1. General instructions

1. Compliance of project design with requirements

1.1 When completing this form for a proposed Article 6.4 project (hereinafter referred as proposed project), demonstrate the compliance with relevant requirements in: [1]

(a) The "Article 6.4 activity standard for projects";

(b) The Tool: "Article 6.4 sustainable development tool";

(c) The applied mechanism methodologies;

(d) The applied standardized baselines, where applicable; and

(e) Any other standards, mechanism methodologies, methodological tools and guidelines applied in accordance with the applied mechanism methodologies (hereinafter "any other standards, methodologies, methodological tools and guidelines to be applied in accordance with the applied (selected) methodologies" are collectively referred to as the other (applied) methodological regulatory documents);

(f) Methodological requirements that may be specified by the host Party in accordance with paragraph 27(a) of the rules, modalities and procedures (RMPs) for the Article 6.4 mechanism.[2]

2. Documenting post-registration changes

2.1 When documenting the changes that occurred to the project in accordance with the applicable provisions relating to post-registration changes:

(a) Prepare two versions of the PDD using this form, one in clean version and the other version indicating the changes to the previously approved PDD (i.e. the PDD at registration, renewal of the crediting period or the last post-registration change, whichever the latest) in track-change;

(b) Provide a summary of the changes in Appendix 4 below.

3. Confidential information

3.1 Where a PDD contains information that the activity participants wish to be treated as confidential/proprietary, submit the PDD in two versions:

(a) One version where all parts containing confidential/proprietary information are made illegible (e.g. by covering those parts with black ink) to be made publicly available without displaying confidential/proprietary information;

(b) Other version containing all information that is to be treated as confidential/proprietary by all parties handling this documentation (designated operational entities (DOEs), Supervisory Body members and alternate members, panel members, external experts requested to consider such documents in support of work for the Supervisory Body, and the secretariat).

3.2 Information is not considered proprietary or confidential if it is used to:

(a) Demonstrate additionality;

(b) Describe the application of the selected mechanism methodologies, standardized baselines and the other methodological regulatory documents; and

(c) Support the social, environment and sustainable development impact assessments.

(d) Make any data, values and formulae included in spreadsheets accessible and verifiable.

4. Working language

[1] The "Rules and Regulations" section of the UNFCCC Article 6.4 mechanism website (https://unfccc.int/process-and-meetings/bodies/constituted-bodies/article-64-supervisory-body/rules-and-regulations) contains all regulatory documents for the Article 6.4 mechanism, such as standards (including methodologies and standardized baselines), procedures, methodological tools, guidelines, clarifications and forms that are applicable to the A6.4 activities.

[2] Annex to decision 3/CMA.3.

(a) Complete this form in English;

(b) Prepare all attached documents in English, or provide full translation to English of relevant sections of documents if their originals were prepared in other language.

5. Format and lay-out of the form

(a) Complete this form using the same format without modifying its font, headings or logo, and without any other alteration to the form;

(b) Do not modify or delete tables and their columns in this form. Add rows of the tables as needed;

(c) Add additional appendices as needed.

6. Sections not applicable

6.1 If a section of this form is not applicable, explicitly state that the section is left blank intentionally.

7. Other instructions

7.1 Use an internationally recognized format for presentation of values. For example, use digits grouping in thousands and mark a decimal point with a dot (.), not with a comma (,).

7.2 Complete this form removing this Attachment.

8. Acronyms

8.1 The following acronyms are referred to in this form:

(a) PDD: project design document;

(b) Activity standard: Article 6.4 activity standard for projects;

(c) Sustainable development tool: Tool: Article 6.4 sustainable development tool.

2. Specific instructions

PROJECT DESIGN DOCUMENT (PDD) FORM FOR ARTICLE 6.4 PROJECTS

(Version 02.0)

BASIC INFORMATION			
UNFCCC project reference number:	>> *Provide the UNFCCC unique reference number for the proposed project received after publishing the notification of prior consideration.*		
Project title:	>> *Provide the title of the proposed project.*		
Host Party:	Choose a Party.		
Other participating Parties:	Choose a Party. *Copy and paste the drop list menu to add more participating Parties, if needed.*		
Activity participant(s): (add rows if needed)	**Type of Party**	**Party that is to provide authorization**	**Activity participant**
	Choose a type of Party.	Choose a Party.	
	Choose a type of Party.	Choose a Party.	
	Choose a type of Party.	Choose a Party.	
	Provide the name of the activity participants that are to be authorized by the participating Parties and indicate the type of Party (i.e. 'Host' or 'Other participating Party').		
PDD version number:	>> *Provide the version number of this PDD.*		
PDD completion date:	**Click or tap to enter a date.**		
Applied mechanism methodologies and standardised baselines, and their versions: **(Add rows per each mechanism methodology/ standardized baseline)**	**Reference Number**	**Title**	**Version**
	Provide the UNFCCC reference numbers of the applied mechanism methodologies, and where applicable, the applied standardized baselines	*Provide the UNFCCC titles of the applied mechanism methodologies, and where applicable, the applied standardized baselines*	*Provide the UNFCCC versions of the applied mechanism methodologies, and where applicable, the applied standardized baselines*
Sectoral scope(s):	>> *Provide all sectoral scopes of the project based on the applied mechanism methodologies, using one line per sectoral scope.*		

Type of the project:	☐ Emission reductions activity ☐ Removals activity ☐ Combined emission reductions and removals activity	
Estimated annual emission reductions and/or net removals over the crediting period (tCO_2e/year):	Emission reductions:	*Provide the estimated average annual amount of emission reductions to be achieved by the proposed project.*
	Net removals:	*Provide the estimated average annual amount of net removals to be achieved by the proposed project.*
	Total emission reductions and net removals:	*Provide the estimated average annual amount of emission reductions and net removals to be achieved by the proposed project.*

SECTION A. Project description

A.1. Project purpose and general description

>>

Provide the purpose and a general description of the proposed project, including a summary of the following:

1. *The geographical location of the proposed project.*
2. *The technologies/measures to be employed and/or implemented by the project.*
3. *The project boundary.*
4. *The baseline scenario.*
5. *The estimates of annual average and total GHG emission reductions/net removals for the chosen crediting period.*
6. *Summary of deviations (if applicable).*

The detailed description of the above points shall be provided in sections A.4, A.5, B.2, B.4, B.5 B.8, D belowrespectively.

A.2. Confirmation that the project aligns with the A6.4 activity types indicated by the host Party

>>

Justify how the proposed project is in compliance within the types of A6.4 activities indicated by the host Party that it would consider approving in accordance with paragraph 26(e) of the RMPs.

A.3. Project geographical location

Host Party	Choose a Party.
Region(s)/State(s)/Province(s)	>> *Indicate the region(s)/state(s)/province(s).*
Cities/towns/communities	>> *Indicate the city(ies)/town(s)/community(ies), street name and number*
Geographic coordinates	>> *Indicate the geographical coordinates (e.g. Latitude XX°YY' South, Longitude XX°YY' West) where the proposed project is located.*
Map of project location	
>> *Provide an image containing a map that indicates the precise location of the proposed project.*	

Physical delineation of the project to be provided in the form of Keyhole Markup Language files or similar formats as one or more polygon(s), by specifying the coordinates of the geographic boundary using a known coordinate system or any other method to delineate the geographic boundary, in accordance with the applied mechanism methodologies.

A.4. Technology/measures

A.4.1. Pre-activity scenario

>>

Describe the pre-activity scenario as per the requirements of the applied mechanism methodologies that involves:

a) *The circumstances immediately prior to the implementation of the A6.4 project, i.e. the technologies and/or measures existing prior to the implementation of the project at the same site, as applicable, including the following information:*

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.*

Provide a short summary of the baseline scenario as established in section B.4 below, including the equivalent information listed in paragraphs 1-7 above.

b) *The conditions in the absence of policies that refer to or formally integrate the mechanism as an instrument for implementation; or the existing conditions for providing the activity output(s) in the baseline geographical reference area for projects involving distributed technologies for households, communities and/or small and medium enterprises*

A.4.2. Technologies and/or measures to be employed and/or implemented by the project

>>

Describe the technologies/measures to be deployed and/or implemented by the proposed project, including:

1. *Facilities, system, practices and/or equipment:*
   - *List the facilities, systems, practices and/or equipment that will be installed and/or modified by the proposed project.*
2. *Types and level of services:*
   - *Specify the services provided by the facilities, systems, practices and/or equipment (e.g. the amount of a certain type of cement produced or the amount of electricity fed into the electricity grid).*
   - *Describe their relation, if any, to other facilities, systems and equipment outside the project boundary.*

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

A.5. Parties and activity participants

(Add/remove rows as necessary)

Type of Party	Name of the Party	Activity participant(s)
Choose a type of Party.	Choose a Party.	
Choose a type of Party.	Choose a Party.	
Choose a type of Party.	Choose a Party.	

Select the type of Party ('Host Party' or 'Other participating Party') and the name of the Party from the drop list menu. Provide the names of the activity participants to be authorised by the respective Parties.

SECTION B. Application of mechanism methodologies, methodological tools and standardized baselines

B.1. References to mechanism methodologies, methodological tools and standardized baselines

>>

Provide the exact references (titles, versions and UNFCCC reference numbers) of the following:

1. *Selected mechanism methodologies:*
    - *The mechanism methodologies selected for the proposed project.*
2. *Other methodological regulatory documents:*
    - *Any other standards, mechanism methodologies or methodological tools and guidelines applied in accordance with the selected mechanism methodologies.*
3. *Selected standardized baselines (if applicable):*
    - *The standardized baselines selected for the proposed project.*
4. *Baseline approaches and other methodological requirements, including additionality specified by the host Party:*
    - *Baseline approaches, and other methodological requirements, including additionality, specified by the host Party in accordance with paragraph 27(a) of the RMPs, if applicable.*

For the exact references of the mechanism methodologies, other methodological regulatory documents including methodological tools, standardized baselines approved by the Supervisory Body, as well as the methodological requirements specified by the host Party, please refer to the UNFCCC website.

Reference Number	Title	Version
Provide the UNFCCC reference numbers of the applied mechanism methodologies, and where applicable, the applied standardized baselines	*Provide the UNFCCC titles of the applied mechanism methodologies, and where applicable, the applied standardized baselines*	*Provide the UNFCCC versions of the applied mechanism methodologies, and where applicable, the applied standardized baselines*

B.2. Applicability of mechanism methodologies, methodological tools and standardized baselines

>>

(Insert the UNFCCC reference number, title and version of the mechanism methodology, other methodological regulatory documents including methodological tool, standardized baseline approved by the Supervisory Body, or the methodological requirements specified by the host Party)

Applicability condition of methodological regulatory document or methodological requirement specified by the host Party	Demonstration of compliance of the project with the applicability condition of methodological regulatory document or methodological requirement specified by the host Party
>>	>>
>>	>>
>>	>>
>>	>>

Justify the choice of the selected mechanism methodologies and, where applicable, the selected standardized baselines and the other methodological regulatory documents approved by the Supervisory Body, as well as the methodological requirements specified by host Party, by demonstrating that the proposed project meets all applicability conditions of these regulatory documents and the methodological requirements of the host Party, if applicable.

1. *Applicability conditions of the mechanism methodology, standardized baseline, other methodological regulatory document approved by the Supervisory Body, or the methodological requirements specified by the host Party:*
    - *Copy the exact text from the mechanism methodology, standardized baseline and other methodological regulatory document including methodological tool, and paste in the column 'Applicability condition of methodological regulatory document or methodological requirement specified by the host Party'.*
    - *Reproduce the exact text of the methodological requirements specified by the host Party in accordance with paragraph 27(a) of the RMPs, if applicable, in the column 'Applicability condition of methodological regulatory document or methodological requirement specified by the host Party'.*
    - *Describe the compliance of the proposed project with each applicability condition of the mechanism methodology, methodological tool, standardized baseline and other methodological regulatory document, as well as the respective methodological requirement and other conditions specified by the host Party, if applicable.*
2. *Tables:*
    - *Create one table for each mechanism methodology, methodological tool or standardized baseline.*

- *Create a separate table for the methodological requirements specified by the host Party, if applicable.*
- *Add as many rows as necessary to cover all applicability conditions of the mechanism methodology, standardized baseline and other methodological regulatory document, as well as the methodological requirements by the host Party.*

3. *Deviation from the mechanism methodology or methodological tool*

- *Provide reference to and description of a deviation from approved mechanism methodology or tool that was approved by the Supervisory Body.*

B.3. Addressing double counting due to overlapping claims between different Article 6.4 mechanism activities, due to overlap with domestic mitigation schemes and due to overlap with other frameworks or environmental markets

>>

Describe how double counting due to overlapping claims between different A6.4 activities, due to overlap with mandatory domestic mitigation schemes and due to overlap with other frameworks or environmental markets is addressed in accordance with the applied mechanism methodologies and other methodological regulatory documents.

B.4. Project boundary, sources, sinks, greenhouse gases and reservoirs

>>

Describe the project boundary of the proposed project, including the physical delineation of the project in the form of Keyhole Markup Language files or similar formats as one or more polygon(s), by specifying the coordinates of the geographic boundary using a known coordinate system or any other method to delineate the geographic boundary, in accordance with the applied mechanism methodologies.

B.4.1. Baseline emissions/removals

Source/sink reservoir/pool	GHG		Type	Justification/Explanation
Source/ sink/ and reservoir/pool 01	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
Source/ sink and reservoir/pool 02	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included	☐ Controlled ☐ Affected	>>

		☐ Not included	☐ Related	
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
-----	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>

B.4.2. Project emissions/removals

Source/sink/reservoir /pool	GHG		Type	Justification/Explanation
Source/ sink and reservoir/pool 01	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
Source/ sink and reservoir/pool 02	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>

	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
-----	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>

B.4.3. Leakage

Source/sink reservoir/pool	GHG		Type	Justification/Explanation
Source/ sink/ and reservoir/pool 01	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
Source/ sink and reservoir/pool 02	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included	☐ Controlled	>>

		☐ Not included	☐ Affected ☐ Related	
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
-----	CO_2	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	CH_4	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	N_2O	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>
	-----	☐ Included ☐ Not included	☐ Controlled ☐ Affected ☐ Related	>>

Follow these instructions to fill out the tables in sections B.4.1, B.4.2 and B.4.3 above and provide additional documentation, when possible:

1. *Tables for sources, sinks, GHGs and reservoirs:*
   - *Indicate which sources, sinks, GHGs and reservoirs are included in the project boundary. Specify which sources, sinks, GHGs and reservoirs are included within the project boundary, in accordance with the applied mechanism methodologies, the applied standardized baselines and other applied methodological regulatory documents, and indicate whether each of the sources or sinks identified is controlled, related to, or otherwise affected by the A6.4 project in accordance with the applied mechanism methodologies and, where applicable, the applied standardized baselines.*
   - *Add rows as needed.*
2. *Explanation and justification:*
   - *If the applied mechanism methodologies or standardized baselines allow choices regarding the inclusion of a source, sink or GHG in the project boundary, explain and justify the choice.*
3. *Flow diagram:*
   - *In addition to the table, where possible, present a flow diagram of the project boundary based on the description provided in section A.5 above.*
   - *The flow diagram should include all the facilities, systems and equipment, and flows of mass and energy described in section A.5 above.*
   - *Specifically, indicate in the diagram the emission sources, sinks, GHGs and reservoirs included in the project boundary and the data and parameters to be monitored.*

B.5. Establishment and description of the baseline scenario

B.5.1. Identification of the baseline scenario

>>

Follow these instructions to describe the baseline scenario for the proposed project:

1. *Baseline scenario description:*
    - *Describe the baseline scenario for the proposed project as per the requirements of the activity standard.*
    - *Explain how the baseline is established in accordance with applicable provisions for the establishment and description of baseline scenarios in the applied mechanism methodologies, standardized baseline and the other applied methodological regulatory documents.*
    - *Include the baseline approaches specified by the host Party in accordance with paragraph 27(a) of the RMPs, if applicable.*
    - *If an approved standardized baseline that standardizes the baseline scenario is used, describe the baseline scenario as per the applied standardized baseline.*
2. *Information on facilities, system and equipment:*
    - *Provide information on the facilities, systems and equipment to be operated under both the project and the baseline scenarios.*
    - *If the project involves the replacement of existing equipment, follow the guidance on determining the remaining lifetime of equipment in the applied mechanism methodology and in accordance with the Tool: Determination of technical lifetime of equipment, if applicable, to estimate the point in time when the existing equipment would be replaced in the absence of the proposed project.*
3. *Step-by-step procedure:*
    - *Describe how each step of the procedures in the applied mechanism methodologies, standardized baselines, and other applied methodological regulatory documents approved by the Supervisory Body as well as the baseline approaches specified by the host Party is applied.*
    - *Transparently document the outcome of each step.*
    - *Explain and justify key assumptions and rationales.*
    - *Provide and explain all data used to establish the baseline scenario, including variables, parameters, data sources, etc.*
    - *Provide all relevant documentation and/or references.*
4. *Future emissions and suppressed demand:*

Address suppressed demand and demonstrate that the beneficiaries of the proposed A6.4 project are in suppressed demand conditions with respect to the identified basic human need(s) and that such conditions are likely to persist throughout the crediting period following the requirements of the applied mechanism methodology, if the applied mechanism methodology addresses suppressed demand. ***Note that this section and section B.6 below are complementary.*** *Some of the steps undertaken in one section may overlap with the steps undertaken in the other section depending on the procedures used to establish the baseline scenario and demonstrate additionality. In such cases, replicate the same information in both sections and make a reference to the other section where the description is contained.*

B.5.2. Identification of the Business-as-usual (BAU) scenario

>>

Follow these instructions for the identification of the conservative BAU scenario:

1. *Conservative BAU Scenario description:*
    - *Identify and describe the conservative BAU scenario for the proposed project and explain how it is established in accordance with the applied mechanism methodologies and other applied methodological regulatory documents.*
2. *Step-by-step procedure:*
    - *Describe how each step of the procedures in the applied mechanism methodologies is applied for estimating the BAU.*
    - *Transparently document the outcome of each step.*
    - *Explain and justify key assumptions and rationales.*

- *Provide and explain all data used to estimate conservative BAU emissions, including variables, parameters, data sources, etc.*
- *Provide all relevant documentation and/or references.*

B.6. Demonstration of additionality

Demonstrate that the proposed A6.4 project would not have occurred in the absence of the incentives from the Article 6.4 mechanism in accordance with the applied mechanism methodologies, other applied methodological regulatory documents and the requirements related to prior consideration of the Article 6.4 mechanism.

Demonstrate additionality using the appropriate approaches for demonstration of additionality used in the applied mechanism methodologies, the applied standardized baselines and other applied methodological regulatory documents, including regulatory analysis, analysis of lock-in risk, investment analysis or barrier analysis, and common practice analysis and/or performance-based approach.

Demonstrate additionality for an A6.4 project in its entirety and not separately for different parts of an A6.4 project,[3] unless the different parts can be separately implemented at one site and do not affect each other.[4]

B.6.1. Regulatory analysis

>>

Demonstrate, based on the requirements of the selected mechanism methodology, that the proposed project represents mitigation that exceeds any mitigation that is required by law or regulation unless the law or regulation refers to or formally integrates the mechanism as an instrument for implementation. A law or regulation applicable to the proposed activity that may require a certain technological, performance or management action shall be considered, noting that regulatory environments vary.

B.6.2. Analysis of lock-in risk

>>

Demonstrate, based on the requirements of the selected mechanism methodology, that proposed project avoids locking in levels of emissions, technologies or carbon-intensive practices incompatible with paragraph 33 of the RMPs, including through consideration of socio-economic contexts, existing infrastructure and any path dependencies. It shall also consider the technical or operational lifetime of the technologies or practices established as part of an Article 6.4 activity; the emissions intensity of these technologies and practices; the scale of the Article 6.4 activity and availability and feasibility of alternative options given national circumstances.

B.6.3. Investment Analysis or Barrier analysis

☐ Investment analysis ☐ Barrier analysis

(Select one option)

>>

[3] For example, if a project involves the capture of landfill gas combined with use of the landfill gas for energy generation, additionality should be demonstrated for both parts together, and not separately for the landfill gas capture part and for the energy generation part.

[4] For example, if the project involves the implementation of energy efficiency improvements and the catalytic abatement of N2O emissions at a nitric acid production plant.

The demonstration of additionality through investment analysis or barrier analysis shall be undertaken following the requirements of the activity standard, the applied mechanism methodology(ies) and/or standardized baseline and other applied methodological regulatory documents approved by the Supervisory Body, as well as the additionality approaches specified by the host Party in accordance with paragraph 27(a) of the RMPs, if applicable.

1. *Additionality demonstration can be provided either by:*
    - *Default approach - Investment Analysis: Demonstration that the proposed project would not have occurred in the absence of the incentives from the Article 6.4 mechanism through an investment analysis; or*
    - *Alternative approach – Barrier Analysis: Assessment of barriers to the implementation of the project, such as financial and institutional barriers, first of its kind, taking into account all relevant national policies, including legislation and current practices within the activity sector and geographic area including Indigenous Traditional Knowledge and customary laws may be used as an alternative to the investment analysis subject to applicability conditions as per the applied mechanism methodologies and/or standardized baseline and other applied methodological regulatory documents and appropriate justifications.*
    - *Complement the investment analysis or barrier analysis with a common practice analysis as per section B6.4 below by demonstrating that the measure or technology is not common practice.*
    - *Ensure that the investment analysis and barrier analysis is provided in accordance with the applied mechanism methodologies, and/or standardized baseline, and other applied methodological regulatory documents approved by the Supervisory Body, as well as the additionality approaches specified by the host Party in accordance with paragraph 27(a) of the RMPs, if applicable.*

B.6.4. Common practice analysis

(This section is to be filled if the investment analysis or barrier analysis in the previous sub-section is followed for demonstrating additionality)

>>

Demonstrate that the measure or technology implemented/employed by the project is not common practice (e.g. it has a low market penetration) and is not already widespread through an analysis of the extent to which the proposed project type (e.g. technology or practice) has already diffused in the relevant sector and region following the applied , based on the requirements of the selected mechanism methodologies, standardized baseline and applied methodological regulatory documents.

B.6.5. Performance-based approach

Performance-based approach may be used as an alternative to the investment analysis/ barrier analysis and common practice analysis subject to applicability conditions as per the applied mechanism methodologies, and/or standardized baselines and other applied methodological regulatory documents and appropriate justifications:

- *Demonstrate that:*
    - *Indicators are established as per the requirements of the applied mechanism methodologies or standardized baseline and other applied methodological regulatory documents.*
    - *Thresholds are established and set in accordance with the requirements of the applied mechanism methodologies or standardized baselines and other applied methodological regulatory documents.*
    - *Use and collection of data as per the applied mechanism methodologies or standardized baseline and other applied methodological regulatory documents;*
    - *Use of threshold(s) for determining baseline emissions where a threshold is defined as greenhouse gas emissions per unit of output, it may also be used for determining baseline emissions, as long as the requirements in the "Standard for baseline setting" are fulfilled;*

- *Ensure compliance with the requirements of the selected methodology and/or standardized baseline and other applied methodological regulatory documents approved by the Supervisory Body, as well as the additionality approaches specified by the host Party in accordance with paragraph 27(a) of the RMPs, if applicable.*

Note that this section and section B.5 above are complementary. *Some of the steps undertaken in one section may overlap with the steps undertaken in the other section depending on the procedures used to establish the baseline scenario and demonstrate additionality. In this case, replicate the same information in both sections and make a reference to the other section where the description is contained.*

B.7. Addressing non-permanence and risks of reversals

B.7.1. Reversals risk assessment

>>

Identify and justify the risks of reversals that may be attributed to the proposed project involving removals and emission reduction projects with reversal risks as per the requirements of the selected methodology and/or standardized baseline, the provisions of the standard 'Requirements for activities involving removals under the Article 6.4 mechanism' and "Addressing non-permanence and reversals in mechanism methodologies", Methodological Tool: 'Reversal risk assessment' and other applied methodological regulatory documents approved by the Supervisory Body.

The risks of reversals may be related to, inter alia:

1. *Activity finance and management, asset ownership, rising opportunity costs.*
2. *Regulatory uncertainty and social instability, political, governance and legal risks, acts of terrorism, crime, and war.*
3. *Natural disturbances and extreme events such as fires, pests, and droughts, hurricanes, floods, and landslides, earthquakes, volcanic eruptions, geological faults, and fractures.*
4. *Climate change impacts exacerbating any of the above risks.*

Assess the risk of non-permanence of GHG emission reductions or net GHG removals, if applicable, that may occur from the proposed project involving removals and emission reduction projects with reversal risks following the requirements for reversal risk assessment of the selected methodology and/or standardized baseline, the provisions of the standard 'Requirements for activities involving removals under the Article 6.4 mechanism' and "Addressing non-permanence and reversals in mechanism methodologies", Methodological Tool: Reversal risk assessment and other applied methodological regulatory documents approved by the Supervisory Body.

B.7.2. Reversals risk mitigation plan

>>

If a risk of non-permanence is identified for a project involving removals and emission reduction project with reversal risks, develop and implement risk mitigation plan to address any risks identified through the reversal risk assessment following the relevant provisions of the standard 'Requirements for activities involving removals under the Article 6.4 mechanism', Methodological Tool: 'Reversal risk assessment' and other applied methodological regulatory documents approved by the Supervisory Body.

B.7.3. Calculation of an overall percentage-based risk

>>

Provide a calculation of an overall percentage-based risk rating that accounts for both avoidable and unavoidable reversals, taking into account, inter alia, the nature, magnitude, likelihood and duration of the risks.

B.7.4. Remediation of reversals

>>

Describe the measures to be implemented to remediate reversals, including proactively mitigating reversal risks and avoiding reversals as per the requirements of the standard 'Requirements for activities involving removals under the Article 6.4 mechanism' and other applied methodological regulatory documents approved by the Supervisory Body.

B.8. Estimation of emission reductions and/or net removals

B.8.1. Calculation of baseline emissions and/or removals

B.8.1.1. Calculation of unadjusted baseline emissions and/or removals

>>

*Follow these instructions to provide the **ex-ante calculation** of unadjusted baseline emissions and/or removals for each year of the crediting period and the total amount for the entire crediting period and **describe how the ex-post calculation** of the unadjusted baseline emissions and/or removals for each year of the crediting period and the total amount for the entire crediting period will be undertaken:*

1. *Equations:*
   - *Provide the equations as per the selected mechanism methodology, methodological tool, standardized baseline, other applied methodological regulatory documents approved by the Supervisory Body as well as the baseline approaches specified by the host Party in accordance with paragraph 27(a) of the RMPs.*
   - *Indicate which parameters will be fixed ex ante and which will be monitored ex post.*
   - *If the equations to determine the ex ante and ex post baseline emissions/removals are different, indicate the equation for each approach.*
2. *Methodological choices:*
   - *Describe and justify the methodological choices, the options/scenarios selected and all steps to be undertaken for the calculations.*
   - *If the methodological choices to determine the ex ante and ex post baseline emissions/removals are different, indicate the methodological choice for each approach.*
3. *Conservative estimates:*
   - *Ensure that the assumptions and choices result in conservative estimates.*
4. *Sampling plan (if applicable):*
   - *If sampling will be conducted, develop a sampling plan and describe it in accordance with the standard for sampling and surveys for Article 6.4 mechanism activities to be developed by the Supervisory Body.*

If the proposed project contains more than one component, apply the equations and explanation of methodological choices for each component separately.

B.8.1.2. Calculation of downward adjusted baseline emissions and/or removals

B.8.1.2.1. Downward adjustment at the calendar year of the start date of the first crediting period

>>

Follow these instructions to provide the calculation of the initial downward adjustment as per the requirements of the selected mechanism methodology and other applied methodological regulatory documents:

5. *Equations:*
    - *Provide the equations as per the applied mechanism methodology(ies) or other applied methodological regulatory documents approved by the Supervisory Body as well as the baseline approaches specified by the host Party in accordance with paragraph 27(a) of the RMPs.*
6. *Uncertainty in year y1*
    - *Explain how the uncertainty of the unadjusted baseline emissions in year y1 is calculated, including reference to statistical models (if any);*
    - *Justify assumptions and choices for the calculation of the uncertainty;*
7. *Conservative estimates:*
    - *Indicate the sources used to determine the uncertainty;*
    - *Justify that the value selected results in conservative emissions, including if the uncertainty is provided in a range basis.*

B.8.1.2.2. Downward adjustment at the subsequent years

>>

Follow these instructions to provide the calculation of the downward adjustment in the subsequent years as per the requirements of the selected mechanism methodology and other applied methodological regulatory documents:

1. *Equations:*
    - *Provide the equations as per the applied mechanism methodology(ies) or other applied methodological regulatory documents approved by the Supervisory Body as well as the baseline approaches specified by the host Party in accordance with paragraph 27(a) of the RMPs;*
2. *Methodological choices:*
    - *Describe and justify the methodological choices, the options selected and all steps to be undertaken for the calculations.*
3. *Conservative estimates:*
    - *Ensure that the assumptions and choices result in conservative estimates.*

B.8.1.3. Calculation of downward adjusted baseline emissions and/or removals

>>

*Follow these instructions to provide the **ex-ante calculation** of downward adjusted baseline emissions and/or removals for each year of the crediting period and the total amount for the entire crediting period and **describe how the ex-post calculation** of the downward adjusted baseline emissions and/or removals for each year of the crediting period and the total amount for the entire crediting period will be undertaken:*

1. *Equations:*
    - *Provide the equations as per the applied mechanism methodology(ies) or other applied methodological regulatory documents approved by the Supervisory Body as well as the baseline approaches specified by the host Party in accordance with paragraph 27(a) of the RMPs;*
2. *Methodological choices:*
    - *Describe and justify the methodological choices, the options selected and all steps to be undertaken for the calculations.*
3. *Conservative estimates:*
    - *Ensure that the assumptions and choices result in conservative estimates.*

B.8.1.4. Calculation of BAU emissions and/or removals

>>

*Follow these instructions to provide the **ex-ante calculation** of annual and total conservative BAU emissions and/or removals and **describe how the ex-post calculation** of the annual and total conservative BAU emissions and/or removals will be undertaken:*

- *Provide the equations/formulae as per the applied mechanism methodology(ies), the applied standardized baseline and other applied methodological regulatory documents.*
- *Describe and justify the methodological choices, the options/scenarios selected and all steps to be undertaken for the calculations.*
- *Ensure that the assumptions and choices result in conservative estimates.*
- *If sampling will be conducted, develop a sampling plan and describe it in accordance with the standard for sampling and surveys for Article 6.4 mechanism activities to be developed by the Supervisory Body.*

If the proposed project contains more than one component, apply the equations and explanation of methodological choices for each component separately.

B.8.1.5. Comparison between the downward adjusted baseline and conservative BAU baseline emissions and/or removals

>>

Compare the downward adjusted baseline emissions and/or removals and the conservative BAU baseline emissions and/or removals for each calendar year of the crediting period and cumulatively over the crediting period.

If the ex-ante conservative BAU baseline emissions and/or removals is lower than the ex-ante downward adjusted baseline for any calendar year or cumulatively over the crediting period, revise the quantitative methods and factors to determine the downward adjustment to ensure that the downward adjusted baseline is lower than the conservative BAU baseline for each calendar year and cumulatively for the crediting period.

Describe how the ex-post crediting baseline for the proposed A6.4 project will be determined in accordance with the applied mechanism methodologies, the applied standardized baselines and other applied methodological regulatory requirements. Describe and justify how the calculations comply with all requirements in the applied mechanism methodologies, the applied standardized baselines and other applied methodological regulatory documents.

B.8.2. Calculation of project emissions and/or removals

>>

*Follow these instructions to provide **the ex-ante calculation** of project emissions and/or removals for each year of the crediting period and the total amount for the entire crediting period and **describe how the ex-post calculation** of the project emissions and/or removals for each year of the crediting period and the total amount for the entire crediting period will be undertaken:*

1. *Equations:*
   - *Provide the equations as per the applied mechanism methodology, methodological tool, standardized baseline and other applied methodological regulatory documents.*
   - *Indicate which parameters will be fixed ex ante and which will be monitored ex post.*
   - *If the equations to determine the ex ante and ex post project emissions/removals are different, indicate the equation for each approach.*
2. *Methodological choices:*

- *Describe and justify the methodological choices, the options/scenarios selected and all steps to be undertaken for the calculations.*
- *If the methodological choices to determine the ex ante and ex post project emissions/removals are different, indicate the methodological choice for each approach.*

3. *Performance of project equipment (if applicable):*
   - *Describe approaches to determine the performance of project equipment as per the activity standard.*
4. *Norms, specifications, standards and procedures:*
   - *Identify and justify the use of norms, specifications, standards and test procedures.*
5. *Conservative estimates:*
   - *Ensure that the assumptions and choices result in conservative estimates.*
6. *Sampling plan (if applicable):*
   - *If sampling will be conducted, develop a sampling plan and describe it in accordance with the standard for sampling and surveys for Article 6.4 mechanism activities to be developed by the Supervisory Body.*

If the proposed project contains more than one component, apply the equations and explanation of methodological choices for each component separately.

B.8.3. Addressing of leakage

B.8.3.1. Sources of leakage

>>

If leakage is addressed at the mechanism methodology level (e.g. through the application of a discount factor to the downward adjusted baseline emissions), this section does not need to be filled; otherwise, follow the instructions below:

- *List and specify all potential sources of leakage included in the quantification of emission reductions and/or net removals and the approaches to quantify leakage in accordance with applied mechanism methodologies and other applied methodological regulatory documents.*
- *Take into account the relevant information from the DNA of the host Party on leakage, where applicable and as per the applied mechanism methodology and other applied methodological regulatory documents.*
- *If the applied mechanism methodologies and other applied methodological regulatory document allow for the exclusion of any of the sources of leakage, provide proper justifications if that source is excluded.*

B.8.3.2. Description of how leakages is avoided, minimized or addressed

>>

If leakage is addressed at the mechanism methodology level (e.g. through the application of a discount factor to the downward adjusted baseline emissions), this section does not need to be filled; otherwise, follow the instructions below:

- *Describe how leakage will avoided and, where not possible, minimized, or addressed, in accordance with applied mechanism methodology(ies) and other applied methodological regulatory documents.*

B.8.3.3. Calculation of leakage emissions

>>

If leakage is addressed at the mechanism methodology level (e.g. through the application of a discount factor to the downward adjusted baseline emissions), this only needs to be filled with the equation provided

by the mechanism methodology; otherwise, follow these instructions to provide the ex ante calculation of leakage emissions for each year of the crediting period and the total amount for the entire crediting period and describe how the ex-post calculation of the leakage emissions for each year of the crediting period and the total amount for the entire crediting period will be undertaken:

1. *Equations:*
    - *Provide the equations as per the applied mechanism methodology(ies), methodological tool, standardized baseline and other applied methodological regulatory documents.*
    - *Indicate which parameters will be fixed ex ante and which will be monitored ex post.*
    - *If the equations to determine the ex ante and ex post leakage emissions are different, indicate the equation for each approach.*
2. *Methodological choices:*
    - *Describe and justify the methodological choices, the options/scenarios selected and all steps to be undertaken for the calculations, including by indicating which parameters will be fixed ex ante and which will be monitored ex post.*
    - *If the methodological choices to determine the ex ante and ex post leakage emissions are different, indicate the methodological choice for each approach.*
3. *Conservative estimates:*
    - *Ensure that the assumptions and choices result in conservative estimates.*

If the proposed project contains more than one component, apply the equations and explanation of methodological choices for each component separately.

If the applied mechanism methodologies, the applied standardized baselines or other applied methodological regulatory documents include different scenarios or cases or provide different options and/or default values to choose from, justify the choice.

B.8.4. Calculation of emission reductions and/or net removals

>>

*Follow these instructions to provide **the ex-ante calculation** of emission reductions and/or net removals for each year of the crediting period and the total amount for the entire crediting period and **describe how the ex-post calculation** of the project emissions and/or removals for each year of the crediting period and the total amount for the entire crediting period will be undertaken:*

Equations:

- *Provide the equations as per the applied mechanism methodology, methodological tool, standardized baseline and other applied methodological regulatory documents.*

Calculations:

- *Provide sample calculations for all formulae used to calculate emission reductions/net removals.*
- *Apply values, based on the equations provided in the methodologies, methodological tools or standardized baseline.*
- *Attach spreadsheets to the PDD to present full calculations for emission reductions and/or net removals (if applicable).*
- *If the proposed project involving removals that also result in emission reductions, the estimation of removals and emission reductions shall be separated in accordance with applied mechanism methodology(ies), the applied standardized baseline and other applied methodological regulatory documents.*

B.8.5. Data and parameters fixed ex ante

(Copy this table for each piece of data or parameter)

Data/parameter	**>>** *Ensure that the name of the parameter matches with the information provided in the equations in sections B.7.1, B.7.2 or B.7.3 above.*
Description	>> *Ensure that the description of the parameter matches with the information provided in the equations in sections B.7.1, B.7.2 or B.7.3 above.*
Data unit	>> *Ensure that the unit of the parameter matches with the information provided in the equations in sections B.7.1, B.7.2 or B.7.3 above.*
Equations referred	>> *Indicate in which equation(s) the parameter is used.*
Purpose of data	☐ Baseline emissions / removals ☐ Project emissions / removals ☐ Leakage emissions *Tick the applicable box(es).*
Value(s) applied	>> • *Provide the values of the parameter that will be applied for the entire crediting period.* • *Where a time series of data is used, where several measurements are undertaken or where surveys have been conducted, provide detailed information in Appendix 5 below.* • *Use one table to report multiple values referring to the same data or parameter.* • *If necessary, include references to spreadsheets for additional data.*
Source of data	☐ Measured ☐ Other sources *Tick the applicable box. 'Other sources' include official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.*
Treatment of uncertainty	>> *Describe the source of the uncertainty for this parameter, and indicate the value applied. If the source includes a range of values, justify the value selected and explain how its application ensures a conservative estimation of emission reductions.*
Choice of data or measurement methods and procedures	>> *If the parameter is 'Measured', explain the measurement methods and procedures (e.g. which standards have been used), indicate the responsible person/entity that undertook the measurement, the date of the measurement and the measurement results.* *If the parameter is from 'Other sources', indicate the source of the parameter and justify the choice of the data.*
Additional comments	>>

To compile information on the data and parameters that are not monitored during the crediting period but are determined before the registration of the project and remain fixed throughout the crediting period, use the instructions below to fill the table:

- *Include data and parameters that are determined before the registration of the project and remain fixed throughout the crediting period.*
- *Do not include parameters that are calculated with equations provided in the applied mechanism methodologies, methodological tools or standardized baselines.*

B.8.6. Summary of ex ante estimates of emission reductions and/or net removals

Year	Baseline emissions/removals (tCO_2e)	Project emissions/removals (tCO_2e)	Leakage emissions (tCO_2e)	Emission reductions/Net removals (tCO_2e)
Year 1				
Year 2				

Year 3				
Year …				
Total				
Total number of years in the crediting period				
Annual average over the crediting period				

Use the estimates determined in sections B.7.1, B.7.2 and B.7.3 above to fill the table. Add rows as needed to reflect the number of years of the crediting period to which the PDD is applicable.

Provide separate tables for emission reductions and removals and for the sum of emission reductions and removals when applicable.

B.9. Monitoring Plan

B.9.1. Data and parameters to be monitored

(Copy this table for each piece of data or parameter)

Include a compilation of information on the data and parameters that are not monitored during the crediting period of the project but are determined before its registration and remain fixed throughout the crediting period. Use the instructions below to fill the table.

Data/parameter	**>>** *Ensure that the name of the parameter matches with the information provided in the equations in sections B.7.1, B.7.2 or B.7.3 above.*	
Description	>> *Ensure that the description of the parameter matches with the information provided in the equations in sections B.7.1, B.7.2 or B.7.3 above.*	
Data unit	>> *Ensure that the unit of the parameter matches with the information provided in the equations in sections B.7.1, B.7.2 or B.7.3 above.*	
Equations referred	>> *Indicate in which equation(s) the parameter is used.*	
Purpose of data	☐ Baseline emissions / removals ☐ Project emissions / removals ☐ Leakage emissions *Tick the applicable box(es).*	
Measurement methods and procedures	>> *Explain whether the approach to measuring the parameter, e.g. directly, via sampling, indirectly, interview with users, manual counting; for projects involving removals measurements, sampling, remote-sensing, third party sources and published literature.* *Indicate which accepted industry standards, or national or international standards, were applied, if relevant.*	
Entity/person responsible for the measurement	>> *Explain who has the responsibility to ensure the monitoring of the parameter, e.g. the plant operator, the electric utility, an external laboratory, etc.*	
Measuring instrument(s)	*Type of instrument*	>> *Indicate which type of instrument will be used for the monitoring (e.g. electricity-meter, weight-scale, gas analyser, etc) and whether it is certified to national or IEC standards.*
	Accuracy class	>> *Indicate the exact or the minimum accuracy class of the measuring instrument.*
	Calibration requirements	>> *1. Calibration procedures:*

		• *Indicate the calibration procedures to be applied.* • *Specify the responsible person/entity who/that will perform the calibration and whether the person/entity is accredited.* *2. Calibration frequency:* • *If the applied mechanism methodologies, applied standardized baselines, other applied methodological regulatory documents or the Supervisory Body's guidance do not specify any requirements for calibration frequency for measuring equipment, follow these steps:* ○ *Ensure that the equipment is calibrated in accordance with the local/national standards or the manufacturer's specifications.* ○ *If local/national standards or the manufacturer's specifications are not available, international standards may be used.*
	Location	>> *Indicate the location of the measuring instrument, e.g. substation, main gas line, entrance of the anaerobic digester, etc.*
Measurement intervals	>> • *Specify the measurement interval of the parameter.* • *If the methodology or methodological tool does not specify the measurement interval, and if the parameter continuously impacts the GHG emission reductions or net GHG removals (e.g. quantity of fuel inputs, amount of heat or electricity produced, gas captured), measure continuously and record at appropriate intervals.*	
QA/QC procedures	>> • *Explain the QA/QC procedures employed, e.g. any cross-checking with data from other sources if the measured data has high levels of uncertainty.* • *Review the data collected, measures to prevent loss of data (backups), measures employed in case of erroneous reading, etc.*	
Treatment of uncertainty	>> *Indicate the value of the uncertainty applied based on the specifications of the monitoring instruments or based on a default uncertainty of the method or standard used.*	
Additional comment	>> *Provide any additional comment to the monitoring of the parameter that is not covered above.*	

B.9.2. Sampling plan

>>

If the applied mechanism methodologies, the applied standardized baselines or the other applied methodological regulatory documents allow it, develop and provide a description of the sampling plan in accordance with the standard for sampling and surveys for Article 6.4 mechanism activities to be developed by the Supervisory Body.

B.9.3. Monitoring management system

>>

Provide a description of:

- *The operational and management structure to be put in place to implement the monitoring plan.*

- *Provisions to ensure that data monitored and required for verification of GHG emission reductions or net GHG removals and issuance of A6.4ERs are kept and archived for at least two years after the end of the final crediting period or the last issuance of A6.4ERs, whichever occurs later.*
- *Definitions of responsibilities and institutional arrangements for data collection and archiving.*

B.9.4. Post-crediting period monitoring plan

>>

For projects involving removals, describe the monitoring after the end of the last active crediting period of the project to assess whether any reversals have occurred as per the requirements of the selected methodology(ies) and/or standardized baseline, and other applied methodological regulatory documents approved by the Supervisory Body.

SECTION C. Start date, crediting period type and duration

C.1. Project start date

>>

Provide the start date of the project, in the format DD/MM/YYYY, based on the definition of 'start date of the proposed A6.4 project' in the activity standard and indicate the evidence.

C.2. Expected operational lifetime of the project

>>

Indicate and justify the expected operational lifetime of the project.

C.3. Project crediting period

C.3.1. Type of crediting period approved by the host Party

☐ Renewable ☐ Fixed

Tick the applicable box.

C.3.2. Start date of the crediting period

>>

Indicate the start date of the crediting period in the format DD/MM/YYYY as approved by the host Party.

C.3.3. Duration of the crediting period

>>

Indicate the duration of the crediting period as approved by the host Party.

Adjust the crediting period accordingly in cases where the DNA has specified conditions that ensure the total length of the crediting period(s) is shorter than the lifetime of the technology implemented, including any replacements undertaken during the crediting period.

SECTION D. Environmental impacts, social impacts and sustainable development impacts

D.1. Environmental and social impacts and sustainable development impacts as per the Article 6.4 sustainable development tool

D.1.1. Summary of the environmental and social risk analysis and applicable mitigation measures

>>

- *Provide a summary of the analysis of the environmental and social impacts in accordance with the Article 6.4 sustainable development tool.*
- *Provide the identification, evaluation and avoidance of the environmental and/or social risks that may be caused by the proposed A6.4 CP in the A6.4 Environmental and Social Safeguards Risk Assessment Form as per the requirements of Article 6.4 sustainable development tool.*
- *Provide the relevant mitigation and minimization measures and monitoring to be implemented in the A6.4 Environmental and social management plan form in cases where risks are identified in the A6.4 Environmental and social safeguards risk assessment form as per the requirements of the article 6.4 Sustainable development tool.*
- *Provide the completed A6.4 Environmental and Social Safeguards Risk Assessment Form and A6.4 Environmental and social management plan form in accordance with the requirements of the Article 6.4 sustainable development tool in Appendixes 6 and 7, respectively.*
- *Describe and provide a summary of the deviation from the elements and criteria of the A6.4 Sustainable development tool, if deviation was approved by the Supervisory Body for the proposed project.*

D.1.2. Summary of the sustainable development impacts evaluation

>>

- *Provide a summary of the evaluation of the sustainable development impacts in accordance with the Article 6.4 sustainable development tool.*
- *Provide the evaluation of sustainable development impacts and the measuring, monitoring and reporting methodology in the A6.4 Sustainable Development Impact Form.*
- *Provide the completed A6.4 Sustainable Development Impact Form in accordance with Article 6.4 sustainable development tool as Appendix 8.*
- *Describe the deviation from the elements and criteria of the A6.4 Sustainable development tool, if deviation was approved by the Supervisory Body for the proposed project.*

D.2. Environmental and social impacts as per the host Party regulations

D.2.1. Summary of host Party requirements

>>

Describe the host Party requirements for environmental impact assessment and/or social impact assessment, if any.

D.2.2. Summary and conclusion of the assessment

>>

Provide a summary and conclusions of the environmental impact assessment and/or social impact assessment required by the host Party, if any.

SECTION E. Local stakeholder consultation

E.1. Scope of the consultation

>>

Explain the scope of the consultation, as a minimum, the potential direct positive and negative impacts that the proposed project may have.

E.2. Stakeholders invited

>>

Follow the instructions below:

1. *Indicate which stakeholders were invited to participate in the stakeholder consultation.*
2. *Describe their relationship with the proposed project.*
3. *Explain how the invitations were communicated.*
4. *Ensure that, at a minimum, the following are invited:*
   - *Representatives of local stakeholders directly impacted by the proposed project, including local communities and indigenous peoples as applicable; and*
   - *Representatives of local authorities relevant to the project.*
5. *If any of the relevant stakeholders were not invited, provide appropriate justification.*

E.3. Modalities for the consultation

>>

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

E.4. Summary of comments received

>>

Provide a summary report of the comments received.

E.5. Consideration of comments received

>>

Describe how comments received were taken into account. If comments were not incorporated, provide a proper justification.

SECTION F. Double or revived registration

F.1.1. Declaration related to the existence of a former project in the same geographical location

>>

Declare, if applicable, the existence of a registered A 6.4 project, component project under a registered A6.4 PoA or an activity under any other international, regional, national or subnational GHG mitigation crediting scheme whose crediting period has or has not expired in the same geographical location as the proposed project (collectively referred to as former project).

If a former project exists in the same location, demonstrate that the proposed project:

1. *Utilizes both different measure and different technology(ies), technique(s) and/or resource(s) from those of the former project.*
2. *Does not share or utilize any of the assets of the former project.*
3. *Utilizes a different resource type compared to the former project.*

***Note:** If the proposed A6.4 project involves the implementation of distributed units in households and the conditions above are not met, request a DOE to validate and confirm by other means that the project will not lead to the discontinuation or modification of the former project, and does not decrease the GHG emission reductions or net GHG removals by the former project.*

F.1.2. Declaration related to registration under the A6.4 mechanism or other crediting schemes

A 6.4 mechanism	☐ **The proposed A6.4 project has not been already registered as an A6.4 project.** ☐ **The proposed A6.4 project has not been already included as a component project (CP) in a registered Article 6.4 mechanism programme of activities (A6.4 PoA).** ☐ **The proposed A6.4 project has not been previously deregistered from the Article 6.4 mechanism.** *Tick all the three boxes above as a confirmation of compliance with mandatory requirements.* ☐ **The proposed A6.4 project was a CP in a registered A6.4 PoA but has been previously excluded.** *Tick the box if applicable.* *If this box is ticked, describe:* • *Whether the project was excluded from the A6.4 PoA voluntarily or due to erroneous inclusion.* • *The UNFCCC registration number of the A6.4 PoA.* • *The CP number and the inclusion date; and* • *The crediting period type (i.e. renewable or fixed) and the end date of the crediting period valid for the CP at the time of the exclusion.*

Other	☐ **The proposed A6.4 project is not currently registered or pursuing registration, or covered by a programme, under any other international, regional, national, subnational or sector-wide GHG mitigation crediting scheme.** ☐ **The proposed A6.4 project was previously registered under or covered by a programme under any other international, regional, national, or subnational or sector-wide GHG mitigation crediting scheme but deregistered or excluded from the other crediting scheme before fully exhausting the crediting period under the other crediting scheme.** ☐ **The proposed A6.4 project is currently registered or covered by other international, regional, national, subnational or sector-wide GHG mitigation crediting scheme.** *Tick only one applicable box.* *If the second box is ticked, obtain a confirmation of the other crediting scheme of the effective date of deregistration or exclusion from the other crediting scheme and remaining crediting period under the other crediting scheme at the time of deregistration or exclusion.* *If the third box is ticked, obtain a confirmation of the other crediting scheme of the effective date of the registration or coverage, the start and end dates of the crediting period, and the monitoring periods for which credits have been issued under the other crediting scheme.*

Appendix 1. Contact information of activity participants

(Copy this table for each activity participant)

Organization name	>>
Legal entity identifier:	>>
Country	Choose a Party.
Address	>>
Telephone	>>
Mobile	>>
E-mail	>>
Website	>>
Contact person	>>

Appendix 2. Applicability of methodologies and standardized baselines

>>

Provide any further background information on the applicability of the selected methodologies and, where applicable, the selected standardized baselines and the other methodological regulatory documents, and the methodological requirements specified by the host Party in accordance with paragraph 27(a) of the RMPs, if applicable.

Appendix 3. Further background information on ex ante calculation of emission reductions and/or net removals

>>

Provide any further background information on the ex ante calculation of emission reductions or net removals. This may include data, measurement results, data sources, etc.

Appendix 4. Summary of post-registration changes

>>

Describe the post-registration changes being proposed in this version of the PDD.

If applicable, provide a history of all post-registration changes to the project that have been approved by the Supervisory Body after its registration.

For all post-registration changes, include the following:

- *Reasons for the changes.*
- *Impacts of the changes on the relevant requirements in accordance with the activity standard, and*
- *Any additional information relating to the changes.*

Appendix 5. Further background information on monitoring plan

>>

Provide any further background information used in the development of the monitoring plan. This may include tables with time series data, additional documentation of measurement equipment, procedures, etc.

Appendix 6. A6.4 Environmental and Social Safeguards Risk Assessment Form (A6.4-FORM-AC-015)

>>

Include the 'A6.4 Environmental and Social Safeguards Risk Assessment Form' as per the Article 6.4 sustainable development tool.

Appendix 7. A6.4 Environmental and Social Management Plan Form (A6.4-FORM-AC-016)

>>

Include the 'A6.4 Environmental and Social Management Plan Form' as per the Article 6.4 sustainable development tool.

Appendix 8. A6.4 Sustainable Development Impact Form (A6.4-FORM-AC-017)

>>

Include the 'A6.4 Sustainable Development Impact From' as per the Article 6.4 sustainable development tool.

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Document information

Version	*Date*	*Description*
02.0	1 April 2026	Revision to align with the provisions of the “Standard: Article 6.4 activity standard for projects” (version 03.0) (A6.4-STAN-AC-002) and respective methodological documents.
01.0	11 December 2024	Initial publication of form template.

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