PROJECT DESIGN DOCUMENT (PDD) FORM FOR ARTICLE 6.4 PROJECTS

(Version 02.0)

<table>
<tr><th colspan="5">BASIC INFORMATION</th></tr>
<tr><td>UNFCCC project reference number:</td><td colspan="4">>></td></tr>
<tr><td>Project title:</td><td colspan="4">>> Low-carbon navigation project for passenger vehicles</td></tr>
<tr><td>Host Party:</td><td colspan="4">China</td></tr>
<tr><td>Other participating Parties:</td><td colspan="4">Choose a Party.</td></tr>
<tr><td rowspan="4">Activity participant(s):
(add rows if needed)</td><td>Type of Party</td><td colspan="2">Party that is to provide authorization</td><td>Activity Participant</td></tr>
<tr><td>Host Party</td><td colspan="2">China</td><td>CONFIDENTIAL INFORMATION</td></tr>
<tr><td>Choose a type of Party.</td><td colspan="2">Choose a Party.</td><td></td></tr>
<tr><td>Choose a type of Party.</td><td colspan="2">Choose a Party.</td><td></td></tr>
<tr><td>PDD version number:</td><td colspan="4">>> 1.0</td></tr>
<tr><td>PDD completion date:</td><td colspan="4">26/04/2026</td></tr>
<tr><td rowspan="4">Applied mechanism methodologies and standardised baselines, and their versions:</td><td>Reference number</td><td colspan="2">Title</td><td>Version</td></tr>
<tr><td>/</td><td colspan="2">GHG emission reductions through shifting to a low-carbon navigation route for passenger vehicles</td><td>01.0</td></tr>
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<tr><td>Sectoral scope(s):</td><td colspan="4">>> 7. Transport</td></tr>
<tr><td>Type of the project:</td><td colspan="4">☒ Emission reductions activity
☐ Removals activity
☐ Combined emission reductions and removals activity</td></tr>
<tr><td rowspan="3">Estimated annual emission reductions and/or net removals over the crediting period (tCO_2e/year):</td><td colspan="2">Emission reductions:</td><td colspan="2">>> 91,804</td></tr>
<tr><td colspan="2">Net removals:</td><td colspan="2">>> NA</td></tr>
<tr><td colspan="2">Total emission reductions and net removals</td><td colspan="2">>> 91,804</td></tr>
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SECTION A. Project description

A.1. Project purpose and general description

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The purpose of the proposed project is to reduce greenhouse gas (GHG) emissions from road transport by facilitating the adoption of low-carbon navigation routes by drivers in Beijing, People's Republic of China. The proposed project is developed by *CONFIDENTIAL INFORMATION* (hereinafter referred to as AP).

This proposed project introduces new functional modules to the existing navigation platform, including a low-carbon route identification and prompting module and a data monitoring and verification module. Through the operation of these modules, the proposed project will identify, for each driving trip, the route with the lowest GHG emissions among all planned routes in a navigation planning scheme and display it with a prompt, enabling drivers to voluntarily adopt the low-carbon route. The eligible vehicles under this proposed project include the entire stock of passenger vehicles using petrol as the sole fuel in Beijing. Under the activity scenario, they may choose to shift to low-carbon navigation routes on a voluntary basis. In the absence of the proposed project, the corresponding driving trips would have been completed following the drivers' existing pattern of route adoption.

The geographical extent of the activity boundary includes all low-carbon navigation routes adopted to complete driving trips under the proposed project scenario within Beijing, as well as the routes that would otherwise have been adopted to complete the same driving trips in the absence of the proposed project. The spatial extent of the project boundary encompasses all passenger vehicles involved in the proposed project. All these elements fall within the defined geographical boundary of the proposed project.

The baseline scenario is the continuation of the pre-activity scenario, i.e., the drivers' existing pattern of route adoption in the absence of the proposed project. As the fuel cost savings resulting from the adoption of low-carbon routes accrue only to drivers but not to the Activity Participant, whose sole source of financial returns is from A6.4ERs, the proposed project is additional.

The average annual emission reductions are estimated as 91,804 tCO_2 during the first crediting period, with a total of 459,021 tCO_2 expected over the first crediting period.

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

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The proposed project involves the establishment and implementation of new functional modules to the existing navigation platform, including a low-carbon route identification and prompting module and a data monitoring and verification module in Beijing to facilitate drivers to adopt low-carbon navigation routes, thereby reducing greenhouse gas (GHG) emissions from road transport. Confirmation by the host Party, the People's Republic of China, that the proposed project aligns with the A6.4 activity types will be available at the time of requesting registration. However, China's updated Nationally Determined Contribution (NDC)[1], submitted on 03/11/2025, highlights the promotion of low-carbon lifestyle through measures such as energy conservation and green consumption. The proposed activity is therefore consistent with the host Party's anticipated approved activity types and in full compliance with paragraph 26(e) of the Rules, Modalities and Procedures (RMPs).

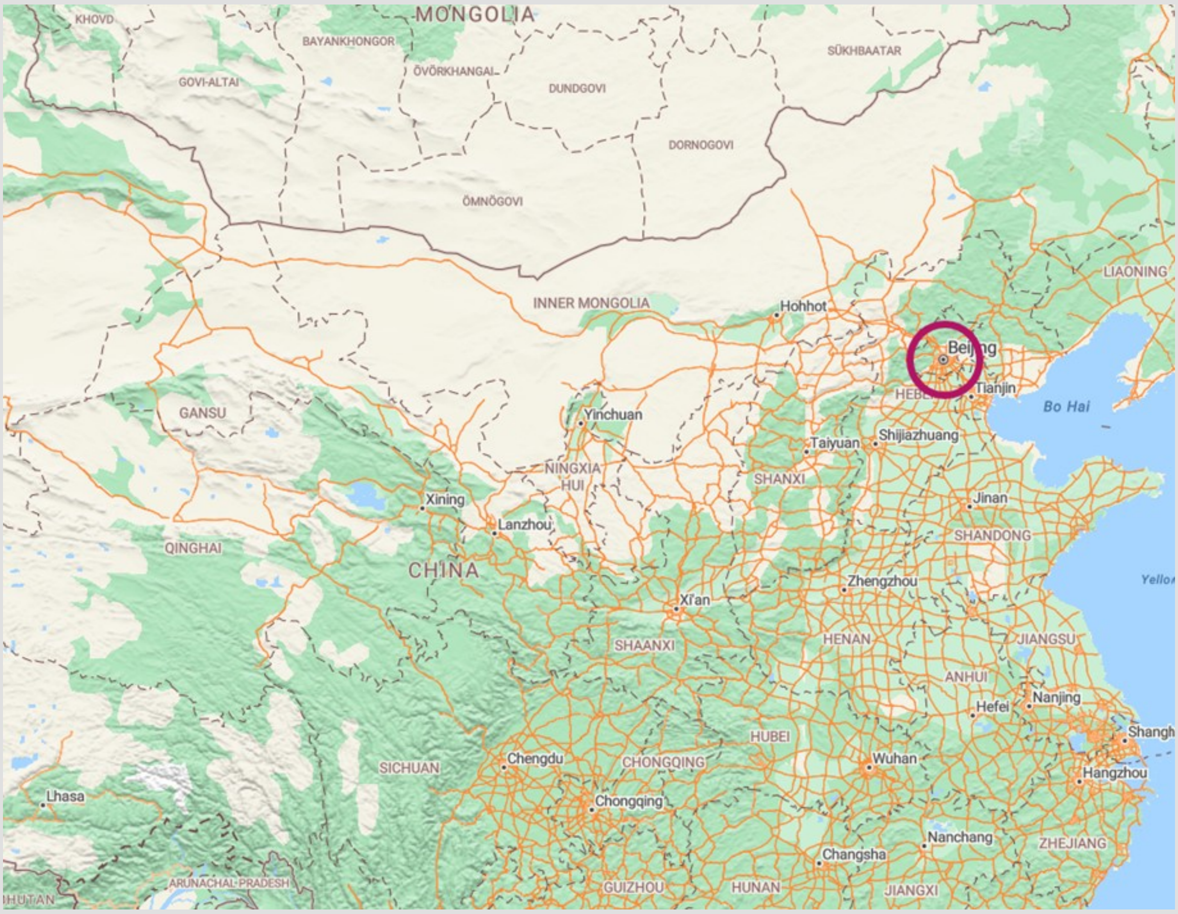
A.3. Project geographical location

[1] https://unfccc.int/sites/default/files/2025-11/2035%E5%B9%B4%E4%B8%AD%E5%9B%BD%E5%9B%BD%E5%AE%B6%E8%87%AA%E4%B8%BB%E8%B4%A1%E7%8C%AE%E6%8A%A5%E5%91%8A.pdf

Host Party	China
Region(s)/State(s)/Province(s)	>> Beijing
Cities/towns/communities	>> Beijing
Geographic coordinates	>> *CONFIDENTIAL INFORMATION*

Map of project location

>>



A.4. Technology/measures

A.4.1. Pre-activity scenario

>>

Prior to the implementation of the proposed project in Beijing, drivers adhere to an existing pattern of route adoption. In the absence of this project, drivers are not informed of which route is of the lowest GHG emissions for a given driving trip and they would continue to complete driving trips following their established pattern of route adoption, influenced by factors of travel time, distance, familiarity, etc.

There is no measure or practice of low-carbon navigation route identification and indication to enable drivers to adopt low-carbon route for their driving trips.

Drivers' existing pattern of route adoption does not have a fixed operational lifespan tied to specific equipment.

Consequently, prior to the project, drivers would continue to follow their pre-activity existing pattern of route adoption.

The baseline scenario is a continuation of this pre-activity scenario, wherein drivers complete driving trips under the existing pattern of route adoption.

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

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Under the proposed project, the existing navigation platform will be expanded through the deployment of new functional modules:

- Identification and prompting module: This module identifies the route with lowest emissions within each navigation planning scheme by comparing the estimated CO_2 emissions of all available planned routes within a navigation planning scheme prior to a driving trip. Emissions for each route are calculated based on displacement-specific speed-emission factors, the predicted speeds on each constituent link, and the link lengths. The route with the lowest calculated CO_2 emissions is designated as the low-carbon route and prominently prompted to the driver through the navigation platform's interface, to facilitate adoption.
- Data monitoring and verification module: This module conducts monitoring of low-carbon route navigation compliance, accumulation of link lengths, quality assurance and quality control (QA/QC) checks on the monitored data to ensure accuracy and integrity. Only data that meet the defined QA/QC requirements are classified as valid and used in the emission reduction calculations.

There is no fixed technical lifetime associated with the integrated navigation platform, thereby no fixed technical lifetime with the new functional modules.

The monitoring equipment used in the proposed project includes drivers' smartphones and mobile in-vehicle terminals. These devices track drivers' navigation trajectories, including real-time data such as latitude, longitude, and departure time, which are processed by the proposed project platform using appropriate algorithms to identify low-carbon route adherence and calculate travel distances based on the link lengths of low-carbon route traversed by vehicles. The calculation is conducted in a conservative manner to ensure that emission reductions are not overestimated, aligning with methodological requirements for accuracy and reliability.

A.5. Parties and activity participants

(Add/remove rows as necessary)

Type of Party	Name of the Party	Activity participant(s)
Host Party	China	>> *CONFIDENTIAL INFORMATION*
Choose a type of Party.	Choose a Party.	>>
Choose a type of Party.	Choose a Party.	>>

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
/	GHG emission reductions through shifting to a low-carbon navigation route for passenger vehicles	01.0
A6.4-STAN-AC-002	Article 6.4 activity standard for projects	03.0
A6.4-TOOL-AC-001	Article 6.4 sustainable development tool	01.1
A6.4-AMT-001	Methodological tool: Common practice analysis	01.0
A6.4-AMT-002	Methodological tool: Investment analysis	01.0

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

>>

Applied methodology:

- GHG emission reductions through shifting to a low-carbon navigation route for passenger vehicles, version 01.0

Other methodological regulatory documents:

- A6.4-STAN-AC-002 Article 6.4 activity standard for projects, version 03.0
- A6.4-TOOL-AC-001 Article 6.4 sustainable development tool, version 01.1
- A6.4-AMT-001 Methodological tool: Common practice analysis, version 01.0
- A6.4-AMT-002 Methodological tool: Investment analysis, version 01.0

(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
>> (a) The methodology is applicable under the following conditions: (i) The activity shall add new functionality to an existing navigation platform, including (1) identifying the low-carbon route within each navigation planning scheme, and (2) prompting drivers with such low-carbon route, and (3) monitoring low-carbon route navigation compliance. This applicability condition shall be demonstrated in the Project Design Document (PDD) and be assessed at the initial validation. (ii) The activity participant shall ensure that passenger vehicles powered by energy types other than petrol shall be excluded from calculation of emission reductions. This applicability condition shall be demonstrated in the Project Design Document (PDD) and be assessed at the initial validation.	>> According to the feasibility study report of the proposed project, it will enhance the existing integrated transportation platform by deploying new functional modules: a low-carbon route identification and prompting module and a data monitoring and verification module, which together establish a mechanism that enables drivers to adopt low-carbon route. These modules enable the platform to monitor drivers’ compliance with low-carbon route navigation and quantify the associated travel distance. Fuel type of participating passenger vehicles will be confirmed based on information declared by drivers upon registration on the navigation platform, and shall be further cross-validated against official vehicle registry records maintained by the competent government traffic management authority. Therefore, the proposed project is fully in compliance with this applicability condition.
>> (b) The methodology is not applicable under the following condition: (i) The activities involving non-navigation-based interventions, such as replacement of or retrofit to vehicle parts, fuel switches, fuel efficiency improvement, etc.	>> The proposed low-carbon navigation project does not fall under the category of non-navigation-based interventions. The project focuses exclusively on enhancing an existing navigation platform through software-based modules. The intervention operates at the behavioural level by influencing drivers' route adoption, as opposed to interventions that modify the vehicles themselves.

Applicability condition in the methodological regulatory document or the methodological	Demonstration of compliance of the project with the applicability condition in the methodological

requirement specified by the host Party	regulatory document or the methodological requirement specified by the host Party
>> The use of the A6.4 SD Tool is mandatory for all proposed A6.4 activities, including all CDM activities seeking eligibility for transition to the Article 6.4 mechanism.	>> A6.4 SD Tool is used. Therefore, the proposed project is fully in compliance with this applicability condition.

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
>> This methodological tool is applicable to Article 6.4 activities that involve emission reductions and/or net removals where its use is explicitly referenced in the applicable mechanism methodology.	>> This tool shall be applied in the development of the project as required by the methodology. Therefore, the proposed project is fully in compliance with this applicability condition.
>> The tool may only be used if recent data on common practice is available as further elaborated in paragraph 21 below.	>> Count-based indicator measured as number of petrol passenger vehicles is required by the methodology. Recent data on this indicator in the city where the proposed project is implemented is available. Please refer to section B.5.4 for details. Therefore, the proposed project is fully in compliance with this applicability condition.
>> This tool is applicable to Article 6.4 activities implemented at the project level. The tool may be amended in the future to also cover activities implemented at other scales (e.g. programmes of activities, policies, sectoral approaches, etc.).	>> The proposed project is a single project, not a programme of activities. Therefore, the proposed project is fully in compliance with this applicability condition.
>> This tool may be used by mechanism methodologies related to both emission reductions and net removals.	>> Not relevant.
Mechanism methodologies intending to use this methodological tool shall include a reference to this tool within the mechanism methodology and shall specify: (a) Which of the following two approaches shall be used by the activity participants to conduct the common practice analysis, as further elaborated in paragraph 18 and section 7.1 below: (i) Approach A: which is based on the identification of existing “comparable activities” and differentiation between ‘similar’ and ‘different’ activities and is generally suited for discrete, large-scale activities; or (ii) Approach B: which is based on the determination of a ‘target market size’ and the ‘market penetration’ of the relevant technology, measure or practice and is generally suited for	Not relevant.

highly distributed small-scale technologies and practices.	
For both Approaches A and B, the mechanism methodology shall specify the following: (a) Whether the indicator of common practice to be used by activity participants when conducting the common practice analysis is: (i) Count-based (i.e., based on the number of units); or (ii) capacity/output-based (e.g., based on kilowatt hours of electricity produced or megawatt of capacity installed). (b) Whether a stock-based approach (e.g., considering all installed plants to date, or all operational devices to date) or a time-bound approach (e.g., assessing uptake or sales within a defined recent period) is used to assess common practice. If a time-bound approach is selected, the methodology shall clearly define the applicable reference period (e.g., the most recent three years) to be used for assessing common practice; (c) How the applicable geographical area for the common practice analysis shall be determined by activity participants (e.g., global, host country, or sub-national jurisdiction); (d) Whether the scale of output or capacity of the technology, measure, or practice shall be considered for identifying comparable activities under Approach A, or for determining target market size under Approach B and, if so, specify the output or capacity range to be applied for such cases, or provide clear guidance for how activity participants shall determine such a range and the appropriate justification; (e) What common practice threshold shall be applied to assess whether a technology, measure or practice is considered common practice; (f) Which activities other than the Article 6.4 activity shall be considered comparable to the Article 6.4 activity under Approach A and, within this cohort of comparable activities, which activities shall be considered similar to the Article 6.4 activity and which activities shall be considered different from the Article 6.4 activity (see definitions above), including relevant parameters for such differentiation, in line with the requirements and guidance provided in this tool; (g) How, in the case of Approach B, the market penetration of a given technology, measure or practice and the target market size shall be determined, as further outlined in section 7.6 below.	Not relevant.
Mechanism methodologies may specify additional provisions for the application of this tool in relation to the mitigation activity types they cover. These may include sector-specific parameters,	Not relevant.

methodological considerations, or data requirements relevant to conducting the common practice analysis	
Where the mechanism methodology referring to this tool specifies approaches for conducting the common practice analysis that differ from those described in this tool, the requirements contained in the mechanism methodology shall take precedence.	Not relevant.

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
>> This methodological tool is applicable to Article 6.4 activities: (a) That involve removals and/or emission reductions; (b) That are implemented by private or public entities operating in an environment where the decision to implement an activity is mainly based on the consideration of whether the activity is financially attractive or which option is the most or least financially attractive; and Where it is referred to in the applied mechanism methodology.	>> The proposed project involves emission reductions and is implemented by a private entity whose decision on implementation is mainly based on the consideration of whether the proposed project is financially attractive. This tool shall be applied in the development of the project as required by the methodology. Therefore, the proposed project is fully in compliance with this applicability condition.
>> This version of the tool is applicable to Article 6.4 activities implemented at the project level. The tool may be amended in the future to also cover activities implemented at other scales (e.g. programmes of activities, policies, sectoral approaches, etc).	>> The proposed project is a single project, not a programme of activities. Therefore, the proposed project is fully in compliance with this applicability condition.
>> Mechanism methodologies intending to use this methodological tool shall include a reference to this tool within the mechanism methodology and specify the following elements or provide guidance for how activity participants applying this tool shall address them: (a) What realistic and credible alternative scenarios to the proposed Article 6.4 activity, or which minimum list of scenarios, shall be assessed by activity participants in undertaking the investment analysis or how activity participants shall identify these alternative scenarios; (b) Which of the methods for investment analysis provided in this tool (simple cost analysis, benchmark analysis, investment comparison analysis) shall be applied by the activity participants or how activity participants may choose between these methods;	>> Not relevant.

(c) Where mitigation activities covered by the mechanism methodology do not have an end date of expected operation, what assessment period shall be used by the activity participants in conducting the analysis or how activity participants shall determine the assessment period; (d) Where the investment comparison analysis or benchmark analysis is to be applied by the activity participants, specify: (i) Which financial indicator is most suitable for the type of mitigation activity and decision context and shall be used by the activity participants, either by specifying an indicator (e.g., net present value (NPV) or internal rate of return (IRR)) and/or by describing how activity participants may choose a suitable financial indicator; (ii) How the sensitivity analysis shall be conducted by activity participants in the context of the type of mitigation activities covered by the methodology, including by specifying which assumptions and parameters should be varied and the degree of these variations or how activity participants shall determine the assumptions and parameters to be varied; and (iii) Whether the type of activities covered by the methodology could (1). only be implemented by the activity participants and not by any other entities; or (2) be implemented by either the activity participants or other entities, or how activity participants may make this determination.	
>> Mechanism methodologies may provide further specifications and requirements for how this methodological tool shall be applied by activity participants in the context of the type of mitigation activities covered by the methodology.	>> Not relevant.
Where the mechanism methodology referring to this tool contains requirements for conducting the investment analysis that are different from those described in this tool, the requirements contained in the methodology shall take precedence.	Not relevant.

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

>>

No 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 exists.

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

>>

The geographical boundary of the proposed project covers all low-carbon routes adopted under the proposed project to complete driving trips and the routes that would otherwise have been adopted to complete the same driving trips in the absence of the proposed project. The spatial boundary of the proposed project encompasses the entire stock of petrol-fueled passenger vehicles in Beijing.

The greenhouse gases and emission sources included in or excluded from the project boundary are shown in table below:

B.4.1. Baseline emissions/removals

Source/sink reservoir/pool	GHG		Type	Justification/Explanation
Emissions from the continuation of the pre-activity scenario, i.e., the drivers' existing pattern of route adoption	CO_2	☒ Included ☐ Not included	☐ Controlled ☒ Affected ☐ Related	>>Main emission source
	CH_4	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>Excluded for simplification. This is conservative
	N_2O	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>Excluded for simplification. This is conservative

B.4.2. Project emissions/removals

Source/sink/reservoir /pool	GHG		Type	Justification/Explanation
Emissions from passenger vehicles completing driving trips by adopting the low-carbon route within a navigation planning scheme	CO_2	☒ Included ☐ Not included	☐ Controlled ☒ Affected ☐ Related	>>Main emission source
	CH_4	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>Excluded for simplification. This is conservative
	N_2O	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>Excluded for simplification. This is conservative

B.4.3. Leakage emissions

Source/sink/reservoir /pool	GHG		Type	Justification/Explanation
No significant leakage is identified for the implementation of Article 6.4 activities under this methodology	CO_2	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>No significant leakage is identified for the implementation of Article 6.4 activities under this methodology
	CH_4	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>No significant leakage is identified for the implementation of Article 6.4 activities under this methodology
	N_2O	☐ Included ☒ Not included	☐ Controlled ☐ Affected ☐ Related	>>No significant leakage is identified for the implementation of Article 6.4 activities under this methodology

The boundary of the proposed project is shown in below figure.

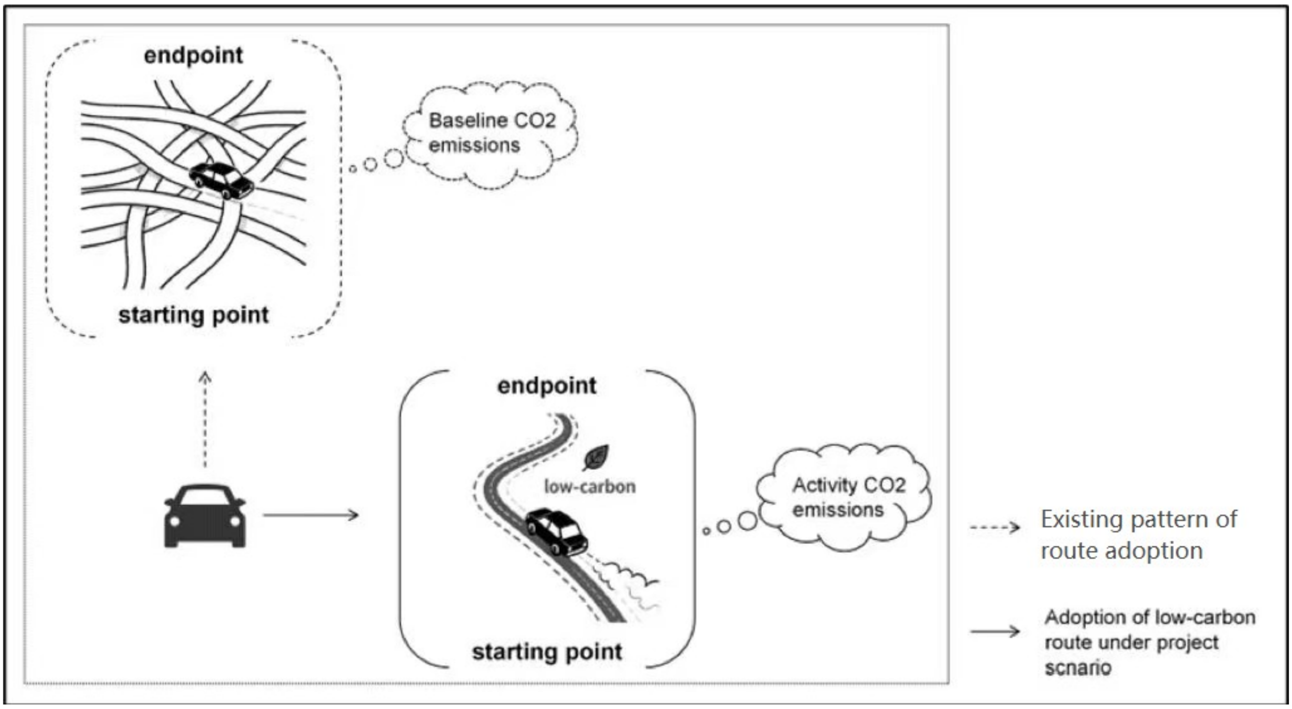

Figure 1 Indicative emission sources and gases applicable in the project boundary

B.5. Establishment and description of baseline scenario

B.5.1. Identification of the baseline scenario

>>

As specified in the applied methodology, the baseline scenario for the proposed project is the continuation of the pre-activity scenario, i.e., the existing route adoption patterns of drivers in Beijing.

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

>>

In line with the applied methodology, the conservative BAU scenario is identified as the pre-activity scenario, i.e., the existing route adoption patterns of drivers in Beijing. As assessed in section B.5.1, no national or local laws, regulations, or support schemes impose legally binding requirements on low-carbon route identification and prompt or adoption of low-carbon navigation routes or restrict alternative routes within a navigation planning scheme within the crediting period. Furthermore, no national or sub-national targets that specify an equivalent level of emission reductions by comparable measures of low-carbon route identification and prompt during the crediting period.

Therefore, the continuation of the pre-activity scenario, i.e., the existing route adoption of drivers in Beijing, is the plausible conservative BAU scenario for the proposed project.

B.6. Demonstration of additionality

B.6.1. Regulatory analysis

>>

Neither national nor Beijing-level policies impose direct, enforceable requirements on low-carbon route identification and prompt or adoption of low-carbon routes. Efforts prioritize systemic changes like vehicle standards, emission zones, and modal shifts, supporting voluntary low-carbon behaviours.

1. National-Level Regulations

China's 2035 National Determined Contributions, United Nations Framework Convention on Climate Change (UNFCCC)[2]: Based on a review of China's 2035 National Determined Contributions (NDC) submitted on 03/11/2025 and related policies, there are no direct mandatory requirements for drivers to choose low-carbon routes during driving. The NDC emphasizes promoting low-carbon lifestyles through measures like energy

[2] https://unfccc.int/documents

conservation, green consumption, and shifting to low-carbon transport modes (e.g., rail and water over road), but these are framed as overall sectoral targets for reduction in economy-wide net greenhouse gas emissions by 7% to 10% from peak levels by 2035.

Action Plan for Carbon Dioxide Peaking Before 2030, National Development and Reform Commission (NDRC)[3]: Policies focus on vehicle electrification, fuel efficiency standards, and infrastructure development rather than enforceable mandates on individual route selection. For instance, promotes the low-carbon transformation of transport equipment and NEVs, but without specific driver-level route obligations.

2. City-Level Regulations

Beijing Municipal Transport Development and Construction Plan for the 14th Five-Year Plan Period[4], released in April 2022, establishes a "rail + bus + slow traffic" integrated green travel system; mandates that the number of small passenger vehicles be controlled within 5.8 million by 2025; promotes full electrification of public transport, taxi and other public service vehicles by 2025; advances the construction of charging and swapping infrastructure.

Beijing Municipality Carbon Peaking Implementation Plan[5], released in October 2022 optimizes transport structure to promote "truck-to-rail" for bulk cargo; accelerates the replacement of fuel vehicles with new energy vehicles (NEVs), with the goal of electrifying all public service vehicles (public transport, taxis, sanitation, etc.) by 2030; supports the demonstration of hydrogen fuel cell vehicles; advances the construction of a high-quality charging infrastructure network.

Beijing Comprehensive Transport Management Action Plan for 2025[6], released in February 2025 promotes the revision of the Beijing Non-Motor Vehicle Management Regulations to improve the slow traffic system; advances the "oil-to-electricity" transition of cruise taxis; optimizes bus routes and develops MaaS 2.0 to encourage green travel.

Implementation Plan for Further Strengthening Energy Conservation in Beijing (2024 Edition)[7], released in 2024 optimizes freight structure to promote "truck-to-rail" for bulk cargo; supports NEV promotion and high-quality charging infrastructure construction; strengthens energy efficiency management in the transport sector.

All these city-level regulations do not mandate the identification or indication of low-carbon routes in any form. In addition, there is a lack of targeted government programs, subsidies or support policies that specifically address the identification and promotion of low-carbon travel routes to achieve deeper emission reductions. Therefore, the proposed project exceeds what is mandated by law.

B.6.2. Analysis of lock-in risk

>>

As specified in the methodology, the proposed project consists of behavioural measures in the transport sector, including identifying and prompting low-carbon route in a navigation planning scheme to facilitate adoption of such low-carbon route without involving long-lived infrastructure investments. Therefore, the proposed project does not create a risk of locking in GHG emissions.

B.6.3. Investment Analysis or Barrier analysis

☒ Investment analysis ☐ Barrier analysis

(Select one option)

>>

As required by the methodology, a financial analysis has been conducted to demonstrate additionality of the proposed project, following the steps below:

Step 1: Identify realistic and credible alternative scenarios

As per the applied methodology, the realistic and credible alternative scenario under this methodology shall be the continuation of the pre-activity scenario, i.e. the drivers' existing pattern of route adoption in the absence of the proposed project.

Step 2: Determine appropriate analysis method

[3] http://www.ndrc.gov.cn
[4] https://www.beijing.gov.cn/zhengce/zhengcefagui/202205/t20220507_2704320.html
[5] https://www.ndrc.gov.cn/fggz/hjyzy/tdftzh/202211/t20221130_1343045.html
[6] https://www.beijing.gov.cn/gate/big5/www.beijing.gov.cn/zhengce/zhengcefagui/202502/t20250224_4017915.html
[7] https://www.beijing.gov.cn/gate/big5/www.beijing.gov.cn/zhengce/zhengcefagui/202402/t20240202_3554355.html

Option I – Simple cost analysis is applied as the feasibility study report confirms that the proposed project generates no cost savings or revenues other than from A6.4ERs.

Step 3: Determination of the assessment period

The operational lifetime of the proposed project is expected to be 20 years, which will be taken as the assessment period for financial analysis.

Step 4: Conduct investment analysis

Option I – Simple cost analysis

According to the feasibility study report, the proposed project will incur the following costs: initial investment, operation and maintenance (O&M) costs, monitoring, reporting and verification (MRV) costs, A6.4ER-relevant costs, including validation, verification, and issuance and transaction fees. The proposed project does not generate revenues or cost savings other than from the sale of A6.4ERs. Although the implementation of the proposed project may result in fuel cost savings, these accrue to the drivers and not to the AP, and therefore cannot be considered as project revenues or cost savings.

In accordance with the methodology, implementation costs exclude any transaction costs associated with generating A6.4ERs (e.g. PDD preparation, validation, verification, UNFCCC fees). Accordingly, A6.4ER-relevant costs are not included in the analysis.

The incurred costs, as reported in the feasibility study, are summarized below:

Cost Item	**Description**	**Amount (ten-thousand CNY)**	**Remarks**
Initial investment	IT system, algorithms, equipment	500	One-time
O&M costs	Staff, customer service, risk control	500 / year	Recurring
MRV costs	Data collection and reporting	200 / year	Recurring

As specified in the methodology, the realistic and credible alternative scenario under is the continuation of the pre-activity scenario, i.e. the drivers' existing pattern of route adoption in the absence of the proposed project. Since no intervention occurs under the alternative scenario, it will not generate any cost savings or revenues.

Step 5: Outcome of investment analysis

Option I – Simple cost analysis

As shown in Step 4, the proposed project incurs significant costs, and both the Article 6.4 activity and the alternative scenario do not generate any revenues or cost savings. Therefore, the proposed project is considered additional.

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)

>>

As per the applied methodology, the stepwise analysis specified in the *A6.4-AMT-001 Methodological tool: Common practice analysis Version 01.0* is followed to assess whether the proposed project is additional, in complement to the investment analysis.

Step 1: Specify the Approach (A or B) and the indicator of common practice to be used

In accordance with the methodology, Approach B is applied. The indicator of common practice is a count-based indicator, measured as number of petrol passenger vehicles.

Step 2: If relevant, specify the applicable output or capacity range

Not applicable, as the methodology does not prescribe any output or capacity range for this activity type.

Step 3: Specify the applicable geographical area

The applicable geographical area is the city of Beijing, where the proposed project is implemented. This is consistent with the methodology, since the route adoption patterns are directly influenced by city-level transport infrastructure, road network, and local policies.

Step 4: Determine the target market size (for Approach B)

In line with the methodology and Approach B, the target market size (P_{all}) is defined as the number of petrol passenger vehicles within the applicable geographical area (Beijing) in the calendar year immediately prior to the start of the proposed project. Where such data are unavailable, it is defined as the number of petrol passenger vehicles within Beijing in the most recent calendar year provided that the year falls within the three calendar years immediately prior to the start of the proposed project. Data are drawn from industry statistics.

Step 5: Sum up the indicator of common practice for all activities included in the target market size (for Approach B)

The indicator of common practice is expressed as the number of petrol passenger vehicles.

P_{all} = Number of petrol passenger vehicles in Beijing in the most recent calendar year prior to the start of the proposed project where such data is available.

The number of petrol passenger vehicles in Beijing for 2024 is 4,939,000, sourced from 2025 Beijing Transport Development Annual Report[8], developed by Beijing Transport Institute under Beijing Municipal Commission of Transport.

Step 6: Determine the total number or total capacity/output of similar activities (applicable to both Approaches A and B)

As per the methodology, similar activities are those that involve identifying the low-carbon routes within the navigation planning schemes and prompting drivers to adopt it.

Based on the methodological definition, P_{sim} is calculated as the total number of drivers participating in similar activities in Beijing in the most recent calendar year prior to the start of the proposed project. However, no similar activities have been conducted in Beijing.

$P_{sim} = 0$

Step 7: Calculate the common practice factor (F)

The common practice factor is calculated as the market share of the proposed measure:

$F = P_{sim} / P_{all} = 0 / 4{,}939{,}000 = 0$

Step 8: Compare the common practice factor F with the common practice threshold (applicable to both approaches A and B)

As per the methodology, the value of common practice threshold (F_{max}) is 10%.

Since $F = 0 < F_{max}$ (10%), then the proposed activity is "not common practice".

Based on the investment analysis and complemented by the common practice analysis, the proposed project is credibly and conservatively demonstrated to be additional.

B.6.5. Performance-based approach

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Not applicable.

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

B.7.1. Reversals risk assessment

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Not applicable.

B.7.2. Reversals risk mitigation plan

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Not applicable.

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[8] https://www.bjtrc.org.cn/List/index/cid/7/p/1.html

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

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Not applicable.

B.7.4. Remediation of reversals

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Not applicable.

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

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In line with the methodology, the unadjusted baseline emissions are calculated based on the baseline emission factor and the distance travelled by drivers' passenger vehicles on the identified low-carbon route within the navigation planning scheme under the activity scenario.

$$BE_{history,y} = EF_{BL,y} \times L_{\hat{p},\widehat{lc},y} \quad \textbf{Equation 1}$$

Where:

$BE_{history,y}$	=	Unadjusted existing historical net baseline emissions in year y of the crediting period (tCO2/year)
$EF_{BL,y}$	=	Baseline emission factor in year y (tCO2/km)
$L_{\hat{p},\widehat{lc},y}$	=	Total length of links traversed on the low-carbon route $\widehat{lc}$ predicted by the navigation platform under a navigation planning scheme, accumulated from the navigation starting point, in year y (km)
$\hat{p}$	=	Navigation planning scheme provided by the navigation platform to the driver before a driving trip during the crediting period
$\widehat{lc}$	=	Predicted low-carbon route within each navigation planning scheme $\hat{p}$ during the crediting period
y	=	Calendar year of the crediting period

Determination of baseline emission factor ($EF_{BL,y}$)

The baseline emission factor shall be updated annually and determined ex post.

Step 1: Calculation of the representative WLTC combined fuel consumption per engine displacement category

For each engine displacement category k, the representative WLTC combined fuel consumption $FC_{k,WLTC,y'}$ shall be calculated as the frequency-weighted average of all distinct WLTC combined fuel consumption values published by the government authorities for petrol-fuelled passenger vehicle model variants in category k over the three calendar years ending in year y', where each distinct published fuel consumption value is weighted by the number of times it appears in the published records over that three-year period:

$$FC_{k,WLTC,y'} = \frac{\sum_j \left(fc_{j,k,(y'-2,y'-1,y')} \times n_{j,k,(y'-2,y'-1,y')} \right)}{\sum_j n_{j,k,(y'-2,y'-1,y')}} \quad \textbf{Equation 2}$$

Where:

$FC_{k,WLTC,y'}$	=	Representative WLTC combined fuel consumption of petrol-fuelled passenger

		vehicles in engine displacement category k in year y' (L/100 km)
$fc_{j,k,(y'-2,y'-1,y')}$	=	The j-th distinct WLTC combined fuel consumption value (or converted WLTC-equivalent value) published by the government authorities for a petrol-fuelled passenger vehicle model variant in engine displacement category k over the three calendar years ending in year y' (L/100 km)
$n_{j,k,(y'-2,y'-1,y')}$	=	Frequency count of the fuel consumption value $fc_{j,k,(y'-2,y'-1,y')}$ in the official government published records for engine displacement category k over the three calendar years ending in year y' (count)
k	=	Engine displacement category (in litres)
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

Note: Each entry in the official government fuel consumption database corresponds to a distinct vehicle model variant submitted for type-approval. The frequency weight $n_{j,k}$ therefore reflects the number of model variants associated with a given fuel consumption level. This approach provides an objective, transparent and fully reproducible measure of the distribution of fuel consumption performance across marketed vehicle configurations within each engine displacement category, based solely on publicly available government records.

Representative WLTC combined fuel consumption of petrol passenger vehicles in engine displacement category k

Engine displacement category (k)	Representative WLTC combined fuel consumption (L/100km)
$k \leq 1.0L$	5.94
$1.0L < k \leq 1.6L$	7.05
$1.6L < k \leq 2.0L$	8.60
$k > 2.0L$	10.74

Step 2: Calculation of average CO_2 emissions per kilometre per engine displacement category

For each engine displacement category k, the average CO_2 emissions per kilometre shall be calculated as:

$$E_{PKM,k,y'} = EF_{CO2} \times FC_{k,WLTC,y'} \times NCV \times \rho \times \frac{1}{100}$$ **Equation 3**

Where:

$E_{PKM,k,y'}$	=	Average CO_2 emissions per kilometre of petrol-fuelled passenger vehicles in engine displacement category k in data year y' (tCO_2/km)
EF_{CO2}	=	Emission factor of petrol (tCO2/MJ)
$FC_{k,WLTC,y'}$	=	Representative WLTC combined fuel consumption of petrol-fuelled passenger vehicles in engine displacement category k in year y' (L/100 km)

NCV	=	Net caloric value of petrol (MJ/L)
ρ	=	Density of petrol (ton/L)
$\frac{1}{100}$	=	Unit conversion factor converting L/100km to L/km
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

Average CO_2 emissions per kilometer of petrol passenger vehicles in each engine displacement category k is present in the below table.

Engine displacement category (k)	Average CO_2 emissions per kilometre of petrol passenger vehicles in engine displacement category k (tCO_2/km)
$k \leq 1.0L$	0.000126995
$1.0L < k \leq 1.6L$	0.000150819
$1.6L < k \leq 2.0L$	0.000183782
$k > 2.0L$	0.000229588

Step 3: Calculation of the share of each engine displacement category

For each engine displacement category k, its share in the total petrol passenger vehicle stock of the host city shall be calculated as:

$$S_{k,y'} = \frac{P_{k,y'}}{\sum_k P_{k,y'}}$$ **Equation 4**

Where:

$S_{k,y'}$	=	Share of engine displacement category k in the entire petrol passenger vehicle stock in year y' (%)
$P_{k,y'}$	=	Number of vehicles in engine displacement category k in year y'
k	=	Engine displacement category (in litres)
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

Entire vehicle stock in Beijing is stratified by engine displacement k with shares of each engine displacement category shown in the below table.

Engine displacement category (k)	Share of petrol passenger vehicles of each engine displacement category ($S_{k,y'}$)

$k \leq 1.0L$	0%
$1.0L < k \leq 1.6L$	35%
$1.6L < k \leq 2.0L$	49%
$k > 2.0L$	16%

Step 4: Calculation of the baseline emission factor ($EF_{BL,y}$)

The baseline emission factor shall be calculated as the stock-share-weighted average of the average CO_2 emissions per kilometre across all engine displacement categories in the host city:

$$EF_{BL,y} = \sum_{k} \left(E_{PKM,k,y'} \times S_{k,y'}\right) \quad \textbf{Equation 5}$$

Where:

$EF_{BL,y}$	=	Baseline emission factor in year y (tCO2/km)
$E_{PKM,k,y'}$	=	Average CO_2 emissions per kilometer of petrol passenger vehicles in engine displacement category k in year y' (tCO_2/km)
$S_{k,y'}$	=	Share of engine displacement category k in the total petrol passenger vehicle stock in year y' (%)
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period
y	=	Calendar year of the crediting period

The baseline emissions factor ($EF_{BL,y}$), as the weighted average of the average CO_2 emissions per kilometer of the entire petrol vehicle stock is 0.000179574 tCO_2/km and this value will be used for ex-ante estimation of baseline emissions at the PDD validation stage and shall be updated on an annual basis at the verification stage.

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

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As per the methodology, in the calendar year of the start date of the first crediting period, the downward adjustment is determined as the minimum downward adjusted baseline emissions as specified in paragraph 64(a)iii of the baseline standard as follows:

$$BE_{adj,min,y1} = BE_{history,y1} - \left(BE_{history,y1} - AE_{y1}\right) \times 0.1 \quad \textbf{Equation 6}$$

Where:

$BE_{adj,min,y1}$	=	Minimum downward adjusted baseline emissions in year y1 (tCO_2/year)

$BE_{history,y1}$ = Unadjusted existing historical net baseline emissions in year y1 of the crediting period (tCO_2/year)

AE_{y1} = Activity emissions in year y1 of the crediting period (tCO_2/year)

y1 = Calendar year of the start date of the first crediting period

$$BE_{adj,y1} = BE_{adj,min,y1} \quad \textbf{Equation 7}$$

Where:

$BE_{adj,y1}$ = Downward adjusted baseline emissions in year y1 of the crediting period (tCO_2/year)

$BE_{adj,min,y1}$ = Minimum downward adjusted baseline emissions in year y1 (tCO_2/year)

y1 = Calendar year of the start date of the first crediting period

B.8.1.2.1.1. Downward adjustment at the subsequent years

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According to the methodology, for subsequent calendar years following the calendar year of the start date of the first crediting period, the baseline emissions are subject to a downward adjustment based on an increase INDA of 1%.

$$BE_{adj,y} = BE_{history,y} - (DA_{y1} + BE_{history,y} \times INDA \times (y - y1)) \quad \textbf{Equation 8}$$

Where:

$BE_{adj,y}$ = Downward adjusted baseline emissions in year y (tCO2/year)

$BE_{history,y}$ = Unadjusted baseline emissions in year y (tCO2/year)

DA_{y1} = Initial downward adjustment to the baseline emissions in year1 (tCO_2/year), determined as the difference between $BE_{adj,y1}$ and $BE_{history,y1}$

INDA = Increase in the downward adjustment in the subsequent years of the crediting period (%)

y1 = Calendar year of the start date of the first crediting period

y = Calendar year of the crediting period

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

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As per the methodology, since the existing actual or historical emissions approach is applied to determine the baseline scenario, the downward adjustment shall be applied in both the calendar year of the start date of the first crediting period and the subsequent years.

The downward adjusted baseline emissions ex-ante estimated over the crediting period are presented in the below table.

Year	$EF_{BL,y}$ (tCO_2/km)	$L_{\hat{p},\hat{lc},y}$ (km)	$BE_{history,y}$ (tCO_2)	AE_y (tCO_2)	$INDA$	$BE_{adj,y}$ (tCO_2)	DA_{y1} (tCO_2)
1	0.000179574	12,400,000,000	2,226,714	2,075,227	/	2,211,565	22,116
2	0.000179574	12,400,000,000	2,226,714	/	1%	2,189,298	/
3	0.000179574	12,400,000,000	2,226,714	/	1%	2,167,031	/

4	0.000179574	12,400,000,000	2,226,714	/	1%	2,144,764	/
5	0.000179574	12,400,000,000	2,226,714	/	1%	2,122,497	/
Total						10,835,155	/

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

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According to the methodology, the net BAU emissions are determined using the BAU emission factor and the equivalent travel distance by existing pattern of route adoption replaced by drivers' adoption of low-carbon route under the activity scenario.

$$BAU_y = EF_{BAU,y} \times L_{\hat{p},\widehat{lc},y} \quad \textbf{Equation 9}$$

Where:

BAU_y	=	Most likely net BAU baseline emissions in year y (tCO2/year)
$EF_{BAU,y}$	=	BAU emission factor (tCO2/km)
$L_{\hat{p},\widehat{lc},y}$	=	Total length of links traversed on the low-carbon route $\widehat{lc}$ predicted by the navigation platform under a navigation planning scheme, accumulated from the navigation starting point, in year y (km)
$\hat{p}$	=	Navigation planning scheme provided by the navigation platform to the driver before a driving trip during the crediting period
$\widehat{lc}$	=	Predicted low-carbon route within each navigation planning scheme $\hat{p}$ during the crediting period
y	=	Relevant year or period

<u>Determination of BAU emission factor ($EF_{BAU,y}$)</u>

As specified in the methodology, the calculation method of BAU emission factor is consistent with the calculation of baseline emission factor $EF_{BL,y}$. Please refer to Section B.8.1.1.

As required by the methodology, a conservative adjustment is applied during the first crediting period as follows:

$$BAU_{cons,min,y} = BAU_y - \left(BAU_y - AE_y\right) \times 0.1 \quad \textbf{Equation 10}$$

Where:

$BAU_{cons,min,y}$	=	Minimum conservative BAU baseline emissions in year y (tCO2/year)
BAU_y	=	Most likely net BAU baseline emissions in year y (tCO2/year)
AE_y	=	Activity emissions in year y (tCO2/year)
y	=	Relevant year or period

$$BAU_{cons,y} = BAU_{cons,min,y} \quad \textbf{Equation 11}$$

Where:

$BAU_{cons,y}$	=	Conservative BAU baseline emissions in year y (tCO2/year)
$BAU_{cons,min,y}$	=	Minimum conservative BAU baseline emissions in year y (tCO2/year)

y = Relevant year or period

The BAU scenario and its quantification are determined ex ante in the PDD at the start of the first crediting period for the same duration as the crediting period of the proposed project, specifying the BAU emissions for each calendar year within the crediting period and ex post for each calendar year during the crediting period. The BAU emission factor (EF_{BAU}) and the distance travelled following low-carbon route ($L_{\hat{p},\hat{lc},y}$) will be updated ex post for each calendar year during the crediting period.

The conservative BAU emissions ex-ante estimated over the crediting period are presented in the below table.

Year	$EF_{BAU,y}$ (tCO2/km)	$L_{\hat{p},\hat{lc},y}$ (km)	BAU_y (tCO2)	AE_y (tCO2)	$BAU_{cons,y}$ (tCO2)
1	0.000179574	12,400,000,000	2,226,714	2,075,227	2,211,565
2	0.000179574	12,400,000,000	2,226,714	2,075,227	2,211,565
3	0.000179574	12,400,000,000	2,226,714	2,075,227	2,211,565
4	0.000179574	12,400,000,000	2,226,714	2,075,227	2,211,565
5	0.000179574	12,400,000,000	2,226,714	2,075,227	2,211,565
Total					11,057,826

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

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The baseline emissions of the year y during the crediting period shall be:

$$BE_y = \min\left(BAU_{cons,y}, BE_{adj,y}\right)$$ **Equation 12**

Where:

BE_y = Baseline emissions in year y (tCO2/year)

$BAU_{cons,y}$ = Conservative BAU baseline emissions in year y (tCO2/year)

$BE_{adj,y}$ = Downward adjusted baseline emissions in year y (tCO2/year)

y = Relevant year or period

The annual and cumulative differences between the downward adjusted baseline and the conservative BAU emissions are presented in the below table, indicating for each year and the total whether downward adjusted baseline emissions are greater than, equal to, or less than the corresponding BAU emissions.

Year	$BE_{adj,y}$ (tCO2)	Comparison	$BAU_{cons,y}$ (tCO2)
1	2,211,565	=	2,211,565
2	2,189,298	<	2,211,565
3	2,167,031	<	2,211,565
4	2,144,764	<	2,211,565
5	2,122,497	<	2,211,565
Total	10.835,155	<	11,057,826

Since the downward adjusted baseline is consistently not greater than the conservative BAU, the downward adjusted baseline is taken as the crediting baseline for the proposed project and used for emission reduction calculation.

The ex-post calculated downward-adjusted baseline and the ex-post calculated conservative BAU baseline for each calendar year of the crediting period will be compared and the conservative value will be used for that year as baseline emissions.

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

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The activity emissions are calculated as follows:

$$AE_y = EF_{AE,y} \times L_{\hat{p},\widehat{lc},y} \qquad \textbf{Equation 13}$$

Where:

AE_y	=	Activity emissions in year y (tCO2/year)
$EF_{AE,y}$	=	Activity emission factor in year y (tCO2/km)
$L_{\hat{p},\widehat{lc},y}$	=	Total length of links traversed on the low-carbon route $\widehat{lc}$ predicted by the navigation platform under a navigation planning scheme, accumulated from the navigation starting point, in year y (km)
$\hat{p}$	=	Navigation planning scheme provided by the navigation platform to the driver before a driving trip during the crediting period
$\widehat{lc}$	=	Predicted low-carbon route within each navigation planning scheme $\hat{p}$ during the crediting period
y	=	Calendar year of the crediting period

- Calculation of $L_{\hat{p},\widehat{lc},y}$
  - $L_{\hat{p},\widehat{lc},y}$ shall be determined by accumulating the pre-calibrated lengths of individual links completely traversed by the vehicle on the predicted low-carbon route $\widehat{lc}$ by the navigation platform, as confirmed through positioning-based travel trajectories recorded on the navigation platform in year y. Link lengths shall be defined and measured in advance by the navigation platform based on government-approved map data, and not subject to real-time measurement variability. A link shall be included in the distance accumulation only if complete traversal is confirmed by trajectory data; any link for which complete traversal cannot be confirmed shall be excluded.
  - Distance accumulation shall commence from the starting link, defined as the link on the predicted low-carbon route $\widehat{lc}$ within which the navigation starting point is located. Where the navigation starting point cannot be precisely located via trajectory data, the first link that can be precisely verified via trajectory data shall be used as the starting link. No distance shall be counted for links prior to this verified starting link, ensuring no overestimation of travel distance.
  - Distance accumulation shall cease when the vehicle's trajectory deviates from the predicted low-carbon route $\widehat{lc}$, defined as the occurrence of a trajectory point that cannot be matched to the next expected link on $\widehat{lc}$. Links traversed after such deviation shall not contribute to $L_{\hat{p},\widehat{lc},y}$.
  - During a trip, where the navigation platform issues a rerouting instruction that modifies the sequence of links remaining in the active route, the ongoing accumulation of link lengths shall cease and the new route plan shall be treated as a separate navigation planning scheme. Recalculation that does not alter the sequence of remaining links shall not constitute a new navigation planning scheme and shall not interrupt distance accumulation. The navigation platform shall maintain a timestamped log of all rerouting events occurring during each trip to support ex post verification of scheme boundaries.
- Prediction of low-carbon route within a navigation planning scheme under the activity scenario

$$E_{\hat{p},\hat{q}} = \sum_{r_{\hat{q}}} \left(L_{\hat{p},r_{\hat{q}}} \times EF_{CO_2 \hat{v}_{\hat{T}_{r_{\hat{q}}}}} \right)$$ **Equation 14**

$$\widehat{lc} = \left\{ \hat{q} \mid E_{\hat{p},\hat{q}} = \min_{\hat{q}} E_{\hat{p},\hat{q}} \right\}$$ **Equation 15**

Where:

$\hat{p}$	=	Navigation planning scheme provided by the navigation platform to the driver before a driving trip during the crediting period
$\hat{q}$	=	Planned route in navigation planning scheme $\hat{p}$
$E_{\hat{p},\hat{q}}$	=	Predicted CO2 emissions generated by passenger vehicle driving along planned route $\hat{q}$ in navigation planning schemes $\hat{p}$ (tCO2)
$L_{\hat{p},r_{\hat{q}}}$	=	Length of link $r_{\hat{q}}$ of planned route $\hat{q}$ in navigation planning scheme $\hat{p}$ (km)
$r_{\hat{q}}$	=	Link $r_{\hat{q}}$ of planned route $\hat{q}$ in navigation planning scheme $\hat{p}$
$\hat{v}_{\hat{T}_{r_{\hat{q}}}}$	=	Predicted speed of link $r_{\hat{q}}$ of planned route $\hat{q}$ in navigation planning scheme $\hat{p}$ at time $\hat{T}_{r_{\hat{q}}}$ (km/h)
$\hat{T}_{r_{\hat{q}}}$	=	Predicted time at which the driver's passenger vehicle would reach link $r_{\hat{q}}$, determined in accordance with Equation 26
$\widehat{lc}$	=	Predicted low-carbon route within each navigation planning scheme $\hat{p}$ during the crediting period
$EF_{CO_2 \hat{v}_{r_{\hat{q}}}}$	=	Weighted speed-emission factor at speed $\hat{v}_{T_{r_{\hat{q}}}}$ for the total petrol-fuelled passenger vehicle stock in the host city (tCO2/km)

Ex-post verification of the predicted low-carbon route planned prior to each driving trip shall be conducted on all relevant navigation planning schemes occurring during the verification period. The following measures shall be applied to ensure no overestimation of low-carbon route travel distance or baseline emissions.

(1) Any predicted low-carbon route that is verified ex post as not generating the lowest CO_2 emissions among all route options within the navigation planning scheme shall be documented. The distance accumulated under such navigation planning schemes shall be excluded from $L_{\hat{p},\widehat{lc},y}$, ensuring no over-estimation of low-carbon route travel distance.

(2) In addition to the exclusion of distance accumulation under (1), a conservative emissions deduction shall be applied to account for cases where the incorrectly predicted route generates higher CO_2 emissions than the corresponding baseline emissions. The deduction shall be calculated as follows:

$$\Delta E_{deduct,y} = (\overline{EF}_{wrong,y} - EF_{BL,y}) \times D_{wrong,y}$$ **Equation 16**

$$\overline{EF}_{wrong,y} = \frac{\sum_{i \in wrong,y} E_{i,y}}{D_{wrong,y}}$$ **Equation 17**

$$D_{wrong,y} = \sum_{i \in wrong,y} d_{i,y}$$ **Equation 18**

Where:

$\Delta E_{deduct,y}$	=	Emission deductions due to predicted low-carbon route verified ex post as not generating the lowest CO2 emissions among all route options within the navigation planning scheme in year y (tCO2/year)

$\overline{EF}_{wrong,y}$	=	Average CO2 emissions per kilometer of incorrectly predicted routes in year y (tCO2/km)
$EF_{BL,y}$	=	Baseline emission factor in year y, calculated as per Equation 5 (tCO2/km)
$D_{wrong,y}$	=	Total travel distance accumulated on incorrectly predicted routes in year y (km)
$E_{i,y}$	=	Actual CO2 emissions of incorrectly predicted route i in year y (tCO2)
$d_{i,y}$	=	Actual travel distance of incorrectly predicted route i in year y (km)
i	=	Predicted low-carbon route verified as not generating the lowest CO2 emissions among all route options within the navigation planning scheme in year y, as per ex post verification outcome, i.e. incorrectly predicted route
y	=	Calendar year of the crediting period

- When $\overline{EF}_{wrong,y} \leq EF_{BL,y}$, $\Delta E_{deduct,y}$ shall be set to zero. In this case, the incorrectly predicted routes do not generate emissions above the baseline level; the exclusion of their distance under measure (1) is sufficient to ensure no overestimation of emission reductions, and no further deduction is required. Setting the deduction to zero rather than applying a negative adjustment ensures conservativeness by avoiding any upward correction to the claimed emission reductions.
- When $\overline{EF}_{wrong,y} > EF_{BL,y}$, $\Delta E_{deduct,y}$ shall be subtracted from the emission reductions calculated as per Equation 31. This deduction reflects the excess CO2 emissions attributable to incorrectly predicted routes above the baseline level, which would otherwise result in an overstatement of net emission reductions. By explicitly quantifying and deducting this excess, the methodology ensures that only emission reductions genuinely attributable to correct low-carbon route guidance are claimed, thereby preserving the conservativeness and environmental integrity of the calculated emission reductions.

- Determination of activity emission factor ($EF_{AE,y}$)

Step 1: Navigation planning scheme sampling in year y

(a) Spatiotemporal stratification: Activity participants shall stratify all navigation planning schemes within the activity boundary in year y' based on the combined time-spatial dimension, which integrates time and spatial characteristics to form exclusive spatiotemporal strata. Year y' refers to the calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period.

(i) Stratification by Time Dimension: A calendar year shall be divided into several categories of characteristic days (i), with each category further subdivided into characteristic time periods (j). Characteristic day categories include weekdays, weekends, and holidays, and characteristic time periods, depending on characteristic day categories, are classified into peak and off-peak periods. Typically, morning peak period is from 7:00 to 9:00, evening peak period is from 17:00 to 19:00, and all other hours of the day are defined as off-peak periods.

(ii) Stratification by Spatial Dimension: The geographic boundary of the activity shall be divided into multiple non-overlapping sub-regions. These sub-regions can be delineated according to administrative divisions, traffic zones, or a grid system. The spatial attribute is characterized by trip origin-destination (od) pairs of the sub-regions. Spatial stratification may be omitted where the geographic boundary of the activity covers only a single indivisible administrative unit.

(b) Spatiotemporal sampling

The sampling process shall be conducted as follows:

(i) Statistically compile the total number of petrol-fuelled passenger vehicle navigation planning schemes in each spatiotemporal stratum (i, j, od) $TP_{i,j,od,y'}$;

Note: If the sub-region of departure and the sub-region of destination are the same, this indicates trips within the same sub-region.

(ii) Taking total number of navigation planning schemes $TP_{i,j,od,y'}$ as the population, a simple random sampling method shall be adopted to extract the sample of navigation planning schemes in each spatiotemporal stratum (i, j, od) $A_{i,j,od,y'}$. The sample size calculation shall comply with the requirement of a minimum confidence level of 95% and a margin of error not exceeding ±5%. The stratum-level sample size is calculated as follows:

$$A_{i,j,od,y'} = \frac{TP_{i,j,od,y'} \cdot z^2 \cdot V_{i,j,od,lc,y'}}{(TP_{i,j,od,y'} - 1) \cdot e^2 + z^2 \cdot V_{i,j,od,lc,y'}}$$ **Equation 19**

Where:

$TP_{i,j,od,y'}$	=	Population of petrol-fuelled passenger vehicle navigation planning schemes in each spatiotemporal stratum (i, j, od) in year y’
$A_{i,j,od,y'}$	=	Sample size of petrol-fuelled passenger vehicle navigation planning schemes in each spatiotemporal stratum (i, j, od) in year y’
z	=	z-score corresponding to a 95% confidence level, 1.96
$V_{i,j,od,lc,y'}$	=	Square of the coefficient of variation of $E_{PKM,p,lc,y'}$, within stratum (i, j, od)
e	=	Allowable margin of error, 0.05
y’	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

$$V_{i,j,od,y'} = \left(\frac{SD^{Exante}_{i,j,od,lc,y'}}{\overline{E}^{Exante}_{PKM,i,j,od,lc,y'}} \right)^2$$ **Equation 20**

Where:

$V_{i,j,od,lc,y'}$	=	Square of the coefficient of variation of $E_{PKM,p,lc,x}$, within stratum (i, j, od)
$SD^{Exante}_{i,j,od,lc,y'}$	=	Expected deviation of $E_{PKM,p,lc,x}$ for low-carbon route lc in spatiotemporal stratum (i, j, od) in year y’
$\overline{E}^{Exante}_{PKM,i,j,od,lc,y'}$	=	Expected mean of $E_{PKM,p,lc,x}$ for low-carbon route lc in spatiotemporal stratum (i, j, od) in year y’
y’	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

For sample size calculation in the PDD, a conservative default value of $V_{i,j,od,lc,y'}$ = 0.25 shall be applied, which corresponds to a coefficient of variation (CV) of 0.5, i.e. $V = CV^2 = 0.5^2 = 0.25$. This default is intended to ensure that the sample size is not underestimated.

For sample size calculation in the monitoring reports, the sample mean and variance obtained in the most recent prior sampling round shall be used as the ex-ante estimates for determining the sample size of the current round, replacing the default value.

Where a spatiotemporal stratum did not exist in the prior sampling round and therefore has no historical data available, the default value of $V_{i,j,od,lc,y'}$ = 0.25 shall be applied for that stratum in the current round. Once sampling data for that stratum are obtained, the stratum shall enter the iterative update cycle in subsequent rounds.

Where a spatiotemporal stratum from the prior round is no longer present or has an insufficient population in the current year, it shall be merged with an adjacent stratum in accordance with the merging rules specified in the PDD. The merged stratum shall be treated as a single stratum for sample size calculation purposes, using the combined population and variance.

The sample mean and variance obtained for each stratum in each sampling round shall be recorded in the monitoring report in a dedicated table, which serves as the input for the following round. The DOE shall verify, during each verification, that the sample size for each stratum has been determined using the parameters recorded in the immediately preceding monitoring report, ensuring full traceability across crediting period years.

(iii) The total sample size of petrol-fuelled passenger vehicle navigation planning schemes for the entire activity boundary $A_{y'}$ in year y' is calculated as the sum of stratum-level sample sizes across all spatiotemporal strata (i, j, od) in year y', with the formula as follows:

$$A_{y'} = \sum_{i,j,od} A_{i,j,od,y'} \qquad \textbf{Equation 21}$$

Where:

$A_{y'}$	=	Total sample size of petrol-fuelled passenger vehicle navigation planning schemes in year y'
$A_{i,j,od,y'}$	=	Stratum-level sample size for spatiotemporal stratum (i, j, od) in year y'
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

Where the achieved margin of error exceeds ±5% for any spatiotemporal stratum, the activity participant shall apply one of the following remedial measures:

(a) Increase the sample size for the affected stratum and re-conduct sampling until the ±5% margin of error requirement is met; or

(b) Accept the achieved margin of error for the affected stratum and apply the upper bound of the actual 95% confidence interval of the stratum-level emission factor estimate, which corresponds to an upward adjustment larger than would apply under the ±5% criterion, thereby ensuring conservativeness.

Under option (b), the achieved margin of error for the affected stratum shall be explicitly documented in the monitoring report, together with a justification for why option (a) was not applied.

The achieved margin of error for each stratum shall be calculated as:

$$MOE_{i,j,od,lc,y'} = \frac{z \times SE_{i,j,od,lc,y'}}{\overline{E}_{PKM,i,j,od,lc,y'}} \times 100\% \qquad \textbf{Equation 22}$$

Where:

$MOE_{i,j,od,lc,y'}$	=	Achieved margin of error for low-carbon route lc in spatiotemporal stratum (i, j, od) in year y' (%)
z	=	z-score corresponding to a 95% confidence level, 1.96
$SE_{i,j,od,lc,y'}$	=	Stratum-level standard error of the estimated average CO2 emissions per kilometer generated by vehicles driving along low-carbon route lc in spatiotemporal stratum (i, j, od) in year y' (tCO2/km)
$\overline{E}_{PKM,i,j,od,lc,y'}$	=	Sample mean of $E_{PKM,p,lc,y'}$ for low-carbon route lc in spatiotemporal stratum (i, j, od) in year y', refer to Equation 33
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

The sample size was determined using a default value of $V_{i,j,od,lc,y'}$ = 0.25, with a minimum confidence level of 95% and a margin of error not exceeding ±5%, ensuring both representativeness and conservativeness. Through stratified spatiotemporal sampling, a total of 884,736 navigation planning schemes were drawn for analysis.

Step 2: Calculation of average CO_2 emissions per kilometer of low-carbon route lc in sample p

The activity emission factor $EF_{AE,y}$ is determined from the set of sampled navigation planning schemes p obtained in year y', with total sample size $A_{y'}$, as described in Step 1: Navigation planning scheme sampling in year y.

For each sampled navigation planning scheme p, the low-carbon route lc shall be identified following the identical procedure set out in Paragraph 76 of the applied methodology. Prediction of low-carbon route within a navigation planning scheme under the activity scenario, with the sole distinction that the identification of the low-carbon route lc within a sampled navigation planning scheme constitutes an ex post calculation based on actual average speed of links, whereas the prediction of the low-carbon route $\widehat{lc}$ within a navigation planning scheme under the activity scenario constitutes an ex ante calculation based on predicted average speed of links. The emissions for each low-carbon route lc shall be calculated as:

$$E_{p,lc,y'} = \sum_{r_{lc}} \left(L_{r_{lc}} \times EF_{co_2,v_{T_{r_{lc},y'}}} \right) \quad \textbf{Equation 23}$$

Where:

$E_{p,lc,y'}$	=	CO2 emissions generated by passenger vehicle driving along low-carbon route lc in sample p in year y' (tCO2)
lc	=	Low-carbon route in sample p
r_{lc}	=	Link of low-carbon route lc in sample p
$L_{r_{lc}}$	=	Length of link r_{lc} of low-carbon route lc in sample p (km)
$T_{r_{lc},y'}$	=	Time at which the driver's passenger vehicle reaches link r_{lc} in year y', determined in accordance with Equation 26
$v_{T_{r_{lc},y'}}$	=	Actual average speed of each link at time $T_{r_{lc},y'}$ when the driver's passenger vehicle would have reached link r_{lc} in year y' (km/h)
$EF_{CO_2,v_{T_{r_{lc},y'}}}$	=	Weighted speed-emission factor at speed $v_{T_{r_{lc},y'}}$ for the total petrol-fuelled passenger vehicle stock in the host city (tCO2/km)
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

- Determination of $EF_{CO_2,v}$

City-level $EF_{CO_2,v}$ at speed v shall be calculated as the weighted average of speed-emission factor at speed v of each vehicle category c. Vehicle category c shall be established by stratifying the petrol-fuelled vehicle population in the host city according to engine displacement k (in liters) and vehicle age t (in years), based on the following classification:

Engine displacement (k) categories		**Vehicle age (t) categories**	
Category	Range	Category	Range
k_1	$k \leq 1.0L$	t_1	0 – 6 years
k_2	$1.0L < k \leq 1.6L$	t_2	7 – 10 years
k_3	$1.6L < k \leq 2.0L$	t_3	＞10 years
k_4	$k > 2.0L$	/	

Each vehicle category c is defined as a unique combination (k_s, t_s), resulting in a maximum of 12 categories.

$EF_{CO_2,v,c}$ shall be updated no less than once every three years during the crediting period and at each renewal of the crediting period. The reference year of the $EF_{CO_2,v,c}$ values in use shall be documented in each monitoring report.

$EF_{co_2,v}$ shall be calculated as the weighted average of $EF_{CO_2,v,c}$.

$$EF_{CO_2,v} = \sum_{c} (EF_{CO_2,v,c} \times S_{c,y'}) \quad \textbf{Equation 24}$$

Where:

$EF_{CO_2,v}$ = Weighted speed-emission factor at speed v for the total petrol-fuelled passenger vehicle stock in the host city (tCO_2/km)

$EF_{CO_2,v,c}$ = Speed-emission factor at speed v for vehicle category c (tCO_2/km)

$S_{c,y'}$ = Share of vehicle category c in the total petrol-fuelled passenger vehicle stock in year y' (%)

c = Vehicle category established according to engine displacement k (in liters) and vehicle age t (in years)

y' = The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

Since all petrol-fuelled passenger vehicles have been stratified into vehicle category c, the share of each category c in the entire petrol-fuelled passenger vehicle stock of the host city shall be calculated as:

$$S_{c,y'} = \frac{P_{c,y'}}{\sum_c P_{c,y'}}$$ **Equation 25**

Where:

$S_{c,y'}$ = Share of vehicle category c in the entire petrol passenger vehicle stock in year y' (%)

$P_{c,y'}$ = Number of petrol vehicles in vehicle category c in year y'

c = Vehicle category established according to engine displacement k (in liters) and vehicle age t (in years)

y' = The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

Entire petrol vehicle stock in Beijing is stratified by vehicle category c with shares of each engine displacement category shown in the below table.

Vehicle category (c)	Share of petrol passenger vehicles of each engine displacement category ($S_{c,y'}$)
k1-t1	0%
k2-t1	12%
k3-t1	24%
k4-t1	7%
k1-t2	0%
k2-t2	11%
k3-t2	14%

k4-t2	7%
k1-t3	0%
k2-t3	12%
k3-t3	11%
k4-t3	2%

- Determination of T_r, applicable to $\widehat{T}_{r_{\hat{q}}}$ and $T_{r_{lc},y'}$

$$T_r = \begin{cases} T_{depart} & r = 1 \\ T_{r-1} + L_{r-1}/v_{T_{r-1}} & r > 1 \end{cases} \quad \textbf{Equation 26}$$

Where:

T_{depart}	=	Time at which the driver's passenger vehicle departs from the navigation starting point
$r-1$	=	The link preceding link r of low-carbon route lc
T_{r-1}	=	Time at which the driver's passenger vehicle reaches preceding link $r-1$
L_{r-1}	=	Length of preceding link $r-1$ (km)
$v_{T_{r-1}}$	=	Average speed of preceding link $r-1$ at time T_{r-1} (km/h)

- Determination of $E_{PKM,p,lc,y'}$

$$E_{PKM,p,lc,y'} = \frac{E_{p,lc,y'}}{\sum_{r_{lc}} L_{r_{lc}}} \quad \textbf{Equation 27}$$

Where:

$E_{PKM,p,lc,y'}$	=	Average CO2 emissions per kilometer generated by vehicles driving along low-carbon route lc in sample p in year y' (tCO2/km)
lc	=	Low-carbon route in sample p
$E_{p,lc,y'}$	=	CO2 emissions generated by passenger vehicle driving along low-carbon route lc in sample p in year y' (tCO2)
$L_{r_{lc}}$	=	Length of link r_{lc} of low-carbon route lc in sample p (km)
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period

Step 3: Determination of activity emission factor ($EF_{AE,y}$)

$$EF_{AE,y} = \sum_{i,j,od} W_{i,j,od,y'} \times \overline{E}_{PKM,i,j,od,lc,y'} \quad \textbf{Equation 28}$$

$$W_{i,j,od,y'} = \frac{TP_{i,j,od,y'}}{\sum TP_{i,j,od,y'}} \quad \textbf{Equation 29}$$

$$\overline{E}_{PKM,i,j,od,lc,y'} = \frac{\sum_{p \in (i,j,od)} E_{PKM,p,lc,y'}}{A_{i,j,od,y'}}$$ **Equation 30**

Where:

$EF_{AE,y}$	=	Activity emission factor in year y (tCO2/km)
p	=	Sampled navigation planning scheme
lc	=	Low-carbon route in sample p
$E_{PKM,p,lc,y'}$	=	Average CO2 emissions per kilometer generated by vehicles driving along low-carbon route lc in sample p in year y' (tCO2/km)
$A_{y'}$	=	Total sample size of petrol-fuelled passenger vehicle navigation planning schemes in year y'
$TP_{i,j,od,y'}$	=	Population of petrol-fuelled passenger vehicle navigation planning schemes in each spatiotemporal stratum (i, j, od) in year y'
$A_{i,j,od,y'}$	=	Sample size of petrol-fuelled passenger vehicle navigation planning schemes in each spatiotemporal stratum (i, j, od) in year y'
$W_{i,j,od,y'}$	=	Weight of spatiotemporal stratum (i, j, od) in year y'
$\overline{E}_{PKM,i,j,od,lc,y'}$	=	Sample mean of $E_{PKM,p,lc,y'}$ for low-carbon route lc in spatiotemporal stratum (i, j, od) in year y'
y'	=	The calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period
y	=	Calendar year of the crediting period

The ex-ante activity emission factor and the expected travel distances on low-carbon routes as specified in the feasibility study report are presented in the table below at the PDD validation stage and will be updated on an annual basis at the verification stage.

Year	$EF_{AE,y}$ (tCO_2/PKM)	$L_{\hat{p},\hat{lc},y}$ (km)	AE_y (tCO_2)
1	0.000167357	12,400,000,000	2,075,227
2	0.000167357	12,400,000,000	2,075,227
3	0.000167357	12,400,000,000	2,075,227
4	0.000167357	12,400,000,000	2,075,227
5	0.000167357	12,400,000,000	2,075,227

B.8.3. Addressing of leakage

B.8.3.1. Sources of leakage

>>

According to the methodology, no significant leakage is expected to occur in these types of activities. Therefore, leakage is considered as zero.

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

>>

Not applicable.

B.8.3.3. Calculation of leakage emissions

>>
Not applicable.

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

>>
Emission reductions are calculated as follows:

$$ER_y = BE_y - AE_y \qquad \textbf{Equation 31}$$

Where:

ER_y	=	Emission reductions in year y (tCO2/year)
BE_y	=	Baseline emissions in year y (tCO2/year)
AE_y	=	Activity emissions in year y (tCO2/year)

B.8.5. Data and parameters fixed ex ante

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

Data/parameter	**>>** NCV
Description	>> Net caloric value of petrol
Data unit	>> MJ/ton
Equations referred	>> *3*
Purpose of data	☒ Baseline emissions/removals ☐ Project emissions/removals ☐ Leakage emissions
Value(s) applied	>> 43,124
Source of data	☐ Measured ☒ Other sources
Treatment of uncertainty	>> Uncertainty has been addressed by employing data from authoritative sources. The applied value is lower than the IPCC default value of motor gasoline 44,400 MJ/ton[9].
Choice of data or measurement methods and procedures	>> *GB/T 2589-2020 General rules for calculation of the comprehensive energy consumption* Locally representative measurements obtained from government authorities
Additional comments	>>

Data/parameter	**>>** EF_{CO2}
Description	>> Emission factor of petrol
Data unit	>> tCO_2/MJ
Equations referred	>> *3*

[9] https://www.ipcc-nggip.iges.or.jp/public/2006gl/chinese/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

Purpose of data	☒ Baseline emissions/removals ☐ Project emissions/removals ☐ Leakage emissions
Value(s) applied	>> 0.000067914
Source of data	☐ Measured ☒ Other sources
Treatment of uncertainty	>> Uncertainty has been addressed by employing data from authoritative sources. The applied value is lower than the IPCC default value of motor gasoline 0.000069300 MJ/ton[10].
Choice of data or measurement methods and procedures	>> Guidelines for Preparation of Provincial Greenhouse Gas Inventories (2025 Version) Locally representative measurements obtained from government authorities
Additional comments	>>

Data/parameter	**>>** ρ
Description	>> Density of petrol
Data unit	>> ton/L
Equations referred	>> *3*
Purpose of data	☒ Baseline emissions/removals ☐ Project emissions/removals ☐ Leakage emissions
Value(s) applied	>> 0.00073
Source of data	☐ Measured ☒ Other sources
Treatment of uncertainty	>> Uncertainty has been addressed by employing data from authoritative sources. The applied value is lower than the typical density of motor gasoline 0.0007407 ton/L as specified in the applied methodology
Choice of data or measurement methods and procedures	>> *GB 17930-2016 Gasoline for motor vehicles* Locally representative measurements obtained from government authorities
Additional comments	>>

Data/parameter	>> **INDA**
Description	>> Increase in the downward adjustment in the subsequent years of the crediting period
Data unit	>> %
Equations referred	>> *8*
Purpose of data	☒ Baseline emissions/removals ☐ Project emissions/removals ☐ Leakage emissions

[10] https://www.ipcc-nggip.iges.or.jp/public/2006gl/chinese/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

Value(s) applied	>> 1
Source of data	☐ Measured ☒ Other sources
Treatment of uncertainty	>> /
Choice of data or measurement methods and procedures	>> From the applied methodology
Additional comments	>>

Data/parameter	**>> *k***
Description	>> Engine displacement category established by stratifying the vehicle population according to engine displacement (in liters)
Data unit	>> /
Equations referred	>> *2,3,4,5*
Purpose of data	☒ Baseline emissions/removals ☐ Project emissions/removals ☐ Leakage emissions
Value(s) applied	>> Engine displacement (k) categories: Category $k \leq 1.0L$ $1.0L < k \leq 1.6L$ $1.6L < k \leq 2.0L$ $k > 2.0L$
Source of data	☐ Measured ☒ Other sources
Treatment of uncertainty	>> /
Choice of data or measurement methods and procedures	>> From applied methodology
Additional comments	>>

Data/parameter	**>>** c
Description	>> Vehicle category established according to engine displacement k (in liters) and vehicle age t (in years)
Data unit	>> /
Equations referred	>> *24,25*
Purpose of data	☐ Baseline emissions/removals ☒ Project emissions/removals ☐ Leakage emissions

<table>
<tr><td>Value(s) applied</td><td>>> c is defined as a unique combination (k_s, t_s)
<table>
<tr><th colspan="2">Engine displacement (k) categories</th><th colspan="2">Vehicle age (t) categories</th></tr>
<tr><td>Category</td><td>Range</td><td>Category</td><td>Range</td></tr>
<tr><td>k_1</td><td>$k \leq 1.0L$</td><td>t_1</td><td>0 – 6 years</td></tr>
<tr><td>k_2</td><td>$1.0L < k \leq 1.6L$</td><td>t_2</td><td>7 – 10 years</td></tr>
<tr><td>k_3</td><td>$1.6L < k \leq 2.0L$</td><td>t_3</td><td>>10 years</td></tr>
<tr><td>k_4</td><td>$k > 2.0L$</td><td colspan="2">/</td></tr>
</table></td></tr>
<tr><td>Source of data</td><td>☐ Measured ☒ Other sources</td></tr>
<tr><td>Treatment of uncertainty</td><td>>> /</td></tr>
<tr><td>Choice of data or measurement methods and procedures</td><td>>> From applied methodology</td></tr>
<tr><td>Additional comments</td><td>>></td></tr>
</table>

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	2,211,565	2,075,227	0	136,338
Year 2	2,189,298	2,075,227	0	114,071
Year 3	2,167,031	2,075,227	0	91,804
Year 4	2,144,764	2,075,227	0	69,537
Year 5	2,122,497	2,075,227	0	47,270
Total	10,835,155	10,376,134	0	459,021
Total number of years in the crediting period	5			
Annual average over the crediting period	2,167,031	2,075,227	0	91,804

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	>> $fc_{j,k,(y'-2,y'-1,y')}$
Description	>> The j-th distinct WLTC combined fuel consumption value (or converted WLTC-equivalent value) published by the government authorities for a petrol-fuelled passenger vehicle model variant in engine displacement category k

	over the three calendar years ending in year y'	
Data unit	>>L/100 km	
Equations referred	>> 2	
Purpose of data	☒ Baseline emissions / removals ☐ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> WLTC combined fuel consumption value published by the government authorities https://yhgscx.miit.gov.cn/fuel-consumption-web/mainPage	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Annually	
QA/QC procedures	>> /	
Treatment of uncertainty	>> Uncertainty has been addressed by employing data disclosed by the government authorities	
Additional comment	>> y' refers to the calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period	

Data/parameter	>> $n_{j,k,(y'-2,y'-1,y')}$	
Description	>> Frequency count of the fuel consumption value $fc_{j,k,(y'-2,y'-1,y')}$ in the official government published records for engine displacement category k over the three calendar years ending in year y'	
Data unit	>>count	
Equations referred	>> 2	
Purpose of data	☒ Baseline emissions / removals ☐ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> WLTC combined fuel consumption value published by the government authorities https://yhgscx.miit.gov.cn/fuel-consumption-web/mainPage	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /

	Location	>> /
Measurement intervals	>> Annually	
QA/QC procedures	>> /	
Treatment of uncertainty	>> Uncertainty has been addressed by employing data disclosed by the government authorities	
Additional comment	>> y' refers to the calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period	

Data/parameter	>> $P_{k,y'}$	
Description	>> Number of petrol-fuelled vehicles in engine displacement category k in year y'	
Data unit	>> Vehicle	
Equations referred	>> 4	
Purpose of data	☒ Baseline emissions / removals ☐ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> Government traffic management department's vehicle registry records	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Annually	
QA/QC procedures	>> The activity participant shall demonstrate that the vehicle stock data are sourced from the official vehicle registration records for the reference year y' and cover the full in-use petrol-fuelled passenger vehicle population within the host city's administrative boundary.	
Treatment of uncertainty	>> /	
Additional comment	>> y' refers to the calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period	

Data/parameter	>> $P_{c,y'}$
Description	>> Number of petrol-fuelled vehicles in vehicle category c in year y'
Data unit	>> Vehicle
Equations referred	>> 25
Purpose of data	☐ Baseline emissions / ☒ Project emissions / ☐ Leakage emissions

	removals	removals
Measurement methods and procedures	>> Government traffic management department's vehicle registry records	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Annually	
QA/QC procedures	>> The activity participant shall demonstrate that the vehicle stock data are sourced from the official vehicle registration records for the reference year y' and cover the full in-use petrol-fuelled passenger vehicle population within the host city's administrative boundary.	
Treatment of uncertainty	>> /	
Additional comment	>> y' refers to the calendar year immediately prior to year y of the crediting period, or the most recent calendar year prior to year y of the crediting period for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period	

Data/parameter	>> p	
Description	>> Sampled navigation planning scheme, comprising: a) Latitude and longitude of navigation starting point and navigation end point, driver's departure time; A set of at least two planned routes, each containing the sequence of route links from navigation starting point to navigation end point, along with road attribute information such as link lengths	
Data unit	>> /	
Equations referred	>> 23,27,30	
Purpose of data	☐ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> Sampling shall be conducted in accordance with the Annual Sampling Provisions as specified in Section B.9.2	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /

Measurement intervals	>> Annually
QA/QC procedures	>> The achieved margin of error shall be calculated. Where the achieved margin of error exceeds ±5% for any spatiotemporal stratum, the activity participant shall apply one of the following remedial measures: (a) Increase the sample size for the affected stratum and re-conduct sampling until the ±5% margin of error requirement is met; or (b) Accept the achieved margin of error for the affected stratum and apply the upper bound of the actual 95% confidence interval of the stratum-level emission factor estimate, which corresponds to an upward adjustment larger than would apply under the ±5% criterion, thereby ensuring conservativeness. Under option (b), the achieved margin of error for the affected stratum shall be explicitly documented in the monitoring report, together with a justification for why option (a) was not applied.
Treatment of uncertainty	>> Sampling uncertainty has been addressed in the QA/QC procedures
Additional comment	1. >> The parameter lc, $\mathrm{r_{lc}}$ and $L_{r_{lc}}$, T_{depart} $(applicable\ to\ T_{r_{lc},y'})$ are included in $\boldsymbol{p}$. 2. For each sample p collected, the low-carbon route lc shall be identified following the identical procedure set out in *Paragraph 76. Prediction of low-carbon route within a navigation planning scheme under the activity scenario*. 3. $\mathrm{r_{lc}}$ refers to link of low-carbon route lc in sample p 4. $L_{r_{lc}}$ refers to length of link $\mathrm{r_{lc}}$ of low-carbon route lc in sample p (km), which is defined and measured in advance by the navigation platform based on map data, and are not subject to real-time measurement variability 5. $\mathrm{T_{depart,p}}$ refers to the time (accurate to the second) at which the driver's passenger vehicle departs from the navigation starting point, which is determined by the trajectory timestamp recorded by the navigation platform

Data/parameter	>> $v_{T_{r_{lc},y'}}$	
Description	>> Actual average speed of each link at time $\mathrm{T_{r_{lc},y'}}$ when the driver's passenger vehicle would have reached link $\mathrm{r_{lc}}$ in year y'	
Data unit	>>km/h	
Equations referred	>> 23,26	
Purpose of data	☐ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> The actual average speed of each link is calculated as the ratio of the pre-calibrated link length to the actual traversal time recorded by GNSS-enabled devices: $\mathrm{v = link\ length/actual\ traversal\ time}$	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> GNSS-enabled devices
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> On-board the voluntarily participating vehicles
Measurement intervals	>> Continuously	

QA/QC procedures	>> Validity criteria applied to each link-level speed record: (1) Spatial completeness: GNSS trajectory must be successfully map-matched to both the entry node and exit node of the target link. Records failing map-matching are discarded. (2) Temporal continuity: The maximum time gap between any two consecutive GNSS points within the time window between the entry node and exit node of the target link must not exceed 60 seconds. Records exceeding this threshold are discarded. (3) Speed plausibility: The resulting link-level speed must satisfy regulatory local speed limit, e.g. 0 < link-level speed ≤ 120 km/h in China. Outliers are discarded. A link-level speed record is accepted for emission calculation only when all criteria above are satisfied.
Treatment of uncertainty	>> – Link lengths shall be defined and measured in advance by the navigation platform based on government-approved map data, and not subject to real-time measurement variability, eliminating measurement variability in the numerator of the speed formula. – The 60-second maximum gap criterion prevents systematic overestimation of traversal time caused by data dropout, thereby avoiding underestimation of link speed. – The validity criteria (1)–(3) collectively ensure that only verified speed records contribute to emission calculations.
Additional comment	>> The statistical aggregation interval for the link-level speed shall not exceed 5 minutes.

Data/parameter	>> $EF_{CO_2,v,c}$
Description	>> Speed-emission factor at speed v for vehicle category c
Data unit	>>tCO_2/km
Equations referred	>> 23,24
Purpose of data	☐ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions
Measurement methods and procedures	>> (1) Publicly credible statistical data, such as sector-specific statistics, values from national standards, or research data from relevant industry associations. Where a range of values is available, the value corresponding to the upper bound of the 95% confidence interval shall be selected to ensure that $\mathrm{EF}_{\mathrm{CO_2,v,c}}$ is not underestimated. (2) Where credible publicly available data as described in (1) are not available, measurements shall be conducted by a qualified and independent institution according to the following methods and procedures: a) Measure driving cycles for roads at different grades within the activity boundary; b) Measure emission factors for each vehicle category c under the driving cycles determined in (a); c) Calculate region-specific vehicle speed-emission factors with relative uncertainties at a 95% confidence level using appropriate and internationally recognized models (e.g. MOVES). The upper bound of the 95% confidence interval shall be applied to ensure that $\mathrm{EF}_{\mathrm{CO_2,v,c}}$ is not underestimated.
Entity/person	>> Activity participant

responsible for the measurement		
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> At least once every three years during the crediting period and at each renewal of the crediting period	
QA/QC procedures	>> Where option (2) is applied, measurements shall be conducted by a qualified and independent institution. The institution's qualifications and the measurement methodology applied shall be documented in the monitoring report and verified by the DOE.	
Treatment of uncertainty	>> Upper bound of 95% confidence interval shall be applied.	
Additional comment	>> /	

Data/parameter	>> $\hat{v}_{\hat{T}_{r_{\hat{q}}}}$	
Description	>> Predicted speed of link $r_{\hat{q}}$ of planned route $\hat{q}$ in navigation planning scheme $\hat{p}$ at time $\hat{T}_{r_{\hat{q}}}$	
Data unit	>> km/h	
Equations referred	>> 14,26	
Purpose of data	☐ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> Predicted speed of each link is calculated as the ratio of the pre-calibrated link length to the traversal time predicted by the navigation platform: $v = \text{link length}/\text{predicted traversal time}$	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Continuously	
QA/QC procedures	>>Link lengths used in the predicted speed calculation shall be defined and measured in advance based on government-approved map data and are not subject to real-time variability. The predicted low-carbon route $\widehat{lc}$ determined using $\hat{v}_{\hat{T}_{r_{\hat{q}}}}$ shall be subject to ex post quality control verification as specified in the QA/QC procedures for $L_{\hat{p},\widehat{lc},y}$.	
Treatment of uncertainty	>> Uncertainty associated with predicted speeds is addressed through ex post quality control: navigation planning schemes for which the predicted low-carbon route is verified as not generating the lowest CO2 emissions shall be	

	excluded from distance accumulation, and a conservative emissions deduction shall be applied where applicable.
Additional comment	>> /

Data/parameter	>> $\hat{\boldsymbol{p}}$		
Description	>> Navigation planning scheme provided by the navigation platform to the driver before a driving trip during the crediting period, including: a) The latitude and longitude of the navigation starting point, the latitude and longitude of the navigation endpoint, and the departure time; b) A set of navigation routes, with minimum of two routes. Each route includes a sequence of links from the navigation starting point to the navigation endpoint, along with road attribute information such as link lengths, and an indication of whether it is a low-carbon route.		
Data unit	>> /		
Equations referred	>> 1,9,13,14,15		
Purpose of data	☒ Baseline emissions / removals	☒ Project emissions / removals	☐ Leakage emissions
Measurement methods and procedures	>> Planned by navigation platform		
Entity/person responsible for the measurement	>> Activity participant		
Measuring instrument(s)	*Type of instrument*	>> /	
	Accuracy class	>> /	
	Calibration requirements	>> /	
	Location	>> /	
Measurement intervals	>> Continuously		
QA/QC procedures	>> The parameter $\hat{q}$, $\widehat{lc}$, $r_{\hat{q}}$ and $L_{r_{\hat{q}}}$, T_{depart} (applicable to $\widehat{T}_{r_{\hat{q}}}$) are included in $\hat{\boldsymbol{p}}$. 1. $\hat{q}$ refers to planned route in navigation planning schemes $\hat{p}$ 2. $\widehat{lc}$ refers to predicted low-carbon route within each navigation planning scheme $\hat{p}$ during the crediting period identified following the procedure set out in *Paragraph 76. Prediction of low-carbon route within a navigation planning scheme under the activity scenario*. 3. $r_{\hat{q}}$ refers to planned route $\hat{q}$ in navigation planning schemes $\hat{p}$ 4. $L_{r_{\hat{q}}}$ refers to length of link $r_{\hat{q}}$ of planned route $\hat{q}$ in navigation planning schemes $\hat{p}$ (km), which is defined and measured in advance by the navigation platform based on map data, and are not subject to real-time measurement variability $T_{depart,\hat{p}}$refers to the time (accurate to the second) at which the driver's passenger vehicle departs from the navigation starting point, which is determined by the trajectory timestamp recorded by the navigation platform		
Treatment of uncertainty	>> /		
Additional comment	>> /		

Data/parameter	>> $traj$
Description	>> The driving trajectory sequence of an driver’s passenger vehicle, including time, location latitude and longitude, and instantaneous speed.
Data unit	>> /
Equations referred	>> /
Purpose of data	☒ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions
Measurement methods and procedures	>> Collected via GNSS-enabled smartphones or in-vehicle mobile terminals, with trajectory data processed and recorded by the navigation platform. All trajectory data are timestamped and stored in the platform’s database, providing a complete audit trail.
Entity/person responsible for the measurement	>> Activity participant
Measuring instrument(s)	*Type of instrument*: >> GNSS-enabled smartphones or in-vehicle mobile terminals
	Accuracy class: >> /
	Calibration requirements: >> /
	Location: >> On-board the voluntarily participating vehicles
Measurement intervals	>> Continuously
QA/QC procedures	>> Validity criteria applied to trajectory data: Invalid records (inaccurate, inconsistent, or missing trajectory data) are excluded from dataset. The time interval between two adjacent latitude and longitude points in the driver's driving trajectory shall not exceed 10 seconds. A link is only credited as fully traversed if both its entry and exit points are independently confirmed by trajectory data; otherwise, it is excluded from distance accumulation. These QA/QC rules ensure that no link is credited based solely on interpolated or inferred positions, maintaining conservativeness.
Treatment of uncertainty	>> Uncertainty has been addressed in the QA/QC procedures
Additional comment	>> Travel trajectories are used to verify whether each link has been completely traversed by the vehicle; only links for which complete traversal is confirmed are included in the distance accumulation.

Data/parameter	>> $L_{\hat{p},\widehat{lc},y}$
Description	>> Total length of links traversed on the low-carbon route $\widehat{lc}$ predicted by the navigation platform under a navigation planning scheme, accumulated from the navigation starting point, in year y
Data unit	>> km
Equations referred	>> 1,9,13,14,15
Purpose of data	☒ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions
Measurement methods and procedures	>> $L_{\hat{p},\widehat{lc},y}$ is determined by accumulating the pre-calibrated lengths of individual road links for which complete traversal is confirmed through positioning-based

	travel trajectories recorded on the navigation platform in year y.	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Continuously	
QA/QC procedures	>> • $L_{\hat{p},\widehat{lc},y}$ shall be determined by accumulating the pre-calibrated lengths of individual road links completely traversed by the vehicle on the predicted low-carbon route $\widehat{lc}$ by the navigation platform, as confirmed through positioning-based travel trajectories recorded on the navigation platform in year y. Link lengths shall be defined and measured in advance by the navigation platform based on government-approved map data, and not subject to real-time measurement variability. A link shall be included in the distance accumulation only if complete traversal is confirmed by trajectory data; any link for which complete traversal cannot be confirmed shall be excluded. • Distance accumulation shall commence from the starting link, defined as the link on the predicted low-carbon route $\widehat{lc}$ within which the navigation starting point is located. Where the navigation starting point cannot be precisely located via trajectory data, the first link that can be precisely verified via trajectory data shall be used as the starting link. No distance shall be counted for links prior to this verified starting link, ensuring no overestimation of travel distance. • Distance accumulation shall cease when the vehicle's trajectory deviates from the predicted low-carbon route $\widehat{lc}$, defined as the occurrence of a trajectory point that cannot be matched to the next expected link on $\widehat{lc}$. Links traversed after such deviation shall not contribute to $L_{\hat{p},\widehat{lc},y}$. • During a trip, where the navigation platform issues a rerouting instruction that modifies the sequence of links remaining in the active route, the ongoing accumulation of link lengths shall cease and the new route plan shall be treated as a separate navigation planning scheme. Recalculation that does not alter the sequence of remaining links shall not constitute a new navigation planning scheme and shall not interrupt distance accumulation. The navigation platform shall maintain a timestamped log of all rerouting events occurring during each trip to support ex post verification of scheme boundaries. • Ex-post verification of the predicted low-carbon route planned prior to a driving trip shall be conducted on all low-carbon route driving navigation planning schemes occurring during the verification period. Those for which the predicted low-carbon route is verified as not generating the lowest CO2 emissions within the navigation planning scheme shall be documented and their distance accumulation shall be excluded from $L_{\hat{p},\widehat{lc},y}$.	
Treatment of uncertainty	>> Uncertainty has been addressed in the QA/QC procedures	

Additional comment	>> /

Data/parameter	>> i	
Description	>>Predicted low-carbon route verified as not generating the lowest CO2 emissions among all route options within the navigation planning scheme in year y, as per ex post verification outcome, i.e. incorrectly predicted route	
Data unit	>> /	
Equations referred	>> 17,18	
Purpose of data	☐ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> As per ex post verification outcome Ex post verification of the predicted low-carbon route planned prior to a driving trip shall be conducted on all low-carbon route driving navigation planning schemes occurring during the verification period to identify those for which the predicted low-carbon route is verified as not generating the lowest CO2 emissions within the navigation planning scheme	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Annually	
QA/QC procedures	>> /	
Treatment of uncertainty	>> This parameter is used in ex post verification of the predicted low-carbon route planned prior to a driving trip conducted on all low-carbon route driving navigation planning schemes occurring during the verification period. Relevant uncertainty has been addressed in the QA/QC procedures of actual average link-level speed.	
Additional comment	>> /	

Data/parameter	>> $E_{i,y}$
Description	>> Actual CO_2 emissions of incorrectly predicted route i in year y shall be calculated in accordance with Equation 15 of the applied methodology, using ex post observed link-level speeds recorded by the navigation platform.
Data unit	>> tCO_2
Equations referred	>> 17
Purpose of data	☐ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions
Measurement methods and procedures	>> Calculation of actual actual CO_2 emissions of incorrectly predicted route i in year y as per Equation 15 of the applied methodology
Entity/person responsible for the	>> Activity participant

measurement		
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Annually	
QA/QC procedures	>> /	
Treatment of uncertainty	>> This parameter is used in ex post verification of the predicted low-carbon route planned prior to a driving trip conducted on all low-carbon route driving navigation planning schemes occurring during the verification period. Relevant uncertainty has been addressed in the QA/QC procedures of actual average link-level speed.	
Additional comment	>> As per ex post verification outcome on whether the predicted low-carbon route planned prior to a driving trip actually generates the lowest CO_2 emissions within the navigation planning scheme	

Data/parameter	>> $d_{i,y}$	
Description	>> Actual travel distance of incorrectly predicted route i in year y	
Data unit	>> km	
Equations referred	>> 18	
Purpose of data	☐ Baseline emissions / removals ☒ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> The actual travel distance of incorrectly predicted route i shall be determined by accumulating the pre-calibrated lengths of all links comprising route i that are confirmed as completely traversed by the vehicle, based on government-approved map data, consistent with the link traversal verification rules applied to $L_{\hat{p},\widehat{lc,y}}$.	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Annually	
QA/QC procedures	>> /	
Treatment of uncertainty	>> Link lengths shall be defined and measured in advance by the navigation platform based on map data, and not subject to real-time measurement variability. Therefore, uncertainty has been addressed accordingly.	
Additional comment	>> As per ex post verification outcome on whether the predicted low-carbon route planned prior to a driving trip actually generates the lowest CO_2	

	emissions within the navigation planning scheme

Data/parameter	>> DA_{y1}	
Description	>> Initial downward adjustment to the baseline emissions in year1	
Data unit	>> tCO_2	
Equations referred	>> 8	
Purpose of data	☒ Baseline emissions / removals ☐ Project emissions / removals ☐ Leakage emissions	
Measurement methods and procedures	>> Determined as the difference between $BE_{adj,y1}$ and $BE_{history,y1}$	
Entity/person responsible for the measurement	>> Activity participant	
Measuring instrument(s)	*Type of instrument*	>> /
	Accuracy class	>> /
	Calibration requirements	>> /
	Location	>> /
Measurement intervals	>> Once for year1 of the first crediting period	
QA/QC procedures	>> /	
Treatment of uncertainty	>> /	
Additional comment	>> y1 refers to calendar year of the start date of the first crediting period	

B.9.2. Sampling plan

>>

Annual Sampling Provisions

Sampling shall be conducted annually throughout the crediting period to determine the activity emission factor ($EF_{AE,y}$) for each year y of the crediting period.

For each year y of the crediting period, the sampling frame includes all navigation planning schemes from year y' which is defined as:

- The calendar year immediately prior to year y; or
- The most recent calendar year prior to year y for which the required data are available, provided that such year falls within the three calendar years immediately prior to year y of the crediting period.

The activity participant shall conduct spatiotemporal sampling of all navigation planning schemes in each calendar year of the crediting period, following the procedure specified in Step 1: Navigation planning scheme sampling in year y for Determination of activity emission factor ($EF_{AE,y}$), to obtain:

- The set of sampled navigation planning schemes p, with total sample size $A_{y'}$
- For each sampled navigation planning scheme p: the identified low-carbon route lc

(1) Sampling design requirements

Each annual sampling shall meet the following statistical requirements:

Minimum confidence level: 95%

Maximum margin of error: ±5%

Sampling method: simple random sampling within each spatiotemporal stratum (i, j, od)

Sample size formula: Equation 20

(2) Documentation and verification requirements

For each calendar year y of the crediting period, the activity participant shall document in the monitoring report:

Item	Requirement
Sampling year y’	Identified sampling year
Spatiotemporal stratification scheme	Stratification criteria applied
Total population $TP_{i,j,od}$	By each spatiotemporal stratum
Sample size $A_{i,j,od}$ and $A_{y'}$	Calculated per Equation 20 and 22 of the applied methodology
Achieved confidence level and margin of error	Verification of 95%/±5% criterion
Sampled navigation planning schemes p	Records of all sampled p

(3) Failure to achieve sampling reliability

Where the achieved margin of error exceeds ±5% for any spatiotemporal stratum, the activity participant shall apply one of the following remedial measures:

(a) Increase the sample size for the affected stratum and re-conduct sampling until the ±5% margin of error requirement is met; or

(b) Accept the achieved margin of error for the affected stratum and apply the upper bound of the actual 95% confidence interval of the stratum-level emission factor estimate, which corresponds to an upward adjustment larger than would apply under the ±5% criterion, thereby ensuring conservativeness.

Under option (b), the achieved margin of error for the affected stratum shall be explicitly documented in the monitoring report, together with a justification for why option (a) was not applied.

The achieved margin of error for each stratum shall be calculated as per Equation 23 of the applied methodology.

B.9.3. Monitoring management system

>>

The monitoring plan of the proposed project will be implemented under a clearly defined operational and management structure. A Monitoring Manager will be appointed to provide overall responsibility for coordinating monitoring activities, ensuring compliance with the applied methodology, and liaising with the DOE during verification.

Supporting the Monitoring Manager, the following technical roles are established:

- Software developers: design and maintain monitoring codes and algorithms embedded in the existing navigation platform and backend system.
- Code testers: perform systematic testing of all functions and boundary conditions to ensure that monitoring codes capture, process, and report data correctly and reliably.
- Risk control and anti-cheating specialists: identify and mitigate abnormal behaviours and potential manipulation of monitored data, applying dedicated anti-fraud detection tools.
- Data storage and security personnel: manage centralized databases, enforce strict access controls, and maintain system integrity through automatic anomaly detection and alarms.

This structure ensures that monitoring data are consistently captured through drivers’ mobile devices, securely transmitted, processed, and stored, while guaranteeing quality assurance and reliability for subsequent verification.

In compliance with Article 6.4 mechanism requirements, the proposed project ensures that all data monitored and required for the verification of emission reductions and for the issuance of A6.4ERs are securely retained.

Specifically:

- Monitoring data are stored in the centralized data platform database with controlled access and automatic backup functions.

- Data integrity is safeguarded by system-level monitoring of changes, with automatic alerts triggered by anomalies.
- All monitoring records, processed datasets, and supporting evidence used in the calculation of emission reductions will be archived for a minimum of five years after the end of the final crediting period.

This ensures full traceability, transparency, and compliance with verification requirements throughout the entire crediting cycle.

B.9.4. Post-crediting period monitoring plan

>>

Not applicable.

SECTION C. Start date, crediting period type and duration

C.1. Project start date

>>

October 2026

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

>>

1 August 2027

C.3.3. Duration of the crediting period

>>

1 August 2027 to 31 July 2042

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.1.1. 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 an item.
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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