Verified Carbon Standard

Draft VCS Methodology

M0280

REVISION TO AMS-III.BM LIGHTWEIGHT TWO- AND THREE-WHEELED PERSONAL TRANSPORTATION

Draft Version

19 March 2025

Sectoral Scope 7: Transport

The original CDM methodology *AMS-III.BM Lightweight two- and three-wheeled personal transportation, v1.0* was adopted on 26 April 2018. This methodology revision must be used with the most recent version of *AMS-III.BM* available on the CDM website.

This draft methodology revision was developed by EQAO and iFood.

CONTENTS

1 SUMMARY DESCRIPTION

Additionality, Crediting Method, and Mitigation Outcome	
Additionality	Project Method
Crediting Baseline	Project Method
Mitigation Outcome	Reductions

The original CDM methodology *AMS-III.BM Lightweight two- and three-wheeled personal transportation* applies to project activities that shift urban passenger transport to mechanical bicycles, tricycles, e-bikes, or e-tricycles by developing supporting infrastructure, such as bike lanes, shared bike programs (dockless or station-based), and bicycle parking areas.

This methodology revision expands the scope of *AMS-III.BM* to other two- or three-wheeled e--vehicles such as e-motorcycles and e-scooters. The revision also expands the scope to include business-oriented delivery/transportation services.

2 SOURCES

This methodology revision applies to CDM methodology *AMS-III.BM Lightweight two- and three-wheeled personal transportation*. Project proponents must use this methodology revision in conjunction with the most recent version of *AMS-III.BM*.

This methodology uses the most recent version of the following tools, guidelines, and standards:

- *VT0010 Emissions from Electricity Consumption and Generation*
- *CDM TOOL18 Baseline Emissions for Modal Shift Measures in Urban Passenger Transport*
- *VT0008 Additionality Assessment*
- *CDM TOOL21 Demonstration of Additionality of Small-scale Project Activities*
- *CDM Standard: Sampling and Surveys for CDM Project Activities and Programme of Activities*

3 DEFINITIONS

In addition to the definitions in *AMS-III.BM* and the most recent version of the *VCS Program Definitions*, the following definitions apply.

Business-oriented activities
Paid delivery activities, controlled by a central system designed to assign, allocate and monitor all deliveries

Infrastructure
This definition replaces the definition in *AMS-III.BM*. Under this methodology, infrastructure means bicycle lanes (new or extension of existing), bicycle parking areas (new or expansion of existing areas), bicycle sharing stations (new or expansion of existing stations), and recharging stations for use by e-bikes, e-tricycles, and other two- or three-wheeled electric vehicles.

Other two- or three-wheeled e-vehicles
Plug-in electric vehicles with two or three wheels, including electric motorcycles (e-motorcycles), electric scooters (e-scooters), and other similar two- or three-wheeled vehicles that run on electric power. Power is supplied by a rechargeable battery that drives one or more electric motors. Electric scooters are distinguished from motorcycles by having a step-through frame, instead of being straddled. Electric bicycles and electric tricycles are similar vehicles, distinguished by retaining the ability to be propelled by the rider pedaling in addition to battery propulsion. All two- or three-wheeled electric vehicles should comply with national standards or regulations.

4 APPLICABILITY CONDITIONS

All applicability conditions of the most recent version of *AMS-III.BM* must be met.

The scope of AMS-III.BM is expanded by including other two- or three-wheeled e-vehicles in type 7 projects and an additional category of type 9 projects, which covers e-bikes and other two- or three-wheeled e-vehicles in business-oriented activities.

Table 1. Types of projects eligible under this methodology (revisions in green)

Type of project	Description	Baseline options applicable			
		Option 1	Option 2	Option 3	Option 4
Type 7	Introduction of e-bikes and other two- or three-wheeled e-vehicles	✓		✓	
Type 9	Introduction of e-bikes and other two- or three-wheeled e-vehicles in business-oriented activities				✓

5 PROJECT BOUNDARY

The spatial extent of the project boundary of *AMS-III.BM* is replaced by the following:[1]

The project boundary is the area in which the users of the infrastructure and/or of the promoted bicycles, tricycles, e-bikes, e-tricycles, and other two- or three-wheeled e-vehicles travel between origins and destinations.

Where the project involves the use of e-bikes, e-tricycles, and/or other two- or three-wheeled e-vehicles, the project boundary also includes the electric grid and all physically connected power plants that supply electricity to the grid used to recharge the battery from e-bikes, e-tricycles, and other two- or three-wheeled e-vehicles.

The baseline emissions include CO_2 emissions from different modes of transport that the users of the bicycles, e-bikes, e-tricycles, and other two- or three-wheeled e-vehicles would have taken in the absence of the project activity. Project emissions include CO_2 emissions from electricity consumption (e.g., recharging batteries). N_2O and CH_4 emissions are excluded from the project boundary since they are *de minimis*.

6 BASELINE SCENARIO

The baseline scenario must be determined following the procedures in the most recent version of *AMS-III.BM*.

7 ADDITIONALITY

Additionality must be demonstrated following the procedures provided in the most recent version of *AMS-III.BM*, with Section 5.3.2, "Other activities," paragraph 19 replaced by the following:[2]

19. Other activities that do not satisfy the conditions under paragraph 18 are considered additional if they comply with one of the following:

    a) For projects that classify as type 7 (introduction of e-bikes) with a market penetration of e-bikes among bicycles in use in the city below or equal to 1.5%. The market penetration is based on the number of annual bicycle trips undertaken in the city or based on the stock of bicycles.

    b) For projects that classify as type 7 (introduction of other two- or three-wheeled e-vehicles) with a market penetration of other two- or three-wheeled e-vehicles among other two- or three-wheeled vehicles in use in the city below or equal to 1.5%. The market penetration is based on the number of annual trips of other two- or three-

[1] The project boundary includes the additional vehicle types.

[2] Other options from *AMS-III.BM* are not applicable.

wheeled vehicles undertaken in the city or based on the stock of other two- or three-wheeled vehicles. The market penetration must be assessed by comparing the project e-vehicle type with comparable vehicles.[3]

c) For projects that classify as type 9 (introduction of e-bikes in business-oriented activities) with a market penetration of e-bikes among bicycles for business-oriented activities in use in the city below or equal to 1.5%. The market penetration is based on the number of annual bicycle trips undertaken in the city or based on the stock of bicycles for business-oriented activities.

d) For projects that classify as type 9 (introduction of other two- or three-wheeled e-vehicles) with a market penetration of other two- or three-wheeled e-vehicles among other two- or three-wheeled vehicles for business-oriented activities in use in the city below or equal to 1.5%. The market penetration is based on the number of annual trips of other two- or three-wheeled e-vehicles undertaken in the city or based on the stock of other two- or three-wheeled e-vehicles for business-oriented activities.

e) It is demonstrated, through the application of the most recent version of the CDM *TOOL21 Demonstration of additionality of small-scale project activities* or Step 2 of the VCS tool *VT0008 Additionality Assessment*,[4] that at least one barrier would prevent the implementation of the project activity.

   When assessing the investment barrier with *TOOL21*, the analysis must be conducted from the perspective of the bike parking area or bicycle-sharing station operator/investor. This includes assessing all relevant costs and revenues, such as:

   - Revenue from parking fees and other sources (e.g., advertising)
   - Costs for rent, maintenance, security, and personnel
   - Land-related expenses, including purchase price, opportunity cost, or fair market value

8 QUANTIFICATION OF REDUCTIONS AND REMOVALS

8.1 Baseline Emissions

Baseline emissions must be determined following the procedures provided in the most recent version of *AMS-III.BM*, with the inclusion of the procedures described below.

[3] For example, e-motorcycles must be compared to conventional motorcycles, excluding bicycles and three-wheeled vehicles.

[4] The VCS tool *VT0008 Additionality Assessment* aims to align with ICVCM's CCP requirements. If VT0008 is applied, all steps 2a) to 2d) of the tool must be applied.

Option 1: Ex-post survey of baseline travel modes

Paragraphs (24), (25), (30), and (31) in Section 5.4 "Baseline Emissions" must read as follows:

24. The vehicle categories index *i* indicated in Step 1 of *TOOL18* shall be included, and "cycling" and "walking" should be considered as potential baseline "vehicle categories" with an emission factor of zero. If some vehicle categories are not explicitly identified or do not fit into the categories from the tool, they should be included in the survey as "others" and baseline emissions of this category are counted as zero. The survey shall be undertaken at locations of the project infrastructure and origin/destination of the cycling trip shall be substituted for "entry/exit station" in TOOL18. The survey may be conducted with a sample of users in the case of the bicycle sharing program or new tricycles, e-bikes, e-tricycles, or other two- or three-wheeled e-vehicles.

25. When applying Step 4 of TOOL18, the following provisions shall apply:

    …

    (b) Parameter D_i may be determined

    (ii) as an average value for bicycle, tricycle, e-tricycle, e-bike or other two- or three-wheeled e-vehicle trips (as relevant) from official data or studies at the city level; or

    (iii) by applying the default conservative value of 2.5 km for bicycle or tricycle trips and 5 km for e-bike, e-tricycle, or other two- or three-wheeled e-vehicles trips.

Option 2: Baseline emissions based on public transportation (excluding cars, taxis and motorcycles) as benchmark

The procedures and requirements in *AMS-III.BM* must be applied for Option 2.

Option 3: Based on a survey of users of e-bikes and users of bicycle sharing programs

30. Under this option, the baseline emission factor is determined through a survey of users of e-bike or other two- or three-wheeled e-vehicle promotion programs or bicycle sharing programs ($EF_{BL,CO2,survey}$) and the distance traveled will be monitored for each user of the programs ($DT_{u,y}$).

31. …

    Where:

    …

$DT_{u,y}$	=	Total distance travelled by the individual user *u* of the bicycle sharing program and/or of the promoted e-bikes and/or other two- or three-wheeled e-vehicles in year y (km)

$EF_{BL,CO2}$	=	Average CO_2 emission factor per passenger-kilometer based on survey conducted with users of e-bike and/or other two- or three-wheeled e-vehicles promotion programs or bicycle sharing programs (tCO_2/pkm)

For the introduction of e-bikes and/or other two- or three-wheeled e-vehicles in business-oriented activities (project type 9), the following paragraph additions are applicable in *AMS-III.BM*, Section 5.4 "Baseline emissions."

Option 4: Based on monitored users of e-bikes and/or other two- or three-wheeled e-vehicles

This option is applicable to project type 9.

Under this option, the baseline emission factor is determined through the monitored data of trips before the start date of the project activity ($EF_{BL,CO2}$) and the distance traveled for each user of the promoted programs ($DT_{u,y}$). The monitored period considered for the determination of the baseline emission factor is one year prior to the start date of the project activity.

Baseline emissions are determined through the following equation:

$$BE_y = EF_{BL,CO2,monitor} \times \sum_u DT_{u,y} \quad (2a)$$

Where:

BE_y	=	Baseline emissions in year *y* ($t CO_2$)
$DT_{u,y}$	=	Total distance traveled by the individual user *u* of the promoted e-bikes and/or other two- or three-wheeled e-vehicles in year *y* (km)
$EF_{BL,CO2,monitor}$	=	Average CO_2 emission factor based on monitored trips prior to the start date of the project activity ($t CO_2$/km)

The average CO_2 emission factor ($EF_{BL,CO2}$) is determined using information from one year of monitored operation, prior to the start date of the project activity, applying the following steps:

Step 1: Determine the relevant vehicle categories

Only vehicles that are relevant to the business-oriented activities must be included.

(a) Bicycles

(b) Electric bicycles (e-bicycles, e-bikes)

(c) Motorcycles

(d) Electric motorcycles (e-motorcycles)

(e) Tricycles

(f) Electric tricycles (e-tricycles)

(g) Other two- or three-wheeled vehicles

(h) Other two- or three-wheeled e-vehicles

(i) On foot

(j) Passenger cars

(k) Other vehicle categories

Step 2: Determine the emission factor per kilometer for each relevant vehicle category

The parameter $EF_{KM,i,x}$ must be calculated using the most recent version of *CDM TOOL18 Baseline emissions for modal shift measures in urban passenger transport*, step 2, with the following modifications:

The baseline year, corresponds to a full year of operation immediately before the start date of the project activity.

Step 3: Determine the average baseline emission factor per kilometer

For business-oriented activities the main objective of the personal transportation is the delivery of a product or a service. Therefore, a single passenger per trip is assumed in all trips, i.e., emission factor per passenger-kilometer is the same as the emission factor per kilometer.

$$EF_{BL,CO2,monitor} = \sum EF_{KM,i,x} \times \frac{DT_{i,0}}{DT_0} \quad (2b)$$

Where:

$EF_{BL,CO2,monitor}$	=	Average CO_2 emission factor based on monitored trips prior to the start date of the project activity (tCO_2/km)
$EF_{KM,i,x}$	=	Emission factor per kilometre of vehicle category *i* in year x (tCO_2/km)
$DT_{i,0}$	=	Total distance travelled using vehicle category *i* in the baseline year (km)
DT_0	=	Total distance travelled in the baseline year (km)

8.2 Project Emissions

Project emissions must be determined following the procedures provided in the most recent version of *AMS-III.BM* applying the changes indicated in this section.

32. Project emissions are determined based on the amount of electricity consumed to recharge the batteries of e-bikes, e-tricycles and other two- or three-wheeled e-vehicles ($EC_{PJ,y}$) using Equation (2) from VCS tool *VT0010 Emissions from Electricity Consumption and Generation*.

33. The electricity consumed to recharge the batteries ($EC_{PJ,y}$) may be determined by:

(a) Directly measuring the electricity consumed by all e-bikes,e-tricycles, and other two- or three-wheeled e-vehicles included in the project; or

(b) Assuming a default consumption $EC_{i,default}$ and determining the electricity consumed using the following equation: [5]

$$EC_{PJ,y} = EC_{i,default} \times \sum_{u} DT_{u,y} \quad \text{(3a) 1}$$

Where:

$EC_{PJ,y}$ = Quantity of electricity consumed to recharge the batteries of e-bikes, e-tricycles, and other two- or three-wheeled e-vehicles in year *y* (kWh)

$EC_{i,default}$ = Default quantity of electricity consumed to recharge the batteries of e-vehicle *i* per kilometer traveled (kWh/km).

$DT_{u,y}$ = Total distance traveled by the individual user *u* of the bicycle sharing program and/or of the promoted e-bikes, e-tricycles, or other two- or three-wheeled e-vehicles in year *y* (km)

Project proponents may propose the default amount of electricity consumed for other two- or three-wheeled e-vehicles, based on transparent and documented evidence, including, but not limited to the following:

(a) Relevant (sectoral) studies or surveys (e.g., market surveys, technology studies, etc.) undertaken by universities, research institutions, industry associations, companies, bilateral/multilateral institutions etc.

(b) Relevant statistical data from national or international statistics

(c) Written documentation of independent judgments from experts in industry, educational institutions (e.g. universities, technical schools, training centers), industry associations, and others

8.3 Leakage Emissions

Leakage emissions must be determined following the procedures provided in the most recent version of *AMS-III.BM*.

8.4 Net Reductions and Removals

[5] For projects developed under baseline scenario option 1, $DT_{u,y}$ is determined following the provisions from *AMS-III.BM* Section 5.4.1, applying the updated procedures in Section 8.1.

Estimated GHG emission reductions must be determined following the procedures provided in the most recent version of *AMS-III.BM*.

9 MONITORING

For all monitoring parameters referring to CDM *TOOL05 Tool to calculate baseline, project and/or leakage emissions from electricity consumption*, it must be replaced by the most recent version of *VT0010 Emissions from Electricity Consumption and Generation*.

9.1 Data and Parameters Available at Validation

Data and parameters available at validation are those in the most recent version of *AMS-III.BM*, with the inclusion of other two- or three-wheeled e-vehicles in modal types, and the following inclusions:

Data / Parameter:	$EF_{BL,CO2,monitor}$
Data unit:	tCO_2/km
Description:	Average CO2 emission factor based on monitored trips prior to the start date of the project activity
Equations	(2a), (2b)
Source of data:	Monitored trips (mode used and distance traveled)
Value applied:	Calculated
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments:	None

Data / Parameter:	$DT_{i,0}$
Data unit:	km
Description:	Total distance traveled using vehicle category *i* in the baseline year
Equations	(2b)
Source of data:	Monitored data

Value applied:	From the project proponents based on monitored data
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments:	None

Data / Parameter:	DT_x
Data unit:	km
Description:	Total distance traveled in the baseline year
Equations	(2b)
Source of data:	Monitored data
Value applied:	From the project proponents based on monitored data
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments:	None

Data/Parameter	$EC_{i,default}$
Data unit	kWh/km
Description	Default quantity of electricity consumed to recharge the batteries of e-vehicle *i* per kilometer traveled
Equations	(2b)
Source of data	For e-bikes, the default value from the most recent version of *AMS-III.BM*. For other two- or three-wheeled e-vehicles, project proponents may propose the default quantity of electricity consumed based on transparent and documented evidence, including, but not limited to:

	1) Relevant (sectoral) studies or surveys (e.g. market surveys, technology studies) undertaken by universities, research institutions, industry associations, companies, bilateral/multilateral institutions etc. 2) Relevant statistical data from national or international statistics 3) Written documentation of independent judgment from experts in industry, educational institutions (e.g., universities, technical schools, training centers), industry associations, and others.
Value applied	Default value for e-bikes in the most recent version of *AMS-III.BM.* For other two- or three-wheeled e-vehicles, proposal from project proponents based on transparent and documented evidence.
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of project emissions
Comments	None

9.2 Data and Parameters Monitored

Data and parameters monitored are those in the most recent version of *AMS-III.BM*, with the inclusion, where appropriate, of other two- and three-wheeled e-vehicles in modal types.

9.3 Description of the Monitoring Plan

The description of the monitoring plan is in accordance with the most recent version of AMS-III.BM.

10 REFERENCES

Ahuja, K., V. Chandra, V. Lord, and C. Peens. 2021. "Ordering in: The Rapid Evolution of Food Delivery." McKinsey & Company, September 22, 2021. https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/ordering-in-the-rapid-evolution-of-food-delivery

ITDP and UC Davis. 2015. *A Global High Shift Cycling Scenario: The Potential for Dramatically Increasing Bicycle and E-bike Use in Cities Around the World, With Estimated Energy, CO_2, and*

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DOCUMENT HISTORY

Version	Date	Comment
v1.0 (draft)	19 Mar 2025	Initial version