5002 Monitoring Report of Bangkok E-bus Program

Monitoring period from 01.01.2023 to 31.12.2023

Document version:	1.8
Date:	15 December 2025
Monitoring period (cycle)	2nd monitoring period
Requested emission reductions [1]	20,416 tonnes of CO_2eq from 01.01.2023 – 31.12.2023
Account name and account number in the host country's registry	Thailand Voluntary Emission Reduction Program: T-VER 1. PoA 01: Bangkok Metropolitan Area E-Bus Zone 1 and 2 version 4 (registered with T-VER as PoA no. 333) 2. PoA 02: Bangkok Metropolitan Area E-Bus Zone 3 and 4 version 4 (registered with T-VER as PoA no. 334)
Account name and account number in the Emissions Trading Registry (EHR) [2]	Stiftung Klimaschutz & CO2-Kompensation KliK Account Number: CH-100-1096-0

Date Qualification decision	Date of registration as compensation project abroad with The Federal Office for the Environment (FOEN), Switzerland is 27 February 2023 Date of registration PoA 01 and PoA 02 under T-VER is 28 March 2023
Date or dates of revalidation(s)	N/A
Crediting period (current)	01.01.2023 – 31.12.2023
Date and version of the valid project/program description	MADD: Operation of e-buses on privately owned, scheduled public bus routes in the Bangkok Metropolitan area by Energy Absolute version 5.3 PoA-DD: 1. PoA 01: Bangkok Metropolitan Area E-Bus Zone 1 and 2 version 4 (registered with T-VER as PoA no. 333) 2. PoA 02: Bangkok Metropolitan Area E-Bus Zone 3 and 4 version 4 (registered with T-VER as PoA no. 334)
Date and versions of the applicable legal bases	Federal Act of 23 December 2011 on the Reduction of CO2 Emissions (CO2 Act, SR 641.71)[3] and the Ordinance of 30 November 2012 on the Reduction of CO2 Emissions (CO2 Ordinance, SR 641.711)[4], status as of 1 May 2025.[5]

[1] In the following, the term "emission reduction" is also understood to mean the increased storage of carbon. For reasons of better readability, both concepts are not mentioned unless a distinction is explicitly necessary.
[2] Certificates are issued to this account, cf. Art. 13 para. 1 CO_2 -Ordinance.
[3] https://www.fedlex.admin.ch/eli/cc/2012/855/en
[4] https://www.fedlex.admin.ch/eli/cc/2012/856/en
[5] https://www.bafu.admin.ch/dam/en/sd-web/hWse-MQz581O/co2-kompensation-projekte-und-programme.pdf

Applicant (company)[6]	Energy Absolute Public Company Ltd.
Name, first name	Mr. Mongkol Kijlerdphon
Street, no.	16th floor, AIA Capital Center Building 89 Ratchadaphisek Road, Dindaeng Bangkok
Postcode, place	10400
Tel.	+66(0)2 248-2488-92 (ext. 195)
E-mail address	Mongkol.kij@energyabsolute.co.th
	ea.sd@energyabsolute.co.th

Project developer (company)	Carbon Coordinating Managing Entity (Co) Ltd., Thailand (100% owned by South Pole Group)
Name, first name	Nadia Kaddouri
Contact person for queries (instead of applicant)?	☒ yes ☐ no
Tel.	+66 (0)2 219 3791
E-mail address	registries@southpole.com

[6] Note: Should the applicant change during the course of the project, this must be communicated to the FOEN in writing.

Table of Content

1 Formal information

1.1 Adjustments in the report compared to the project/program description or earlier monitoring reports

Were there any changes compared to the project/program description?

☒ Yes

☐ No

Have there been any changes since the last monitoring report?

☒ Yes

☐ No

Monitoring report in which adaptation took place	Chapter in which the adaptation took place	Description of the adaptation
1. Monitoring (from 01.01.2023 to 31.12.2023)	MADD Chapter 1.2.2 Table 2 Annex 1 part A1.2 Table A2	The specification of Li-ion battery capacity has changed from ≥150 kWh for each e-bus within the program to ≥120 kWh. This is due to an implementation assessment during the operation showing that a battery with the capacity of 120 kWh is sufficient to operate on the bus routes that are not long distance. Hence, the Program operator considers it to be appropriate to execute this change. The modified specification of battery capacity has been notified and accepted by T-VER registries.
2. Monitoring (from 01.01.2023 to 31.12.2023)	MADD Chapter 3.1.1 Table 6	Roles and responsibility of Charging station operator: The charging station network is managed by Energy Mahanakorn Co., Ltd. (EA Anywhere Brand). However, at the bus terminal station, Thai Smile Bus has signed a service agreement contract with Auto Bus Service Co., Ltd. to operate and service each of the charging stations. Auto Bus is also responsible for data collection of the e-buses' electricity consumption at each bus terminal.
3. Monitoring (from 01.01.2023 to 31.12.2023)	MADD Annex 1 part A1.2 Table A3 and A4 Monitoring Report (1.10.2022 – 31.12.2022) Table 7 and 8	The locations of e-bus terminals for some bus routes have been revised from the MADD/ Monitoring Report (1.10.2022 – 31.12.2022) due to the appropriateness and readiness of each bus terminal. Refer to Table 7 and 8 of this monitoring report for further details.

Monitoring report in which adaptation took place	Chapter in which the adaptation took place	Description of the adaptation
4. Monitoring (from 01.01.2023 to 31.12.2023)	MADD Annex 1 part A3.2 Table A16	1. The electricity bill from the charging station does not reflect the electricity consumption for each operational bus route. Since the electricity bill only reflects the electricity consumption of the e-bus terminal stations, it is not possible to differentiate the electricity consumption into different bus routes. Hence, only recorded data of electricity consumption and electricity invoice from Energy Mahanakorn (EMN) shall be used. 2. The average Specific Fuel Consumption (SFC) of NGV buses is based on the data collected from available NGV buses operating on 35 routes during this monitoring period, a reduction from 37 routes indicated in the MADD
5. Monitoring (from 01.01.2023 to 31.12.2023)	MADD Section 1.2.3 Table 2	The entity in Thailand responsible for authorising international carbon credit transfers has changed from the Office of Natural Resources and Environmental Policy and Planning (ONEP) to the Department of Climate Change and Environment (DCCE).
6. Monitoring (from 01.01.2023 to 31.12.2023)	MADD Annex 1 part A1.5	As of the current monitoring period, a substantial fleet of 1,534 electric vehicle (EV) buses are fully operational in the existing route within the project's scope. A core component of this initiative is the systematic replacement of older, high-polluting internal combustion engine (ICE) buses with electric alternatives. To date, 959 ICE buses have been meticulously verified as decommissioned. This verification is based on official deregistration records issued by the relevant transport authority, providing objective evidence of the permanent removal of these ICE buses from operation.

1.2 FARs that apply to this monitoring report

FAR 01
There was no evidence of the disposal and management of de-registered vehicles from both the Smart Bus merger (221 vehicles) and other minor mergers (160 vehicles).
Applicant's response (23 July 2025) According to the transportation regulations set by Thailand’s Department of Land Transport (DLT), a vehicle that has been officially de-registered from the national transportation system is no longer legally allowed to operate. The applicant will maintain a systematic process for tracking and retaining all relevant evidence to demonstrate compliance with this requirement, in accordance with the criteria outlined in MADD. ref: Reference 3

2 Details of the project/program

2.1 Description of the project/program

The Bangkok E-Bus Program ("the Program") operates on the public transport routes of Thailand. The Program was developed by the Energy Absolute Public Company Limited ("EA") that develops business operations using biodiesel, then moves to renewable energy power plants and businesses that involve other technologies. They strive to meet future energy demand by placing significant importance on clean energy, safety, and environmentally friendly operations.

The Program has enhanced the capability for developing public transportation projects in Thailand and for contributing to a low-carbon society. Thus, the project replaced Thailand's conventional mode of public transport of internal combustion engine vehicles (ICEVs) by the adoption of electric vehicles (EVs). As a result, it will also consequently reduce the energy consumption of, and GHG emissions from, public transport.

In this regard, the company has cooperated with bus service providers licensed by the Department of Land Transport (DLT) to replace the ICE buses with electric buses (e-buses). During this monitoring period from 01.01.2023 to 31.12.2023, one participating bus operator, namely Thai Smile Bus Co., Ltd. ("TSB"), acted as the focal point for data collection, in cooperation with other private bus companies that have mutually signed agreement contracts with TSB. The project covers the management and operation of bus routes operated by TSB in the Bangkok Metropolitan area, which was divided into four zones by the DLT in 2019. The DLT has categorised the bus routes in relation to the zones in which they operate, starting with 1-xx, 2-xx, S-xx[7], 3-xx and 4-xx. This categorisation is shown in Figure 1, and route S-xx is considered in the same group as routes 1-xx and 2-xx. The Program comprises e-buses and its licensed bus routes in group activities based on the purchase date and operating date in line with the allocation plan of e-bus operators.

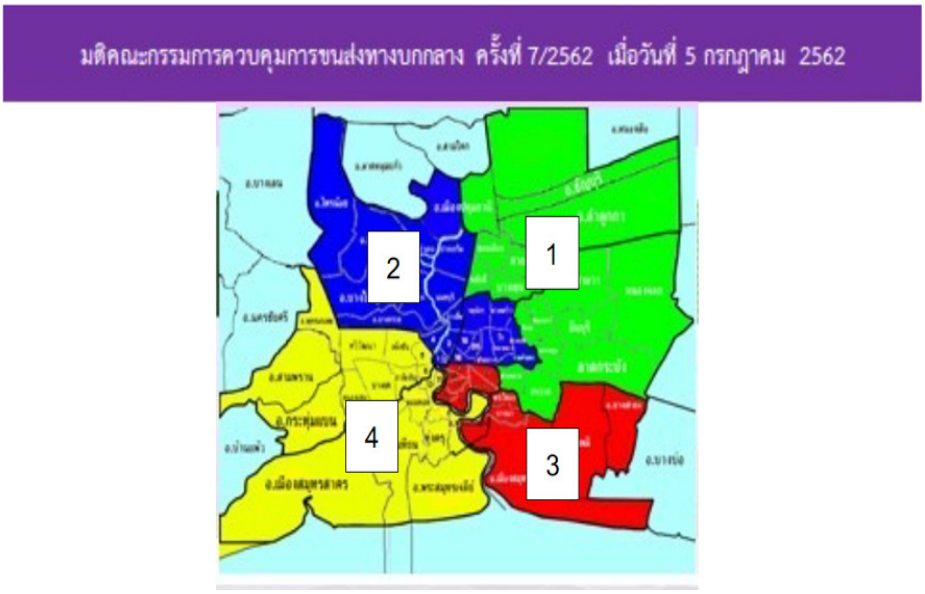


Figure 1: Zoning areas of the Bangkok Metropolitan area[8]

Table 1 provides key milestones of the Program since the first purchase agreement of the e-buses until the approval and registration of the Program under the T-VER standard. These milestones demonstrate the timeline of program implementation alongside the approval Mitigation Activity Design Document: MADD version 5.3 ("MADD").

[7] S-xx are the bus routes going to Suvarnabhumi international airport which is included in PoA 01.
[8] Source: Resolutions of the Meeting of Central Land Transport Control Board No. 7/2019 on 7 July 2019

Table 1: Project Timeline after MADD validation

Date	Event	References/evidence
29.09.2022	Submission of validated MADD to FOEN	Hard copy of validated MADD to FOEN via post
01.10.2022	Data has been monitored and collected	Data collection from TSB (bus operator)
25.10.2022	FOEN review and feedback	First round of comments from FOEN: "5002-Kommunikation_mit_PE-24-10-22_22-25-26"
05.12.2022	MADD approved	Authorisation statement by FOEN for the approval of MADD; ref: Annex 1
08.02.2023	Thailand's Letter of Authorization (LoA) issuance	LoA document no. 1006.4/2810 issued by Office of Natural Resources and Environmental Policy and Planning (ONEP); ref: Reference 1
27.02.2023	Switzerland's LoA issuance and MADD registration with The Federal Office for the Environment (FOEN)	Authorisation statement[9]
28.03.2023	PoAs and CPAs officially registered with T-VER	Registration of PoA 01[10] and PoA 02[11] including the first CPA of each PoA under T-VER standard
25.07.2023	Registration of 9 additional CPAs	Registration of CPA-DD under PoA 01 and PoA 02 under T-VER standard
02-04.08.2023	On-site Verification at e-bus terminal sites for Monitoring Period 1 (MP1) from 01.10.2022 to 31.12.2022	On-site Verification Plan for MP1
27.08.2023	Submission of Verification Report	Verification Report template Version v3.0, by Bureau Veritas Certification (Thailand)
05.09.2023	Technical Evaluation for Monitoring Report (MR) for Oct 1, 2022, to Dec 31, 2022, by TGO subcommittee completed	
06.10.2023	Technical Evaluation for Monitoring Report for Oct 1, 2022, to Dec 31, 2022, by FOEN completed	Letter of confirmation from FOEN dated October 6, 2023
22.11.2023	Letter of Positive Examination issued by Department of Climate Change and Environment (DCCE)	DCCE Letter No.0804/3910
28.11.2023	Verification for MP1 approved by TGO	The TGO Board meeting X/2566 is held on 28 November 2023.

[9] https://share.dma.swiss/s/n77TtCjno4CdNbX
[10] Source: https://ghgreduction.tgo.or.th/th/tver-database-and-statistics/programme-of-activities/item/3602-bangkok-metropolitan-area-e-bus-zone-1-and-2.html
[11] Source: https://ghgreduction.tgo.or.th/th/tver-database-and-statistics/programme-of-activities/item/3605-bangkok-metropolitan-area-e-bus-zone-3-and-4.html

Date	Event	References/evidence
29.11.2023	EA submitted a request for T-VER credit cancelation to TGO	EA requested letter: EA6611/029LT
15.12.2023	MP1 ITMOs Transfer completed	

In this monitoring period, the Bangkok E-Bus Program covers the operation and management of 1,798 e-buses operated on 118 approved passenger transport licensed bus routes by the DLT in the Bangkok Metropolitan area during the Program's crediting period (1 Jan 2023 – 31 Dec 2023).

Table 2: Number of bus routes and e-buses which are registered and in operation.

PoA/CPA		Registered with DLT		In Operation	
		routes	e-buses (vehicle)	routes	e-buses (vehicle)
PoA1	CPA1	5	130	5	129
	CPA2	18	166	18	165
	CPA3	18	227	18	219
	CPA4	9*	181	9	149
	CPA5	5*	67	5	60
Total PoA 1		55	771	55	722
PoA2	CPA1	3	65	3	65
	CPA2	14	221	14	220
	CPA3	13	167	13	159
	CPA4	13	231	13	222
	CPA5	10	238	10	212
	CPA6	10	212	10	198
Total PoA 2		63	1,134	63	1,076
		118	1,905	118	1,798

*Remark: The number of bus routes differs from what is indicated in the CPA-DDs because there are still several routes in the CPAs where no E-Buses were registered with DLT by the end of 2023 (within this monitoring period).

In this monitoring period, the program is continuing to expand its fleet by adding more e-buses. The number of registered e-buses has gradually grown from 835 as of January 1, 2023, to 1,905 as of December 31, 2023. Due to lead time for e-bus manufacturing, system testing, operational testing and staff training, the e-buses are being gradually incorporated into the program.

The implementation period of e-buses on each route aligns with the CPA inclusion approach, where the CPA is grouped by the timely registration date of e-buses with the DLT and does not contradict the CPA inclusion criteria outlined in Table 4. On the operation side, TSB (bus operator) has contracted Auto Bus Service Co., Ltd. to handle bus maintenance and data collection for power consumption, which differs to the MADD which stated that Energy Mahanakorn would be in charge of e-bus data collection and charging services. Based on the monitoring data collected from 01.01.2023 to 31.12.2023, the emissions reduction resulting from the implementation of the Program is calculated as 20,416 tCO_2, due to the fuel-switching in public transport system and modal shift from other mode private vehicles/ other modes of public transportation to e-buses.

The emissions reduction shall be verified and considered as the internationally transferred mitigation outcomes (ITMOs) in compliance with the bilateral agreement between the Thai Government and Switzerland. The process of ITMOs transfer shall be in line with "Offsetting CO2 emissions: projects and programmes" [12], by FOEN and "Thailand's Authorization and Recognition of International Transfer Process" by TGO[13].

[12] Source: https://www.bafu.admin.ch/dam/en/sd-web/hWse-MQz581O/co2-kompensation-projekte-und-programme.pdf
[13] Source: https://ercst.org/document/thailands-authorisation-and-recognition-of-international-transfer-process/

2.2 Implementation of the project/program

2.2.1 Temporal aspects

Could the project/program be implemented in terms of start of implementation, start of impact and start of monitoring as foreseen in the project/program description?

☒ Yes

☐ No

Table 3: Program implementation timeline

Dates	Date according to project/program description	Date Effective implementation	Remarks on deviations
Start of implementation	15 June 2022	15 June 2022	No deviation from the MADD
Start of operation	1 October 2022	20 August 2022[14]	The start of operation considered a pilot phase where some of the bus routes were selected – i.e., routes 2-38
Start monitoring for MP1 (01.10.2022-31.12.0222)	1 October 2022	1 October 2022	No deviation from the MADD
Start monitoring for MP2 (01.01.2023-31.12.2023)	1 January 2023	1 January 2023	No deviation from the MADD

2.2.2 Content aspects: Projects in the program and fulfillment of the admission criteria

The Bangkok E-Bus Program is implemented under the T-VER standard, which aims to encourage domestic greenhouse gas (GHG) emission reductions along with the co-benefits report. Under this standard, the program has been developed as Program of activity (PoA) – a T-VER PoA – that would allow for greater scalability. However, the T-VER PoA has a maximum allowance of 60,000 tCO_2/year per PoA. Correspondingly, the program was developed to allow for greater mitigation potential while also separating the structure of the Bangkok E-Bus Program into two separate zones – Zone 1 and 2, and Zone 3 and 4. All included CPAs shall comply with the eligibility criteria of the Program, which is aligned with the T-VER standard, as indicated in the MADD. The two T-VER PoAs were developed and registered with T-VER registry as follows:

1. T-VER PoA 01[15]: titled “The Bangkok Metropolitan Area E-Bus Zone 1 and 2 (ver.4)”;
2. T-VER PoA 02: titled “The Bangkok Metropolitan Area E-Bus Zone 3 and 4 (ver.4)”.

In compliance with the eligibility criteria stated in the MADD, each CPA has been checked for eligibility criteria fulfilment. Every CPA included in this monitoring period has fulfilled the inclusion criteria, with supporting evidence for each criterion illustrated in Table 4.

[14] Information provided by Thai Smile Bus (Bus operator)
[15] PoA1 includes bus routes S-xx

Table 4: Eligibility criteria under the T-VER standard for CPA inclusion for all CPAs

#	Eligibility criterion - Category	Eligibility criterion - Required condition	Criteria Check	Supporting evidence for inclusion	Fulfillment of the inclusion criteria
	The type of vehicles under any CPAs shall:				
1	1. Not be modified from the existing conventional ICEV	1. Vehicles used in the project activities are not modified ICEVs	1. No vehicles were powered by internal combustion engine (ICE)	1. E-bus purchase agreement; ref: Reference 2	☒ Yes ☐ No
	2. Be 100% battery EV	2.Vehicles used in the project activities are all powered by electricity	2. All vehicles used in the project activities are all powered by electricity	2. Technical specifications of e-buses in the Program; ref: Reference 4	☒ Yes ☐ No
	3. Have documented measures in place in case the vehicles require a new rechargeable battery, to ensure that vehicle owners have access to replacement batteries of comparable quality	3. Project developer demonstrates the cycle of battery replacement or recycling	3. Project developer demonstrates the cycle of battery replacement or recycling	3. Electronic waste management service agreement contract between EA and Amita (battery recycling company). The recycling or replacement of batteries is not relevant to this monitoring period as they have not reached their end of life yet; ref: Reference 5	☒ Yes ☐ No
	4. Not use the replaced vehicles in the project's boundary or other area *Ref: T-VER-METH-TM-05 Version 03, T-VER-METH-TM-06 Version 03*	4. The developer ensures that the replaced vehicles will not be used in any area	4. No replaced vehicle has been used in any area	4. Evidence of salvage and replacement ICE bus; Reference 3	☒ Yes ☐ No
2	Vehicle specifications included in CPA shall consider the following parameters:	E-bus specifications included in the Program shall consider the following parameters:	1. All buses are Standard 2 and/or Standard 3 2. Battery capacity of the bus is 120–302 kWh	1. Technical requirements of e-buses in the Program; ref: Reference 4 and Bus registration; ref: Annex 6	☒ Yes ☐ No

#	Eligibility criterion - Category	Eligibility criterion - Required condition	Criteria Check	Supporting evidence for inclusion	Fulfillment of the inclusion criteria
	1. meet standard vehicle according to the DLT 2. battery capacity *Ref: MADD*	1. Standard 2 (air-conditioned bus class 2) and/or Standard 3 (normal bus) 2. battery capacity ≥150 kWh	Note: The battery capacity of buses included in the Program has changed from ≥150 kWh to 120–302 kWh	2. Notification letter regarding the change in the Program's description, which was acknowledged by TGO; ref: Annex 3	
3	Public bus routes under the CPA shall comply with national laws and regulations *Ref: MADD*	All routes in the project activities must be approved by the DLT	All routes are operated according to the licenses approved by DLT	The approved passenger transport licenses by DLT of the included bus routes in this monitoring report; ref: Annex 2	☒ Yes ☐ No
4	The CPA boundary is within the geographic territory of Bangkok Metropolitan area *Ref: MADD*	All routes are in Bangkok Metropolitan area shown in Figure 1	All routes are in Bangkok Metropolitan area	The approved passenger transport licenses by DLT of the included bus routes in this monitoring report; ref: Annex 2	☒ Yes ☐ No
5	Each CPA shall be categorised by its area of operation	All routes are in Bangkok Metropolitan area shown in Figure 1	All routes are in Bangkok Metropolitan area	The approved passenger transport licenses by DLT of the included bus routes in this monitoring report; ref: Annex 2	☒ Yes ☐ No
6	The emission reductions shall not exceed the limit stipulated under the T-VER standard criteria *Ref: Table 1 of the scheme and Regulation of the Greenhouse Gas Management Organisation on Criteria for*	One PoA shall not exceed 60,000 tCO_2e/year after combining all CPAs under the same PoA The ex-ante calculation shall not exceed 20,000 tCO_2e/year per CPA	The emission reduction of each CPA and cumulatively in each PoA have not exceeded the T-VER criteria	Ex-post calculation based on implementation of e-buses; ref: *MP2 - Ex-Post-bangkok-e-bus_20062025* file for ex-post calculation	☒ Yes ☐ No

#	Eligibility criterion - Category	Eligibility criterion - Required condition	Criteria Check	Supporting evidence for inclusion	Fulfillment of the inclusion criteria
	Considering Voluntary Greenhouse Gas Reduction Projects According to Thailand Standard (T-VER) B.E. 2022, announced on 25 January 2022				
7	Ownership of emission reduction / mitigation outcomes units issued *Ref: MADD*	Contractual agreement between EA and the bus operator indicating that the mitigation outcomes generated under the Bangkok E-Bus Program will be owned by EA	The contractual agreement	Contractual agreement between EA and the bus operator; ref: Reference 6	☒ Yes ☐ No
8	EA shall demonstrate that double counting of emission reductions will not occur, i.e., by monitoring data from each specific vehicle *Ref: MADD*	The Bangkok E-Bus Program mitigation activity does not and will not lead to double counting of emission reductions, since it does not and will not claim emission reductions as: ● a standalone project activity; OR ● as part of a bundled/grouped project activity; OR ● as another registered PoA; OR as a project activity under another emission reduction crediting scheme (e.g., voluntary	The Program did not claim the emission reduction in any other form of project activities	Contractual agreement between EA and the bus operator; ref: Reference 6 Note: TSB has no right to manage the carbon credits generated by this program	☒ Yes ☐ No

#	Eligibility criterion - Category	Eligibility criterion - Required condition	Criteria Check	Supporting evidence for inclusion	Fulfillment of the inclusion criteria
		carbon markets) during the same crediting period			
9	All CPAs shall have a crediting period not exceeding T-VER PoA duration *Ref: Table 1 of the scheme and Regulation of the Greenhouse Gas Management Organisation on Criteria for Considering Voluntary Greenhouse Gas Reduction Projects According to Thailand Standard (T-VER) B.E. 2022, announced on 25 January 2022*	The crediting period shall follow the T-VER standard for which a PoA has a 14-year period and a CPA has a 7-year period, with 1 time renewal	The crediting period of this project followed the T-VER standard, currently in its first monitoring period of the first crediting period Crediting period of PoA1 and PoA2: 01.10.2022 – 30.09.2036 (14 years)	Registration of date of CPA-DD included in this monitoring period; ref: Reference 7, where for the first crediting period each CPA registered within the crediting period of PoA: PoA1[16]: CPA1: 01.10.2022 – 30.09.2029 CPA2: 01.10.2022 – 30.09.2029 CPA3: 25.11.2022 – 24.11.2029 CPA4: 22.02.2023 – 21.02.2030 CPA5: 29.03.2023 – 28.03.2030 PoA2[17]: CPA1: 01.10.2022 – 30.09.2029	☒ Yes ☐ No

[16] Source: https://ghgreduction.tgo.or.th/th/tver-database-and-statistics/programme-of-activities/item/3602-bangkok-metropolitan-area-e-bus-zone-1-and-2.html
[17] Source: https://ghgreduction.tgo.or.th/th/tver-database-and-statistics/programme-of-activities/item/3605-bangkok-metropolitan-area-e-bus-zone-3-and-4.html

#	Eligibility criterion - Category	Eligibility criterion - Required condition	Criteria Check	Supporting evidence for inclusion	Fulfillment of the inclusion criteria
				CPA2: 01.10.2022 – 30.09.2029 CPA3: 03.11.2022 – 02.11.2029 CPA4: 15.12.2022 – 14.12.2029 CPA5: 12.01.2023 – 11.01.2030 CPA6: 15.02.2023 – 14.02.2030	
10	Data collection shall be shared between EA and the bus operator *Ref: MADD*	Bus operator shall provide monitoring data to EA and the Program Coordinating and Managing Entity (CME)	Bus operator has provided monitoring data to EA and CME	Raw data provided by EA to CME for the relevant parameters used for calculation; ref: Reference 9, Reference 11, and Reference 12	☒ Yes ☐ No
11	Demonstration of additionality	Additionality shall be demonstrated at CPA level	All CPAs have passed the additionality when registering for CPA-DD under the T-VER standard	Additionality demonstration of each registered CPA-DD of PoA1[18] and PoA2[19] under T-VER registry	☒ Yes ☐ No

[18] Source: https://ghgreduction.tgo.or.th/th/tver-database-and-statistics/programme-of-activities/item/3602-bangkok-metropolitan-area-e-bus-zone-1-and-2.html
[19] Source: https://ghgreduction.tgo.or.th/th/tver-database-and-statistics/programme-of-activities/item/3605-bangkok-metropolitan-area-e-bus-zone-3-and-4.html

CPAs that pass the eligibility criteria in Table 4 are included in this monitoring period. Detail of each bus route included in each CPA with number of registered e-buses with DLT by December 2023 are illustrated in Table 5 for PoA 01 and Table 6 for PoA 02.

Table 5: Details of e-bus routes and the number of e-buses included in T-VER PoA 01: Bangkok Metropolitan area e-bus Zones 1 and 2

No.	E-Bus Routes Name	E-bus Routes Identified Number	Number of E-Buses Registered with DLT	First date of E-Bus registration
CPA 1: The Bangkok Metropolitan Area E-Bus Zone 1 and 2				
1	Min Buri - Victory Monument	1-37	32	21/10/2022
2	Siam Park - Klongtoey	1-39	34	6/10/2022
3	Ministry of Public Health - Priest Hospital	2-15	18	27/10/2022
4	Happy Land - Memorial Bridge Pier	2-38	41	17/8/2022
5	Minburi - Suvarnabhumi airport	S4	5	22/12/2022
CPA 2: The Bangkok Metropolitan Area E-Bus Zone 1 and 2				
1	Rangsit - Hua Lamphong station (Tollway)	1-2E	18	29/9/2022
2	Bangkhen - Phahon Yothin Road - Hua Lamphong station	1-3	18	14/9/2022
3	Thammasat University Rangsit Campus - Bangkhen	1-4	10	19/10/2022
4	Romklao Housing - Happy Land	1-41	19	21/10/2022
5	Numkrai Industrial Estate - Min Buri	1-47	5	14/11/2022
6	KMITL - Happy Land	1-49	7	22/11/2022
7	Loop Minburi - Khubon Road - Hathairat Road	1-52	6	7/10/2022
8	KMITL - Victory Monument	1-56	11	22/11/2022
9	Siam Park - Lam Luk Ka Khlong 12	1-58	6	9/11/2022
10	Siam Park Bus Depot - Ua-Athorn Sangkasantisuk	1-59	6	9/11/2022
11	Ua-Athorn Sangkasantisuk - Min Buri	1-61	5	27/9/2022
12	Min Buri - Ministry of Commerce	1-62	5	22/11/2022
13	Patthawikorn - Rama VIII Park	1-63	7	25/11/2022
14	Loop Min Buri - Lat Krabang Industrial Estate	1-71	6	22/11/2022
15	Ua-Athorn Latkrabang 2 - Rom Klao	1-73	5	22/11/2022
16	Min Buri - Klongtoey (Additional line)	1-77	5	14/11/2022
17	Khlong Chan Housing - Tha Tian	2-42	20	21/9/2022
18	Loop Bang Sue BTS Station - Kasetsart University	2-17	7	27/10/2022
CPA 3: The Bangkok Metropolitan Area E-Bus Zone 1 and 2				
1	Government Complex - Khlong Luang	1-31	5	19/12/2022
2	Bangkhen -Talat Phlu BTS Station (Tollway)	1-32E	6	19/12/2022
3	Bangkhen - Bangsue Grand Station	1-33	6	22/12/2022
4	Loop Safari World - Nuuan Jan	1-64	5	30/11/2022
5	Loop Bua Khao - Min Buri	1-76	5	25/11/2022
6	Thammasat University Rangsit Campus - Thammasat University Tha Prachan Campus	1-9E	11	22/12/2022
7	Ministry of Public Health - Sanam Luang	2-11	15	8/12/2022
8	Talat Tha It - Victory Monument	2-3	22	19/12/2022
9	Tha It - Ramkhamhaeng University (Tollway)	2-18E	7	25/11/2022
10	Thanam Nonthaburi - Thanon Tok	2-22	10	19/12/2022
11	Muang Thong Thani - Bang Wa BTS Station	2-27	5	19/12/2022
12	Loop Samsen Railway Station - Din Daeng	2-34	7	22/12/2022

No.	E-Bus Routes Name	E-bus Routes Identified Number	Number of E-Buses Registered with DLT	First date of E-Bus registration
13	Rangsit - Siam Park - Suvarnabhumi airport (Tollway)	S3	18	22/12/2022
14	Happy Land - Suvarnabhumi airport	S5	10	22/12/2022
15	Bangkok Bus Terminal (Chatuchak) - Suvarnabhumi airport (Tollway)	S6	10	19/12/2022
16	Tha It - Ramkhamhaeng University	2-13	30	19/1/2023
17	Rangsit - Victory Monument	1-5	13	22/2/2023
18	Rangsit - Bang Rak (Toll)	1-18E	42	9/2/2023
CPA 4: The Bangkok Metropolitan Area E-Bus Zone 1 and 2				
1	Siam Park - Bang Rak	1-45	26	22/2/2023
2	Rajamangala University of Technology - Priest Hospital	1-24E	20	30/3/2023
3	Government Complex - Khlong Tun	1-13	10	27/4/2023
4	Minburi - Hua Lamphong	1-44	25	29/3/2023
5	Bangkhen - Viphawadee Road - Hua Lamphong	1-1	10	19/5/2023
6	Rangsit - Raminthra Road - Suvanabhumi Airport (Toll)	S2	10	19/5/2023
7	Ua-Athorn Klong 3 - Victory Monument	1-17	40	30/3/2023
8	Lak Si - Bangkok Bus Terminal (South)	1-23	20	28/4/2023
9	Talat Bang Bua Thong - Banglamphu	2-19	20	27/4/2023
CPA 5: The Bangkok Metropolitan Area E-Bus Zone 1 and 2				
1	Prachaniwet 3 - Thewet	2-35	14	29/3/2023
2	Thanam Nonthaburi - Pattanakarn	2-26	16	19/5/2023
3	Pak Nam Temple Nonthaburi - Bangkok Bus Station South (Phra Pin Klao)	2-4	22	28/4/2023
4	Happy Land - Bangkok Bus Terminal (Chatuchak)	2-48	10	31/5/2023
5	Suvarnabhumi airport (Tollway) - Thonburi Housing	S7	5	19/5/2023
Total Routes in PoA 01: Bangkok Metropolitan Area E-Bus Zone 1 and 2		**55**	**Total 771 E-buses**	

Table 6: Details of e-bus routes and the number of e-buses included in T-VER PoA 02: Bangkok Metropolitan area e-bus Zones 3 and 4

No.	E-Bus Routes Name	E-bus Routes Identified Number	Number of Buses Registered with DLT	First date of E-Bus registration
CPA 1: The Bangkok Metropolitan Area E-Bus Zone 3 and 4				
1	Rama 3 - Bangkok Bus Terminal (Chatuchak)	3-45	25	19/12/2022
2	Phra Pradaeng Pier - Bang Lamphu	4-15	20	5/9/2022
3	Taling Chan Circle - Thonburi	4-41	20	8/12/2022
CPA 2: The Bangkok Metropolitan Area E-Bus Zone 3 and 4				
1	Paknam - Memorial Bridge Pier	3-1	27	19/10/2022
2	Paknam - Lat Krabang Industrial Estate (Tollway)	3-25E	11	27/9/2022
3	Pu Chao Saming Phrai - Memorial Bridge Pier (Tollway)	3-2E	10	21/10/2022
4	Hua Mak - Sao Ching Cha	3-53	5	21/9/2022
5	Samaedam - Victory Monument (Tollway)	4-23E	34	29/9/2022
6	Bang Khun Thian - Happy Land (Tollway)	4-27E	12	23/8/2022
7	Samaedam - Victory Monument	4-28	12	7/10/2022
8	Phra Pradaeng - Victory Monument	4-3	15	5/9/2022
9	Phutthamonthon Sai 5 Road - Tha Ratcha Woradit	4-45	40	14/9/2022
10	Boromarajonani - Bangkok Bus Terminal (Chatuchak)	4-49	10	2/11/2022
11	Loop Bangkok Bus Terminal (South) - Phet Kasem Road	4-52	17	2/11/2022
12	Boromarajonani - Bangkok Bus Terminal (Eastern)	4-53	13	2/11/2022
13	KMUTT - Prachauthit - Talat Phlu BTS Station	4-17	5	27/9/2022
14	Thonburi Housing - Phra Pradaeng	4-34	10	27/9/2022
CPA 3: The Bangkok Metropolitan Area E-Bus Zone 3 and 4				
1	Bang Phli Housing - Udom Suk BTS Station	3-14	17	9/12/2022
2	Rama 3 - Tha Tian	3-35	17	2/12/2022
3	Bangkok Port (Khlong Toei) - Phasi Charoen Port	3-36	10	14/11/2022
4	Pu Chao Saming Phrai - Siam Park	3-27	14	25/11/2022
5	Samrong - Siam Park	3-32	6	25/11/2022
6	Loop Rama 3 - Hua Lamphong	3-52	7	2/12/2022
7	Tha Phasi Charoen - Victory Monument	3-54	5	30/11/2022
8	Sala Ya Train Station - National Stadium BTS Station	4-55	15	9/11/2022
9	Sala Ya Station - Victory Monument	4-61	26	4/11/2022
10	Suksanari Wittaya School - Hua Lam Phong	4-36	26	3/11/2022
11	Samaedam - Bangkok Bus Terminal (Chatuchak) (Tollway)	4-29E	25	30/11/2022
12	Boromarajonani - Krung Thon Buri BTS Station	4-56	9	14/11/2022
13	Suanpak - Thanon Tok	4-68	5	9/12/2022
CPA 4: The Bangkok Metropolitan Area E-Bus Zone 3 and 4				
1	Thailand Cultural Center - Sanam Chai BTS Station	3-37	15	22/12/2022
2	Thanon Tok - Si Yan	3-39	17	15/12/2022
3	Rama IX Park - National Stadium Station	3-3	14	22/12/2022
4	Samrong - Government Complex (Tollway)	3-23E	7	15/12/2022

No.	E-Bus Routes Name	E-bus Routes Identified Number	Number of Buses Registered with DLT	First date of E-Bus registration
5	Bangkok Port (Khlong Toei) - Victory Monument	3-44	7	22/12/2022
6	Bangkok Port (Khlong Toei) - Rama 7	3-55	5	22/12/2022
7	Bangna - Lat Krabang Industrial Estate (Tollway)	3-34	5	15/12/2022
8	Rai Khing temple - Krung Thon Buri BTS Station	4-46	55	19/12/2022
9	Omyai - Victory Monument (Tollway)	4-54E	25	19/12/2022
10	Sala Ya Train Station - Ministry of Commerce	4-67	6	19/12/2022
11	Sam Rong - Bangkok Bus Station (South)	3-13	27	12/1/2023
12	Ramkhamhaeng University (Bangna Campus) - Victory Monument	3-8	20	12/1/2023
13	Ua-Athorn Salaya - Sanam Luang	4-51	28	12/1/2023
CPA 5: The Bangkok Metropolitan Area E-Bus Zone 3 and 4				
1	Suksanari School - Thewet	4-11	24	12/1/2023
2	Loop Thonburi Housing - Bangkhae	4-25	45	19/1/2023
3	Bang Phli Housing - Ekamai BTS Station	3-15	18	25/1/2023
4	Thonburi Housing - Bang Lamphu	4-8	9	25/1/2023
5	Samutsakorn - Ban Khaek Intersection	4-21	23	25/1/2023
6	Krung Thon Bridge Loop - Bang Lam Phu	4-40	16	25/1/2023
7	Wor Por Or Village - Suan Luang Rama 8	4-44	12	25/1/2023
8	Omyai - Tha Ratcha Woradit	4-50	26	9/2/2023
9	Ramkhamhaeng University (Bangna Campus) - Tha Chang	3-11	31	12/1/2023
10	Phra Pradaeng Pier - Bang Lamphu	4-1	34	15/2/2023
CPA 6: The Bangkok Metropolitan Area E-Bus Zone 3 and 4				
1	Bangkok Bus Station (South) - Chandrakasem Rajabhat University	4-38	40	23/3/2023
2	Bangkok Bus Station (South) - Bangkok Bus Station (Ekamai)	4-39	40	23/3/2023
3	Ua-Athorn Salaya - Tanon Tok	4-63	28	15/2/2023
4	Kalpapruek - Samsen Train Station	4-37	10	27/4/2023
5	Bangkok Bus Station (South) - Rajamangala University of Technology (Bangkok Campus)	4-47	10	27/4/2023
6	Patumkongka Schoool Samutprakan - Bangkok Bus Station (Ekamai)	3-6	22	23/3/2023
7	Phra Pradaeng - Thonburi BTS Station	4-16	10	22/2/2023
8	BTS Talat Phu Loop - Victory Monument	4-19	12	27/4/2023
9	Thonburi Housing - Lumphini MRT	4-26	10	22/2/2023
10	Sao Ching Cha - Tha Phra	4-10	30	22/3/2023
Total Routes in PoA 02: Bangkok Metropolitan Area E-Bus Zone 3 and 4		**63**	**Total 1,134 E-buses**	

2.3 Location and system boundary

Was the project or program implemented at the site according to the project/program description?

☐ Not relevant because it concerns projects of a program and this was not specified in the program description
☐ Yes
☒ No

The boundary of the Program, which is the Bangkok Metropolitan area, remains the same. In the implementation, the terminal stations of each bus route are subject to change due to the appropriateness and readiness of each terminal. The terminal stations for each bus route are identified by the bus operator, TSB, and the charging stations on each bus route are grouped by relative distance of the location of bus routes to the bus terminals. Details and locations of each bus route grouped by CPAs are illustrated in Table 7 and Table 8.

Table 7: Locations of e-bus terminals / charging stations of routes included in CPAs under T-VER PoA 01: Bangkok Metropolitan area e-bus Zones 1 and 2

E-bus Routes Identified Number	E-Bus Routes Name	Name of e-bus terminals	GPS coordinate location
CPA 1			
1-37	Min Buri - Victory Monument	Bueng kum	13° 47' 16.03625", 100° 40' 39.55512" https://goo.gl/maps/AvCdPHGxksvMwaQV9
1-39	Siam Park - Klongtoey		
2-38	Happy Land - Memorial Bridge Pier	Ramkhamhaeng 74	13°46'05.95088077016181",100°39'50.1442229159613" https://goo.gl/maps/eTTLavQuXLkNQESM7
2-15	Ministry of Public Health - Priest Hospital	Nonthaburi Bypass	13°52'26.874", 100°29'37.532" https://maps.app.goo.gl/G3XmA2KCg7zgzHYP7
S-4	Minburi - Suvarnabhumi airport	Minburi - Nong Chok	13°48'33.8399419086701",100°49'57.7086681096524" https://goo.gl/maps/dz5TGZGzytYK2Mfq9
CPA 2			
1-2E	Rangsit - Hua Lamphong station (Tollway)	Rangsit Bangpoon	13° 59' 49.22457", 100° 34' 56.1351" https://goo.gl/maps/4G1B8Vrm9yoBkJ8D8
1-3	Bangkhen - Phahon Yothin Road - Hua Lamphong station	Rangsit Bangpoon	13° 59' 49.22457", 100° 34' 56.1351" https://goo.gl/maps/4G1B8Vrm9yoBkJ8D8
1-4	Thammasat University Rangsit Campus - Bangkhen	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
1-41	Romklao Housing - Happy Land	Buengkum 2	13° 47' 13.04204", 100° 40' 43.28382" https://goo.gl/maps/rKXm2EFHzNb9szoX8
1-47	Numkrai Industrial Estate - Min Buri	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
1-49	KMITL - Happy Land	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
1-52	Loop Minburi - Khubon Road - Hathairat Road	Buengkum 2	13° 47' 13.04204", 100° 40' 43.28382" https://goo.gl/maps/rKXm2EFHzNb9szoX8
1-56	KMITL - Victory Monument	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
1-58	Siam Park - Lam Luk Ka Khlong 12	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56

E-bus Routes Identified Number	E-Bus Routes Name	Name of e-bus terminals	GPS coordinate location
1-59	Siam Park Bus Depot - Ua-Athorn Sangkasantisuk	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
1-61	Ua-Athorn Sangkasantisuk - Min Buri	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
1-62	Min Buri - Ministry of Commerce	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
1-63	Patthawikorn - Rama VIII Park	Buengkum 2	13° 47' 13.04204", 100° 40' 43.28382" https://goo.gl/maps/rKXm2EFHzNb9szoX8
1-71	Loop Min Buri - Lat Krabang Industrial Estate	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
1-73	Ua-Athorn Latkrabang 2 - Rom Klao	Minburi - Nong Chok	13° 48' 33.38873", 100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
1-77	Min Buri - Klongtoey (Additional line)	Minburi - Nong Chok	13° 48' 33.38873",100° 49' 55.29173" https://goo.gl/maps/CKHMzSt5qhQoZTm56
2-42	Khlong Chan Housing - Tha Tian	Ramkhamhaeng 74	13° 46' 6.22412", 100° 39' 46.53427" https://goo.gl/maps/2u1HcnZzcLV7sP517
2-17	Loop Bang Sue BTS Station - Kasetsart University	Nonthaburi Bypass	13°52'26.874", 100°29'37.532" https://maps.app.goo.gl/G3XmA2KCg7zgzHYP7
CPA 3			
1-18E	Rangsit – Bangrak (Tollway)	Rangsit 200 Years	13° 59' 46.21943",100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
1-31	Government Complex - Khlong Luang	Rangsit 200 Years	13° 59' 46.21943",100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
1-32E	Bangkhen -Talat Phlu BTS Station (Tollway)	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
1-33	Bangkhen - Bangsue Grand Station	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
1-5	Rangsit – Victory Monument	Rangsit Bangpoon	13° 59' 49.22457", 100° 34' 56.1351" https://goo.gl/maps/4G1B8Vrm9yoBkJ8D8
1-64	Loop Safari World - Nuuan Jan	Buengkum 2	13° 47' 13.04204", 100° 40' 43.28382" https://goo.gl/maps/rKXm2EFHzNb9szoX8
1-76	Loop Bua Khao - Min Buri	Buengkum 2	13° 47' 13.04204", 100° 40' 43.28382" https://goo.gl/maps/rKXm2EFHzNb9szoX8
1-9E	Thammasat University Rangsit Campus - Thammasat University Tha Prachan Campus	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
2-11	Ministry of Public Health - Sanam Luang	Nonthaburi Bypass	13°52'26.874", 100°29'37.532" https://maps.app.goo.gl/G3XmA2KCg7zgzHYP7
2-13	Tha It - Ramkhamhaeng University	Tha It	13° 53' 25.41353", 100° 27' 37.0185" https://goo.gl/maps/7VxokZosMydU5LuK6
2-3	Talat Tha It - Victory Monument	Tha It	13° 53' 25.41353", 100° 27' 37.0185" https://goo.gl/maps/7VxokZosMydU5LuK6
2-18E	Tha It - Ramkhamhaeng University (Tollway)	Tha It	13° 53' 25.41353",100° 27' 37.0185" https://goo.gl/maps/7VxokZosMydU5LuK6
2-22	Thanam Nonthaburi - Thanon Tok	Nonthaburi Bypass	13°52'26.874", 100°29'37.532" https://maps.app.goo.gl/G3XmA2KCg7zgzHYP7

E-bus Routes Identified Number	E-Bus Routes Name	Name of e-bus terminals	GPS coordinate location
2-27	Muang Thong Thani - Bang Wa BTS Station	Tha It	13° 53' 25.41353", 100° 27' 37.0185" https://goo.gl/maps/7VxokZosMydU5LuK6
2-34	Loop Samsen Railway Station - Din Daeng	Ramkhamhaeng 74	13° 46' 6.22412", 100° 39' 46.53427" https://goo.gl/maps/2u1HcnZzcLV7sP517
S3	Rangsit - Siam Park - Suvarnabhumi airport (Tollway)	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
S5	Happy Land - Suvarnabhumi airport	Ramkhamhaeng University 2	13° 40' 23.9196", 100° 41' 28.212" https://goo.gl/maps/z5KHDcJAwJJdqrf57
S6	Bangkok Bus Terminal (Chatuchak) - Suvarnabhumi airport (Tollway)	Ramkhamhaeng University 2	13° 40' 23.9196", 100° 41' 28.212" https://goo.gl/maps/z5KHDcJAwJJdqrf57
CPA 4			
1-1	Bangkhen-Vibhavadi Rangsit- Hua Lamphong	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
1-13	Government Complex - Khlong Tun	Bueng kum	13° 47' 16.03625", 100° 40' 39.55512" https://goo.gl/maps/AvCdPHGxksvMwaQV9
1-17	Ua-Athorn Klong 3 - Victory Monument	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
1-23	Lak Si - Bangkok Bus Terminal (South)	Talingchan 1	13°46'52.3"N 100°23'30.9"E https://goo.gl/maps/uSSU28gsu1aBJd246
1-24E	Rajamangala University of Technology - Priest Hospital	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
1-44	Minburi - Hua Lamphong	Bueng kum	13° 47' 16.03625", 100° 40' 39.55512" https://goo.gl/maps/AvCdPHGxksvMwaQV9
1-45	Siam Park - Bang Rak	Bueng kum	13° 47' 16.03625", 100° 40' 39.55512" https://goo.gl/maps/AvCdPHGxksvMwaQV9
2-19	Talat Bang Bua Thong - Banglamphu	Tha It	13° 53' 25.41353",100° 27' 37.0185" https://goo.gl/maps/7VxokZosMydU5LuK6
S2	Rangsit - Raminthra Road - Suvanabhumi Airport (Toll)	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
CPA 5			
2-4	Pak Nam Temple Nonthaburi - Bangkok Bus Station South (Phra Pin Klao)	Talingchan 1	13°46'52.3"N 100°23'30.9"E https://goo.gl/maps/uSSU28gsu1aBJd246
2-26	Thanam Nonthaburi - Pattanakarn	Tha It	13° 53' 25.41353",100° 27' 37.0185" https://goo.gl/maps/7VxokZosMydU5LuK6
2-35	Prachaniwet 3 - Thewet	Talingchan 1	13°46'52.3"N 100°23'30.9"E https://goo.gl/maps/uSSU28gsu1aBJd246
2-48	Happy Land - Bangkok Bus Terminal (Chatuchak)	Bueng kum	13° 47' 16.03625", 100° 40' 39.55512" https://goo.gl/maps/AvCdPHGxksvMwaQV9
S7	Suvarnabhumi airport (Tollway) - Thonburi Housing	Thonburi Housing	13° 39' 1.90485", 100° 25' 7.9758" https://goo.gl/maps/Nm48XjHhJQhFaAzF9

Figure 2: Example pictures of bus station in PoA 01 *'Bueng Kum E-bus station and the charging station'*

Table 8: Location of e-bus terminals / charging stations of routes included in CPAs under T-VER PoA 02: Bangkok Metropolitan area e-bus Zones 3 and 4

E-bus Routes Identified Number	E-Bus Routes Name	Name of e-bus terminals	GPS coordinate location
CPA 1			
3-45	Rama 3 - Bangkok Bus Terminal (Chatuchak)	Phra Pradaeng	13° 39' 48.80315", 100° 30' 55.1844" https://goo.gl/maps/mbM4RvyNkknhK3eFA
4-15	Phra Pradaeng Pier - Bang Lamphu		
4-41	Taling Chan Circle - Thonburi	Pran Nok	13°45'17.4802605644302", 100°25'24.0784395243622" https://goo.gl/maps/aA5ZWbVjbCXn6wkT6
CPA 2			
3-1	Paknam - Memorial Bridge Pier	Pak Nam	13° 36' 57.48788", 100° 35' 36.13858" https://goo.gl/maps/rBuT3pRW4nkJehWHA
3-25E	Paknam - Lat Krabang Industrial Estate (Tollway)	Pak Nam	13° 36' 57.48788", 100° 35' 36.13858" https://goo.gl/maps/rBuT3pRW4nkJehWHA
3-2E	Pu Chao Saming Phrai - Memorial Bridge Pier (Tollway)	Pak Nam	13° 36' 57.48788", 100° 35' 36.13858" https://goo.gl/maps/rBuT3pRW4nkJehWHA
3-53	Hua Mak - Sao Ching Cha	Ramkhamhaeng 74	13° 46' 6.22412", 100° 39' 46.53427" https://goo.gl/maps/2u1HcnZzcLV7sP517
4-23E	Samaedam - Victory Monument (Tollway)	Saem Dam	13° 37' 32.34797", 100° 26' 19.6248" https://goo.gl/maps/WBqCch6nFst8QYLp7
4-27E	Bang Khun Thian - Happy Land (Tollway)	Saem Dam	13° 37' 32.34797", 100° 26' 19.6248" https://goo.gl/maps/WBqCch6nFst8QYLp7
4-28	Samaedam - Victory Monument	Saem Dam	13° 37' 32.34797", 100° 26' 19.6248" https://goo.gl/maps/WBqCch6nFst8QYLp7
4-3	Phra Pradaeng - Victory Monument	Phra Pradaeng	13° 39' 48.69215", 100° 30' 53.22867" https://goo.gl/maps/9PJyYs5gbEn7TRjT8
4-45	Phutthamonthon Sai 5 Road - Tha Ratcha Woradit	Wat Rai Khing	13° 45' 17.4722", 100° 17' 7.67889" https://goo.gl/maps/tPpRturFnKwHWGnQ6
4-49	Boromarajonani - Bangkok Bus Terminal (Chatuchak)	Phutthamonthon Sai 2	13° 43' 53.49", 100° 23' 48.174" https://goo.gl/maps/Xz9C4CRhoDKDVZKR8

E-bus Routes Identified Number	E-Bus Routes Name	Name of e-bus terminals	GPS coordinate location
4-52	Loop Bangkok Bus Terminal (South) - Phet Kasem Road	Phutthamonthon Sai 2	13° 43' 53.49", 100° 23' 48.174" https://goo.gl/maps/Xz9C4CRhoDKDVZKR8
4-53	Boromarajonani - Bangkok Bus Terminal (Eastern)	Talingchan 2	13° 46' 53.2272",100° 23' 30.9804" https://goo.gl/maps/uSSU28gsu1aBJd246
4-17	KMUTT - Prachauthit - Talat Phlu BTS Station	Saem Dam	13° 37' 32.34797", 100° 26' 19.6248" https://goo.gl/maps/WBqCch6nFst8QYLp7
4-34	Thonburi Housing - Phra Pradaeng	Saem Dam	13° 37' 32.34797", 100° 26' 19.6248" https://goo.gl/maps/WBqCch6nFst8QYLp7
CPA 3			
3-14	Bang Phli Housing - Udom Suk BTS Station	Bangpli	13° 35' 14.97603", 100° 48' 0.73846" https://goo.gl/maps/ASaYpZvmt86jQmsj7
3-35	Rama 3 - Tha Tian	Phra Pradaeng	13° 39' 48.69215", 100° 30' 53.22867" https://goo.gl/maps/9PJyYs5gbEn7TRjT8
3-36	Bangkok Port (Khlong Toei) - Phasi Charoen Port	Thonburi Housing	13° 39' 1.90485", 100° 25' 7.9758" https://goo.gl/maps/Nm48XjHhJQhFaAzF9
3-27	Pu Chao Saming Phrai - Siam Park	Pak Nam	13° 36' 57.48788", 100° 35' 36.13858" https://goo.gl/maps/rBuT3pRW4nkJehWHA
3-32	Samrong - Siam Park	Ramkhamhaeng University 2	13° 40' 23.9196",100° 41' 28.212" https://goo.gl/maps/z5KHDcJAwJJdqrf57
3-52	Loop Rama 3 - Hua Lamphong	Phra Pradaeng	13° 39' 48.69215", 100° 30' 53.22867" https://goo.gl/maps/9PJyYs5gbEn7TRjT8
3-54	Tha Phasi Charoen - Victory Monument	Thonburi Housing	13° 39' 1.90485", 100° 25' 7.9758" https://goo.gl/maps/Nm48XjHhJQhFaAzF9
4-55	Sala Ya Train Station - National Stadium BTS Station	Salaya	13° 48' 21.15028", 100° 16' 11.7317" https://goo.gl/maps/tSUz2qcCgf9eZviv6
4-61	Sala Ya Station - Victory Monument	Wat Rai Khing	13° 45' 17.4722", 100° 17' 7.67889" https://goo.gl/maps/tPpRturFnKwHWGnQ6
4-36	Suksanari Wittaya School - Hua Lam Phong	Ekachai	13° 34' 35.91356", 100° 18' 36.10437" https://goo.gl/maps/uyAF4RmGyLUQTMJv6
4-29E	Samaedam - Bangkok Bus Terminal (Chatuchak) (Tollway)	Saem Dam	13° 37' 32.34797", 100° 26' 19.6248" https://goo.gl/maps/WBqCch6nFst8QYLp7
4-56	Boromarajonani - Krung Thon Buri BTS Station	Talingchan 2	13° 46' 53.2272",100° 23' 30.9804" https://goo.gl/maps/uSSU28gsu1aBJd246
4-68	Suanpak - Thanon Tok	Talingchan 2	13° 46' 53.2272",100° 23' 30.9804" https://goo.gl/maps/uSSU28gsu1aBJd246
CPA 4			
3-37	Thailand Cultural Center - Sanam Chai BTS Station	Talingchan 2	13° 46' 53.2272",100° 23' 30.9804" https://goo.gl/maps/uSSU28gsu1aBJd246
3-39	Thanon Tok - Si Yan	Phra Pradaeng	13° 39' 48.69215", 100° 30' 53.22867" https://goo.gl/maps/9PJyYs5gbEn7TRjT8
3-3	Rama IX Park - National Stadium Station	Ramkhamhaeng University 2	13° 40' 23.9196", 100° 41' 28.212" https://goo.gl/maps/z5KHDcJAwJJdqrf57

E-bus Routes Identified Number	E-Bus Routes Name	Name of e-bus terminals	GPS coordinate location
3-23E	Samrong - Government Complex (Tollway)	Phra Pradaeng	13° 39' 48.69215", 100° 30' 53.22867" https://goo.gl/maps/9PJyYs5gbEn7TRjT8
3-44	Bangkok Port (Khlong Toei) - Victory Monument	Ramkhamhaeng 74	13° 46' 6.22412", 100° 39' 46.53427" https://goo.gl/maps/2u1HcnZzcLV7sP517
3-55	Bangkok Port (Khlong Toei) - Rama 7	Talingchan 2	13° 46' 53.2272",100° 23' 30.9804" https://goo.gl/maps/uSSU28gsu1aBJd246
3-34	Bangna - Lat Krabang Industrial Estate (Tollway)	Ramkhamhaeng University 2	13° 40' 23.9196", 100° 41' 28.212" https://goo.gl/maps/z5KHDcJAwJJdqrf57
4-46	Rai Khing temple - Krung Thon Buri BTS Station	Wat Rai Khing	13° 45' 17.4722", 100° 17' 7.67889" https://goo.gl/maps/tPpRturFnKwHWGnQ6
4-54E	Omyai - Victory Monument (Tollway)	Phutthamonthon Sai 2	13° 43' 53.49", 100° 23' 48.174" https://goo.gl/maps/Xz9C4CRhoDKDVZKR8
4-67	Sala Ya Train Station - Ministry of Commerce	Salaya	13° 48' 21.15028", 100° 16' 11.7317" https://goo.gl/maps/tSUz2qcCgf9eZviv6
4-51	Ua-Athorn Salaya - Sanam Luang	Salaya	13° 48' 21.15028", 100° 16' 11.7317" https://goo.gl/maps/tSUz2qcCgf9eZviv6
3-8	Ramkhamhaeng University (Bangna Campus) - Victory Monument	Ramkhamhaeng University 2	13° 40' 23.9196", 100° 41' 28.212" https://goo.gl/maps/z5KHDcJAwJJdqrf57
3-13	Sam Rong - Bangkok Bus Station (South)	Pak Nam	13° 36' 57.48788", 100° 35' 36.13858" https://goo.gl/maps/rBuT3pRW4nkJehWHA
CPA 5			
3-11	Ramkhamhaeng University (Bangna Campus) - Tha Chang	Ramkhamhaeng University 2	13° 40' 23.9196", 100° 41' 28.212" https://goo.gl/maps/z5KHDcJAwJJdqrf57
3-15	Bang Phli Housing - Ekamai BTS Station	Bangpli	13° 35' 14.97603", 100° 48' 0.73846" https://goo.gl/maps/ASaYpZvmt86jQmsj7
4-1	Phra Pradaeng Pier - Bang Lamphu	Phra Pradaeng	13° 39' 48.69215", 100° 30' 53.22867" https://goo.gl/maps/9PJyYs5gbEn7TRjT8
4-8	Thonburi Housing - Bang Lamphu	Phra Pradaeng	13° 39' 48.69215", 100° 30' 53.22867" https://goo.gl/maps/9PJyYs5gbEn7TRjT8
4-11	Suksanari School - Thewet	Ekachai	13° 34' 35.91356", 100° 18' 36.10437" https://goo.gl/maps/uyAF4RmGyLUQTMJv6
4-21	Samutsakorn - Ban Khaek Intersection	Ekachai	13° 34' 35.91356", 100° 18' 36.10437" https://goo.gl/maps/uyAF4RmGyLUQTMJv6
4-25	Loop Thonburi Housing - Bangkhae	Thonburi Housing	13° 39' 1.90485", 100° 25' 7.9758" https://goo.gl/maps/Nm48XjHhJQhFaAzF9
4-40	Krung Thon Bridge Loop - Bang Lam Phu	Pran Nok	13°45'17.4802605644302", 100°25'24.0784395243622" https://goo.gl/maps/aA5ZWbVjbCXn6wkT6
4-44	Wor Por Or Village - Suan Luang Rama 8	Phutthamonthon Sai 2	13° 43' 53.49", 100° 23' 48.174" https://goo.gl/maps/Xz9C4CRhoDKDVZKR8
4-50	Omyai - Tha Ratcha Woradit	Talingchan 1	13°45'17.3"N 100°17'07.7"E https://goo.gl/maps/tPpRturFnKwHWGnQ6
CPA 6			
3-6	Patumkongka Schoool Samutprakan - Bangkok Bus Station (Ekamai)	Pak Nam	13° 36' 57.48788", 100° 35' 36.13858" https://goo.gl/maps/rBuT3pRW4nkJehWHA

E-bus Routes Identified Number	E-Bus Routes Name	Name of e-bus terminals	GPS coordinate location
4-10	Sao Ching Cha - Tha Phra	Talingchan 1	13°45'17.3"N 100°17'07.7"E https://goo.gl/maps/tPpRturFnKwHWGnQ6
4-16	Phra Pradaeng - Thonburi BTS Station	Thonburi Housing	13° 39' 1.90485", 100° 25' 7.9758" https://goo.gl/maps/Nm48XjHhJQhFaAzF9
4-19	BTS Talat Phu Loop - Victory Monument	Rangsit 200 Years	13° 59' 46.21943", 100° 36' 9.76107" https://goo.gl/maps/9h6dQgBFcaBRYGRTA
4-26	Thonburi Housing - Lumphini MRT	Thonburi Housing	13° 39' 1.90485", 100° 25' 7.9758" https://goo.gl/maps/Nm48XjHhJQhFaAzF9
4-37	Kalpapruek - Samsen Train Station	Thonburi Housing	13° 39' 1.90485", 100° 25' 7.9758" https://goo.gl/maps/Nm48XjHhJQhFaAzF9
4-38	Bangkok Bus Station (South) - Chandrakasem Rajabhat University	Talingchan 1	13°45'17.3"N 100°17'07.7"E https://goo.gl/maps/tPpRturFnKwHWGnQ6
4-39	Bangkok Bus Station (South) - Bangkok Bus Station (Ekamai)	Talingchan 1	13°45'17.3"N 100°17'07.7"E https://goo.gl/maps/tPpRturFnKwHWGnQ6
4-47	Bangkok Bus Station (South) - Rajamangala University of Technology (Bangkok Campus)	Talingchan 1	13°45'17.3"N 100°17'07.7"E https://goo.gl/maps/tPpRturFnKwHWGnQ6
4-63	Ua-Athorn Salaya - Tanon Tok	Salaya	13° 48' 21.15028", 100° 16' 11.7317" https://goo.gl/maps/tSUz2qcCgf9eZviv6

Figure 3: Example pictures of bus station in PoA 02 *'Phra Padaeng E-bus station and the charging station'*

Does the system boundary of the implemented project/program and the projects of the program correspond to that in the project/program description?

☒ Yes
☐ No

2.4 Technology used

If further (not first) monitoring period: Does the implemented project/programme technically correspond to the project/programme according to the last monitoring report?

☒ Yes
☐ No

2.5 Salvage and Replacement of Existing Fleet

The Bangkok E-Bus Program involves the planned replacement of old internal combustion engine buses ("old ICE buses") with electric buses (EVs) across existing public transport routes in the Bangkok Metropolitan Area. The program encompasses of replacing older ICE buses on a one-to-one basis ("The replacement"). This ensures a direct and transparent transition to zero-emission electric transport, significantly reducing greenhouse gas emissions and improving urban air quality.

During this monitoring period, 1,534 EV buses are operating on an existing route. 959 buses are targeted for salvage and replacement based on documented evidence of deregistration. The deregistration records, officially issued by the Department of Land Transport (DLT), constitute verifiable and authoritative proof that the corresponding ICE buses have been withdrawn from service and are no longer legally permitted to operate (see Reference 3). The process of collecting evidence of deregistration from the Department of Land Transport (DLT) is currently on track to meet the replacement. A formal claim for the replacement of these old ICE buses will be submitted in the future, aligned with the program's monitoring, reporting, and verification (MRV) procedures.

The decommissioning of old ICE buses is managed through formal salvage purchase agreements, which govern the removal and disposal process. These agreements explicitly prohibit the reuse or re-entry of salvaged old ICE buses into service—either within the project area or elsewhere. This non-reuse condition is critical to prevent the risk of double-counting emission reductions and to ensure the environmental integrity of the program.

If old ICE buses were reintroduced into operation, their emissions would have to be accounted for, thereby, the enforcement of a policy that prohibits re-entry into service through formal vehicle deregistration serves as a mechanism to ensure that the greenhouse gas (GHG) emission reductions resulting from the use of electric buses in the project are real, measurable, verifiable, and genuinely additional.

This rigorous salvage and The replacement approach, coupled with transparent reporting and strict adherence to climate project standards, supports Thailand's broader climate commitments. It also promotes a more sustainable and cleaner public transport system for the Bangkok Metropolitan Area.

Since the replacement of internal combustion engine (ICE) buses with electric buses (e-buses) has not followed a uniform replacement pattern in terms of service characteristics., a proportioned method has been applied to accurately estimate and attribute the impacts associated with this transition. This approach ensures that changes in operational characteristics, service coverage, and emissions are appropriately scaled to reflect the actual ratio of e-buses introduced relative to the number of ICE buses replaced. As a result, the calculated benefits, including emissions reductions and fuel savings, more reliably capture the reality of the deployment and provide a sound basis for monitoring and verification.

Table 9 : the number of bus routes and e-buses (Existing Route / New Route / Total)

PoA/CPA		No. of Routes	Existing Route (After proportioned	New Route	Total
PoA1	CPA1	5	81	0	81
	CPA2	18	56	76	132
	CPA3	18	95	66	161
	CPA4	9	93	0	93
	CPA5	5	37	0	37
Total PoA 1		55	362	142	504
PoA2	CPA1	3	40	0	40
	CPA2	14	125	20	145
	CPA3	13	55	69	124
	CPA4	13	120	27	147
	CPA5	10	133	0	133
	CPA6	10	124	0	124
Total PoA 2		63	597	116	713
		118	959	258	1,217

3 Differentiation from climate or energy policy instruments and avoidance of double counting

This project is implemented under the Paris Agreement 6.2 scheme. It is in line with the bilateral agreement between Switzerland and Thailand. Hence, aside from transferring ITMOs generated from this Program, there is no other subsidy to this Program.

3.1 Grants

If further (not first after validation) monitoring period: Do the grants received, as well as non-repayable cash benefits, for which a breakdown of impact is necessary, correspond to the information in the last monitoring report?

This program does not receive any grants or non-payable cash benefits from any counterparty.

☒ Not relevant
☐ Yes
☐ No

3.2 Distinction from companies that are exempt from the CO_2 levy

If further (not first after validation) monitoring report: Does the delineation to companies exempt from CO_2 tax match the delineation presented in the last monitoring report?

This section is not relevant as the Bangkok E-Bus Program is an abroad program that is implemented in Thailand.

☒ Not relevant
☐ Yes
☐ No

3.3 Double counting due to other compensation for ecological added value

If further (not first after validation) monitoring period: Do the facts regarding double counting of emission reductions correspond to the presentation in the last monitoring report?

☐ Not relevant
☒ Yes
☐ No

If further (not first after validation) monitoring period: Are the measures to avoid double counting due to other compensation of the ecological added value according to the last monitoring report implemented?

☐ Not relevant
☒ Yes
☐ No

4 Implementation monitoring

4.1 Detection method and data collection

If further (not first after validation) monitoring period: Does the applied detection method correspond to the method described in the last monitoring report, if necessary also with regard to scientific monitoring?

☒ Yes
☐ No

4.2 Formulas for calculating the ex-post emission reductions achieved

If further (not first after validation) monitoring period: Do the formulas for calculating the achieved emission reductions correspond to the method described in the last monitoring report?

☒ Yes
☐ No

4.3 Parameters and data collection

4.3.1 Fixed parameters

Fixed parameter: NCV_{NGV}	Detail
Parameter description	Net calorific value of natural gas vehicle (NGV)
Value	36.67
Unit	MJ/kg
Data source	Energy statistics report from the Department of Alternative Energy Development and Efficiency, Ministry of Energy From Energy Statistics of Thailand 2024 (https://www.eppo.go.th/index.php/th/informationservices/ct-menu-item-56) $NCV_{NGV\ (dry)}$ = 1.02 MJ/scf NGV consumption (dated April 18, 2023) – (https://www.eppo.go.th/index.php/th/petroleum/gas/ngv/ngv-unit) NGV conversion = 27.81873313 tonne/mmscf

Fixed parameter: $EF_{CO2,x}$	Detail
Parameter description	Emission factor of NGV
Value	0.05610
Unit	$kgCO_2/MJ$
Data source	Table 1.4 2006 IPCC Guidelines for National GHG Inventories

Fixed parameter: $FC_{BL,i,NGV}$	Detail
Parameter description	Quantity of fuel consumption of the NGV of the ICEV in the public transport system on route i in the baseline
Measured value and unit	19,905,212.3 kg_{NGV} in this monitoring period
Data source / document	Calculated by multiplying (i) the specific fuel consumption[20] (unit fuel/distance) of the monitoring data for at least 3 months continuously and backdated for at most 2 years after replacement by an EV, (ii) the number of operating vehicles, and (iii) total distance travelled per year per vehicle. Refer to Reference 8 for the source of calculated data.

Fixed parameter: $L_{BL,i}$	Detail
Parameter description	Annual distance (round trip) on route 'i' in the baseline scenario.
Measured value and unit	Total distance of 37,137,281.0 km in this monitoring period
Data source / document	This shall be equal to $L_{PJ,i,y}$ since the project is a 1:1 replacement, as mentioned in the registered MADD.

Fixed parameter: $N_{BL,i}$	Detail
Parameter description	Number of ICEV on route 'i' in the baseline situation.
Measured value and unit	Total operation of 1,217 vehicles in this monitoring period
Data source / document	This shall be equal to $N_{PJ,i,y}$ since the project is calculated based on the proportioned data.

Fixed parameter: $PKM_{BL,i}$	Detail
Parameter description	Calculated from the total number of passengers and the average distance travelled of passengers, or report of passengers' distance travelled data. Refer to Reference 14
Measured value and unit	Passenger-km/year
Data source / document	Initial sampling survey report from Thai smile bus which conducted based line study on 122 bus routes within the program from October 2021 – April 2022.

[20] Specific fuel consumption shall also be considered as a parameter that has to be monitored throughout the crediting period. The average data of specific fuel consumption in this monitoring period come from the collected data of existing NGV buses from 35 bus routes. The determination of the specific fuel consumption of baseline vehicles shall follow the methodology of AMS.III-C section 5.4.4 option (4): Using data from a control group of vehicles.

<table>
<tr><td>Fixed parameter: $EF_{PKM,x}$</td><td>Detail</td></tr>
<tr><td>Parameter description</td><td>Emission factor of the passenger travelled with vehicle ‘x’</td></tr>
<tr><td>Measured value and unit</td><td>gCO_2/passenger-km</td></tr>
<tr><td>Data source / document</td><td>T-VER-METH-TM06 ver.03 calculated from the reference data from:
● Department of Highways, 2008
● Office of Transport Policy and Planning (OTP), 2020
● Department of Land Transport, 2021

<table>
<tr><th>Type of other vehicles used</th><th>Emission factors (gCO_2/passenger-km)</th></tr>
<tr><td>Motorbike</td><td>43.06</td></tr>
<tr><td>Private car</td><td>127.10</td></tr>
<tr><td>Taxi</td><td>155.94</td></tr>
<tr><td>Three wheels taxi</td><td>105.53</td></tr>
<tr><td>Minibus</td><td>22.55</td></tr>
<tr><td>Public van</td><td>41.11</td></tr>
<tr><td>Public bus</td><td>11.2</td></tr>
<tr><td>Passenger Ferry*</td><td>15</td></tr>
<tr><td>BTS/MRT**</td><td>4.3</td></tr>
</table>
* Reference data from IPCC-WG3-AR5 Chapter 8
**Reference data from BEM IMPACT Report 2022</td></tr>
</table>

4.3.2 Dynamic Parameters and measured values

If further (not first after validation) monitoring period: Do the dynamic parameters for calculating the emission reductions correspond to those according to the last monitoring report?

☒ Yes
☐ No

Measured value / dynamic $L_{PJ,i,y}$	Detail
Parameter description	Annual distance of electric vehicles in route i year y.
Measured value and unit	Total distance of 37,137,281.0 km in this monitoring period
Data source / document	Record of monitored value of total distance travelled on a daily basis. Refer to Reference 8 and Reference 11 for annual distance value in route ‘i’

Measured value / dynamic $N_{PJ,i,y}$	Detail
Parameter description	Number of electric vehicles in route i year y.
Measured value and unit	Total operation of 1,217 vehicles in this monitoring period
Data source / document	Record of monitored value of number of electric vehicles on a daily basis. Refer to Reference 8 for number of vehicles in route ‘i’

Measured value / dynamic $EC_{PJ,i,j,y}$	Detail
Parameter description	Annual electricity consumption for charging EV number j on route i during year y
Measured value and unit	Total electricity consumption of 40,700,924.2 kWh in this monitoring period
Data source / document	Data that shows the electricity consumption from EV charging, which shall be reported on a monthly basis. Refer to Reference 8 for electricity consumption for EV number 'j' on route 'i'

Measured value / dynamic $EF_{EC,y}$	Detail
Parameter description	Grid Emission factor.
Measured value and unit	0.4857 tCO_2/MWh
Data source / document	In the case of using electricity from the national grid system, $EF_{EC,y}$ shall refer to TGO's latest $EF_{EC,y}$ value for the monitoring period. Nonetheless, if there is not any supersede during the monitoring period, TGO's latest value for $EF_{EC,y}$ shall be referred to. The value is based on latest Emission Factor from TGO, published on September 27, 2023 (https://ghgreduction.tgo.or.th/th/download-tver/120-tver-gwp-emission-factor.html)

Other Data Dynamic parameters stated in MADD section A3.2 monitoring plan

Measured value / dynamic NGV buses	Detail
Parameter description	Number of ICE buses in the public transport system of Bangkok and metropolitan area
Measured value and unit	6,689 ICE vehicles in Bangkok Metropolitan's public transportation system as of 31 Dec 2023 where most of the fuel types are Diesel, CNG, and CNG-Gasoline (a reduction from 8,102 ICE vehicles from the last monitoring period)
Data source / document	DLT Registration Record (Accumulated) by Fuel Type (as of December 31, 2023) from https://web.dlt.go.th/statistics/

Measured value / dynamic Operational license	Detail
Parameter description	Validity of passenger transport license monitored annually
Data source / document	Passenger transport license for each bus route refers to Annex 2, as example

Measured value / dynamic $PKM_{PJ,i,j,y}$	Detail
Parameter description	Travelling distance of passengers riding on EVnumber 'j' on route 'i' of the public transportation system in year 'y.' Refer to Reference 15
Measured value and unit	Passenger-km/year
Data source / document	Collect the evidence of tickets sold and calculate travelling distance from the shortest distance on specific price range on monthly basis.

Measured value / dynamic $BSP_{x,y}$	Detail
Parameter description	Mode of transportation ratio of vehicle type 'x' of passenger who shift to EV for public transit in year 'y.' Refer to Reference 16
Measured value and unit	%
Data source / document	Survey of the passengers who use the EV for public transit. Refer to Reference 17 for details of survey and questionnaire form.

Measured value / dynamic IR_i	Detail
Parameter description	Technology improvement factor for vehicle category i per year
Measured value and unit	Default value 0.99 in case of no available data from country specific data
Data source / document	UNFCCC-CDM-Tool 18 version 01

Measured value / dynamic SDG 8	Detail
Parameter description	Number of employees of TSB as of December 2023
Measured value and unit	TSB employees in this Monitoring Period as of December 31, 2023
Data source / document	Refer to Reference 10 for Thai Smile Bus Operational Report 2023

Male	Female	Underage
1,882	1,732	0

Measured value / dynamic SDG 11	Detail
Parameter description	Ambient annual PM_x level in Bangkok Metropolitan
Measured value and unit	Average ambient air quality from 23 locations around Bangkok and Metropolitan area from January 2023 to December 2023. The information was retrieved and calculated from Thailand's pollution control department.
Data source / document	http://air4thai.pcd.go.th/webV3/#/History

Month – 2023	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)
January	57.7	33.1
February	68.7	39.1
March	60.3	38.6
April	57.6	37.3
May	41.3	23.0
June	28.4	14.7
July	27.4	14.3
August	31.0	16.1
September	26.7	14.5
October	38.4	21.0
November	50.4	28.4
December	59.1	24.8

Note: no tailpipe emission from E-Bus in the program.

Measured value / dynamic SDG 13	Detail
Parameter description	Quantity of emission reduction in this monitoring period (01.01.2023 – 31.12.2023)
Measured value and unit	20,416 tCO_2e
Data source / document	*MP2 - Ex-Post-bangkok-e-bus_15122025* file

4.3.3 Plausibility check of dynamic parameters or measured values

If further (not first after validation) monitoring period: Was the plausibility check carried out in the same way as according to the last monitoring report?

☒ Yes
☐ No

A plausibility check is carried out for fundamental dynamic parameters as indicated in the following tables.

Parameters for plausibility check	$L_{BL,i,y}$
Parameter description	Annual distance of Electric Vehicles in route i year y.
Value	37,137,281.0
Unit	km/this monitoring period
Data source	GPS data of distance travelled on a daily basis refers to Reference 11 for GPS exported data
Parameter plausibilised with this parameter	N/A

Parameters for plausibility check	$EC_{PJ,i,j,y}$
Parameter description	Annual electricity consumption for charging EV number j on route i in the operating year y.
Value	40,700,924.2
Unit	kWh in this monitoring period
Data source	Data that shows the electricity consumption from EV charging, which shall be reported on a monthly basis. Refers to Reference 8 for electricity consumption data recorded.
Parameter plausibilised with this parameter	N/A

Parameters for plausibility check	$FC_{BL,i,NGV}$
Parameter description	Quantity of Fuel consumption of the NGV of the ICEV in the public transport system on route i in the baseline
Value	19,905,212.3
Unit	kgNGV/year
Data source	Calculated by multiplying (i) the specific fuel consumption[21] (unit fuel/ distance) of the monitoring data for at least 3 months continuously and backdated for at most 2 years after replacement by an EV, (ii) the number of existing vehicles, and (iii) the average total distance travelled per year per vehicle.
Parameter plausibilised with this parameter	$SFC_{NGV,y}$ derived from average NGV fuel consumption based on data from the 35 bus routes that are still in operation with NGV buses in this monitoring period. The determination of the $SFC_{i,y}$ parameter complied with specific fuel consumption determination according to CDM-AMS-III.C version 16, paragraphs 37 and 38. Refers to Reference 9 for fuel consumption of the existing NGV bus.

Are all the parameters listed under 4.3.1 and 4.3.2 plausible?

☒ Yes
☐ No

Parameters Justification:
$L_{BL,i,y}$: is cross-checked with the mileage record that is manually recorded in the logbook by the bus driver on a daily basis. An example of mileage logbook can be found Annex 4

$EC_{PJ,i,j,y}$ is cross-checked with the electricity data that is manually recorded on a daily basis. An example of electricity consumption logbook can be found in Reference 12

$FC_{BL,i,NGV}$ is calculated from average $SFC_{NGV,y}$ data, which is calculated from the recorded distance travelled and kg NGV consumption of available NGV buses, to identify the baseline emissions of the Program refers to Reference 9.

4.3.4 Examination of influencing factors

Does the situation of the influencing factors of the implemented project/program correspond to that in the project/program description?

☐ Examination not foreseen
☐ Yes
☒ No

[21] Specific fuel consumption shall also be considered as a parameter that has to be monitored throughout the crediting period. The average data of specific fuel consumption in this monitoring period come from the collected data of existing NGV buses from 35 bus routes. The determination of the specific fuel consumption of baseline vehicle shall follow the methodology of AMS.III-C section 5.4.4 option (4): Using data from a control group of vehicles.

Influencing factor	Number of operating E-buses
Description of the influencing factor	Number of Electric Vehicles in route i year y.
Impact on project emissions or the emissions of the projects in the program or the reference development	The project emission was expected to vary from the ex-ante as described in the MADD due to the difference in number of e-buses operating during this monitoring period. The number of e-buses operating proportionally reflects upon the overall energy consumption from the charging activity in this program. Hence, the higher number of e-buses operating, the higher the project emission in the program.
Development of the influencing factor during the present monitoring period	In this monitoring period, the influencing factor regarding the number of e-buses operating was lower than anticipated in the MADD, which predicted the number of operating e-buses would reach 1,913 by June 2023. However, the actual number of e-buses operating in this monitoring period was only 1,798.
Data source, references	GPS data and logbook of monthly operation schedule of each bus terminal. Refers to Reference 11 and Annex 4 for example of GPS interface and mileage logbook

Influencing factor	Evidence of salvage and replacement buses
Description of the influencing factor	Number of Electric Vehicles in route i year y.
Impact on project emissions or the emissions of the projects in the program or the reference development	During the monitoring period, it was observed that only 959 internal combustion engine (ICE) buses were counted as salvaged and replacement, while 1,534 electric buses (e-buses) were in existing route of the operation. This mismatch indicates that not all operating e-buses could be directly linked to decommissioned ICE buses, which is essential for justifying emission reductions under the one-to-one replacement principle.
Development of the influencing factor during the present monitoring period	A proportioned data approach was applied, whereby emissions reductions and baseline emissions were adjusted according to the ratio of salvage and replacement buses to total e-buses in operation. This ensured that only the eligible portion of emission reductions was credited, in line with conservative and transparent accounting principles. To address this, a route-level proportional allocation approach was implemented. Specifically, the proportion of salvage and replacement ICE buses relative to operating e-buses was calculated for each individual bus route and applied accordingly in the calculation. Furthermore, while electricity consumption data was still only available at the terminal (charging station) level, the route-level proportional allocation helped improve the accuracy of emissions accounting by aligning the credited reductions more closely with the operational realities and the salvage-and-replacement status on a per-route basis.
Data source, references	Calculation MP2 - Ex-Post-bangkok-e-bus_15122025 file

Value in project/program description	Effective value	Justification/assessment of the deviation
1,913 vehicles	1,217 vehicles that passed QA/QC criteria were taken into account for Emission Reduction Calculation. (1,798 e-buses were in operation during this monitoring period)	The effective value is less than the value mentioned in the program description as this MP was also in the e-buses fleet rollout phase. E-buses have not completely been filled the bus routes yet. And also, the exclusion of 581 vehicles is due to numerous factors, including data inconsistencies, technical malfunctions, and non-compliance with monitoring standards. Furthermore, sufficient evidence was not available to demonstrate that some ICE buses had been decommissioned, salvaged, and replaced prior to their official replacement dates; therefore, these vehicles were excluded to ensure conservative and credible claims This adjustment ensures the accuracy and reliability of reported emission reductions, in line with established verification protocols
Description of why and how the reference development was adjusted		
The adjustment to the number of operating e-buses depends on the demand for buses on specific routes, which could differ from the MADD where the number of buses was estimated from the minimum number that are needed to comply with the passenger transport license.		

4.4 Special features of monitoring

Special features of monitoring are not relevant to this Program.

4.5 Scientific monitoring

If the project/program has introduced scientific monitoring, has this reduced the uncertainty in the quantification of emission reductions to such an extent that scientific monitoring could be discontinued?

☐ Yes
☒ No
☐ The project/programme does not provide scientific support

4.6 Carbon storage projects

If further (not first after validation) monitoring period: Do the established process and management structures correspond to the structures defined in the last monitoring report?

☐ Yes
☒ No
☐ The project/programme does not provide scientific support

4.7 Process and management structure, responsibilities

If further (not first after validation) monitoring period: Is the programme structure (e.g., infrastructure for managing data on individual projects) unchanged from the structure presented in the last monitoring report?

☒ Yes
☐ No

If further (not first after validation) monitoring period: Is the process for the new projects to be included in the programme unchanged from the process described in the last monitoring report?

☒ Yes
☐ No

4.8 Program structure

If further (not first after validation) monitoring period: Is the programme structure (e.g., infrastructure for managing data on individual projects) unchanged from the structure presented in the last monitoring report?

☒ Yes
☐ No

If further (not first after validation) monitoring period: Is the process for the new projects to be included in the programme unchanged from the process described in the last monitoring report?

☒ Yes
☐ No

5 Ex-post calculation of eligible emission reductions

5.1 Calculation of the achieved emission reductions

Emission reduction calculation from 01.01.2023 to 31.12.2023

In this monitoring period, the emission reduction from fuel-switching and modal shift activity are considered. Hence, the emission reduction formula is as follows:

$$ER_{total,y} = BE_{total,y} - PE_{total,y} - LE_{total,y} \quad \text{Formula [1]}$$

where,

$ER_{total,y}$	= Overall emission reduction in year y (tCO_2/ year).
$BE_{total,y}$	= Total baseline emissions in year y (tCO_2/ year).
$PE_{total,y}$	= Total project emissions in year y (tCO_2/ year)
$LE_{total,y}$	= Total Leakage in year y (tCO_2/year)

Baseline emissions from fuel switch

$$BE_{FF,y} = \sum_i \sum_x [(FC_{BL,i,x} \times NCV_x \times EF_{CO2,x}) \times ADJ_{i,y}] \times 10^{-9} \quad \text{Formula [2]}$$

where,

$BE_{FF,y}$	= Total baseline emissions in year y (tCO_2/year)
$FC_{BL,i,x}$	= Quantity of fossil fuel consumption type x of the ICEV in the public transport system on route i in the baseline (unit/year)
NCV_x	= Net calorific value of fossil fuel type x
$EF_{CO2,x}$	= Emission factor of fossil fuel type x
$ADJ_{i,y}$	= Correction factor for route i in year y

The baseline emissions for fuel switching also consider the technology improvement factor. In the context of emission reduction calculations for the transportation sector in Thailand, TGO realised the importance of the technology improvement factor, hence considering technological improvement at the default rate of 1% annually using the default factor from CDM-AMS.III-C. Moreover, if there are new NGV buses included in the Bangkok public transportation system, the Program plans to monitor these new buses (and their fuel consumption) to monitor the fuel consumption rate on a yearly basis to see if it changes from the baseline emission assumption data and how it impacts the overall baseline emission.

whereby $ADJ_{i,y}$ is calculated as:

$$ADJ_{i,y} = (N_{PJ,i,y} \times L_{PJ,i,y}) / (N_{BL,i} \times L_{BL,i}) \quad \text{Formula [3]}$$

where,

$ADJ_{i,y}$	= Correction factor for route i during year y
$N_{PJ,i,y}$	= Number of EVs on route i during year y
$L_{PJ,i,y}$	= Average annual distance of EVs on route i during year y
$N_{BL,i}$	= Number of ICEVs on route i in the baseline situation
$L_{BL,i}$	= Annual distance (round trip) on route i in the baseline scenario

Regarding the $ADJ_{i,y}$ parameter, as indicated in the MADD a service extension could occur in the baseline, since there is space for new buses to be included before reaching the maximum number of buses as per the passenger transport license. Also as mentioned, the ADJ is the correction factor for when there are more e-buses put into operation than envisaged in the baseline. The higher number of e-buses would be treated as e-buses operating on new routes where, if no e-buses were in operation, the bus operator would fill the routes with NGV buses. It infers that the higher number of e-bus replaces the NGV buses. The Program only considers NGV buses for conservativeness (since there is no regulation on fuel type of bus) of the baseline calculation. Hence, the correction factor of this program shall remain as 1 as it is a 1:1 replacement.

Baseline emissions from modal shift

$BE_{Shift,y} = \sum i \, [CT_{BL,i,y} \times \sum j \, (PKM_{PJ,i,j,y} - PKM_{BL,i})] \times 10^{-6}$ Formula [4]

where,

$BE_{shift,y}$ = Baseline emissions per vehicle in year y (tCO_2/year)
$CT_{BL,i,y}$ = Emission factor per passenger-km travelled on route 'i' as baseline scenario in year 'y' (gCO2/passenger-km)
$PKM_{PJ,i,j,y}$ = Travelling distance of passengers riding on EV number 'j' on route 'I' of the public transportation system in year 'y' (passenger-km/year)
$PKM_{BL,i}$ = Travelling distance of passengers who already use the public transport on route 'i' as their means for transportation in the baseline (passenger-km/year)

whereby $CT_{BL,y}$ is calculated as:

$CT_{BL,i,y} = \sum x \, (BSPx,y \times EF_{PKM,x}) / \sum BSPx,y$ Formula [5]

where,

$CT_{BL,i,y}$ = Emission factor per passenger-km travelled on route 'i' as baseline scenario in year 'y'
$BSP_{x,y}$ = Mode of transportation ratio of vehicle type 'x' of passengers who shift to EV for public transit in year 'y'
$EF_{PKM,x}$ = Emission factor of the passenger travelled with vehicle 'x'

Project emissions from fuel switch

$PE_{FF,y} = \sum_i \sum_j (EC_{PJ,i,j,y} - EC_{RE,PJ,i,j,y}) \times EF_{EC,y} \times 10^{-3}$ Formula [6]

$PE_{FF,y}$ = Total project emissions in year y (tCO_2/year)
$EC_{PJ,i,j,y}$ = Annual electricity consumption for charging EV number j on route i during year y
$EC_{RE,PJ,i,j,y}$ = Annual electricity consumption from renewable energy sources for the charging of the project's EV number j on route i during year y
$EF_{EC,y}$ = Grid emission factor

Project emissions from modal shift

Since the activity emission is the same as T-VER-METH-TM-05 ver.03 as stated in the annotation of the methodology, the project emission shall not be considered. Hence, $PE_{shift,y} = 0$. In other words, the project emission from modal shift activity is already accounted in the project emission from fuel switch

Leakage emissions from fuel switch

No related activity (replaced vehicles shall not be used within the project's boundary and other areas)

Leakage emissions from modal shift

Leakage emission shall be considered only the CO_2 emission from the change in load factor of passengers in the public transportation system. This includes the reduction of other public transport vehicles on the road, taxi, and road congestion as the consequence of modal shift from other mode of transportation to EV for transit. In accordance with the T-VER-METH-TM-06 version 03, the project developer is allowed to use the default factor to estimate the leakage emissions from the mitigation activity, which equal to 2.64% of baseline emissions

$LE_{shift,y} = 2.64\% \times BE_{Shift,y}$ Formula [7]

5.2 Impact distribution

This Program does not receive any grants or non-payable cash benefits from any counterparty, aside from revenue from carbon credit. Hence, impact distribution is not relevant to the Program.

5.3 Overview

The applicant requests the issuance of the following certificates:

Calendar year	*Achieved* emission reductions *without* impact splitting in t CO_2eq	*Creditable* emission reductions *with* impact distribution in tCO_2eq
2023 from 01.01.2023 – 31.12.2023	20,416 tCO_2 (20,354 tCO_2 from TM-05 methodology and 62 tCO_2 from TM-06 methodology)	N/A

6 Emission reductions and significant changes

Were there any significant changes during the monitoring period that affected the economic analysis, the emission reductions achieved or the technique or technology used?

☐ Yes
☒ No

6.1 Comparison of ex-post achieved and ex-ante expected emission reductions

Calendar year	Planned Component of implementation (CPAs)	Ex-post emission reductions achieved without impact splitting in tCO_2eq	Ex-ante expected emission reductions without impact splitting in tCO_2eq	Deviation and justification / assessment (detailed if the deviation is >20%)
PoA 01				The ex-post emission reduction falls significantly short of the ex-ante estimates in all CPAs. This is primarily due to several factors: 1. Deregistration evidences were identified for 959 buses from existing routes plus 258 buses from new routes, resulting in a total of 1,217 eligible buses, compared to 1,798 buses originally in operation. 2. Fewer e-buses were operational than anticipated during the monitoring period. While the ex-ante assessment assumed full operation of 1,913 e-buses from 1 July 2023 onward, in practice the number of operational e-buses increased gradually on a monthly basis and peaked at only 1,798 units. 3. For certain routes, measured values of key monitoring parameters, such as distance travelled, electricity consumption, or both, were incomplete or insufficient. These data points were therefore excluded during the QA/QC process, which in turn reduced the volume of data available for emission reduction calculations.
2023 from 01.01.2023 – 31.12.2023	CPA 1	1,630	2,536	
	CPA 2	3,845	4,696	
	CPA 3	2,579	6,834	
	CPA 4	879	8,385	
	CPA 5	190	3,710	
PoA 02				
2023 from 01.01.2023 – 31.12.2023	CPA 1	698	1,537	
	CPA 2	3,164	5,744	
	CPA 3	2,653	5,782	
	CPA 4	2,376	5,741	
	CPA 5	1,354	9,232	
	CPA 6	1,048	7,214	
Total		**20,416**	**61,411**	

The deviation mainly resulted from deregistration evidence which affected the overall operating data (distance, fuel consumption and power consumption) of e-buses in this monitoring period. Additionally, several data monitoring points, such as distance, electricity consumption, and %BSP from the survey, are excluded from the ER calculation after undergoing QA/QC processes.

These processes involve checking if the recorded energy consumption of the e-bus is reasonable by comparing it with the manufacturer specifications (0.7-1.2 kWh/km). Data below 0.7 kWh/km are removed and not considered in the ER calculation.

For the BSP results from the survey, the confidence/precision level is checked to ensure the sample size sufficiently meets the 95/10 level requirement. Only results that meet the 95/10 confidence/precision level are then considered for the ER calculation.

6.2 Comparison of costs and revenues

Capital expenditure (CAPEX) shows slight differences compared to the ex-ante estimate (-3.3% for PoA1 and 7.5% for PoA2). This is because the major CAPEX in this program is the e-bus cost, and there is no difference in the unit price of e-buses compared to the ex-ante estimate. The total number of e-buses purchased as of December 31, 2023, is 1,905 units, which is close to the ex-ante estimate of 1,913 units.

Operating expenses (OPEX) are less than the ex-ante estimate (-15.9% for PoA1 and -1.8% for PoA2) primarily due to the lower number of operating e-buses in both PoAs compared to the ex-ante estimate.

The revenue from e-buses in this monitoring period is significantly lower than the ex-ante estimates (-71.8% for PoA1 and -65.5% for PoA2). The main reason for this deviation is that the number of e-buses operating is less than the ex-ante estimate (-13.6% for PoA1 and -6.3% for PoA2), resulting in reduced revenue from both bus tickets and advertising. Advertising revenue specifically fell short of the ex-ante estimate by 63%.

The summary of financial details of the program during the monitoring period from 1.01.2023 to 31.12.2023 is provided in Reference 18.

6.3 Comparison of planned and deployed technology and techniques

The deployed technology specification is slightly different from the MADD, where the specification of battery capacity is about 150 kWh at a minimum. However, due to an implementation assessment during the operation, it was found that a battery with a capacity of 120 kWh is sufficient to operate on routes that are not long distance. This change does not have any impact on the amount of GHG emissions because the amount of electricity charged only depends on the electricity consumption for each trip. The higher battery capacity will only affect the charging frequency of the e-bus but not the overall power consumption.

7 Others

None.

8 Communication on the application and signatures

The applicant consents to the Secretariat communicating and exchanging documents on this application with the following parties:

Project developer	☒ yes	☐ no
Verification agency	☒ yes	☐ no
Location canton	☒ yes	☐ no

8.1. Declaration of consent to the publication of the documents

The Federal Office for the Environment FOEN may publish application documents while maintaining commercial and manufacturing secrecy (Art. 14 CO_2 Ordinance).

The applicant agrees on behalf of all persons concerned to the publication of the following documents relating to the domestic emission reduction project ("offset project") on the website of the Federal Office for the Environment FOEN:

Consent to publication

☒ I agree to the publication of this document (this monitoring report). The document does not contain any trade or manufacturing secrets of my own or of third parties. I confirm that I have contacted the third parties concerned and that, from their point of view, no trade or manufacturing secrets are contained in this document. I consent to the publication of my contact details.

☐ I agree to the publication of a partially redacted version of this document which respects the commercial or manufacturing secrecy of all persons concerned. I confirm that I have contacted the third parties concerned and have made the redactions with their consent. The third parties concerned consent to the publication of the partially redacted version. This version for publication can be found in the annex A1.

Document	Version	Date	Testing laboratory & client
Verification report (incl. checklist)	1.1	13.08.2025	Bureau Veritas Certification (Thailand) Limited (on behalf of the Energy Absolute Company Limited)

Consent to publication

☒ I agree to the publication of the document. The document contains neither my own trade or manufacturing secrets nor those of third parties. I confirm that I have contacted the third parties concerned and that, from their point of view, no trade or manufacturing secrets are contained in this document.

☐ I agree to the publication of a partially redacted version of the document which respects the commercial or manufacturing secrecy of all persons concerned. I confirm that I have contacted the third parties concerned and have made the redactions with their consent. The third parties concerned consent to the publication of the partially redacted version. This version for publication can be found in the annex A2.

8.2. Signatures

The applicant undertakes to provide truthful information. Intentionally false information will be prosecuted.

Place, date	Name, function and signature of the applicant
Bangkok, December 18, 2025	 Mongkol Kijlerdphon Vice President - Climate Change Strategy & Sustainability Energy Absolute Public Company Limited

Table of abbreviations

CME	Program Coordinating and Managing Entity
CCME	Carbon Coordinating and Managing Entity Co., Ltd.
CPA	Component project activity
DCCE	Department of Climate Change and Environment
DLT	Department of Land Transportation (Thailand)
EA	Energy Absolute Public Company Limited
EVs	Electric Vehicles
FOEN	Federal Office for the Environment
GHG	greenhouse gas
ICE	internal combustion engine
ICEV	internal combustion engine vehicles
ITMOs	International Transferred Mitigation Outcomes
LoA	Letter of Authorization
MADD	Mitigation Activity Design Document
MP	Monitoring Period
NGV	Natural Gas Vehicle
ONEP	Office of Natural Resources and Environmental Policy and Planning
PoA	Program of Activities
T-VER	Thailand Voluntary Emission Reduction Program
TGO	Thailand Greenhouse Gas Management Organisation

9 Annex

Annex 1– Authorisaton statement by FOEN for MADD approval

Annex 2 – Example of DLT approved passenger transport license

Annex 3 – Letter of acknowledgement by TGO to the use of battery capacity 120 kWh in the project

Annex 4 – Example of Mileage logbook

Annex 5 – TSB's management structure corresponds to the e-buses data monitoring

Annex 6 – Example of bus registration license

Annex 7– List of Reference

Annex 1– Authorisation statement of FOEN for MADD approval

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of the Environment, Transport, Energy and Communications DETEC

Federal Office for the Environment FOEN

AUTHORIZATION STATEMENT
BY THE FEDERAL OFFICE FOR THE ENVIRONMENT
OF THE SWISS CONFEDERATION

Authorization statement reference number: *5002, 2023*

Acting as the authorized entity of the Swiss Government, the Federal Office for the Environment (FOEN)[1] hereby authorizes per Article 6.3 of the *Paris Agreement* and per Article 5.1 of the *Implementing Agreement between the Swiss Confederation and the Kingdom of Thailand* signed on 24th June 2022 (hereafter referred to as the *Implementing Agreement*) the international transfer and use of Internationally Transferred Mitigation Outcomes (ITMOs) specified in this statement. The provisions of the *Implementing Agreement* apply.

I. **Date of authorization (date of signature of this authorization statement)**: 27.02.2023

II. **Entity authorized (to transfer)**: Energy Absolute Public Company Ltd, Bangkok

III. **ITMO uses authorized**: ITMOs are authorized for use towards NDC, as specified in the authorization statement by the Ministry of Natural Resources and Environment of the Kingdom of Thailand (MONRE).

IV. **Definition of first transfer**: The first transfer, triggering corresponding adjustments by the host Party is defined by the recognition of the occurred international transfer of an ITMO under the Implementing Agreement (Article 8).

V. **Authorized mitigation activity:** "Bangkok e-bus Program" (project ID number 5002) as determined below and in the annexed Mitigation Activity Design Document (MADD). Applied standards and baseline methodologies as well as requirements for monitoring and verification, including for contributions to sustainable development, apply as specified in the MADD.

Total cumulative maximum amount of Mitigation Outcomes for which international transfer and use is authorized: 500'000 of t CO_2eq

VI. **Authorized crediting period:** 1 October 2022 – 31 December 2030

VII. **NDC period(s) during which the Internationally Transferred Mitigation Outcomes (ITMOs) are authorized for use, as appropriate:** 2021 – 2030

VIII. **Corresponding Authorization from MONRE[2], where applicable:** https://www.onep.go.th/letter-of-authorization/

[1] According to Article 13.2 of the Implementing Agreement.
[2] According to Article 13.1 of the Implementing Agreement.

Federal Office for the Environment FOEN
Compensation Office
3003 Berne
Tel. +41 58 46 538 15
carbonoffset@bafu.admin.ch
https://www.bafu.admin.ch/emission-reduction-certificates

BAFU-D-4EB03401/76

IX. **The following method for corresponding adjustment will be applied by the Swiss Confederation pursuant to 2/CMA.3 paragraph 7 of the Annex (Art 6.2 guidance)**: trajectory approach as defined in paragraph 7.a.i for the single year target of Switzerland's NDC (minus 50 percent in 2030 compared to 1990) and 7.b for the multi-year target of Switzerland's NDC (minus 35 percent over the period 2021-30 compared to 1990)

In accordance with Article 1.3 of the *Implementing Agreement*, this Authorization Statement guarantees the recognition of the international transfer of Mitigation Outcomes specified in this Statement, pending fulfillment of positive examination statements pursuant to Article 7 of the *Implementing Agreement* issued by FOEN and MONRE.

Pursuant to Article 5.4 of the *Implementing Agreement*, this Authorization Statement enters into force thirty calendar days after its date of signature. In case of issuance of a statement of inconsistency by MONRE during this period of thirty calendar days, this Authorization Statement remains invalid pursuant to Article 5.4 of the *Implementing Agreement*.

Pursuant to Article 5.5 of the Implementing Agreement this Authorization Statement may be updated or changed. Such changes or updates can only be made upon request of the entity authorized to transfer. Updates or changes of Authorization Statements become valid within 30 calendar days after their date of issuance, unless the other Party to the *Implementing Agreement* issues a notification of inconsistency per Article 5.4 of the *Implementing Agreement*.

The authorization statement is signed by Reto Burkard, head of climate division of FOEN.

Reto Burkard
Head of climate division

Issuing authority:
Federal Office for the Environment
Woblentalstrasse 68
3003 Bern
Switzerland
carbonoffset@bafu.admin.ch

Annex: MADD " Bangkok e-bus Program" (project ID number 5002)

2/2

Annex 2 – Example of DLT approved passenger transport license

ขส.บ. 12 ก.

ใบอนุญาตประกอบการขนส่งประจำทาง
ด้วยรถที่ใช้ในการขนส่งผู้โดยสาร

ใบอนุญาตที่ กก.59/2565

นายทะเบียนออกใบอนุญาตให้ บริษัท ไทย สมายล์ บัส จำกัด
สำนักงานชื่อ บริษัทไทย สมายล์ บัส จำกัด
อยู่เลขที่ 41/327 ถนนกัลปพฤกษ์
แขวงบางแค เขตบางแค จังหวัดกรุงเทพมหานคร
มีสิทธิประกอบการขนส่งประจำทาง ในเส้นทางหมวด 1 สายที่ 3-36
ท่าเรือคลองเตย - ท่าเรือภาษีเจริญ
ใบอนุญาตฉบับนี้ให้มีอายุ 7 ปี นับตั้งแต่วันที่ 25 เดือน เมษายน พ.ศ. 2565
ถึงวันที่ 24 เดือน เมษายน พ.ศ. 2572
โดยให้ปฏิบัติตามกฎหมายและเงื่อนไขที่นายทะเบียนกำหนดตามมาตรา 31 แห่งพระราชบัญญัติการขนส่งทางบก พ.ศ. 2522 ในใบอนุญาตนี้

ให้ไว้ ณ วันที่ 25 เดือน เมษายน พ.ศ. 2565

(นางชะไมพร โพธิ์ทอง)
ผู้อำนวยการสำนักการขนส่งผู้โดยสาร
ปฏิบัติราชการแทน นายกรมการขนส่งทางบก

กรมการขนส่งทางบก

เลขที่ 57- 0005681

(นางสาวราตรี บุญนิตย์)
หขก.

ตารางเลขที่ ๑/๐๑๖๔/๒๕๖๔

ตารางการเดินรถโดยสารประจำทางในเขตกรุงเทพมหานครและจังหวัดที่มีเส้นทางต่อเนื่อง
หมวด ๑ สายที่ ๓-๓๖ ชื่อเส้นทาง ท่าเรือคลองเตย -ท่าเรือภาษีเจริญ
โดยอนุมัติคณะกรรมการควบคุมการขนส่งทางบกกลาง ในการประชุมครั้งที่ ๘/๒๕๖๔ เมื่อวันที่ ๖ ตุลาคม ๒๕๖๔

ช่วงการเดินรถ	ระยะทาง (กม.)	จำนวนเที่ยวการเดินรถขั้นต่ำต่อวัน (เที่ยว) ตั้งแต่เวลา ๐๕.๐๐น.ถึงเวลา ๒๒.๐๐ น.			จำนวนรถ (คัน)
		ไป	กลับ	รวม	
ท่าเรือคลองเตย - ท่าเรือภาษีเจริญ	๑๔	๒๐	๒๐	๔๐	๑๐ - ๒๘

หมายเหตุ ๑. ลักษณะรถมาตรฐาน ๒ (รถโดยสารปรับอากาศชั้น ๒) และหรือ
รถมาตรฐาน ๓ (รถโดยสารธรรมดา)
๒. ยกเลิกตารางการเดินรถเดิมและให้ใช้ตารางนี้แทน

เอกสารนี้เป็นเงื่อนไขในใบอนุญาตฯ
ตามมาตรา ๓๑ (๑), (๑๑)
แห่ง พ.ร.บ.การขนส่งทางบก พ.ศ.๒๕๒๒

ตรวจสอบถูกต้องแล้ว

(นางบุศรา สมใจคิด)
นักวิชาการขนส่งชำนาญการ
๘ ตุลาคม ๒๕๖๔
สำนักการขนส่งผู้โดยสาร
กรมการขนส่งทางบก

Annex 3 - Letter of acknowledgement by TGO to the use of battery capacity 120 kWh in the project

องค์การบริหารจัดการก๊าซเรือนกระจก (องค์การมหาชน)
THAILAND GREENHOUSE GAS MANAGEMENT ORGANIZATION (PUBLIC ORGANIZATION)
The Government Complex, Ratthaprasasanabhakti Bldg., 9th Fl., 120 Chaengwattana Rd., Laksi, Bangkok 10210, Thailand
Tel +66 2141 9790 Fax +66 2143 8400 www.tgo.or.th

ที่ อบก ๒๕๖๖.๐๔/๕๖๙

๑๖ พฤษภาคม ๒๕๖๖

เรื่อง รับทราบการแจ้งเปลี่ยนแปลงรายละเอียดโครงการ

เรียน กรรมการผู้จัดการบริษัท บริหารโครงการคาร์บอน จำกัด

อ้างถึง หนังสือบริษัท บริหารโครงการคาร์บอน จำกัด ที่ ๔๐๖๑/๐๐๕๒๓ ลงวันที่ ๘ พฤษภาคม ๒๕๖๖

ตามหนังสือที่อ้างถึงบริษัท บริหารโครงการคาร์บอน จำกัด ได้ขอแจ้งการเปลี่ยนแปลงรายละเอียดโครงการลดก๊าซเรือนกระจกภาคสมัครใจตามมาตรฐานของประเทศไทยแบบมาตรฐาน (Standard T-VER) ชื่อ "โครงการรถโดยสารไฟฟ้า กรุงเทพมหานครและปริมณฑล โซน ๑ และ ๒ (Bangkok Metropolitan Area E-Bus Zone 1 and 2)" และ "โครงการรถโดยสารไฟฟ้า กรุงเทพมหานครและปริมณฑล โซน ๓ และ ๔ (Bangkok Metropolitan Area E-Bus Zone 3 and 4)" ซึ่งได้รับการขึ้นทะเบียนเป็นโครงการ T-VER เมื่อวันที่ ๒๘ กุมภาพันธ์ ๒๕๖๖ และต่อมาได้มีการเปลี่ยนแปลงรายละเอียดโครงการ ความละเอียดแจ้งแล้ว นั้น

องค์การบริหารจัดการก๊าซเรือนกระจก (องค์การมหาชน) หรือ อบก. รับทราบการแจ้งการเปลี่ยนแปลงรายละเอียดการปรับขนาดของความจุแบตเตอรี่จากเดิมที่ระบุความจุเท่ากับหรือมากกว่า 150 kWh เป็นความจุเท่ากับหรือมากกว่า 120 kWh ทั้งนี้ อบก. จะมีการติดตามประเมินผลโครงการประจำปีในโอกาสต่อไป

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ

(นายเกียรติชาย ไมตรีวงษ์)
ผู้อำนวยการองค์การบริหารจัดการก๊าซเรือนกระจก

สำนักรับรองคาร์บอนเครดิต
โทรศัพท์ ๐ ๒๑๔๑ ๙๘๔๖
โทรสาร ๐ ๒๑๔๓ ๘๔๐๔

"TGOร่วมสร้างไทย โปร่งใส ไร้ทุจริต"

Annex 4 – Example of Mileage logbook

บริษัท ออโต้บัส เซอร์วิส จำกัด (AUTO BUS SERVICE CO.,LTD.)
41/251 ถนนกัลปพฤกษ์ แขวงบางแค เขตบางแค กรุงเทพฯ 10160 (สำนักงานใหญ่)
โทร : 02-404-3383-5 ทะเบียนนิติบุคคลเลขที่ 0105564150740

ใบรายการตรวจเช็คสภาพรถบัสไฟฟ้าโดยสารประจำทางสาย : 1-31 วันที่ : 9-1-66

ทะเบียนรถ : 16-6845 เบอร์รถ : 2 ไมล์รถ : 244.7 SOC : 39%

ชื่อพขร. : [illegible] ชื่อพตร. : [illegible] ผู้ตรวจเช็ค : [illegible]

หัวข้อ	ลำดับ	รายการตรวจเช็ครถ	ผลการตรวจ ปกติ	ผลการตรวจ ผิดปกติ	หมายเหตุ
ภายในตัวรถ	1	เบาะนั่งผู้โดยสาร - เบาะคนขับรถ ○ คราบเลอะสกปรก ○ ฉีกขาด/เป็นรู ○ คราบฝุ่นดำ	✓		
	2	ผ้าม่านบนรถโดยสาร ○ ขาด/เป็นรู ○ ดำ/สกปรก ○ เหม็นอับ	✓		
	3	ราวเหล็ก - เสาจับ ○ แตก/หัก ○ ดำ/สกปรก ○ สนิม	✓		
	4	กระจกภายใน (คราบฝุ่น,สกปรกดำ) ○ รอยร้าว/แตก ○ ดำ/สกปรก ○ คราบฝุ่นดำ	✓		
	5	เพดานรถ - ขอบหน้าต่าง (ความสะอาด , คราบฝุ่นสิ่งสกปรก) หน้ารถ - หลังรถ (แถวซอกกระจก ความสะอาดเรียบร้อย)	✓		
	6	พื้นรถ - บรรไดรถ (ฝุ่น,ขยะ,คราบฝังลึก)	✓		
	7	ถังดับเพลิง + ค้อนทุบกระจก Ø มี ○ ไม่มี	✓		
	8	สภาพหลังคารถ ○ มีรูรั่ว/สนิม Ø ไม่มีรูรั่ว	✓		
	9	ระบบปรับอากาศ ○ พัดลมแอร์ไม่ทำงาน ○ น้ำยาแอร์รั่ว	✓		
	10	หลอดไฟในรถ - ไฟป้าย Ø สว่าง ○ ไม่สว่าง	✓		
ภายนอก - ระบบไฟฟ้า	1	โครงรอบตัวถังของรถ ○ รอยบุบ/แตก ○ สีหลุดร่อน ○ อื่นๆ ระบุ ระบุจำนวนแผล	✓		
	2	กระจกรอบตัวรถ ○ รอยแตก ○ รอยร้าว กระจกส่องมองข้าง ○ อื่นๆ ระบุ ระบุจำนวนแผล	✓		
	3	ระบบช่วงล่างและระบบถุงลม ○ ถุงลมรั่วแตก,โช๊ครั่วซึม ○ สวิตซ์ระบบไฟฟ้าชำรุด ○ ระดับจาระบีในถังเติมต่ำ ○ อื่นๆ ระบุ	✓		
	4	พวงมาลัยเพาเวอร์ ○ สายน้ำมันเพาเวอร์รั่วซึม ○ ปั้มน้ำมันเพาเวอร์ชำรุด	✓		
	5	ระบบไฟเลี้ยวซ้าย - ขวา Ø ติด ○ ไม่ติด/ชำรุด	✓		
	6	ระบบไฟหน้า -ไฟหรี่-ไฟเบรกหลัง Ø ติด ○ ไม่ติด/ชำรุด	✓		
	7	ระดับน้ำหล่อเย็นแบตเตอรี่ Ø ระดับน้ำปกติ ○ ระดับน้ำต่ำกว่าปกติ	✓		
	8	ระดับน้ำหล่อเย็นมอเตอร์ Ø ระดับน้ำปกติ ○ ระดับน้ำต่ำกว่าปกติ	✓		
	9	ระบบปัดน้ำฝน Ø ติด/เปิดได้ดี ○ ไม่ติด/ชำรุดค้าง	✓		
	10	ประตูเปิดรับผู้โดยสาร,ประตูคนขับรถ Ø ติด/เปิดได้ดี ○ ไม่ติด/ชำรุดค้าง	✓		
	11	ประตูทางออกฉุกเฉิน Ø ติด/เปิดได้ดี ○ ไม่ติด/ชำรุดค้าง	✓		
	12	ยางล้อรถทั้ง 6 เส้น ○ เสื่อมสภาพ ○ แตก/ปริ/รั่วซึม ○ พอใช้ได้ ○ อื่นๆ ระบุ	✓		
	13	ลมยางล้อทั้ง 6 เส้น แรงดันลมยาง (110-130PSI)	✓		
หน้าปัด คนขับ	1	ตรวจสอบจอหน้าปัดคนขับ ตรวจสอบ SOC ของแบตเตอรี่	✓		
	2	ตรวจสอบแรงดันไฟฟ้า 24 V	✓		
	3	ตรวจสอบการแจ้งเตือนความผิดปกติของระบบ (Error Code)	✓		
	4	ตรวจสอบสัญลักษณ์ บนหน้าปัดว่ามีอะไรผิดปกติ	✓		
	5	ตรวจสอบวันเวลาและเลขไมล์รถ และป้ายไฟ LED สายรถเมย์	✓		

รอยตำหนิรถโดยสาร ดังนี้

1 ________ 2 ________
3 ________ 4 ________

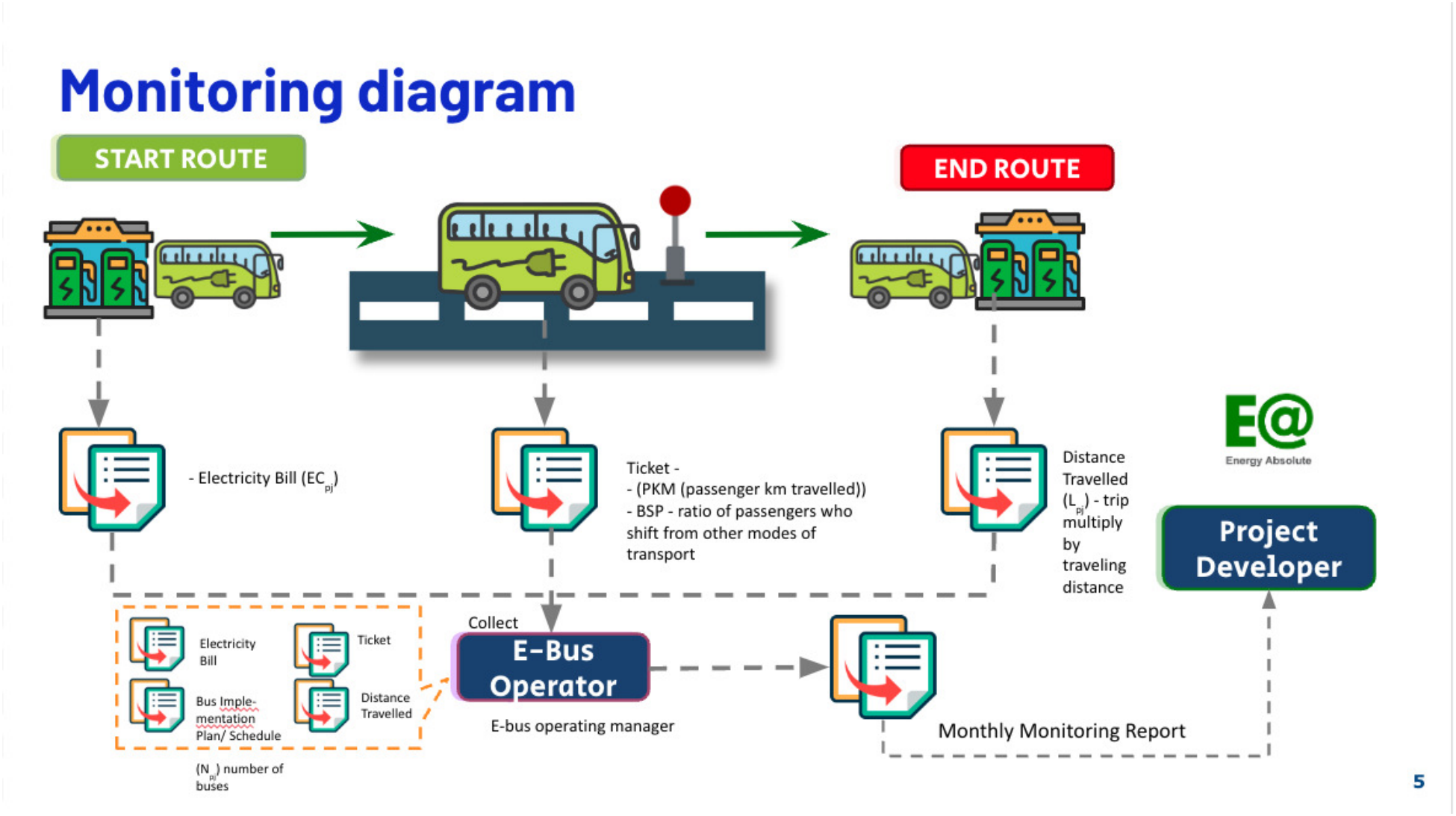
หมายเหตุ อื่นๆ : ________

ลงชื่อ : ________ ผู้ตรวจสอบ
(นายมณฑล สิทธิปรีชาชาญ/นายอภิชาติ จรัลพรเลิศสิน)
วันที่ : 01 ส.ค. 2566

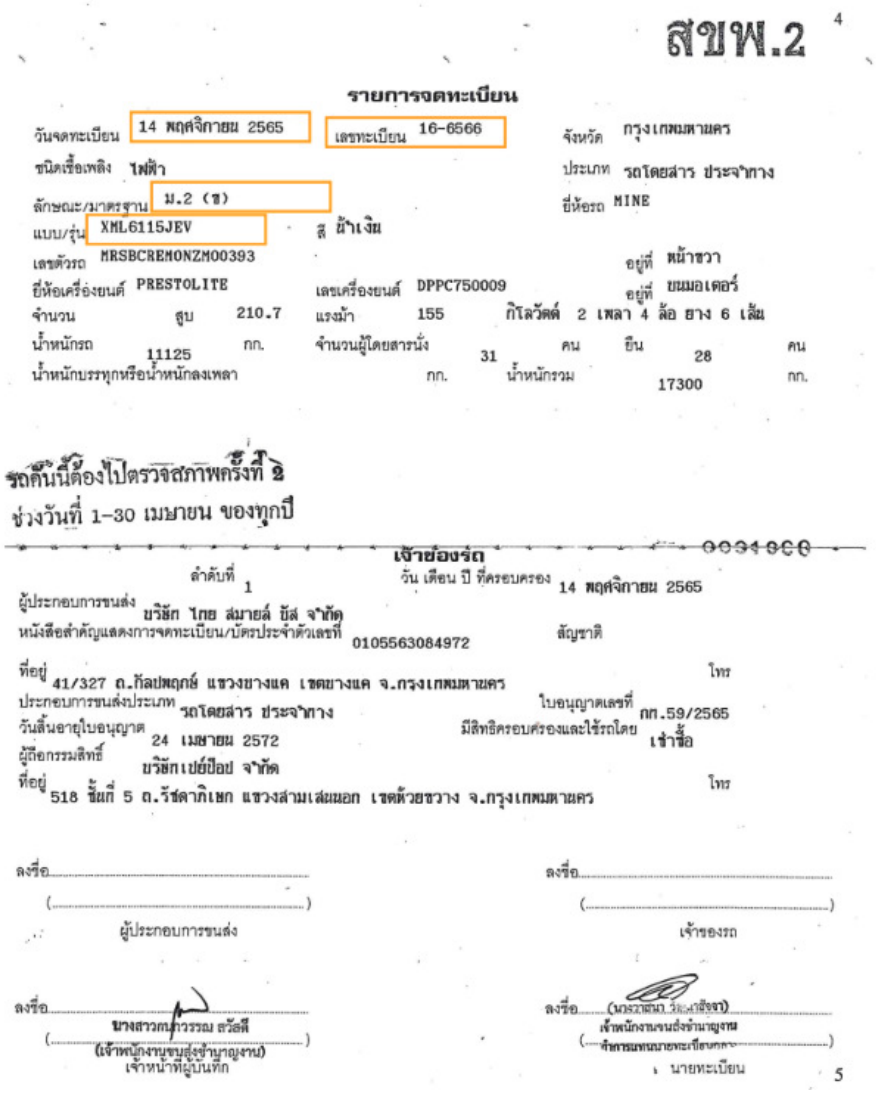
ลงชื่อ : ________ ผู้จัดการอู่
( )
วันที่ : [illegible]

MTN-ABS-FM-06 (00)

Annex 5 – TSB's management structure corresponds to the e-buses data monitoring



Annex 6 – Example of bus registration license



สขพ.2

รายการจดทะเบียน

วันจดทะเบียน 14 พฤศจิกายน 2565 เลขทะเบียน 16-6566 จังหวัด กรุงเทพมหานคร

ชนิดเชื้อเพลิง ไฟฟ้า ประเภท รถโดยสาร ประจำทาง

ลักษณะ/มาตรฐาน ม.2 (ข) ยี่ห้อรถ MINE

แบบ/รุ่น XML6115JEV สี ฟ้าเงิน

เลขตัวรถ MRSBCREMONZM00393 อยู่ที่ หน้าขวา

ยี่ห้อเครื่องยนต์ PRESTOLITE เลขเครื่องยนต์ DPPC750009 อยู่ที่ ขนมอเดอร์

จำนวน สูบ 210.7 แรงม้า 155 กิโลวัตต์ 2 เพลา 4 ล้อ ยาง 6 เส้น

น้ำหนักรถ 11125 กก. จำนวนผู้โดยสารนั่ง 31 คน ยืน 28 คน

น้ำหนักบรรทุกหรือน้ำหนักลงเพลา กก. น้ำหนักรวม 17300 กก.

รถคันนี้ต้องไปตรวจสภาพครั้งที่ 2

ช่วงวันที่ 1-30 เมษายน ของทุกปี

เจ้าของรถ

ลำดับที่ 1 วัน เดือน ปี ที่ครอบครอง 14 พฤศจิกายน 2565

ผู้ประกอบการขนส่ง บริษัท ไทย สมายล์ บัส จำกัด สัญชาติ

หนังสือสำคัญแสดงการจดทะเบียน/บัตรประจำตัวเลขที่ 0105563084972

ที่อยู่ 41/327 ถ.กัลปพฤกษ์ แขวงบางแค เขตบางแค จ.กรุงเทพมหานคร ไทย

ประกอบการขนส่งประเภท รถโดยสาร ประจำทาง ใบอนุญาตเลขที่ กก.59/2565

วันสิ้นอายุใบอนุญาต 24 เมษายน 2572 มีสิทธิครอบครองและใช้รถโดย เช่าซื้อ

ผู้ถือกรรมสิทธิ์ บริษัทเปย์ป้อย จำกัด

ที่อยู่ 518 ชั้นที่ 5 ถ.รัชดาภิเษก แขวงสามเสนนอก เขตห้วยขวาง จ.กรุงเทพมหานคร ไทย

ลงชื่อ..... ลงชื่อ.....

( ) ( )

ผู้ประกอบการขนส่ง เจ้าของรถ

ลงชื่อ..... ลงชื่อ.....

(นางสาวกนกวรรณ สวัสดี) ( )

(เจ้าหน้าที่งานขนส่งชำนาญงาน) เจ้าหน้าที่งานขนส่งชำนาญงาน

เจ้าหน้าที่ผู้บันทึก นายทะเบียน

5

10

รายการเสียภาษี

วันเสียภาษี	ใบเสร็จรับเงิน เลขที่คุม/เลขที่	งวดภาษี	อัตราภาษี บาท/สด.	เงินเพิ่ม บาท/สด.	วันสิ้นอายุภาษี	ลงชื่อเจ้าหน้าที่	ลงชื่อนายทะเบียน
4 พ.ย.65	n20429680/660000425	4/65-3/66	1,450.00	0.00	30 ก.ย.66	สขพ.5(วิโลวรรณ)	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

หมายเหตุ สามารถนำรถมาตรวจสภาพและชำระภาษีล่วงหน้าก่อนวันสิ้นอายุภาษีได้ไม่เกิน 3 เดือน

รายการเสียภาษี

วันเสียภาษี	ใบเสร็จรับเงิน เลขที่คุม/เลขที่	งวดภาษี	อัตราภาษี บาท/สด.	เงินเพิ่ม บาท/สด.	วันสิ้นอายุภาษี	ลงชื่อเจ้าหน้าที่	ลงชื่อนายทะเบียน
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							

หมายเหตุ สามารถนำรถมาตรวจสภาพและชำระภาษีล่วงหน้าก่อนวันสิ้นอายุภาษีได้ไม่เกิน 3 เดือน

11

Annex 7 – List of References

Reference 1 : Letter of Authorization

Reference 2 : Purchase orders of e-buses

Reference 3 : NGV bus salvage purchase agreement and deregistration licenses

Reference 4 : Technical specifications of e-buses

Reference 5 : Electronic service agreement contract between EA and Amita

Reference 6 : Contract agreement between EA and the bus operator (TSB)

Reference 7 : Proof of CPAs registration under T-VER standard

Reference 8 : Monitoring data provided by bus operation (TSB)

Reference 9 : Average specific fuel consumption calculation

Reference 10 : Thai Smile Bus Operational Report 2023

Reference 11 : GPS exported data

Reference 12 : Electricity Consumption data and logbook

Reference 13 : Data collection for electricity consumption procedure

Reference 14 : Passenger Kilometer from Baseline Study

Reference 15 : Passenger Kilometer in 2023

Reference 16 : Mode of transportation ratio of vehicle type ‘x’ of passenger who shift to EV for public transit in 2023

Reference 17 : Details of survey and questionnaire form

Reference 18 : Summary of Financial details for PoA1 and PoA2 during Monitoring period: 1.01.2023 to 31.12.2023