CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)
Version 01

CONTENTS

NOTE:

(i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.

(ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of small scale CDM programme activity (CPA)

A.1. Title of the small-scale CPA:

Public Utility Jeepney engine modernization program for University of Philippines, Diliman in Metro Manila

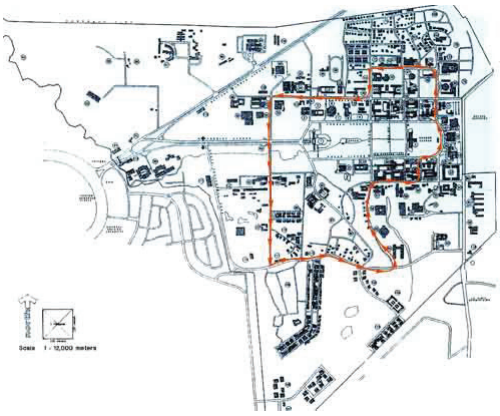
Version: 01
Date: 01/03/2008

A.2. Description of the small-scale CPA:

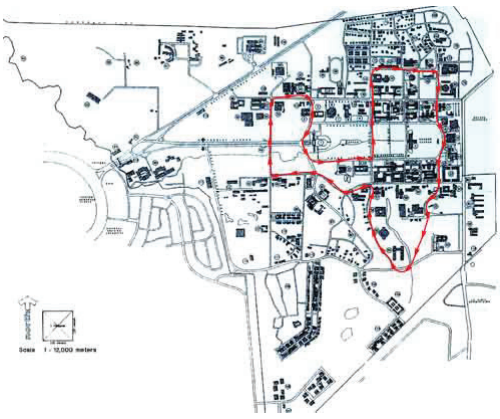
The purpose of the small-scale CPA engine exchange is to improve the efficiency of Jeepneys operating in the University of the Philippines Diliman (UP-Diliman).

The University of the Philippine is the only national university in the country and comprised of seven constituent universities located in 12 campuses throughout the Phili ppine archipelago. The UP-Diliman is one of the constituent universities located in the Quezon City, Metro Manila. For the convenience of students and faculties, the UP-Diliman operates its own Jeepney system with 323 vehicles on 6 routes.
These Jeepneys are operating on 6 routes average of 7 km long.

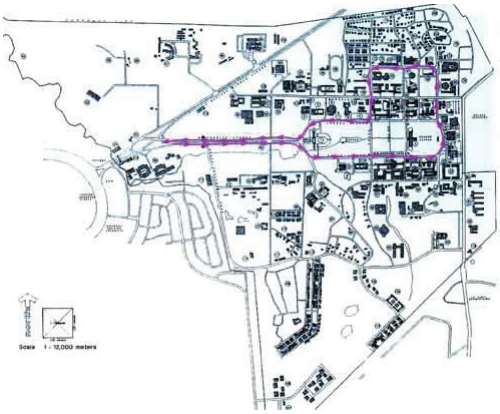
Map of 6 Jeepney routes in the UP-Diliman



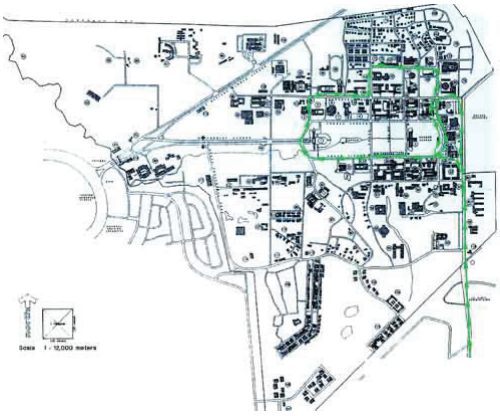
UP-IKOT Route



UP-TOKI Route



UP-Philcoa
UP-North EDSA



UP-Pantranco
UP-Katipunan Route

The project comprises of:
1. Provide soft loans for provision of brand new engines
2. Replacement of engines by engine manufacturer(s)
3. Provision of technical training for check-up and maintenance of brand new engines by engine manufacture(s)
4. Periodical check-up and maintenance by end users

Contribution to sustainable development

The proposed project activities will contribute to sustainable development of Philippines in the following aspects:

Environmental dimension - In Metro Manila, vehicular emissions attribute 70%[3] of the total pollution load and 17%[4] of the coarse particulates (TSP) pollution load. The transport sector has been identified as the most significant source of PM10 and PM2.5 pollutants.

Poor air quality intensifies the health burden of cardiovascular and respiratory disease. It is estimated that 5,000 premature deaths each year in Manila—which amounts to 12% of all deaths in the city—are due to respiratory and cardiovascular diseases from exposure to poor air quality.[5]

[3] Philippine Emission Inventory, 2005

[4] PNRI Air Pollution Source Apportionment Study, 2006

[5] Philippines Environment Monitor 2006, Chapter 4.

Improvements in the engine's energy efficiency leads to a decrease in the amount of fuel consumed, allowing for the same amount of service provided while decreasing emissions due to fuel consumption. Furthermore, air pollution from vehicles is caused by inefficient combustion of fuel in the engine. Thus, improving the engine's energy efficiency reduces greenhouse gas emissions, reduces pollution, and allows compliance with vehicular emission standards set in the Clean Air Act (CAA, Republic Act 8749) of 1999.

Social dimension - The project activity will make contribute in social aspect by improving the quality of life for the Jeepney operators and drivers by reducing emissions of pollutants from the Jeepney driving.
The operators and drivers will also have a better living condition by increased income due to reduction in fuel purchasing cost.

A.3. Entity/individual responsible for the small-scale CPA:

In this program, 323 Jeepneys in operating in the UP-Diliman compose a unit of CPA.

Within the CPA, University of Philippines Transportation Committee (UPTC) will be an authorized entity to perform the role of "CPA Implementer".
UPTC is responsible for overall operation of the Jeepneys in the campus.
The CPA Implementer will coordinate with a coordinating entity of PoA for implementation of the program and monitoring.

A.4. Technical description of the small-scale CPA:

This project comprises of:

1. Provide soft loans for provision of brand new engines
2. Replacement of engines by engine manufacturer(s)
3. Provision of technical training for check-up and maintenance of brand new engines by engine manufacture(s)
4. Periodical check-up and maintenance by end users

Operational characteristics of Jeepneys in UP-Diliman is described in the following table.

Table 4.1 Operational information of Jeepneys

Route name	Number of Jeepneys	Trip Distance (km)	Total Distance Traveled (km/Day)	Daily fuel consumption (li/day)
IKOT	56	5	160	31
TOKI	15	6	126	23
PHILCOA	40	5	55	10
NORTH EDSA	42	8	120	26
PANTRANCO	90	8	104	18
KATIPUNAN	80	10	60	14
	323(Total)	7.00 (Average)	104 (Total)	20(average)

A.4.1. Identification of the small-scale CPA:

Public Utility Jeepney engine modernization program for University of Philippines, Diliman in Metro Manila

A.4.1.1. Host Party:

Republic of the Philippines

A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):

The University of the Philippines, Diliman campus is located in Quezon City, Metro Manila.

A.4.2. Duration of the small-scale CPA:

A.4.2.1. Starting date of the small-scale CPA:

01/08/2008

A.4.2.2. Expected operational lifetime of the small-scale CPA:

10 years

This is a recommended operational life time of new engine by the manufacture. The CPA will be excluded from the PoA once this operational life time expires.

A.4.3. Choice of the crediting period and related information:

Fixed crediting period

A.4.3.1. Starting date of the crediting period:

Upon registration of the CPA

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

10 years

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Years	Annual estimation of emission reductions in tonnes of CO2(tCO2e)
Year 1	2,728
Year 2	2,728
Year 3	2,728
Year 4	2,728
Year 5	2,728
Year 6	2,728
Year 7	2,728
Year 8	2,728
Year 9	2,728
Year 10	2,728
Total estimated reductions (tonnes of CO2e)	27,280
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	2,728

A.4.5. Public funding of the CPA:

Public funding is considered for the registered PoA. The DENR is now under negotiation with international financial institution for this purpose.
However, there is no public funding is considered for the CPA.

A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component

The implementer of this proposed small-scale CPA has no other registered small-scale CDM programme activity within this CPA's boundary. Furthermore, the coordinating entity does not have another large scale PoA of the same sectoral scope.

A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:

The small-scale CPA is not registered as an individual CDM project activity. It is neither a part of another registered PoA.

SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which small-scale CPA is added:

Public Utility Jeepney Engine Modernization Program in Metro Manila

B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA :

The proposed CPA has access to financing channel through registered PoA.
The end users in this CPA, are members of the UP Transportation Committee. The end users operate public utility Jeepneys serving the University of the Philippines, which is a campus within Metro Manila.

B.3. Assessment and demonstration of additionality of the small-scale CPA, as per eligibility criteria listed in the Registered PoA:

Investment barrier:

Second-hand engines that are available in the country are can be around 80,000-120,000PHP per engine. Indeed, the survey result shows that around 50% of the respondents[6] obtained their engines at lower than 100,000PHP whereas the brand new engine cost between 300,000-400,000PHP. The brand new engine with body will cost approximately 550,000PHP.

These second-hand engines are considerably cheaper thereby influencing the owners' decision making process in trying to keep investment costs down. The wide discrepancy between the cost of second-hand and brand new engine is a major factor for discouraging drivers from purchasing a new engine.

Due to high investment cost, the installation of new engines in the Jeepney sector will not likely to realize without the program. The utilization of soft credit under the program can facilitate overcoming the investment barrier for individual drivers.

Technology barrier:

There is no local automobile engine manufacturer in the Philippines. Especially for the Jeepney, there is a very limited availability of brand new engine. Isuzu, being one of the major diesel engine providers, only started in 2005 their importation of brand new engines manufactured in Japan and then sold locally. These are the main technical barrier that preventing access to the new engines by the Jeepney owners.

Prevailing practice barrier:

As a general practice, most of the Asian cars have a life expectancy of 5 years or equivalent of more or less 100,000 kilometer run. It is normal that when a vehicle is sold on its 4th or 5th year after sales, many mechanical problems arise. This is also the time when vehicles are scrapped and replaced with a new one, especially in the advanced economies.

However, in the case of the countries like the Philippines, even more so for Jeepneys, the scenario is different. At the onset, when the Jeepney is first assembled, there is no set of formal standards to follow. Self-repair or in-house repairs are the usual practice. Many of the drivers have also learned indigenous practical solutions for second hand, surplus or even dilapidated engines that are never thought in formal training institutes.

There are many informal shops that provide repair and maintenance service for the engine at low fees in Philippines. Observations show that even scrap materials can be of some use to

[6] For this particular item, responses were obtained from less than 30% of total surveyed population.

Public Utility Jeepneys simply because there is no standard to follow concerning technical specifications.

This being common practice in the sector, drivers are hesitant to replace their engines, for many of
them have a perception that new engines have high technical specifications requiring expert knowledge.

Regulatory barrier:

The Executive Order No. 782 series of 1982 which ban on importing second-hand engines has been suspended since 1989. Currently, there is no regulation to prohibit continuing importation of second-hand engines from overseas.

This phenomenon has also opened the gates for more second-hand or surplus vehicle parts in the country. In a way the replacement of engines or parts of the second-hand vehicles sold to the public has an after-market support (although very inadequate) despite some conflict in government policies. With these long-standing and unresolved issues at hand, the program on vehicle and engine scrapping is not in the central focus. In reality, the country is becoming a receiver of pre-owned vehicles, auto parts and industrial equipments. Therefore, there are cases that old engines are installed even in newly built Jeepneys.

The DOTC issued Department Order No. 2002-30 set on Aug. 2002 setting the age limit of public transport vehicles at 15 years. However, in response to the clamor of the public transport sector, the order is currently under review and the implementation of this order has been put on hold.

B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.

The CPA reduces CO_2 emissions by decreasing diesel oil consumption by public utility Jeepneys. The Jeepneys in this CPA operate in specific routes within UP-Diliman. The CPA is located within Metro Manila which is the geographical boundary of the registered PoA.

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

Data / Parameter:	ρ
Data unit:	kg_{fuel}/liter
Description:	Fuel density
Source of data used:	Default data for diesel

Value applied:	0.85
Justification of the choice of data or description of measurement methods and procedures actually applied :	No country specific data is available
Any comment:	-

Data / Parameter:	$V_{fuel\text{-}base}$
Data unit:	li/day
Description:	Volume of fuel consumed per day
Source of data used:	Survey data by University of the Philippines. National Center for Transporation Studies Foundation Inc.
Value applied:	20.0li/day
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

Data / Parameter:	**CF**
Data unit:	$TJ/10^3ton$
Description:	Conversion Factor ($43TJ/10^3ton$)
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol2 Tab1.2
Value applied:	43.0 $TJ/10^3ton$
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	

Data / Parameter:	**Carbon Content**
Data unit:	tC/TJ
Description:	Carbon content
Source of data used:	IPCC 2006 default data for gasoline table 1.3
Value applied:	20.2
Justification of the	

choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

B.5.2. Ex-ante calculation of emission reductions:

The calculation of emission reductions will be based on the CDM small scale baseline methodology SSC_149 "Transport Energy Efficiency Activities using Retrofit Technologies"[7].

The basic formula used to calculate emission reduction through the replacement of existing engines is the following:

$$ER = BE - PE - Leakage$$

Where

ER = total emissions reductions in tCO_2e/yr
BE = baseline emissions in tCO_2e/yr
PE = project emissions in tCO_2e/yr

Project Emissions:

Step 1. Estimating apparent fuel consumption at a common energy unit (TJ)

$$FC_{project} = m_{fuel\text{-}project} * CF$$

Where

$FC_{project}$ Baseline energy consumption of jeepneys per year (TJ / year)
CF Conversion Factor ($43.0TJ/10^3ton$: IPCC 2006 default value table 1-2)

$$m_{fuel} = v_{fuel} * \rho * T * 1ton/1000kg$$

[7] The proposed new SSC methodology was discussed at the 14th SSC Working Group held in Feb. 11-13, 2008. The methodology received several comments and has not been approved as of March 20, 2008. However, as of now, this particular methodology is the most suited to the proposed PoA and CPA. The author of this PDD will closely watch the next discussion at the next SSC Working Group meeting and make necessary adjustment to complete this PDD.

where

$m_{fuel\text{-}project}$	annual consumed fuel mass (tons/year)
$V_{fuel\text{-}project}$	Volume of fuel consumed per hr (li/day)
ρ	Fuel Density (kg_{fuel}/liter: 0.85)
T	number of operational hours in a year (hours/yr)

m_{fuel} = 10li/day * 0.85 kg/li * 312 days/year * 1ton/1000kg
m_{fuel} = 2.652 tons/year

$FC_{project}$ = 2.652 tons/year * 43 TJ/10^3 ton
$FC_{project}$ = 0.114036 TJ/year

Step 2. Multiply by carbon emission factor

Carbon content of fossil fuel = FC_{base} (TJ/year) * CC (tC/TJ)

Where
Carbon Content (20.2 tC/TJ)

Carbon content of fossil fuel = 0.114036TJ/year * 20.2 tC/TJ
Carbon content = 2.3035272tC/year

Step 3. Converting to CO_2 emissions

PE = carbon content * mole ratio * N

Where
Carbon content carbon content of fuel consumed per year

Mole ratio	mole ratio of carbon to carbon dioxide
N	Number of eepneys to be retrofitted

PE = 2.3035272 tC/year * 44/12 * 323 Jeepneys
PE_y = 2,728 tCO_2e

<u>Baseline Emissions:</u>
Step 1. Estimating apparent fuel consumption at a common energy unit (TJ)

$FC_{base} = m_{fuel} * CF$

Where

FC_{base}	Baseline energy consumption of jeepney per year (TJ / year)
CF	Conversion Factor ($43.0TJ/10^3$ton: IPCC 2006 default value table 1-2)

$m_{fuel} = v_{fuel} * \rho * T * 1ton/1000kg$

where

m_{fuel}	annual consumed fuel mass (tons/year)
$V_{fuel\text{-}base}$	Volume of fuel consumed per hr (li/day)
ρ	Fuel Density (kg_{fuel}/liter: 0.85)
T	number of operational hours in a year (hours/yr)

$m_{fuel} = 20li/day * 0.85\ kg/li * 312\ days/year * 1ton/1000kg$
$m_{fuel} = 5.304$ tons/year

$FC_{base} = 5.304$ tons/year * 43 $TJ/10^3$ ton
$FC_{base} = 0.228072$ TJ/year

Step 2. Multiply by carbon emission factor

Carbon content of fossil fuel = FC_{base} (TJ/year) * CC (tC/TJ)

Where
Carbon Content (20.2 tC/TJ)

Carbon content of fossil fuel = 0.228072TJ/year * 20.2 tC/TJ
Carbon content = 4.6070544 tC/year

Step 3. Converting to CO_2 emissions

BE = carbon content of fossil fuel consumed * mole ratio * N

Where
Carbon content of fuel consumed per year

Mole ratio	mole ratio of carbon to carbon dioxide
N	Number of Jeepneys to be retrofitted

BE = 4.6070544 tC/year * 44/12 * 323 Jeepneys
BE_y = 5,456 tCO_2e

B.5.3. Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO2 e)	Estimation of leakage (tonnes of CO2 e)	Estimation of overall emission reductions (tonnes of CO2 e)
Year 1	2,728	5,456	0	2,728
Year 2	2,728	5,456	0	2,728
Year 3	2,728	5,456	0	2,728
Year 4	2,728	5,456	0	2,728
Year 5	2,728	5,456	0	2,728
Year 6	2,728	5,456	0	2,728
Year 7	2,728	5,456	0	2,728
Year 8	2,728	5,456	0	2,728
Year 9	2,728	5,456	0	2,728
Year 10	2,728	5,456	0	2,728
Total (tonnes of CO_2 e)	27,280	54,560	0	27,280

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

The following are outline of monitoring plan based on the CDM small scale monitoring methodology SSC_149 "Transport Energy Efficiency Activities using Retrofit Technologies"[8]. The monitoring will be conducted for those items described in Section E.7.1. of the SSC-PoA-DD.

(i) Monitoring shall track the number of retrofit vehicles operated under the small-scale CDM project activity and the annual units of service for a sample of the vehicles.

- ✧ The CPA implementer to account the number of Jeepney units in operation that will be

[8] The proposed new SSC methodology was discussed at the 14th SSC Working Group held in Feb. 11-13, 2008. The methodology received several comments and has not been approved as of March 20, 2008. However, as of now, this particular methodology is the most suited to the proposed PoA and CPA. The author of this PDD will closely watch the next discussion at the next SSC Working Group meeting and make necessary adjustment to complete this PDD.

included in the CPA prior to the project implementation.

- ✧ The CPA implementer to monitor the number of Jeepney units with new engines.

(ii) The quantity of fossil fuel consumed should be monitored for a sample retrofit vehicles.

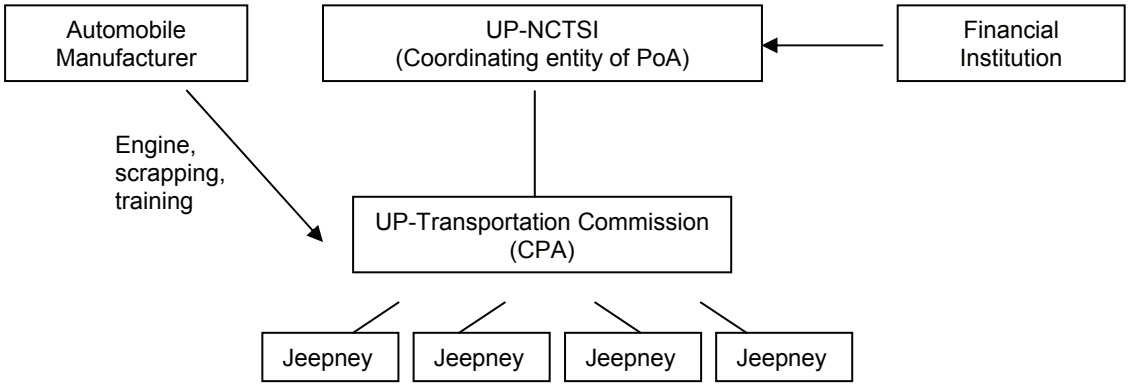
- ✧ The CPA implementer should correct fuel purchase receipt by individual Jeepney units with new engines.

(iii) The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other.

- ✧ The CPA implementer should coordinate with engines providers to confirm scrapping of old engines on-site upon replacement with new engines.

The monitoring structure for this CPA is shown below.

Table 6. Monitoring structure



SECTION C. Environmental Analysis

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

☑ Environmental analysis provided at the PoA level.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

N/A

C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:

N/A

No significant environmental impacts are expected to result from the Project. The project will consume less fuel than before the implementation of the Project.

Moreover, the project will contribute to environmental preservation by reducing GHG and ambient air pollutant emissions from diesel oil. This is further confirmed by the issuance of the CNC by the EMB.

SECTION D. Stakeholders' comments

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

☑ Local stakeholder consultation was conducted at the PoA level.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

N/A

D.3. Summary of the comments received:

N/A

D.4. Report on how due account was taken of any comments received:

N/A

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA

Organization:	U.P. Diliman Transportation Committee c/o National Center for Transportation Studies, University of the Philippines Diliman
Street/P.O.Box:	
Building:	NCTS Building, U.P. Diliman
City:	Quezon City
State/Region:	Metro Manila
Postfix/ZIP:	1101
Country:	Philippines
Telephone:	+(632) 928-8305
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Represented by:	
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Salutation:	Dr.
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Information provided in Section A.4.5.

Annex 3

BASELINE INFORMATION

Information provided in Section B.5.

Annex 4

MONITORING INFORMATION

Information provided in Section B.6.

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