

Monitoring Plan Sheet (Input Sheet) [Attachment to Project Design Document]

Table 1: Parameters to be monitored *ex post*

(a) Monitoring point No.	(b) Parameters	(c) Description of data	(d) Estimated Values	(e) Units	(f) Monitoring option	(g) Source of data	(h) Measurement methods and procedures	(i) Monitoring frequency	(j) Other comments
(1)	$EC_{PJ, i, p}$	Amount of electricity consumption of the project refrigerator i during the period p	135.0	MWh/p	Option C	Monitored data	<p>Data is measured by measuring equipments in the factory.</p> <ul style="list-style-type: none"> - Specification of measuring equipments: Electrical power meter is applied for measurement of electrical power consumption of project refrigerator. - Measuring and recording: Measured data is automatically sent to a server where data is recorded and stored. - Data collection and reporting: Inputting the collected recorded data to a spreadsheet electronically. - QA/QC: 1) Recorded data is checked its integrity once a month by responsible staff. 2) Calibration is conducted every year after the installation by a qualified entity. 	Continuously	
(2)	$EI_{grid, p}$	Electricity imported from the grid to the project site during the period p	135.0	MWh/p	Option B	Invoice from the power company who owns the grid	Data is collected from relevant invoices from the power company who owns the grid and input to a spreadsheet electronically.	Every month	

(3)	$h_{gen,p}$	Operating time of captive electricity generator during the period p	0	hours/p	Option C	Monitored data	<p>Data is measured by meter equipped to a generator.</p> <ul style="list-style-type: none"> - Specification of measuring equipments: Meter is applied for measurement of the operation time of captive electricity generator. - Measuring and recording: Measured data is recorded and stored electronically. - Data collection and reporting: Inputting the collected recorded data to a spreadsheet electronically. - QA/QC: 1) Recorded data is checked its integrity once a month by responsible staff. 2) Calibration is conducted every year after the installation by a qualified entity. 	Continuously	
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Table 2: Project-specific parameters to be fixed *ex ante*

(a)	(b)	(c)	(d)	(e)	(f)
Parameters	Description of data	Estimated Values	Units	Source of data	Other comments
EF_{elec}	[For grid electricity] CO ₂ emission factor for consumed electricity	0.814	tCO ₂ /MWh	The most recent value available at the time of validation is applied and fixed for the monitoring period thereafter. The data is sourced from “Emission Factors of Electricity Interconnection Systems”, National Committee on Clean Development Mechanism Indonesian DNA for CDM unless otherwise instructed by the Joint Committee.	
EF_{elec}	[For captive electricity] CO ₂ emission factor for consumed electricity	0.80	tCO ₂ /MWh	Default value stipulated in the para.9 of CDM approved methodology AMS-I.A ver.16.	
$COP_{RE,i}$	COP of the project refrigerator type i	1.32	-	The default values for $COP_{RE,i}$ are set as follows: For cold storage: 1.71 For individual quick freezer: 1.32	
$COP_{PJ,i}$	COP of the reference refrigerator type i	1.63	-	Specifications of project refrigerator i prepared for the quotation or factory acceptance test data by manufacturer.	
RC_{gen}	Rated capacity of generator		kW	Specification of generator for captive electricity.	

Table3: *Ex-ante* estimation of CO₂ emission reductions

CO ₂ emission reductions	Units
25	tCO ₂ /p

[Monitoring option]

Option A	Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and
Option B	Based on the amount of transaction which is measured directly using measuring equipments (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipments (Data used: measured values)

Monitoring Plan Sheet (Calculation Process Sheet) [Attachment to Project Design Document]

1. Calculations for emission reductions	Fuel type	Value	Units	Parameter
Emission reductions during the period p	N/A	25.6	tCO ₂ /p	ER _p
2. Selected default values, etc.				
COP of the reference refrigerator type i	N/A	1.32	-	COP _{RE,i}
COP of the project refrigerator type i	N/A	1.63	-	COP _{PJ,i}
3. Calculations for reference emissions				
Reference emissions during the period p	N/A	135.5	tCO ₂ /p	RE _p
CO ₂ emission factor for consumed electricity [grid]	Electricity	0.814	tCO ₂ /MWh	EF _{elec}
CO ₂ emission factor for consumed electricity [captive]	Electricity	0.80	tCO ₂ /MWh	EF _{elec}
Proportion of grid electricity over total electricity consumed at the project site	N/A	1.00	-	-
Proportion of captive electricity over total electricity consumed at the project site	N/A	0.00	-	-
Amount of electricity consumption of the project refrigerator i during the period p	Electricity	135	MWh/p	EC _{PJ,i,p}
COP of the reference refrigerator type i	N/A	1.32	-	COP _{RE,i}
COP of the project refrigerator type i	N/A	1.63	-	COP _{PJ,i}
4. Calculations of the project emissions				
Project emissions during the period p		109.9	tCO ₂ /p	PE _p
CO ₂ emission factor for consumed electricity [grid]	Electricity	0.814	tCO ₂ /MWh	EF _{elec}
CO ₂ emission factor for consumed electricity [captive]	Electricity	0.80	tCO ₂ /MWh	EF _{elec}
Proportion of grid electricity over total electricity consumed at the project site	N/A	1.00	-	-
Proportion of captive electricity over total electricity consumed at the project site	N/A	0.00	-	-
Amount of electricity consumption of the project refrigerator i during the period p	Electricity	135	MWh/p	EC _{PJ,i,p}

[List of Default Values]

	COP _{RE,i}	
For cold storage	1.71	
For individual quick freezer	1.32	

Monitoring Structure Sheet [Attachment to Project Design Document]

Responsible personnel	Role
Project Manager	Responsible for project implementation, monitoring results and reporting.
Deputy Project Manager	Appointed to be in charge of confirming the recorded data and archived data.
QA/QC team	Appointed to be in charge of checking the archived data for irregularity and calibration of the monitoring equipments.
Record keeper	Appointed to be in charge of inputting the monitored data to a spreadsheet (recording sheet) manually

Monitoring Report Sheet (Input Sheet) [For Verification]

Table 1: Parameters monitored *ex post*

(a) Monitoring period	(b) Monitoring point No.	(c) Parameters	(d) Description of data	(e) Estimated Values	(f) Units	(g) Monitoring option	(h) Source of data	(i) Measurement methods and procedures	(j) Monitoring frequency	(k) Other comments
From 2015/2/2 until 2015/7/31	(1)	$EC_{PJ, i, p}$	Amount of electricity consumption of the project refrigerator i during the period p	60.572	MWh/p	Option C	Monitored data	Data is measured by measuring equipments in the factory. - Specification of measuring equipments: Electrical power meter is applied for measurement of electrical power consumption of project refrigerator. - Measuring and recording: Measured data is automatically sent to a server where data is recorded and stored. - Data collection and reporting: Inputting the recorded data to a spreadsheet electrically. - QA/QC: 1) Recorded data is checked its integrity once a month by responsible staff. 2) Calibration is conducted every year after the installation by a qualified entity.	Continuously	
From 2015/2/1 until 2015/7/31	(2)	$EI_{grid, p}$	Electricity imported from the grid to the project site during the period p	605.597	MWh/p	Option B	Invoice from the power company	Data is collected and recorded from invoices from the power company.	Every month	
From 2015/2/1 until 2015/7/31	(3)	$h_{gen, p}$	Operating time of captive electricity generator during the period p	0.0	hours/p	Option C	Monitored data	Data is measured by meter equipped to a generator. - Specification of measuring equipments: Meter is applied for measurement of the operation time of captive electricity generator. - Measuring and recording: Measured data is recorded and stored electrically. - Data collection and reporting: Inputting the recorded data to a spreadsheet electrically. - QA/QC: 1) Recorded data is checked its integrity once a month by responsible staff. 2) Calibration is conducted every year after the installation by a qualified entity.	Continuously	

Table 2: Project-specific parameters fixed *ex ante*

(a) Parameters	(b) Description of data	(c) Estimated Values	(d) Units	(e) Source of data	(f) Other comments
EF_{elec}	[For grid electricity] CO ₂ emission factor for consumed electricity	0.814	tCO ₂ /MWh	The most recent value available at the time of validation is applied and fixed for the monitoring period thereafter. The data is sourced from "Emission Factors of Electricity Interconnection Systems", National Committee on Clean Development Mechanism Indonesian DNA for CDM unless otherwise instructed by the Joint Committee.	

EF _{elec}	[For captive electricity] CO ₂ emission factor for consumed electricity	0.800	tCO ₂ /MWh	Default value stipulated in the para.9 of CDM approved methodology AMS-I.A ver.16.
COP _{RE,i}	COP of the project refrigerator type <i>i</i>	1.320	-	The default values for COP _{RE,i} are set as follows: For cold storage: 1.71 For individual quick freezer: 1.32
COP _{PJ,i}	COP of the reference refrigerator type <i>i</i>	1.628	-	Specifications of project refrigerator <i>i</i> prepared for the quotation or factory acceptance test data by manufacturer.
RC _{gen}	Rated capacity of generator	0.000	kW	Specification of generator for captive electricity.

Table3: Ex-post calculation of CO₂ emission reductions

Monitoring Period	CO ₂ emission reductions	Units
From 2015/2/2 until 2015/7/31	11	tCO ₂ /p

[Monitoring option]

Option A	Based on public data which is measured by entities other than the project participants (Data used: publicly recognized data such as statistical data and
Option B	Based on the amount of transaction which is measured directly using measuring equipments (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipments (Data used: measured values)

Monitoring Report Sheet (Calculation Process Sheet) [For Verification]

1. Calculations for emission reductions	Fuel type	Value	Units	Parameter
Emission reductions during the period p	N/A	11.5	tCO ₂ /p	ER _p
2. Selected default values, etc.				
COP of the reference refrigerator type i	N/A	1.32	-	COP _{RE,i}
COP of the project refrigerator type i	N/A	1.63	-	COP _{PJ,i}
3. Calculations for reference emissions				
Reference emissions during the period p	N/A	60.8	tCO ₂ /p	RE _p
CO ₂ emission factor for consumed electricity [grid]	Electricity	0.814	tCO ₂ /MWh	EF _{elec}
CO ₂ emission factor for consumed electricity [captive]	Electricity	0.80	tCO ₂ /MWh	EF _{elec}
Proportion of grid electricity over total electricity consumed at the project site	N/A	1.00	-	-
Proportion of captive electricity over total electricity consumed at the project site	N/A	0.00	-	-
Amount of electricity consumption of the project refrigerator i during the period p	Electricity	61	MWh/p	EC _{PJ,i,p}
COP of the reference refrigerator type i	N/A	1.32	-	COP _{RE,i}
COP of the project refrigerator type i	N/A	1.63	-	COP _{PJ,i}
4. Calculations of the project emissions				
Project emissions during the period p		49.3	tCO ₂ /p	PE _p
CO ₂ emission factor for consumed electricity [grid]	Electricity	0.814	tCO ₂ /MWh	EF _{elec}
CO ₂ emission factor for consumed electricity [captive]	Electricity	0.80	tCO ₂ /MWh	EF _{elec}
Proportion of grid electricity over total electricity consumed at the project site	N/A	1.00	-	-
Proportion of captive electricity over total electricity consumed at the project site	N/A	0.00	-	-
Amount of electricity consumption of the project refrigerator i during the period p	Electricity	61	MWh/p	EC _{PJ,i,p}

[List of Default Values]

	COP _{RE,i}	
For cold storage	1.71	
For individual quick freezer	1.32	