Monitoring Report Sheet (Input Sheet) [For Verification]

Table 1: Parameters monitored *ex post*

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Monitoring period	**Monitoring point No.**	**Parameters**	**Description of data**	**Monitered Values**	**Units**	**Monitoring option**	**Source of data**	**Measurement methods and procedures**	**Monitoring frequency**	**Other comments**
6/12/2017-30/11/2018	1	$EC_{PJ,i,outdoor,p}$	Electricity consumption of outdoor unit of project air conditioning system *i* during the period *p*	-	MWh/p	Option C	Monitored data	- Measuring equipment is installed in each outdoor unit of air conditioning system to measure power consumption. - Measured data is automatically transmitted to the server for recording. - data recorded in the server is reported and double-checked by a responsible staff on a monthly basis to prevent missing data. - in case a calibration certificate issued by an entity accredited under national/international standards is not provided, such Measuring equipment is required to be calibrated. According to the catalogue by the manufacturer (Panasonic), the accuracy of power meter stays within ±2.0%. All of the measuring equipment have been calibrated on 25/05/2015 by the manufacturer (Panasonic Industrial Devices SUNX Co., Ltd .).	Continuously	Monitored values are input on "MRS(input_each system)" sheet
6/12/2017-30/11/2018	2	$EC_{PJ,indoor,p}$	Total electricity consumption of indoor units of project air conditioning system during the period *p*	72	MWh/p	Option C	Monitored data	[Method 3: Estimation based on operating hours of outdoor unit] - Power consumption of indoor units is estimated from rated power consumption of indoor unit and operating hours of connected outdoor unit with the following equation: $EC_{PJ,i,indoor,p} = RPC_{PJ,i,indoor} \times H_{PJ,i,outdoor,p}$ $RPC_{PJ,i,indoor}$: Total rated power consumption of indoor unit connected outdoor unit *i* $H_{PJ,i,outdoor,p}$: Operating hours of outdoor unit *i* - Measuring equipment is installed in each outdoor unit to monitor operating hours. - Measured data is automatically transmitted to the server for recording. - Data recorded in the server is reported and double-checked by a responsible staff on a monthly basis to prevent missing data.	Continuously	n/a

Monitoring Report Sheet (Input Sheet) [For Verification]

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

(a)	(b)	(c)	(d)	(e)	(f)
Parameters	**Description of data**	**Estimated Values**	**Units**	**Source of data**	**Other comments**
EF_{elec}	CO_2 emission factor for consumed electricity. When captive power generation is not available at the project site, then the most recent Vietnamese national grid emission factor [EF_{grid}] available at the time of validation is applied as [EF_{elec}] and fixed for the monitoring period thereafter. When captive power generation is available at the project site, then [EF_{elec}] is conservatively selected as below and fixed for the monitoring period thereafter: EF_{elec} = min(EF_{grid}, $EF_{captive}$) $EF_{captive}$ = 0.8 tCO_2/MWh* *The most recent emission factor available from CDM approved small scale methodology AMS-I.A at the time of validation is applied.	0.815	tCO_2/MWh	[EFgrid] Ministry of Natural Resources and Environment of Vietnam (MONRE), Vietnamese DNA for CDM unless otherwise instructed by the Joint Committee.	n/a
$COP_{PJ,i,outdoor}$	COP of outdoor unit of project air conditioning system *i* (Outdoor unit)	-	-	Specifications of project air conditioning system for the quotation or factory acceptance test data by manufacturer.	Values are input on "MPS(input_each system)" sheet
$COP_{RE,i}$	COP of reference air conditioning system *i* (Outdoor Unit + Indoor Unit)	-	-	Nominal value available on product catalogs, specification documents or websites, hearing survey. The default values are derived from the result of survey on COP of air conditioning system with non-inverter from manufacturers that have high market share. The default values should be revised if necessary from survey result which is conducted by JC or project participants every three years. The survey should prove the use of clear methodology.	Values are input on "MPS(input_each system)" sheet

Table3: *Ex-post* calculation of CO_2 emission reductions

Monitoring Period	CO_2 emission reductions	Units
6/12/2017-30/11/2018	28	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 specifications)
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)

		Parameters monitored *ex post*	**Project-specific parameters fixed *ex ante***			***Ex-post* calculation of emissions**	
Parameters	i	$EC_{PJ,i,outdoor,p}$	$COP_{PJ,i,outdoor}$	$COP_{RE,i}$	EF_{elec}	**$RE_{i,p}$**	**$PE_{i,outdoor,p}$**
Description of data	Identification number of air conditioning system	Electricity consumption of outdoor unit of project air conditioning system *i* during the period *p*	COP of outdoor unit of project air conditioning system *i*	COP of reference air conditioning system *i*	CO_2 emission factor for consumed electricity	Reference emissions by air conditioning system *i* during the period *p*	Project emissions by outdoor unit air conditioning system *i* during the period *p*
Units	-	MWh/p	-		tCO_2/MWh	tCO_2/p	tCO_2/p
Monitored values	1	8	4.35	2.91	0.815	10.0	6.7
	2	119	3.38	2.56	0.815	128.3	97.2
	3	12	4.40	2.94	0.815	15.2	10.2
	4	78	3.38	2.56	0.815	84.0	63.6
	5	11	4.30	2.91	0.815	13.4	9.1
	6	1	4.30	2.91	0.815	1.4	0.9
	7	5	4.40	2.94	0.815	5.5	3.7
	8	49	3.92	2.56	0.815	60.9	39.8
	9		0.00	0.00	0.815	0.0	0.0
	10		0.00	0.00	0.815	0.0	0.0
	11		0.00	0.00	0.815	0.0	0.0
	12		0.00	0.00	0.815	0.0	0.0
	13		0.00	0.00	0.815	0.0	0.0
	14		0.00	0.00	0.815	0.0	0.0
	15		0.00	0.00	0.815	0.0	0.0
	16		0.00	0.00	0.815	0.0	0.0
	17		0.00	0.00	0.815	0.0	0.0
	18		0.00	0.00	0.815	0.0	0.0
	19		0.00	0.00	0.815	0.0	0.0
	20		0.00	0.00	0.815	0.0	0.0
	21		0.00	0.00	0.815	0.0	0.0
	22		0.00	0.00	0.815	0.0	0.0
	23		0.00	0.00	0.815	0.0	0.0
	24		0.00	0.00	0.815	0.0	0.0
	25		0.00	0.00	0.815	0.0	0.0
	26		0.00	0.00	0.815	0.0	0.0
	27		0.00	0.00	0.815	0.0	0.0
	28		0.00	0.00	0.815	0.0	0.0
	29		0.00	0.00	0.815	0.0	0.0
	30		0.00	0.00	0.815	0.0	0.0
	31		0.00	0.00	0.815	0.0	0.0
	32		0.00	0.00	0.815	0.0	0.0
	33		0.00	0.00	0.815	0.0	0.0
	34		0.00	0.00	0.815	0.0	0.0
	35		0.00	0.00	0.815	0.0	0.0
	36		0.00	0.00	0.815	0.0	0.0
	37		0.00	0.00	0.815	0.0	0.0
	38		0.00	0.00	0.815	0.0	0.0
	39		0.00	0.00	0.815	0.0	0.0
	40		0.00	0.00	0.815	0.0	0.0
	41		0.00	0.00	0.815	0.0	0.0
	42		0.00	0.00	0.815	0.0	0.0
	43		0.00	0.00	0.815	0.0	0.0
	44		0.00	0.00	0.815	0.0	0.0
	45		0.00	0.00	0.815	0.0	0.0
	46		0.00	0.00	0.815	0.0	0.0
	47		0.00	0.00	0.815	0.0	0.0
	48		0.00	0.00	0.815	0.0	0.0
	49		0.00	0.00	0.815	0.0	0.0
	50		0.00	0.00	0.815	0.0	0.0
	Total	-	-	-	-	318.8	231.1

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	28.9	tCO_2/p	ER_p
2. Selected default values, etc.				
CO_2 emission factor for consumed electricity.	Electricity	0.815	-	EF_{elec}
COP of reference air conditioning system *i* (Outdoor Unit + Indoor Unit)	-	-	-	$COP_{RE,i}$
3. Calculations for reference emissions				
Reference emissions during the period *p*	N/A	318.8	tCO_2/p	RE_p
*Calculation for each air conditioning system is detailed in "MRS(input_each system)" sheet				
4. Calculations of the project emissions				
Project emissions during the period *p*	N/A	289.8	tCO_2/p	PE_p
Project emissions by outdoor unit	Electricity	231.1	tCO_2/p	$PE_{outdoor,p}$
Project emissions by indoor unit	Electricity	58.7	tCO_2/p	$PE_{indoor,p}$
Total electricity consumption of indoor units of project air conditioning system during the period *p*	Electricity	71.98	MWh/p	$EC_{PJ,indoor,p}$
CO_2 emission factor for consumed electricity	Electricity	0.815	tCO_2/MWh	EF_{elec}

[List of Default Values]

Project-specific parameters to be fixed *ex ante*	
COP of reference air conditioning system (Outdoor Unit + Indoor Unit) (Cooling capacity 14.0 ≤ x < 28.0kW)	2.97
COP of reference air conditioning system (Outdoor Unit + Indoor Unit) (Cooling capacity 28.0 ≤ x < 42.0kW)	2.94
COP of reference air conditioning system (Outdoor Unit + Indoor Unit) (Cooling capacity 42.0 ≤ x < 56.0kW)	2.91
COP of reference air conditioning system (Outdoor Unit + Indoor Unit) (Cooling capacity 56.0 ≤ x)	2.56