Monitoring Spreadsheet: JCM_VN_AM011_ver01.0
Reference Number: VN011

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**	**Monitored Values**	**Units**	**Monitoring option**	**Source of data**	**Measurement methods and procedures**	**Monitoring frequency**	**Other comments**
2018/5/28-2018/12/31	(1)	$EC_{PJ,i,p}$	Power consumption of project chiller *i* during the period *p*	-	MWh/p	Option C	Monitored data	Data is measured by power meter. A specification of power meter is provided by its manufacturer, and it states that the accuracy stays within ±2.0% being tested in line with JIS C 1111. There is no statement regarding replacement nor calibration interval recommended by the manufacturer. Therefore, power meters are not a subject of calbration nor replacement during the JCM project period.	Continuously	Input on "MRS (input_separate)" _2018

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	0.9185	tCO_2/MWh	[Grid electricity] Ministry of Natural Resources and Environment of Vietnam (MONRE), Vietnamese DNA for CDM unless otherwise instructed by the Joint Committee. [Captive electricity] For the option a) Specification of the captive power generation system provided by the manufacturer (ηelec,CG [%]). CO2 emission factor of the fossil fuel type used in the captive power generation system (EFfuel,CG [tCO2/GJ]) For the option b) Generated and supplied electricity by the captive power generation system (EGPJ,CG,p [MWh/p]). Fuel amount consumed by the captive power generation system (FCPJ,CG,p [mass or volume/p]). Net calorific value (NCVfuel,CG [GJ/mass or volume]) and CO2 emission factor (EFfuel,CG [tCO2/GJ]) of the fuel consumed by the captive power generation system in order of preference: 1) values provided by the fuel supplier; 2) measurement by the project participants; 3) regional or national default values; 4) IPCC default values provided in tables 1.2 and 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Lower value is applied. [Captive electricity with diesel fuel] CDM approved small scale methodology: AMS-I.A. [Captive electricity with natural gas] 2006 IPCC Guidelines on National GHG Inventories for the source of EF of natural gas. CDM Methodological tool "Determining the baseline efficiency of thermal or electric energy generation systems version02.0" for the default efficiency for off-grid power plants.	
$T_{cooling\text{-}out,i}$	Output cooling water temperature of project chiller *i* set under the project specific condition	-	degree Celsius	Specifications of project chiller i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$T_{chilled\text{-}out,i}$	Output chilled water temperature of project chiller *i* set under the project specific condition	-	degree Celsius	Specifications of project chiller i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$COP_{RE,i}$	COP of reference chiller *i* under the standardizing temperature conditions	-	-	Selected from the default values set in the methodology	Input on "MPS (input_separate)"
$COP_{PJ,i}$	COP of project chiller *i* under the project specific conditions	-	-	Specifications of project chiller i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$COP_{PJ,tc,i}$	COP of project chiller *i* calculated under the standardizing temperature conditions	-	-	Calculated with the following equation; COPPJ,tc,i= COPPJ,i × [(Tcooling-out,i - Tchilled-out,i + TDchilled + TDcooling) ÷ (37 - 7 + TDchilled + TDcooling)]	

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

Monitoring Period	CO_2 emission reductions	Units
2018/5/28-2018/12/31	45	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 equipment (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipment (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*		45.4	tCO_2/p	ER_p
2. Calculations for reference emissions				
Reference emissions during the period *p*		532.3	tCO_2/p	RE_p
Reference emissions during the period *p*	N/A	532.3	tCO_2/p	RE_p
3. Calculations of the project emissions				
Project emissions during the period *p*		487.0	tCO_2/p	PE_p
Project emissions during the period *p*	N/A	487.0	tCO_2/p	PE_p

[List of Default Values]

$COP_{RE,i}$ (300≤x<450USRt)	5.59	-
$COP_{RE,i}$ (450≤x<550USRt)	5.69	-
$COP_{RE,i}$ (550≤x<825USRt)	5.85	-
$COP_{RE,i}$ (825≤x≤1,500USRt)	6.06	-

$TD_{cooling}$	1.5	degree Celsius
$TD_{chilled}$	1.5	degree Celsius

Monitoring Spreadsheet: JCM_VN_AM011_ver01.0
Reference Number: VN011

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**	**Monitored Values**	**Units**	**Monitoring option**	**Source of data**	**Measurement methods and procedures**	**Monitoring frequency**	**Other comments**
2019/1/1-2019/7/31	(1)	$EC_{PJ,i,p}$	Power consumption of project chiller *i* during the period *p*	-	MWh/p	Option C	Monitored data	Data is measured by power meter. A specification of power meter is provided by its manufacturer, and it states that the accuracy stays within ±2.0% being tested in line with JIS C 1111. There is no statement regarding replacement nor calibration interval recommended by the manufacturer. Therefore, power meters are not a subject of calbration nor replacement during the JCM project period.	Continuously	Input on "MRS (input_separate)" _2019

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	0.9185	tCO_2/MWh	[Grid electricity] Ministry of Natural Resources and Environment of Vietnam (MONRE), Vietnamese DNA for CDM unless otherwise instructed by the Joint Committee. [Captive electricity] For the option a) Specification of the captive power generation system provided by the manufacturer (ηelec,CG [%]). CO2 emission factor of the fossil fuel type used in the captive power generation system (EFfuel,CG [tCO2/GJ]) For the option b) Generated and supplied electricity by the captive power generation system (EGPJ,CG,p [MWh/p]). Fuel amount consumed by the captive power generation system (FCPJ,CG,p [mass or volume/p]). Net calorific value (NCVfuel,CG [GJ/mass or volume]) and CO2 emission factor (EFfuel,CG [tCO2/GJ]) of the fuel consumed by the captive power generation system in order of preference: 1) values provided by the fuel supplier; 2) measurement by the project participants; 3) regional or national default values; 4) IPCC default values provided in tables 1.2 and 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Lower value is applied. [Captive electricity with diesel fuel] CDM approved small scale methodology: AMS-I.A. [Captive electricity with natural gas] 2006 IPCC Guidelines on National GHG Inventories for the source of EF of natural gas. CDM Methodological tool "Determining the baseline efficiency of thermal or electric energy generation systems version02.0" for the default efficiency for off-grid power plants.	
$T_{cooling\text{-}out,i}$	Output cooling water temperature of project chiller *i* set under the project specific condition	-	degree Celsius	Specifications of project chiller i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$T_{chilled\text{-}out,i}$	Output chilled water temperature of project chiller *i* set under the project specific condition	-	degree Celsius	Specifications of project chiller i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$COP_{RE,i}$	COP of reference chiller *i* under the standardizing temperature conditions	-	-	Selected from the default values set in the methodology	Input on "MPS (input_separate)"
$COP_{PJ,i}$	COP of project chiller *i* under the project specific conditions	-	-	Specifications of project chiller i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$COP_{PJ,tc,i}$	COP of project chiller *i* calculated under the standardizing temperature conditions	-	-	Calculated with the following equation; COPPJ,tc,i= COPPJ,i × [(Tcooling-out,i - Tchilled-out,i + TDchilled + TDcooling) ÷ (37 - 7 + TDchilled + TDcooling)]	

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

Monitoring Period	CO_2 emission reductions	Units
2019/1/1-2019/7/31	51	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 equipment (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipment (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*		51.4	tCO_2/p	ER_p
2. Calculations for reference emissions				
Reference emissions during the period *p*		602.7	tCO_2/p	RE_p
Reference emissions during the period *p*	N/A	602.7	tCO_2/p	RE_p
3. Calculations of the project emissions				
Project emissions during the period *p*		551.3	tCO_2/p	PE_p
Project emissions during the period *p*	N/A	551.3	tCO_2/p	PE_p

[List of Default Values]

$COP_{RE,i}$ (300≤x<450USRt)	5.59	-
$COP_{RE,i}$ (450≤x<550USRt)	5.69	-
$COP_{RE,i}$ (550≤x<825USRt)	5.85	-
$COP_{RE,i}$ (825≤x≤1,500USRt)	6.06	-

$TD_{cooling}$	1.5	degree Celsius
$TD_{chilled}$	1.5	degree Celsius

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**	**Monitored Values**	**Units**	**Monitoring option**	**Source of data**	**Measurement methods and procedures**	**Monitoring frequency**	**Other comments**
2017/12/1-2017/12/31	(1)	$EC_{PJ,i,p}$	Power consumption of project Heat Recovery Electric Heat Pump (HREHP) *i* during the period *p*	-	MWh/p	Option C	Monitored data	Data is measured by power meter. A specification of power meter is provided by its manufacturer, and it states that the accuracy stays within ±2.0% being tested in line with JIS C 1111. There is no statement regarding replacement nor calibration interval recommended by the manufacturer. Therefore, power meters are not a subject of calbration nor replacement during the JCM project period.	Continuously	Input on "MRS (input_separate)"_2017

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	0.9185	tCO_2/MWh	[Grid electricity] Ministry of Natural Resources and Environment of Vietnam (MONRE), Vietnamese DNA for CDM unless otherwise instructed by the Joint Committee. [Captive electricity] For the option a) Specification of the captive power generation system provided by the manufacturer (ηelec,CG [%]). CO2 emission factor of the fossil fuel type used in the captive power generation system (EFfuel,CG [tCO2/GJ]) For the option b) Generated and supplied electricity by the captive power generation system (EGPJ,CG,p [MWh/p]). Fuel amount consumed by the captive power generation system (FCPJ,CG,p [mass or volume/p]). Net calorific value (NCVfuel,CG [GJ/mass or volume]) and CO2 emission factor (EFfuel,CG [tCO2/GJ]) of the fuel consumed by the captive power generation system in order of preference: 1) values provided by the fuel supplier; 2) measurement by the project participants; 3) regional or national default values; 4) IPCC default values provided in tables 1.2 and 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Lower value is applied. [Captive electricity with diesel fuel] CDM approved small scale methodology: AMS-I.A. [Captive electricity with natural gas] 2006 IPCC Guidelines on National GHG Inventories for the source of EF of natural gas. CDM Methodological tool "Determining the baseline efficiency of thermal or electric energy generation systems version02.0" for the default efficiency for off-grid power plants.	
$EF_{RE\,re\,h}$	CO_2 emission factor for the reference equipment for heating energy generation	-	tCO_2/GJ	[Boiler] In the order of preference: a) value provided by fuel supplier; b) value measured by the project participants; c) regional or national default value; or d) IPCC default value provided in table 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Lower value is applied. [Electric heater] Same source as the parameter EFelec in this section Note: EFreh=EFelec/3.6	Input on "MPS (input_separate)"
ECR_i	Rated electricity consumption of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
η_{REh}	Efficiency of the reference equipment for heating energy generation	-	-	[Boiler] CDM Methodological tool “Determining the baseline efficiency of thermal or electric energy generation systems, Version 2” [Electric heater] Theoretically the most efficient value	Input on "MPS (input_separate)"
$COP_{RE,cool,i}$	*COP of reference air-cooled chiller i*	-	-	The default COP values are derived from the result of survey on COP of air-cooled chillers from manufacturers with high market share. The survey should prove the use of clear methodology. The COPRE,cool should be revised if necessary from survey result which is conducted by JC or project participants.	Input on "MPS (input_separate)"
$H_{PJ,i}$	Rated heating capacity of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$CH_{PJ,i}$	Rated cooling capacity of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"

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

Monitoring period	CO_2 emission reductions	Units
2017/12/1-2017/12/31	62	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 equipment (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipment (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*		62.4	tCO_2/p	ER_p
2. Calculations for reference emissions				
Reference emissions during the period *p*		82.2	tCO_2/p	RE_p
Reference emissions during the period *p*	N/A	82.2	tCO_2/p	RE_p
3. Calculations of the project emissions				
Project emissions during the period *p*		19.7	tCO_2/p	PE_p
Project emissions during the period *p*	electricity	19.7	tCO_2/p	PE_p

[List of Default Values]

EF_{elec} (For captive electricity)	0.8	tCO_2/MWh

$COP_{RE,cool,i}$ ($4 \leq x \leq 60$USRt)	3.08	-
$COP_{RE,cool,i}$ ($60 < x \leq 140$USRt)	2.96	-
$COP_{RE,cool,i}$ ($140 < x \leq 184$USRt)	2.71	-

η_{REh} (Boiler)	0.92	-
η_{REh} (Electric heater)	1.0	-

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**	**Monitored Values**	**Units**	**Monitoring option**	**Source of data**	**Measurement methods and procedures**	**Monitoring frequency**	**Other comments**
2018/1/1-2018/12/31	(1)	$EC_{PJ,i,p}$	Power consumption of project Heat Recovery Electric Heat Pump (HREHP) *i* during the period *p*	-	MWh/p	Option C	Monitored data	Data is measured by power meter. A specification of power meter is provided by its manufacturer, and it states that the accuracy stays within ±2.0% being tested in line with JIS C 1111. There is no statement regarding replacement nor calibration interval recommended by the manufacturer. Therefore, power meters are not a subject of calbration nor replacement during the JCM project period.	Continuously	Input on "MRS (input_separate)"_2018

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	0.9185	tCO_2/MWh	[Grid electricity] Ministry of Natural Resources and Environment of Vietnam (MONRE), Vietnamese DNA for CDM unless otherwise instructed by the Joint Committee. [Captive electricity] For the option a) Specification of the captive power generation system provided by the manufacturer (ηelec,CG [%]). CO2 emission factor of the fossil fuel type used in the captive power generation system (EFfuel,CG [tCO2/GJ]) For the option b) Generated and supplied electricity by the captive power generation system (EGPJ,CG,p [MWh/p]). Fuel amount consumed by the captive power generation system (FCPJ,CG,p [mass or volume/p]). Net calorific value (NCVfuel,CG [GJ/mass or volume]) and CO2 emission factor (EFfuel,CG [tCO2/GJ]) of the fuel consumed by the captive power generation system in order of preference: 1) values provided by the fuel supplier; 2) measurement by the project participants; 3) regional or national default values; 4) IPCC default values provided in tables 1.2 and 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Lower value is applied. [Captive electricity with diesel fuel] CDM approved small scale methodology: AMS-I.A. [Captive electricity with natural gas] 2006 IPCC Guidelines on National GHG Inventories for the source of EF of natural gas. CDM Methodological tool "Determining the baseline efficiency of thermal or electric energy generation systems version02.0" for the default efficiency for off-grid power plants.	
$EF_{RE\,reh}$	CO_2 emission factor for the reference equipment for heating energy generation	-	tCO_2/GJ	[Boiler] In the order of preference: a) value provided by fuel supplier; b) value measured by the project participants; c) regional or national default value; or d) IPCC default value provided in table 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Lower value is applied. [Electric heater] Same source as the parameter EFelec in this section Note: EFreh=EFelec/3.6	Input on "MPS (input_separate)"
ECR_i	Rated electricity consumption of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
η_{REh}	Efficiency of the reference equipment for heating energy generation	-	-	[Boiler] CDM Methodological tool “Determining the baseline efficiency of thermal or electric energy generation systems, Version 2” [Electric heater] Theoretically the most efficient value	Input on "MPS (input_separate)"
$COP_{RE,cool,i}$	*COP of reference air-cooled chiller i*	-	-	The default COP values are derived from the result of survey on COP of air-cooled chillers from manufacturers with high market share. The survey should prove the use of clear methodology. The COPRE,cool should be revised if necessary from survey result which is conducted by JC or project participants.	Input on "MPS (input_separate)"
$H_{PJ,i}$	Rated heating capacity of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$CH_{PJ,i}$	Rated cooling capacity of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"

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

Monitoring period	CO_2 emission reductions	Units
2018/1/1-2018/12/31	835	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 equipment (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipment (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*		835.2	tCO_2/p	ER_p
2. Calculations for reference emissions				
Reference emissions during the period *p*		1,099.0	tCO_2/p	RE_p
Reference emissions during the period *p*	N/A	1,099.0	tCO_2/p	RE_p
3. Calculations of the project emissions				
Project emissions during the period *p*		263.8	tCO_2/p	PE_p
Project emissions during the period *p*	electricity	263.8	tCO_2/p	PE_p

[List of Default Values]

EF_{elec} (For captive electricity)	0.8	tCO_2/MWh

$COP_{RE,cool,i}$ ($4 \leq x \leq 60$USRt)	3.08	-
$COP_{RE,cool,i}$ ($60 < x \leq 140$USRt)	2.96	-
$COP_{RE,cool,i}$ ($140 < x \leq 184$USRt)	2.71	-

η_{REh} (Boiler)	0.92	-
η_{REh} (Electric heater)	1.0	-

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**	**Monitored Values**	**Units**	**Monitoring option**	**Source of data**	**Measurement methods and procedures**	**Monitoring frequency**	**Other comments**
2019/1/1-2019/7/31	(1)	$EC_{PJ,i,p}$	Power consumption of project Heat Recovery Electric Heat Pump (HREHP) *i* during the period *p*	-	MWh/p	Option C	Monitored data	Data is measured by power meter. A specification of power meter is provided by its manufacturer, and it states that the accuracy stays within ±2.0% being tested in line with JIS C 1111. There is no statement regarding replacement nor calibration interval recommended by the manufacturer. Therefore, power meters are not a subject of calbration nor replacement during the JCM project period.	Continuously	Input on "MRS (input_separate)"_2019

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	0.9185	tCO_2/MWh	[Grid electricity] Ministry of Natural Resources and Environment of Vietnam (MONRE), Vietnamese DNA for CDM unless otherwise instructed by the Joint Committee. [Captive electricity] For the option a) Specification of the captive power generation system provided by the manufacturer (ηelec,CG [%]). CO2 emission factor of the fossil fuel type used in the captive power generation system (EFfuel,CG [tCO2/GJ]) For the option b) Generated and supplied electricity by the captive power generation system (EGPJ,CG,p [MWh/p]). Fuel amount consumed by the captive power generation system (FCPJ,CG,p [mass or volume/p]). Net calorific value (NCVfuel,CG [GJ/mass or volume]) and CO2 emission factor (EFfuel,CG [tCO2/GJ]) of the fuel consumed by the captive power generation system in order of preference: 1) values provided by the fuel supplier; 2) measurement by the project participants; 3) regional or national default values; 4) IPCC default values provided in tables 1.2 and 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Lower value is applied. [Captive electricity with diesel fuel] CDM approved small scale methodology: AMS-I.A. [Captive electricity with natural gas] 2006 IPCC Guidelines on National GHG Inventories for the source of EF of natural gas. CDM Methodological tool "Determining the baseline efficiency of thermal or electric energy generation systems version02.0" for the default efficiency for off-grid power plants.	
$EF_{RE\,reh}$	CO_2 emission factor for the reference equipment for heating energy generation	-	tCO_2/GJ	[Boiler] In the order of preference: a) value provided by fuel supplier; b) value measured by the project participants; c) regional or national default value; or d) IPCC default value provided in table 1.4 of Ch.1 Vol.2 of 2006 IPCC Guidelines on National GHG Inventories. Lower value is applied. [Electric heater] Same source as the parameter EFelec in this section Note: EFreh=EFelec/3.6	Input on "MPS (input_separate)"
ECR_i	Rated electricity consumption of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
η_{REh}	Efficiency of the reference equipment for heating energy generation	-	-	[Boiler] CDM Methodological tool “Determining the baseline efficiency of thermal or electric energy generation systems, Version 2” [Electric heater] Theoretically the most efficient value	Input on "MPS (input_separate)"
$COP_{RE,cool,i}$	*COP of reference air-cooled chiller i*	-	-	The default COP values are derived from the result of survey on COP of air-cooled chillers from manufacturers with high market share. The survey should prove the use of clear methodology. The COPRE,cool should be revised if necessary from survey result which is conducted by JC or project participants.	Input on "MPS (input_separate)"
$H_{PJ,i}$	Rated heating capacity of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"
$CH_{PJ,i}$	Rated cooling capacity of project HREHP *i*	-	kW	Specifications of project HREHP i prepared for the quotation or factory acceptance test data by manufacturer	Input on "MPS (input_separate)"

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

Monitoring period	CO_2 emission reductions	Units
2019/1/1-2019/7/31	500	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 equipment (Data used: commercial evidence such as invoices)
Option C	Based on the actual measurement using measuring equipment (Data used: measured values)

Monitoring Spreadsheet: JCM_VN_AM012_ver01.0
Reference Number: VN011

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

1. Calculations for emission reductions	Fuel type	Value	Units	Parameter
Emission reductions during the period *p*		500.3	tCO_2/p	ER_p
2. Calculations for reference emissions				
Reference emissions during the period *p*		658.4	tCO_2/p	RE_p
Reference emissions during the period *p*	N/A	658.4	tCO_2/p	RE_p
3. Calculations of the project emissions				
Project emissions during the period *p*		158.0	tCO_2/p	PE_p
Project emissions during the period *p*	electricity	158.0	tCO_2/p	PE_p

[List of Default Values]

EF_{elec} (For captive electricity)	0.8	tCO_2/MWh

$COP_{RE,cool,i}$ ($4 \leq x \leq 60$USRt)	3.08	-
$COP_{RE,cool,i}$ ($60 < x \leq 140$USRt)	2.96	-
$COP_{RE,cool,i}$ ($140 < x \leq 184$USRt)	2.71	-

η_{REh} (Boiler)	0.92	-
η_{REh} (Electric heater)	1.0	-