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

CONTENTS

Annexes

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:

Building Energy Saving Programmatic CDM Project for ABC Telecommunication Co.

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

ABC Telecommunication Co. is a telecommunication company in the Philippines, which operates a nationwide telecommunication network, covering a wide range of the population. ABC Telecommunication Co. is committed to make a difference in the lives of the Filipino people through their services and through their contribution to the country's sustainable development goals by reducing their greenhouse gas (GHG) emissions. The company believes that sustainable development goals can be achieved through energy efficiency and conservation.

The proposed small scale CPA aims to reduce greenhouse gas (GHG) emissions through the reduction of electricity consumption in the building housing the Main Headquarters of ABC Telecommunication Co. The CPA consists of a variety of small energy-efficiency improvement measures at the target building as described in the CDM-SSC-PoA-DD. Among the measures listed in the CDM-SSC-PoA-DD, following measures are implemented at the building of Headquarter under the proposed CPA.

Measures		HQ ABC
Type A Improvement of cooling sources and cooling towers	Measure 1: Replacement of chillers with high-efficient type	
	Mearure2: Replacement of cooling tower (CT) with high efficient type	○
Type B Improvement of air-conditioners	Measure 3: Replacement of PAC with high-efficient type	○
Type C Improvement of chilled water/air carrier systems	Measure 4: Replacement of chilled/cooled water pump with high-efficient type	○
	Measure 5: Installation of inverter control of pump and VWV	○
	Measure 6: Replacement of fan with high-efficient type	
	Measure 7: Installation of inverter control of fan and VAV to the duct	○
Type D Improvement of lighting systems	Measure 8: Replacement of ballast	○
	Measure 9: Replacement of lighting equipments	

The reduction of electricity consumption through the implementation of energy efficiency improvement measures to all its buildings is a voluntary coordinated action by ABC Telecommunication Co. as part of the company's energy policy on reducing energy consumption and the company's environmental policy on reducing GHG emissions.

The PoA will definitely have positive contribution to the sustainable development goals and objectives of the Philippine Government outlined in Philippine Agenda 21 by reducing electricity consumption and thus, conserve valuable energy resources. It shall contribute to the social, economic, technological and environmental well being of the country.

Social Well Being:

Energy efficiency improvements at ABC Telecommunication Co. will result to increased level of access (i.e., availability, affordability, and variety) of energy services in the country. Through the amount of energy saved by the company, more people will gain access to energy services such as the provision of electricity to unenergized areas. The lack of access to energy services is closely linked to a range of social concerns, including poverty, lack of opportunities, urbanization, and poor health. Hence, through this CPA, energy savings can help alleviate some of these social concerns.

At the company level, people employed will have no worries of being retrenched because of increased expenditures by the company. The equivalent amount of money saved due to energy efficiency improvements can be channelled to other expenditures like benefits for the employees. In this manner, the company will be able to exercise its corporate social responsibility to its employees while, at the same time, the employees will enjoy a sense of job security.

Economic Well Being:

Energy efficiency improvements can contribute to the economic well-being of the country. Through energy savings, demand for electricity will be reduced. Because of this, the country will not be constrained to construct additional power plants which entail investments and additional resources for fuel. As most of the fossil fuel is imported, dollar exchange will also be conserved. Without fuel importation and construction investments, electricity rates will not go up. Hence, the economy of the country will improve.

At the company level, energy efficiency improvements can help reduce and defer financial investments on new capacity process and utility equipment. ABC Telecommunication Company can sustain its main core business on telecommunication. Energy efficiency can give some stability to the company in terms of staying up in business.

Environmental Well Being:

The implementation of the CPA will sustain the environmental well being of the country. The energy efficiency improvements under the CPA mainly involve the reduction of electricity consumption which will lead to a reduction in the demand to generate electric power. This, in turn, will directly reduce the greenhouse gases emitted by power plants. In addition, other social benefits in terms of improved health conditions due to reduced air pollution and transportation activities will be envisaged.

In reducing the demand for electric power, there will also be a corresponding decrease in the use of valuable energy resources.

Technological well being:

The implementation of the CPA will encourage other commercial buildings as well as office, industrial and residential buildings to adopt energy efficient and environmentally sound technologies such as efficient chillers, efficient electric motors, and efficient lighting systems. With the demonstration of the new technologies and proven energy savings, many buildings will come to realize the social, economic and environmental benefits of energy efficiency improvements.

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

Philippines: ABC Telecommunication Company
Japan: Kajima Corporation

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

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

A.4.1.1. Host Party:

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 project will be implemented at the Main Headquarters of ABC Telecommunication Co. located in Metro Manila specifically in Makati City.

Makati City

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

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

The small-scale CPA is planed to be started in July 2008.

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

The average equipment operation/technology lifetime included in the project is about 15 years.

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

Renewable crediting period

A.4.3.1. Starting date of the crediting period:

July 2008

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

>>
Seven (7) years

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

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The chosen crediting period is 7 years. The annual energy saving of the project activity throughout the project period is estimated to be 2,393,300kWh. The annual emission reductions through the proposed CPA over the crediting period are estimated as shown in the table below. (See "Section B" for details)

Estimated amounts of emission reductions

Years	Annual estimation of emission reductions in tonnes of CO2e
Year 1	1,312
Year 2	1,312
Year 3	1,312
Year 4	1,312
Year 5	1,312
Year 6	1,312
Year 7	1,312
Total estimated reductions (tonnes of CO2e)	9,181
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	1,312

A.4.5. Public funding of the CPA:

No public funding is involved in this CPA.

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

As mentioned under Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities, the following results into debundling of large CDM project:

> *"A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:*
>
> ☐ *With the same project participants;*
> ☐ *In the same project category and technology/measure; and*
> ☐ *Registered within the previous 2 years; and*
> ☐ *Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point."*

There is no registered small-scale CDM project activity and no application to register a small-scale CDM project activity that meets all four conditions above. At least there is no CDM project activity that meets the third and fourth condition (registered within the previous 2 years, and having project boundary within 1km of the project boundary of the proposed CDM). Therefore, the proposed CPA is not a debundled component of a larger project activity.

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

This small-scale CPA has been neither registered as an individual CDM project activity nor is 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:

Building Energy Saving Programmatic CDM Project for ABC Telecommunication Co.

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

Eligibility criteria for inclusion of the SSC-CPA in the PoA is provided in the Section A.4.2.2. of the design document of the corresponding PoA. As shown in the table below, the small-scale CPA meets all

the applicability criteria provided in the CDM-SSC-PoA-DD, and hence the small-scale CPA is eligible to be included in the PoA.

	Eligibility Criteria	CPA
1	The SSC-CPA must be able to demonstrate its additionality.	The energy-efficiency improvement measures planned to be introduced as CDM projects would not be implemented without CDM incentives, due to the several barriers, as described in the Secion B.3. Therefore, the additionality of the CPA was demonstrated.
2	All SSC-CPAs must apply the baseline and monitoring methodology described under Project Type II (Energy Efficiency Improvement Projects), specifically II.E (Energy efficiency and fuel switching measures for buildings).	The SSC-CPA aims to reduce the GHG emission by implementing energy-efficiency improvement measures at the building to reduce the electricity consumption, and the annual energy savings is estimated below 60 GWh/year Therefore, the baseline and monitoring methodology of the Project Type II.E is applicable to this CPA.
3	All SSC-CPAs must adopt an appropriate energy efficiency measure or set of measures which are included in the list of energy efficiency improvements in Section A.4.2.1	As described in the Section A.2., the CPA adopts the energy efficiency measures listed in the CDM-SSC-PoA-DD (Secion A.4.2.1) of the corresponding PoA.
4	The aggregate energy savings by a SSC-CPA must not exceed the equivalent of 60 GWh per year.	The annual energy savings through the proposed CPA is estimated as about 2.4 GWh/year, that is, below 60 GWh/year
5	The SSC-CPA must neither been registered as an individual CDM project activity nor included in another registered *PoA*.	The proposed SSC-CPA has not been registered as an individual CDM project activity nor included in another registered PoA.

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

As indicated in the registered PoA, the key criteria and data for assessing additionality of a CPA when proposed to be included in the registered PoA are the payback period of the project activity, which is adopted by ABC Telecommunication Co. as a an indicator to evaluate the economic attractiveness and financial viability of energy efficiency improvement measures. Hence, an investment barrier analysis must be done for the demonstration of additionality for the proposed CPA.

Investment barrier analysis

Payback time for each energy efficiency improvement measure planned to be introduced in the CPA was calculated as shown in the table below:

Measures	Payback Time (year)
Measure 2 (replacement of cooling tower with high efficient type)	3.5
Measure 3-a (replacement of PAC with high efficiency type) + **Measure 7** (installation of inverter control fan and VAV)	6.9
Measure 3-b (replacement of PAC with high efficiency type)	7.9
Measure 4 (replacement of chilled/cooled water pump with high-efficient type) + **Measure 5** (Installation of inverter control of pump and VWV)	6.2
Measure 8 (replacement of ballast)	6.7

All the payback times of the energy efficiency improvement measures planned to be introduced as CPA are longer than 2 years which is the "threshold value" of the payback time at ABC Telecommunication Co. , and thus they do not comply with their project viability requirements.

In addition, the proposed energy-efficiency improvement measures in the typical CPA do not result in expansion of their business operation. Therefore, the investment priority for these measures is relatively low, and the proposed measures are unlikely implemented as introduced in the project activity, without CDM.

As for the technological barrier, barrier due to prevailing practice, and other barriers, same analysis results stated in the registered SSC-PoA-DD can be obtained, because there are no difference in the condition between the proposed CPA and typical CPA.

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 SSC-CPA boundary constitutes the Main Headquarters of ABC Telecommunication Co. located at Makati City. The geographical boundary of the registered PoA covers all the regions in the Philippines including Metro Manila, the national capital region, where Makati City is located. The ABC Telecommunication Co. Main Headquarters building uses only electricity as their main source of energy.

GHG emission sources taken into account in the CPA are summarized in the table below.

		Inside project boundary	Outside project boundary
Baseline scenario	Calculated (to be monitored)	- CO_2 emissions from electricity consumption of existing facilities	
	Not calculated (not to be monitored)	- CH_4 and N_2O emissions from electricity consumption of existing facilities	

Project scenario	Calculated (to be monitored)	- CO_2 emissions from electricity consumption of supporting facilities after applying energy-efficiency improvement measures	GHG emissions related to transferred existing equipments to another activity or transferred energy-efficiency facilities from another activity - HFC emissions from disposal of existing facilities
	Not calculated (not to be monitored)	- CH_4 and N_2O emissions from electricity consumption of facilities after applying energy-efficiency improvement measures	

B.5. Emission reductions:

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

Data / Parameter:	BE_y
Data unit:	tCO_2/y
Description:	Annual Baseline GHG Emission
Source of data used:	Calculation
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated as follows: $BE_y = \sum_j E^B_{j,y}$
Any comment:	

Data / Parameter:	$E^B_{j,y}$
Data unit:	tCO_2/y
Description:	Annual GHG emissions from target facility j in baseline scenario
Source of data used:	Calculation
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated as follows: $E^B_{j,y} = Q^B_{j,y} * EF^B_{j,y}$
Any comment:	

Data / Parameter:	$Q^B_{j,y}$
Data unit:	MWh/y
Description:	Annual electricity consumption of facility j in baseline scenario
Source of data used:	Calculation
Value applied:	-
Justification of the	Calculated as the sum of electricity consumption of target facilities in baseline

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

Data / Parameter:	EF^B
Data unit:	tCO_2/MWh
Description:	The weighted average emissions of the current generation mix in the Luzon grid in baseline scenario
Source of data used:	Calculation
Value applied:	0.548
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated as follows: $EF^B=(\sum F_{i,w,y} * COEF_{i,w})/ \sum_t GEN_{t,y}$
Any comment:	

Measure 2

Data / Parameter:	W^B_{CT}
Data unit:	kW
Description:	Rated electricity consumption of the existing target CT in baseline scenario
Source of data used:	Calculation
Value applied:	CT1: 20.0 CT2: 36.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated based on the data measured by WH monitor
Any comment:	

Data / Parameter:	W^P_{CT}
Data unit:	kW
Description:	Rated electricity consumption of the new target CT in project scenario
Source of data used:	Calculation
Value applied:	CT 1: 12.0 CT 2: 16.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacture's specification

Any comment:	

Data / Parameter:	$ESR_{inverter,CT}$
Data unit:	
Description:	Energy saving rate of the higher-efficient CT
Source of data used:	Manufacturer's specifications
Value applied:	0.2
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacturer of CT
Any comment:	

Measure 3-a + Measure 7

Data / Parameter:	$W^{B}_{compressor}$
Data unit:	kW
Description:	Rated electricity consumption of the existing target evaporator fan of PAC in baseline scenario
Source of data used:	Calculation
Value applied:	Compressor 1: 26.0 Compressor 2: 40.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated based on the data measured by WH monitor
Any comment:	

Data / Parameter:	$W^{B}_{evap.fan}$
Data unit:	kW
Description:	Rated electricity consumption of the existing target evaporator fan of PAC in baseline scenario
Source of data used:	Calculation
Value applied:	Evaporation fan 1: 8.0 Evaporation fan 2: 18.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated based on the data measured by WH monitor
Any comment:	

Data / Parameter:	$W^{P}_{compressor}$
Data unit:	kW
Description:	Rated electricity consumption of the target compressor introduced to the PAC-a in project scenario
Source of data used:	Calculation
Value applied:	Compressor 1: 22.0 Compressor 2: 32.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacture's specification
Any comment:	

Data / Parameter:	$W^{P}_{evap.fan}$
Data unit:	kW
Description:	Rated electricity consumption of the new target evaporator fan of PAC in project scenario
Source of data used:	Calculation
Value applied:	Evaporation fan 1: 7.0 Evaporation fan 2: 12.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacture's specification
Any comment:	

Data / Parameter:	$ESR_{inverter.fan}$
Data unit:	
Description:	Energy saving rate of the energy-efficiency measure (installation of inverter of fan and VAV) introduced to the target new PAC
Source of data used:	Manufacturer's specifications
Value applied:	0.2
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacturer of inverter of fan and VAV
Any comment:	

Measure 3-b

Data / Parameter:	$W^{B}_{compressor}$
Data unit:	kW
Description:	Rated electricity consumption of the existing target compressor of PAC in baseline scenario
Source of data used:	Calculation
Value applied:	400.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated based on the data measured by WH monitor
Any comment:	

Data / Parameter:	$W^{B}_{evap.fan}$
Data unit:	kW
Description:	Rated electricity consumption of the existing target evaporator fan of PAC in baseline scenario
Source of data used:	Calculation
Value applied:	100.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated based on the data measured by WH monitor
Any comment:	

Data / Parameter:	$W^{B}_{cond.fan}$
Data unit:	kW
Description:	Rated electricity consumption of the existing target condenser fan of PAC in baseline scenario
Source of data used:	Calculation
Value applied:	25.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated based on the data measured by WH monitor
Any comment:	

Data / Parameter:	LF
Data unit:	
Description:	Load factor of target facility
Source of data used:	Calculation

Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacturer
Any comment:	

Data / Parameter:	$W^{P}_{compressor}$
Data unit:	kW
Description:	Rated electricity consumption of the new target compressor of PAC in project scenario
Source of data used:	Calculation
Value applied:	310.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacture's specification
Any comment:	

Data / Parameter:	$W^{P}_{evap.fan}$
Data unit:	kW
Description:	Rated electricity consumption of the new target evaporator fan of PAC in project scenario
Source of data used:	Calculation
Value applied:	90.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacture's specification
Any comment:	

Data / Parameter:	$W^{P}_{cond.fan}$
Data unit:	kW
Description:	Rated electricity consumption of the new target condenser fan of PAC in project scenario
Source of data used:	Calculation
Value applied:	20.0
Justification of the choice of data or description of measurement methods and procedures actually	Estimated from the data provided by the manufacture's specification

applied :	
Any comment:	

Data / Parameter:	LF
Data unit:	
Description:	Load factor of target facility
Source of data used:	Monitoring device
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacturer
Any comment:	

Measure 4 and 5

Data / Parameter:	W^{B}_{pump}
Data unit:	kW
Description:	Rated electricity consumption of the existing target pump in baseline scenario
Source of data used:	Calculation
Value applied:	Pump 1: 30.0 Pump 2: 25.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated based on the data measured by WH monitor
Any comment:	

Data / Parameter:	W^{P}_{pump}
Data unit:	kW
Description:	Rated electricity consumption of the new target pump in project scenario
Source of data used:	Calculation
Value applied:	Pump 1: 20.0 Pump 2: 22.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacture's specification
Any comment:	

Data / Parameter:	ESR_{pump}
Data unit:	
Description:	Energy saving rate of the energy-efficiency measure (installation of inverter

	control of pump)
Source of data used:	Manufacturer's specifications
Value applied:	0.2
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacturer of cool water pump
Any comment:	

Measure 8

Data / Parameter:	W^{B}_{light}
Data unit:	kW
Description:	Rated electricity consumption of the light in baseline scenario
Source of data used:	Calculation
Value applied:	Light 1: 0.08 Light 2: 0.04
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated based on the data measured by WH monitor
Any comment:	

Data / Parameter:	ESR_{light}
Data unit:	
Description:	Energy saving rate of the energy-efficiency measure (higher-efficient lighting system) in project scenario
Source of data used:	Manufacturer's specifications
Value applied:	0.15
Justification of the choice of data or description of measurement methods and procedures actually applied :	Estimated from the data provided by the manufacturer of the lighting system
Any comment:	

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

GHG emission reductions are calculated as follows;

$ER_y = BE_y – PE_y - L_y$

where

ER_y	Annual GHG emission reductions in year *y* (tCO_2/year)
BE_y	Annual baseline GHG emissions in year *y* (tCO_2/year)
PE_y	Annual project GHG emissions in year *y* (tCO_2/year)
L_y	Annual leakage GHG emissions in year y (tCO_2/year)

$BE_y = \sum_j E^B_{j,y} = \sum_j (Q^B_{j,y} * EF^B_{j,y})$

where

$E^B_{j,y}$	Annual GHG emissions from target facility *j* in year *y* in baseline scenario (tCO_2/year)
$Q^B_{j,y}$	Annual electricity consumption of facility *j* in year *y* in baseline scenario (MWh/year)
$EF^B_{j,y}$	Carbon emission factor of electricity consumed by facility *j* in year *y* in baseline scenario (tCO_2/MWh)

In case the lifetime of existing target facilities ends during the crediting period, emission reductions derived from the corresponding energy-efficiency improvement measures is not claimed after the end of the lifetime, assuming that baseline emissions are equal to project emissions at the facilities ($E^B_{j,y} = E^P_{j,y}$)

$PE_y = \sum_j E^P_{j,y} = \sum_j (Q^P_{j,y} * EF^P_{j,y})$

where

$E^P_{j,y}$	Annual GHG emissions from target facility *j* in year in project scenario (tCO_2/year)
$Q^P_{j,y}$	Annual electricity consumption of facility *j* in year *y* in project scenario (MWh/year)
$EF^P_{j,y}$	Carbon emission factor of electricity consumed by facility *j* in year *y* in project scenario (tCO_2/MWh)

Measures applied to the typical CPA (at the headquarters of ABC Telecommunication Co.) are:

Measure 2: Replacement of cooling tower with high-efficient type
Measure 3-a: Replacement of PAC with high-efficient type (12-hour operation)
Measure 3-b: Replacement of PAC with high-efficient type (24-hour operation)
Measure 4: Replacement of cool water pump with high-efficient type
Measure 5: Installation of inverter control of pump and VWV
Measure 7: Installation of inverter control of fan and VAV to the duct
Measure 8: Replacement of ballast

Practically, at the headquarters of ABC Telecommunication Co., Measure 3-a will be implemented in combination with Measure 7. The electricity consumption reduced through those measures will be monitored in a lump. The same is applied to the combination of Measure 4 and Measure 5.

Formula to calculate $Q^B_{j,y}$

Measure 2: Replacement of cooling tower with high-efficient type

$$Q^{B}_{j,y} = \sum^{8760} Q^{P}_{CT,h} / (1\text{-}ESR_{CT})$$

Where

$Q^{P}_{CT,h}$	Hourly electricity consumption of target new CT with inverter control in hour *h* in project scenario (MWh/hours)
ESR_{CT}	Energy saving rate of the energy-efficiency measure (CT with inverter control) introduced to the target building(%)

<Ex-ante estimation>

$$Q^{B}_{j,y} = n * W^{B}_{CT} * h \ / 1000$$

where

n	Number of target facilities
W^{B}_{CT}	Rated electricity consumption of target existing CT in baseline scenario (kW)
h	Annual operation hour of target new facility in baseline scenario (hour/year)

Measure 3-a: Replacement of PAC with high-efficient type (12-hour operation) **+ Measure 7**:Installation of inverter control of fan and VAV to the duct

$$Q^{B}_{j,y} = \sum^{8760} Q^{P}_{PACa,h} / (1\text{-}ESR_{PACa})$$

where

$Q^{P}_{PACa,h}$	Hourly electricity consumption of target new PAC with inverter control of evaporation fan and VAV in hour *h* in project scenario (MWh/hours)
ESR_{PACa}	Energy saving rate of the energy-efficiency measure (water-cooled PAC with inverter control of evaporation fan and VAV) introduced to the new water-cooled PAC at building *i* (%)

<Ex-ante estimation>

$$Q^{B}_{j,y} = n * (W^{B}_{compressor} + W^{B}_{evap.fan})* h / 1000$$

n	Number of target facilities
$W^{B}_{compressor}$	Rated electricity consumption of target existing compressor of PAC in baseline scenario (kW)
$W^{B}_{evap.fan}$	Rated electricity consumption of target existing evaporation fan of PAC in baseline scenario (kW)
h	Annual operation hour of target new facility in baseline scenario (hour/year)

Measure 3-b: Replacement of PAC with high-efficient type (24-hour operation)

$$Q^{B}_{j,y} = \sum^{8760} Q^{P}_{PACb,h} / (1\text{-}ESR_{PACb})$$

where

$Q^{P}_{PACb,h}$	Hourly electricity consumption of target new PAC in hour *h* in project scenario (MWh/hours)
ESR_{PACb}	Energy saving rate of the energy-efficiency measure (high-efficient PAC) introduced at building *i* (%)
LF	Load factor of target facility

<Ex-ante estimation>

$$Q^{B}_{j,y} = n * (W^{B}_{compressor} + W^{B}_{evap.fan} + W^{B}_{cond.fan}) * h * LF / 1000$$

where

n	Number of target facilities
$W^{B}_{compressor}$	Rated electricity consumption of target existing compressor of PAC in baseline scenario (kW)
$W^{B}_{evap.fan}$	Rated electricity consumption of target existing evaporator fan of PAC in baseline scenario (kW)
$W^{B}_{cond.fan}$	Rated electricity consumption of target existing condenser fan of PAC in baseline scenario (kW)
h	Annual operation hour of target new facility in baseline scenario
LF	Load factor of target facility

Measure 4: Replacement of chilled/cooled water pump with high-efficient type + **Measure 5:** Installation of inverter control of pump and VWV

$$Q^{B}_{j,y} = \sum^{8760} Q^{P}_{pump,h} / (1\text{-}ESR_{pump})$$

where

$Q^{P}_{pump,h}$	Hourly electricity consumption of target new pump with inverter control in hour *h* in project scenario (MWh/hours)
ESR_{pump}	Energy saving rate of the energy-efficiency measure (installation of inverter control of pump) introduced to the target new pump building *i* (%)

<Ex-ante estimation>

$$Q^{B}_{j,y} = n * W^{B}_{pump} * h / 1000$$

where

n	Number of target facilities
W^{B}_{pump}	Rated electricity consumption of target existing pump with inverter control in baseline scenario (kW)
h	Annual operation hour of target new facility in baseline scenario (hour/year)

Measure 8: Replacement of ballast

$Q^{B}_{j,y} = n * W^{B}_{light} * h / 1000$

where

n	Number of target facilities
W^{B}_{light}	Rated electricity consumption of target existing light in baseline scenario (kW)
h	Annual operation hour of target new facility in baseline scenario (hour/year)

<Ex-ante estimation>

$Q^{B}_{j,y} = n * W^{B}_{light} * h / 1000$

Formula to calculate $Q^{P}_{j,y}$ (for a typical CPA)

Measure 2: Replacement of cooling tower with high-efficient type

$Q^{P}_{j,y} = \sum^{8760} Q^{P}_{CT,h}$

where

$Q^{P}_{CT,h}$	Hourly electricity consumption of target new CT with inverter control of CT unit and fan unit in hour h in project scenario (MWh/hours)

<Ex-ante estimation>

$Q^{P}_{j,y} = n * W^{P}_{CT} * h * (1-ESR_{inverter\ CT}) / 1000$

where

n	Number of target facilities
W^{P}_{CT}	Rated electricity consumption of target new CT in project scenario (kW)
h	Annual operation hour of target new facility in project scenario (hour/year)
$ESR_{inverter\ CT}$	Energy saving rate of the energy-efficiency measure (installation of inverter control of CT unit and fan unit) introduced to the target new CT (%)

Measure 3-a: Replacement of PAC with high-efficient type (12-hour operation) **+ Measure 7**:Installation of inverter control of fan and VAV to the duct

$Q^{P}_{j,y} = \sum^{8760} Q^{P}_{PACa,h}$

where

$Q^{P}_{PACa,h}$	Hourly electricity consumption of target new PAC with inverter control of evaporation fan and VAV in hour h in project scenario (MWh/hours)

<Ex-ante estimation>

$Q^{P}_{j,y} = [\ n * W^{P}_{compressor} * h + n * W^{P}_{evap.fan} * h * (1\text{-}ESR_{fan\ inverter})\ ] / 1000$

where

n	Number of target facilities
$W^{P}_{compressor}$	Rated electricity consumption of target new compressor of PAC in project scenario (kW)
h	Annual operation hour of target new facility in project scenario (hour/year)
$W^{P}_{evap.fan}$	Rated electricity consumption of target new evaporation fan of PAC in project scenario (kW)
$ESR_{fan\ inverter}$	Energy saving rate of the energy-efficiency measure (inverter control of evaporation fan) introduced to the new PAC (%)

Measure 3-b: Replacement of PAC with high-efficient type (24-hour operation)

$Q^{P}_{j,y} = \sum^{8760} Q^{P}_{PACb,h}$

where

$Q^{P}_{PAC,bh}$	Hourly electricity consumption of target new PAC with inverter control of evaporation fan and VAV in hour h in project scenario (MWh/hours)

<Ex-ante estimation>

$Q^{P}_{j,y} = n * (\ W^{P}_{compressor} + W^{P}_{evap.fan} + W^{P}_{cond\ fan}\ ) * h * LF / 1000$

where

n	Number of facilities
$W^{P}_{compressor}$	Rated electricity consumption of target new compressor in project scenario (kW)
$W^{P}_{evap.fan}$	Rated electricity consumption of target new evaporation fan in project scenario (kW)
$W^{P}_{cond.fan}$	Rated electricity consumption of target new condenser fan in project scenario (kW)
h	Annual operation hour of target new facility in project scenario (hour/year)
LF	Load factor of the target facility

Measure 4: Replacement of chilled/cooled water pump with high-efficient type + **Measure 5:** Installation of inverter control of pump and VWV

$Q^{P}_{j,y} = \sum^{8760} Q^{P}_{pump,h}$

where

$Q^{P}_{pump,h}$	Hourly electricity consumption of target new pump with inverter control in hour h in project scenario (MWh/hours)

<Ex-ante estimation>

$Q^{P}_{j,y} = n * W^{P}_{pump} * h * (1\text{-}ESR_{inverter\ pump}) / 1000$

where

n	Number of target facilities
W^{P}_{pump}	Rated electricity consumption of target new pump with inverter control in project scenario (kW)
h	Annual operation hour of target new facility in project scenario (hour/year)
$ESR_{i,inverter\ pump}$	Energy saving rate of the energy-efficiency measure (installation of inverter control of pump) (%)

Measure 8: Replacement of ballast

$Q^{P}_{j,y} = \sum^{8760} Q^{P}_{light,h}$

where

$Q^{P}_{light,h}$	Hourly electricity consumption of target new inverter ballast to the existing lighting system at building *i* in hour *h* in project scenario (MWh/hours)

<Ex-ante estimation>

$Q^{P}_{j,y} = Q^{B}_{light,y} * (1\text{-}ESR_{light})$

where

$Q^{B}_{light,\ y}$	Annual electricity consumption of target existing lighting system in year *y* in baseline scenario (MWh/years)
ESR_{light}	Energy saving rate of the energy-efficiency measure (Replacement of ballast with inverter type) introduced to existing lighting system (%)

Formula to calculate $EF^{B}_{electricity,i,j,y}$

The Philippine electricity grid is divided into three (3) main grids, namely, the Luzon Grid, the Visayas Grid and the Mindanao Grid. Each grid has a different energy mix and therefore has different emission coefficients.

The target building of the CPA is located at the Makati City, Luzon region. All the electricity consumed at target building is purchased from the Luzon Grid, hence, emission factor for the Luzon Grid is adopted in the proposed CPA.

In category I.D, it has been indicated that the emission coefficient (measured in kg CO_2e/kWh) must be calculated in a transparent and conservative manner. Two options have been provided:

- A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM)

- The weighted average emissions (in kg CO_2e/kWh) of the current generation mix.

The second option "the weighted average emissions of the current generation mix" is chosen in the project activity because the data necessary to calculate the combined margin is not available in the area from which the buildings of ABC Telecommunication purchases electricity.

Based on the latest data available[3], Emission Coefficient for the Luzon Grid is calculated as 0.548 tCO2/MWh.

Leakage (L_y)

Leakage can be calculated from the following formula;

$$L_y = L_{diversion,y} + L_{HFC,y} * GWP_{HFC}$$

where

L_y	Annual leakage emissions in year y (tCO_2/y)
$L_{diversion,y}$	GHG emissions related to existing equipment transferred to another activity or energy-efficiency equipment transferred from another activity in year y. (tCO_2/y)
$L_{HFC,y}$	HFC emissions contained in target existing chillers to be disposed through the project activity in year y. (tHFC/y)
GWP_{HFC}	Global warming potential of HFC ($tCO_2/tHFC$)

The project activity does not include transfer of equipment from another activity nor the transfer of existing equipment to another activity. Therefore, $L_{diversion,y}$ is estimated to be zero. This fact will be confirmed by monitoring disposal certificates which are prepared as part of normal accounting procedures at the target buildings.

As HFC is contained in existing chillers at some building, there is some possibility that implementation of Measure 1-A may cause the release of this gas into the atmosphere. However, this project activity will include thorough recovery of HFC at the time of disposal of these equipments. Recovery certificates issued by companies conducting the recovery will be monitored.

Based on the above consideration, leakage is estimated to be zero.

[3] Department of Energy, 2007. Power Statistics.

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

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Estimated amount of emission reductions are shown in the table below.

Estimated amount of emission reductions (tCO2/y)

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
Year 1	5,414	4,103	0	1,312
Year 2	5,414	4,103	0	1,312
Year 3	5,414	4,103	0	1,312
Year 4	5,414	4,103	0	1,312
Year 5	5,414	4,103	0	1,312
Year 6	5,414	4,103	0	1,312
Year 7	5,414	4,103	0	1,312
Total (tonnes of CO_2e)	37,898	28,721	0	9,181

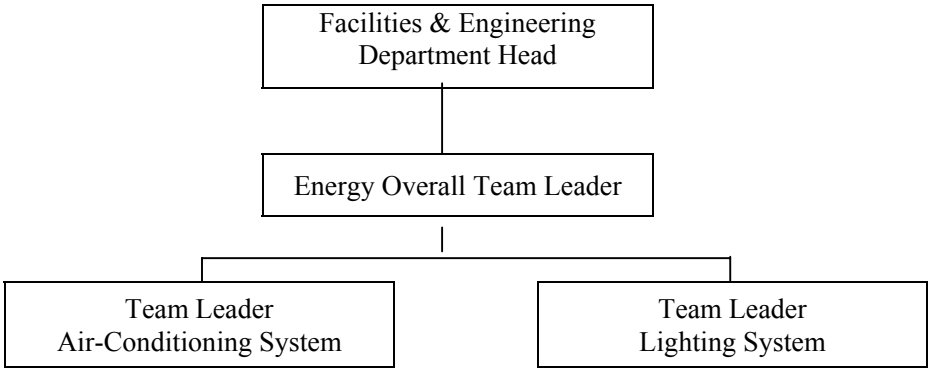
B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

ABC Telecommunication Co. shall designate an energy team who will conduct the monitoring of energy use and the emission reductions. All equipment and gadgets to be replaced will be labeled and recorded taking note of its nameplate data and specifications (e.g. kW rating, voltage, amperes, etc.). Power meters shall be installed in strategic locations to monitor the electricity consumption of the replaced equipment and gadgets. The installation of power meters will either be one of the following options: a) one meter each for replaced equipment, b) one meter for each group of equipment, or c) one meter for each closed circuit of lighting system that can be clearly separated from other equipment.

Monitoring shall be done by the Energy Team consisting of an Overall Team Leader, the Team Leader for the air-conditioning system and the Team Leader for the lighting system. Both Team Leaders shall prepare a monitoring worksheet for all equipment to be monitored. Daily reading of meters will be done by the energy team and readings will be placed on logbooks dedicated for the replaced equipment. The energy team will further log the power data on spreadsheets, analysed for emissions reduction and reported to the Energy Overall Team Leader. The Overall Team Leader will, in turn, review the data for any discrepancies observed from past readings. The energy team will maintain all records on a daily, monthly, quarterly and yearly basis. The energy team shall also monitor and check non-metered systems to ensure that they are still operating.

Organizational Structure of the Monitoring Team and roles are as shown below;



Responsibilities:

Team Leaders:

- Daily reading of meters
- Logging of data in logbooks and spreadsheets
- Analysis of emission reductions
- Maintain all records on a daily, monthly, quarterly and yearly basis
- Monitor and check non-metered systems to ensure that they are still operating.
- Prepare report to the Energy Team Leader

Energy Team Leader

- Review data entry in logbooks
- Review data in spreadsheets for any discrepancies
- Consolidate reports of the Team Leaders

Prepare report for the Facilities and Engineering Department Head

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 will be undertaken at CPA level. The administrative order related to EIA in the Philippines stipulates the project to prepare and submit necessary documents per area. Complying with this provision, the project will take necessary actions at CPA level.

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

The adoption of the energy efficiency improvement measures under the proposed PoA poses no major negative environmental impacts.

The possible negative environmental impact that can be caused by the implementation of the PoA is the generation of wastes, which are the used inefficient equipment. The PoA, however, shall comply with

Republic Act 9003 or the Ecological Solid Waste Management Act of 2000. The inefficient equipment shall be disposed of in assigned Materials Recovery Facility located in various towns and cities.

Major positive environmental impact from the PoA will be the energy savings at target buildings. Because of the energy efficiency improvement measures at buildings, the PoA will be able to reduce the consumption of energy resources and contribute to the stable supply of electricity.

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:

The proposed CPA is not required Environmental Impact Assessment. EIA is required for the construction of new commercial buildings as provided for in the Department of Environment and Natural Resources (DENR) Administrative Order No. 30 Series of 2003 (DAO 03-30) entitled "Implementing Rules and Regulations of Presidential Decree No. 1586, Establishing the Philippine Environmental Impact Statement System". Retrofitting of energy efficient technologies in commercial buildings like upgrading of chillers or installation of inverters is not covered under DAO 03-30. As indicated in the Administrative Order, the appropriate document is not an Environmental Impact Statement (EIS) but an EIA Report incorporating the project's environmental performance and its current Environmental Management Plan. This report is an Environmental Performance Report and Management Plan (EPRMP) for single project applications. For small project modifications, an updating of the project description or the Environmental Management Plan with the use of the proponent's historical performance and monitoring records may suffice.

SECTION D. Stakeholders' comments

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

Local stakeholder consultation was done at the SSC-CPA level. The proposed PoA covers the buildings of ABC Telecommunication Co. located nationwide. It is quite difficult to convene all the stakeholders from Luzon, Visayas and Mindanao.

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

Comments from the local stakeholders of energy efficiency improvement measures at ABC Telecommunication Co. were obtained from the employees, the Top Management, the Energy Efficiency and Conservation Division of the Department of Energy and the Energy Efficiency Practitioners Association of the Philippines, Inc. The stakeholders were interviewed about the proposed CPA.

D.3. Summary of the comments received:

All the stakeholders interviewed have given positive feedbacks on the objective of the proposed CPA. They have given their approval and satisfaction on the adoption of energy efficient technologies by ABC Telecommunication Co. particularly on the benefits that can be derived by the country on the reduction of GHG emissions.

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

The comments received from the stakeholders were compiled into a report taking note of all the inquiries and clarifications made about the different energy efficiency improvement measures. All concerns of the stakeholders were addressed.

Annex 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

Organization:	ABC Telecommunication Co.
Street/P.O.Box:	
Building:	Headquarter building
City:	Makati City
State/Region:	
Postfix/ZIP:	
Country:	Philippines
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No fund from public sources is used in any aspect of the proposed project.

Annex 3

BASELINE INFORMATION

The Philippine electricity grid is divided into three (3) main grids, namely, the Luzon Grid, the Visayas Grid and the Mindanao Grid. Electricity consumed at the target building of the CPA are purchased from the Luzon Grid, hence, the CPA adopt the Emission Coefficients of Luzon Grid for emission reduction calculation. Below tables will show how the emission coefficients were calculated based on the latest data available [5]..

Calculation of Emission Coefficients of Luzon Grid

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Item	2002-2004 Electricity Generation	Heat Rate	Fuel Consumption Impact	Carbon Emission Factor	Unadjusted Annual Carbon Emission Impact	Combustion Efficiency	Actual Carbon Emission Impact	Annual Carbon Dioxide Emission Impact
Abbreviation	GEN		FCI	CEF	CEI		Adjusted CEI	tCO_2/yr
Data Source	PDOE Powerstats	PEOE	(AxBx1055) / 10^12	IPCC	CxE		Ex F	Fx (44/12)
Unit	kWh/yr	BTU/ kWh	TJ/yr	tC/TJ	tC/yr	%	tC/yr	
Oil-based								
Comb Cycle	641,881,033	6,550	4,435.56	20.2	89,598.28	0.99	88,702.30	325,241.76
Diesel	2,344,537,894	8,900	22,014.04	20.2	444,683.58	0.99	440,236.74	1,614,201.39
Gas Turbine	10,420,047	14,400	158,30	20.2	3,197.69	0.99	3,165.71	11,607.60
Oil Thermal	894,336,867	8,600	8,114.32	21.1	171,212.12	0.99	169,500.00	621,499.99
Coal	15,237,932,917	8,900	143,076.57	26.8	3,834,452.11	0.98	3,757,763.06	13,778,464.57
Natural Gas	11,431,575,403	6,550	78,995.04	15.3	1,208,624.17	0.995	1,202,581.05	4,409,463.85
Hydro	3,681,713,073							
Geothermal	3,636,684,131							
Wind								
Total	37,879,081,365							20,760,479.16
Emission Factor	(H) / (A / 1000)	0.548	tCO_2/MWh					

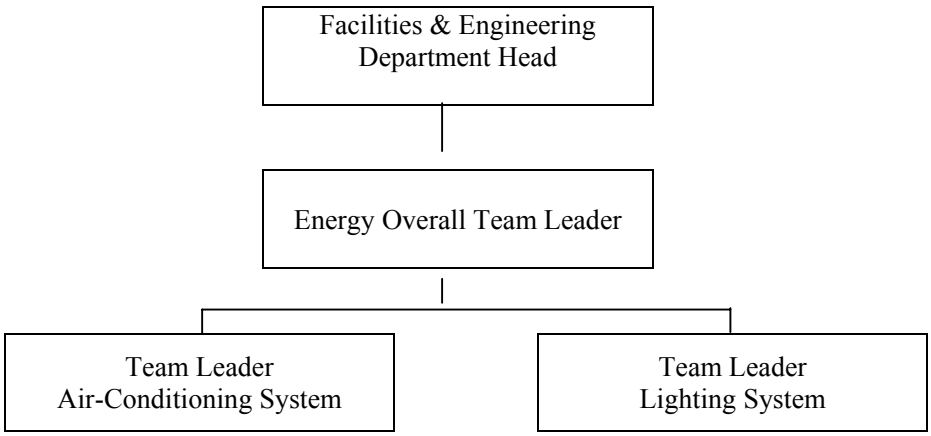
[4] Department of Energy, 2007. Power Statistics.

[5] Department of Energy, 2007. Power Statistics.

Annex 4

MONITORING INFORMATION

Organizational Structure of the Monitoring Team:



Responsibilities:

Team Leaders:

- Daily reading of meters
- Logging of data in logbooks and spreadsheets
- Analysis of emission reductions
- Maintain all records on a daily, monthly, quarterly and yearly basis
- Monitor and check non-metered systems to ensure that they are still operating.
- Prepare report to the Energy Team Leader

Energy Team Leader

- Review data entry in logbooks
- Review data in spreadsheets for any discrepancies
- Consolidate reports of the Team Leaders
- Prepare report for the Facilities and Engineering Department Head

Data to be Monitored:

The data to be monitored are as follows:

Data/parameter	Data unit	Description	Source of data used	Measurement method and procedures to be applied
PE_y	tCO_2/y	Annual Project GHG Emission	Calculation	Caluculated as follows; $PE_y = \sum j\ E^P_{j,y}$
$E^P_{j,y}$	tCO_2/y	Annual GHG emissions from target facility j in project scenario	Calculation	Caluculated as follows; $E^P_{i,j,y} = Q^P_{j,y} * EF^P_{j,y}$
$Q^P_{j,y}$	MWh/y	Annual electricity consumption of facility j in project scenario	Calculation	Calculated as the sum of electricity consumption of target facilities in project scenario
EF^P	tCO_2/MWh	The weighted average emissions of the current generation mix in the Luzon grid in project scenario	Calculation	Calculated as follows; $EF^B=(\sum F_{i,w,y} * COEF_{i,w})/ \sum_t GEN_{t,y}$
GEN	MWh/year	Annual electricity generated by power plant connected to Luzon Grid	Statistics	To be updated annually using appropriate official documents.
Measure 2				
$Q^P_{CT,h}$	MWh/hour	Hourly electricity consumption of target CT in project scenario	Monitoring device	Measured by WH monitor
Measure 3-a + Measure 7				
$Q^P_{PACa,h}$	MWh/hour	Hourly electricity consumption of target PAC with inverter control of evaporation fan in project scenario	Monitoring device	Measured by WH monitor
Measure 3-b				
$Q^P_{PACa,h}$	MWh/hour	Hourly electricity consumption of target PAC in project scenario	Monitoring device	Measured by WH monitor
Measure 4 + Measure 5				
$Q^P_{pump,h}$	MWh/hour	Hourly electricity consumption of target chilled water pump with inverter control in project scenario	Monitoring device	Measured by WH monitor

Measure 8				
$Q^{P}_{light,h}$	MWh/hour	Hourly electricity consumption of target lighting system with inverter ballast in project scenario	Monitoring device	Measured by WH monitor

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