Wayang Windu Phase 2 Geothermal Power Project

Clean Development Mechanism (CDM)

CER Monitoring Report

Certified Emission Reductions

Monitoring Period: 2 December 2010 – 22 May 2011 (inclusive of both days)

Reference No: 3193

Date: 25 May 2011
Version 01

A project designed to meet the baseline and monitoring requirements of UNFCCC CDM Approved Methodology

"Consolidated methodology for grid-connected electricity generation from renewable sources"
Version 9 (ACM0002)

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

CDM – Executive Board

MONITORING REPORT FORM (CDM-MR)*
Version 01 - in effect as of: 28/09/2010

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 01– 25/05/2011

Wayang Windu Phase 2 Geothermal Power Project
Reference Number 3193
Monitoring Period 1: 02/12/2010 – 22/05/2011 (inclusive of both days)

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

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The project activity, Wayang Windu Phase 2 Geothermal Power Project, involves the installation of the additional main 117MW steam turbine and peripheral equipment to enable the turbine to be driven by the steam produced by the Wayang Windu geothermal fields. The turbine is connected to a generator which would produce the electricity to the JAMALI grid, and hence adding the electricity capacity of the existing Wayang Windu Phase 1.

Wayang Windu Phase 1 has been producing power since June 2000, delivering 110 MW of electricity into the national grid through a single buyer, PLN.

The baseline scenario for this project is the generation of electricity by the operation of grid-connected power plants and by the addition of new generation sources. In the absence of the project activity electricity will continue to be generated by the existing generation units in the JAMALI grid.

The purpose of the Project activity is the generation of power using a reliable and renewable resource in place of power generation by a more greenhouse gas intensive fuel/source. The project will reduce greenhouse gas emissions through the displacement of fossil fuel electricity generation with a clean, renewable energy source.

The construction of the project activity started in Jan 2007 and the commercial operation of the project started in March 2009. The project activity has been registered with the United Nations Framework Convention on Climate Change (UNFCCC) as a CDM project activity (Reference No. 3193) on 2 December 2010. The details can be viewed on http://cdm.unfccc.int/Projects/DB/TUEV-SUED1260194062.48/view

This Monitoring Report 1 covers the monitoring period of 2 December 2010 – 22 May 2011 (inclusive of both days). The total emission reductions achieved in this monitoring period is 378,646 tCO_2e.

A.2. Project Participants

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Star Energy Geothermal (Wayang Windu) Ltd, a private geothermal company which operates in Indonesia and having its office at Jl. Let. Jend. S. Parman Kav 62-63, 8th - 11th floor, Jakarta 12710, Indonesia (hereinafter referred to as "SEG(WW)L").

Sindicatum Carbon Capital Ltd, a company incorporated under the laws of England and having its office at 33 Duke Street, London, W1U 1JY, United Kingdom (hereinafter referred to as "SCC").

A.3. Location of the project activity:

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Republic of Indonesia, 40km south of Bandung Kecamatan Pangalengan, West Java
7° 12′ 26.79″ S, 107° 37′ 44.12″ E

Figure 1 Location of Bandung

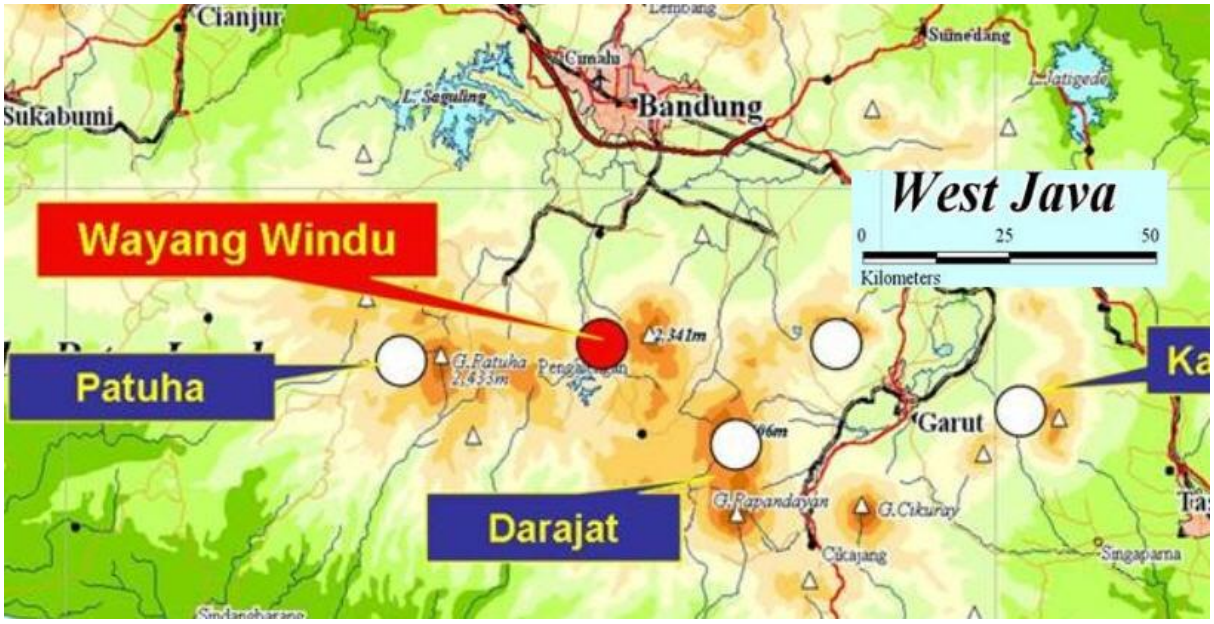

Figure 2 Location of Wayang Windu

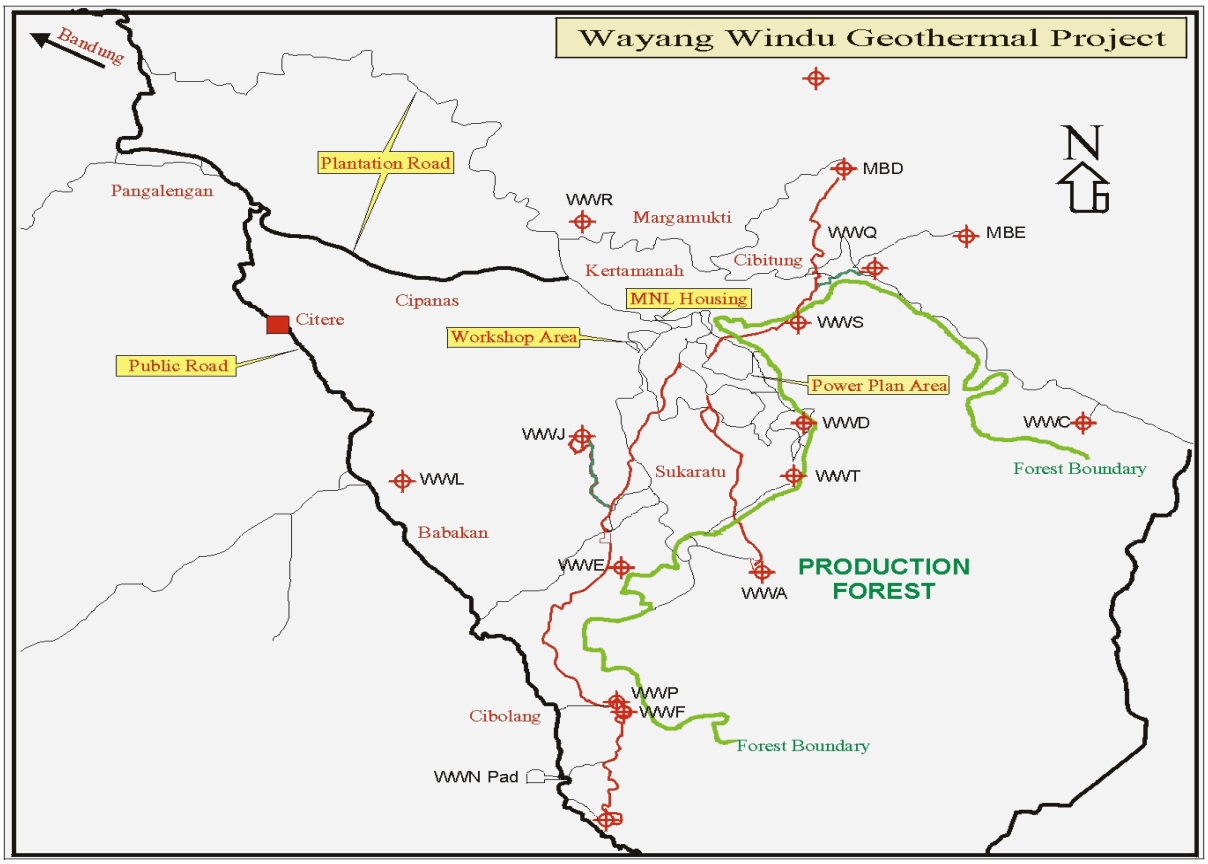

Figure 3 Location of the Wayang Windu Wells and Plant

A.4. Technical description of the project

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The proposed project activity, Wayang Windu Phase 2 Geothermal Power Project, is the construction and operation of a 117 MW geothermal power station, which is an additional power unit to an existing grid-connected renewable power plant. Wayang Windu Phase 1 has been producing power since June 2000, delivering 110 MW of electricity into the national grid through a single buyer, PLN.

Geothermal energy in Wayang Windu is stored in a steam reservoir within the earth's crust. Dry saturated steam at high pressure is produced at the surface from wells drilled into this reservoir. The steam is delivered to the power generation facilities through a steam gathering system, to move the turbine blades and drive a generator hence generating electricity. Exhaust steam from the turbine is condensed in a direct contact condenser and part of the condensed exhaust steam is re-injected into the geothermal reservoir, with the remaining being evaporated in the cooling towers. The electricity produced is transferred by the load dispatcher at the adjacent power switchyard to the transmission lines located outside the power plant.

The power plant will consist of a conventional geothermal condensing steam turbine generator with a capacity of 117 MW. Energy of condensation will be transferred to the circulating cooling water system in the steam exhaust condenser and will subsequently be rejected to atmosphere in a conventional mechanical draught cooling tower.

List of Main Equipment and Systems:

- 117 MW steam turbine
- 17,900 m^3/hour condenser

- Cooling tower
- 137.5 MVA Main Generator
- 150kV/13.8kV Generator Transformer
- Scrubbers
- Separator
- Plant DCS (Distributed Control System)
- SAGS (Steamfield Above Ground System)

This technology is technically sound and environmentally safe as is demonstrated by hundreds of similar installations around the world, including Indonesia. Sumitomo Corporation, a Japanese corporation, which was selected to provide technical equipment, and to perform all engineering, procurement and construction services of the Project. Knowledge transfer is ensured through a comprehensive training for SEG(WW)L, the Owner's operation and maintenance personnel. The training covered the configuration and maintenance of all Equipment and systems of the Project designed and supplied by the Contractor.

The location of measurement devices installed is presented below:

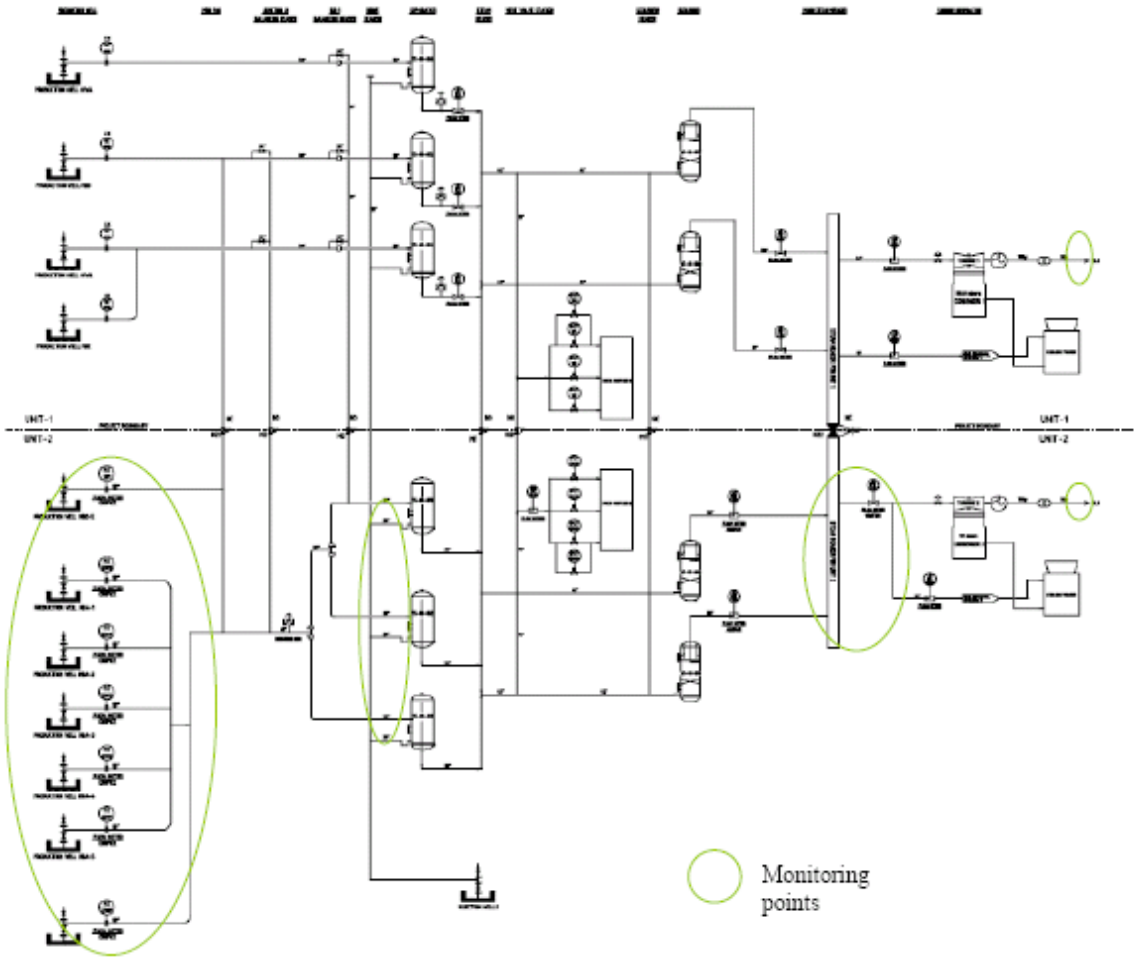

Figure 4 Location of the measurement devices

CH_4 and CO_2 will be emitted from the non-condensable gases contained in the geothermal steam. CO_2 will also be emitted from combustion of fossil fuels in the emergency diesel power generation set and diesel fire pump.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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Title : Wayang Windu Phase 2 Geothermal Power Project

Methodology : Consolidated methodology for grid-connected electricity generation from renewable sources – Version 9 (ACM0002). This methodology also uses the build margin (BM) and operating margin (OM) approach as specified in "Tool to calculate the emission factor for an electricity system" (Version 01.1) and also references the "Tool for the demonstration of additionality" (Version 5.2), "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" (Version 02)

A.6. Registration date of the project activity:

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Registration Date: 02 December 2010.

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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Crediting Period: 02 December 2010 – 01 December 2017 (Renewable)

A.8. Name of responsible person(s)/entity(ies):

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Mr. Gareth Phillips
Chief Climate Change Officer
Sindicatum Carbon Capital (SCC)
33 Duke Street
London, UK
Tel. +44(0)207 224 7555

Sven JP Starckx
Senior Technical Advisor – Monitoring & Issuance
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London, UK
Tel. +44(0)207 224 7555

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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Wayang Windu Phase 2 Geothermal Power Project Plant started operation on 1 Mar 2009 and the project activity was registered as a CDM activity on 2 Dec 2010.

This Monitoring Report covers the monitoring period of 2 Dec 2010 – 22 May 2011 (inclusive of both days). The total emission reductions achieved in this monitoring period is 378,646 tCO_2e.

During this monitoring period, no special event has taken place at the plant with respect to the CDM project activity.

B.2. Revision of the monitoring plan

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Not applicable

B.3. Deviation applied to this monitoring period

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There is no deviation in this project activity for this monitoring period.

B.4. Notification or request of approval of changes

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Not applicable

SECTION C. Description of the monitoring system

>>The location of measurement devices installed is presented in figure below:

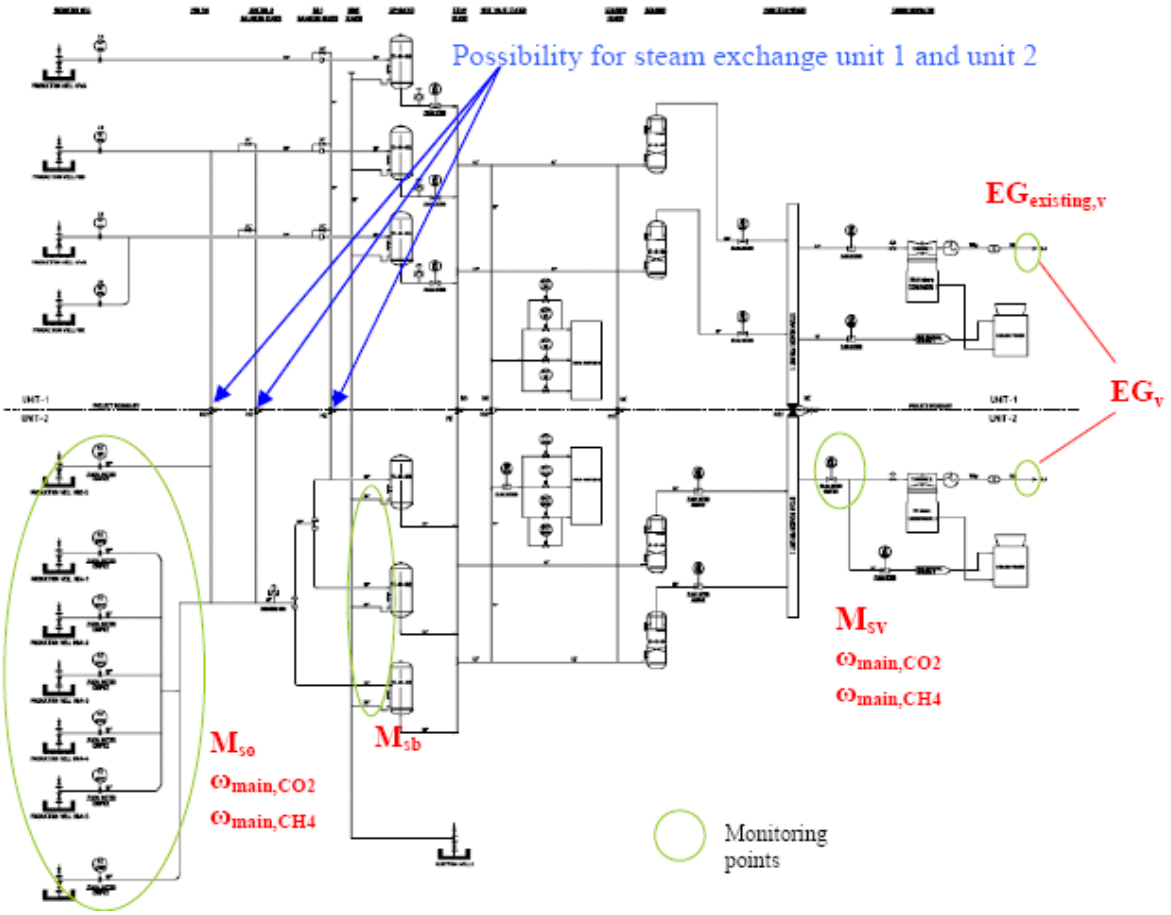


Figure 5 Simplified Process Flow Diagram for Monitoring

CH_4 and CO_2 will be emitted from the non-condensable gases contained in the geothermal steam. CO_2 will also be emitted from combustion of fossil fuels in the emergency diesel power generation set and diesel fire pump.

In order to guarantee the quality of the data and data collection system, a detailed monitoring manual has been developed and implemented. This quality manual or monitoring plan (available for verification by a designated operational entity (DOE)) is based upon the requirements set in the registered PDD and addresses as a minimum the items listed below.

Data will be compared from month to month using trend analysis to show where parameters have deviated significantly from preceding or following values. Any values identified as being unusual in this manner will be rechecked. Where preceding or following values are not available, references values may be taken from published data as appropriate such as 2006 IPCC guideline.

Table 1 Data collection process

Parameter	Reference	Procedure / Frequency	Registration	Check and correct primary measurements
Baseline Emissions	The baseline emissions are calculated using the formulae described in the PDD, section B6.1 - using the CDM spreadsheet.	Primary data (weekly reports) are entered by the SCC officer in the CDM spreadsheet at the start of each month	CDM spreadsheet stored at SCC Project File S-Server	The SCC project officer performs a consistency check based upon previous months. In case of irregularities data is double checked with SEG(WW)L and if needed corrected
Leakage	= 0			
Project Emissions	The project emissions are calculated using the formulae described in the PDD, section B6.1 - using the CDM spreadsheet	Primary data are entered by the SCC officer in the CDM spreadsheet at the start of each month	CDM spreadsheet stored at SCC Project File S-Server	The SCC project officer performs a consistency check based upon previous months. In case of irregularities data is double checked with SEG(WW)L and if needed corrected
Emissions Reductions	The emission reductions are calculated using the formulae described in the PDD, section B6.1 - using the CDM spreadsheet	Primary data (weekly reports) are entered by the SCC officer in the CDM spreadsheet at start of each month	CDM spreadsheet stored at SCC Project File S-Server	The SCC project officer performs a consistency check based upon previous months. In case of irregularities data is double checked with SEG(WW)L and if needed corrected

Preparation of monitoring report

The data will be used to prepare a periodic monitoring report to be submitted to the CDM EB for verification and issuance of CERs. A standard format for the monitoring report will be prepared and prior to the submission of the first monitoring report. An internal technical review process will be conducted and documented before such a report will be submitted for verification.

Accuracy and calibration of instruments

All meters will be purchased and maintained to ensure a high level of accuracy. The exact specifications of each meter will be determined during the detailed design of the project. Thereafter the meter accuracies will be included in this procedure and steps taken to maintain those levels of accuracy.

All key meters will be subjected to a quality control regime that will include regular maintenance and calibration. A record will be maintained showing the location and unique identification number of each meter, the calibration status of that meter (when last calibrated, when next due for calibration) and who performs the calibration service. Calibration certificates will be retained for all meters until two years after the end of the crediting period.

Archiving of data
The monitoring team will periodically archive data to a secure and retrievable storage format on a periodic e.g. weekly basis. Calibration records may be archived by scanning and storage in an accessible electronic format. These data will be stored until 2 years after the end of the crediting period.

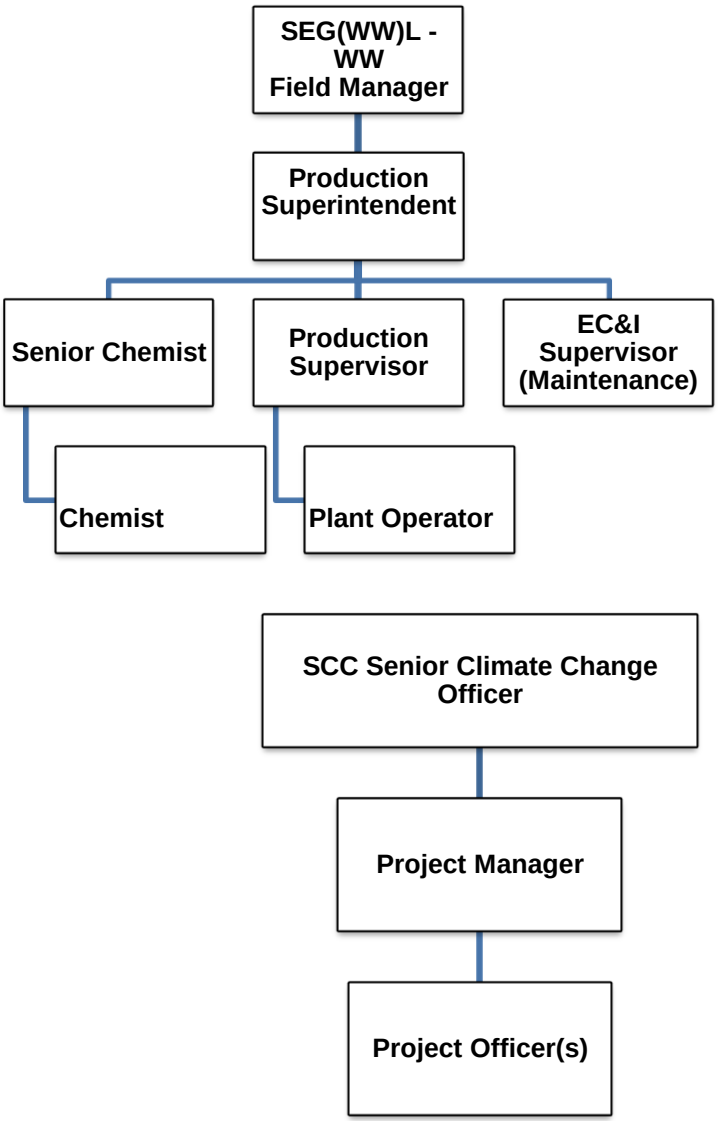
Document Control
The Project Manager will implement a document control system that ensures that the current versions of necessary documents are available at the point of use. All documents must be maintained in English with local translations because English is the formal language of the CDM.

Audit function and management review
The Project Manager will arrange for an audit of the management system periodically and at least once per year. The auditor will not be involved in the daily operation of the project and if necessary, may be sourced from a third party. The auditor will assess the implementation of the monitoring procedure and the preparation of the monitoring report. Audit findings, and steps taken to address findings will be recorded and reviewed by the management, which will also review the effectiveness of these procedures and necessary changes implemented.

Organisation & Responsibilities
SEG(WW)L
- Wayang Windu Field Manager is responsible for supervision of overall plant operations and management responsibilities
- Production Superintendent is responsible for the preparation of monthly CDM report and supervision of plant productions
- EC&I Supervisor is responsible for maintaining the measurement devices and ensuring calibration of the measurement devices
- Senior Chemist is responsible for checking steam quality information for CDM and submission to SCC
- Chemist is responsible for steam sampling and analysis, checking and recording of steam quality
- Production Supervisor is responsible for external data collection, checking CDM information (excluding steam quality data) and weekly spreadsheet and submission to SCC
- Plant Operators are responsible for meter readings, data recording and other roles as specified by the supervisors

SCC
- Senior Climate Change Officer is responsible for the supervision of overall climate change monitoring of the project, initiate verification with DOE, and conducts internal audit on correct implementation MP
- Project Manager is responsible for management and checking of CDM information and reporting
- Project Officer is responsible for project coordination, implementation and liaison, data gathering and retention, completion of the CDM spreadsheet, calculation of emission reductions, preparation of monitoring report

The organizational structure will be as follows:



SECTION D. Data and parameters

The parameters monitored and the monitoring procedure applied for determination of the emission reductions is described in section B.6.2 and more specific in section B.6.3 and B.6.4 of the Project Design Document version 3 dated 2 December 2010, and available up on the UNFCCC website http://cdm.unfccc.int/filestorage/67XO09RNKPFWQ415AS3THEVIYDLMC8/PDD.pdf?t=S058MTMwMDQzNTk4Ny4yMQ==|9jkgd4EJpb7d59UY7XxqI6jwSpg=

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	GWP_{CH4}
Data unit:	tCO_2/tCH_4
Description:	Global warming potential of methane valid for the relevant commitment

	period
Source of data used:	IPCC
Value(s) :	Default value for the first commitment period = 21 tCO_2/tCH_4
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculations
Additional comment:	--

Data / Parameter:	$EG_{historical}$
Data unit:	MWh
Description:	Average of historical electricity delivered by the existing facility to the grid
Source of data used:	Project activity site.
Value applied:	912,476
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Any comment:	The average of historical electricity delivered by the existing facility (Wayang Windu Phase 1) to the grid, spanning all data from the most recent available month (February 2009) to the time at which the facility was operated (June 2000) expressed in MWh per year. Data is based on invoices from net electricity sales to the grid operator.

Data / Parameter:	$DATE_{BaselineRetrofit}$
Data unit:	Date
Description:	Point in time when the existing equipment would need to be replaced in the absence of the project activity
Source of data used:	Project activity site
Value applied:	01 June 2030
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations The technical lifetime of the existing facility, i.e. Wayang Windu Phase 1, in the absence of the project activity is taken to be 30 years. This is a conservative number, considering many of the power plants in Indonesia are operated even after its technical lifetime. Wayang Windu 1 started operation in June 2000, hence the $DATE_{BaselineRetrofit}$ is 01 June 2030.
Any comment:	--

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Grid emission factor for JAMALI
Source of data used:	Grid calculation published by Department of Energy and Mineral Resources of Indonesia - Directorate General of Electricity and Energy

	Utilization and endorsed by Indonesia DNA on 19 January 2009.
Value applied:	0.891
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Any comment:	Calculated with "tool to calculate the emission factor for an electricity system version 01.1". Calculated once ex-ante at the start of the crediting period, using the most recent three historical years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

D.2. Data and parameters monitored

Data / Parameter:	$\omega_{main,CO2}$
Data unit:	tCO_2/t steam
Description:	Average mass fraction of CO_2 in the produced steam
Measured /Calculated /Default:	Measured
Source of data:	The mass fraction of CO_2 in the produced steam at the production wells and at the steam field-power plant interface by the external laboratory.
Value(s) of monitored parameter:	See CER spreadsheets
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The CO_2 monitoring equipment consists of gas flasks, filled with sodium hydroxide solution and additional chemicals to prevent oxidation. The gas sampling is carried out using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable to sampling single phase steam only). The analysis are carried out by an external laboratory accredited under ISO 17025 by the National Accreditation Committee (KAN - Komite Akreditasi Nasional).
Measuring/ Reading/ Recording frequency:	Sampling, analysis, and recording are performed every 3 months.
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

Data / Parameter:	$\omega_{main, CH4}$
Data unit:	$t\ CH_4/t$ steam
Description:	Average mass fraction of CH_4 in the produced steam
Measured /Calculated /Default:	Measured
Source of data:	The mass fraction of CH_4 in the produced steam at the production wells and at the steam field-power plant interface by the external laboratory.
Value(s) of monitored parameter:	See CER spreadsheets

Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The C_xH_y monitoring equipment consists of gas flasks, filled with sodium hydroxide solution and additional chemicals to prevent oxidation. The as sampling is carried out using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable to sampling single phase steam only). The analysis are carried out by an external laboratory accredited under ISO 17025 by the National Accreditation Committee (KAN - Komite Akreditasi Nasional).
Measuring/ Reading/ Recording frequency:	Sampling, analysis, and recording are performed every 3 months.
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

Data / Parameter:	**$M_{S,y}$**
Data unit:	Tonnes
Description:	Quantity of steam produced during the year y
Measured /Calculated /Default:	Measured
Source of data:	Continuous measurement by a Venturi flow meter ($M_{sv,y}$) located at the upstream of the Wayang Windu Unit 2 turbine and which is adjusted for losses of brine at the steam separator ($M_{sb,y}$) as well as Orifice Plates ($M_{so,i,y}$) located at the Wayang Windu Unit 2 well heads.
Value(s) of monitored parameter:	See CER spreadsheets
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Venturi Flow Meter Serial Number: A2-FE-0106, A2-FIT-0106-DP (91GA08958738), A2-FIT-0106-SP (91GA08958738) Calibration Frequency : biannually Date of last Calibration: 22 Nov 2010 Validity: 22 May 2011 Orifice Flow Meter for MBB-1 well steam flow Serial Number: FE-2301, FIT-2301 (8G201612), PIT-2302 (01830135) Calibration Frequency : biannually Date of last Calibration: 31 Dec 2010 for FIT, 6 Jan 2011 for PIT Validity: 31 June 2011 for FIT, 6 July 2011 for PIT Orifice Flow Meter for MBA-1 well steam flow Serial Number: FE-2501, FIT-2501 (S/n 01830374), PIT-2502 (s/n 01830130) Calibration Frequency : biannually Date of last Calibration: 28 Dec 2010 for FIT, 6 Dec 2010 for PIT

	Validity: 28 June 2011 for FIT, 6 June 2011 for PIT Orifice Flow Meter for MBA-2 well steam flow Serial Number: FE-2502, FIT-2502 (S/n 8G201617), PIT-2504 (s/n 01830131) Calibration Frequency : biannually Date of last Calibration: 28 Dec 2010 for FIT, 9 Dec 2010 for PIT Validity: 28 June 2011 for FIT, 9 June 2011 for PIT Orifice Flow Meter for MBA-3 well steam flow Serial Number: FE-2503, FIT-2503 (s/n 01830360), PIT-2506 (s/n 01830132) Calibration Frequency : biannually Date of last Calibration: 27 Dec 2010 for FIT, 8 Dec 2010 for PIT Validity: 27 June 2011 for FIT, 8 June 2011 for PIT Orifice Flow Meter for MBA-4 well steam flow Serial Number: FE-2504, FIT-2504 s/n 01830361, PIT-2508 s/n 01830133 Calibration Frequency : biannually Date of last Calibration: 27 Dec 2010 for FIT, 8 Dec 2010 for PIT Validity: 27 June 2011 for FIT, 8 June 2011 for PIT Orifice Flow Meter for MBA-5 well steam flow Serial Number: FE-2505, FIT-2505 s/n 01830359, PIT-2510 01830134 Calibration Frequency : biannually Date of last Calibration: 24 Dec 2010 for FIT, 9 Dec 2010 for PIT Validity: 24 June 2011 for FIT, 9 June 2011 for PIT Orifice Flow Meter for MBD-5 well steam flow Serial Number: FE-MBD5 s/n 702044, FIT501 S/n 01845811, PIT506 s/n 01593780 Calibration Frequency : biannually Date of last Calibration: 30 Dec 2010 for FIT, 20 Dec 2010 for PIT Validity: 30 June 2011 for FIT, 20 June 2011 for PIT Orifice Flow Meter for MBD-5 well steam flow Serial Number: FE-MBD5 s/n 702044, FIT501 S/n 01845811, PIT506 s/n 01593780 Calibration Frequency : biannually Date of last Calibration: 30 Dec 2010 for FIT, 20 Dec 2010 for PIT Validity: 30 June 2011 for FIT, 20 June 2011 for PIT Orifice Flow Meter for WWW-1 brine injection flow Serial Number: FE-984, FIT-984 (S/n 0G238876), PIT-918 (S/n 8F196683) Calibration Frequency : biannually Date of last Calibration: 10 Jan 2011 for FIT, 18 Nov 2010 for PIT Validity: 10 July 2011 for FIT, 18 May 2011 for PIT Flow meters are calibrated using internal calibrator.

	The internal calibrator is calibrated every 2 years by accredited laboratory.
Measuring/ Reading/ Recording frequency:	Data is monitored continuously (polling of at least every second) and condensed to half hour values. Daily figures will be built according to the methodology by accumulation of data.
Calculation method (if applicable):	In order to be conservative, the primary data will be taken from the higher values from either the upstream metering points or the downstream metering. In case steam is transferred from unit 1 steam fields for power generation at unit 2 the upstream figure will higher. In case steam from the new steamfields at unit 2 will be transferred to the power generator of unit 1 the downfield figure will be higher. Using the higher one of the two values ensures that project emissions which are attributable to the capacity addition by unit 2 are clearly identified and accounted. Thus, the quantity of steam ($M_{S,y}$) is given by: $M_{S,y} = \max((M_{sv,y} + M_{sb,y}), \sum_i M_{so,y})$
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

Data / Parameter:	**EG_y**
Data unit:	MWh
Description:	Electricity supplied by the project activity to the grid (total of net electricity generated by Wayang Windu Unit 1 and Unit 2)
Measured /Calculated /Default:	Measured
Source of data:	The reading of the electricity from the transaction meters from Wayang Windu Unit 1 and Unit 2
Value(s) of monitored parameter:	See CER spreadsheets
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Wayang Windu 1 main kWh meter: Accuracy Class: 0.2% Serial Number: MT-0809A063-01 Calibration Frequency : every 5 years Date of last Calibration: N/A belongs to the grid Validity: N/A belongs to the grid Wayang Windu 1 check kWh meter (primary data): Accuracy Class: 0.2% Serial Number: PT-0807A249-01 Calibration Frequency : every 2 years Date of last Calibration: 6 Jan 2011 Validity: 6 Jan 2013 Wayang Windu 2 main kWh meter: Accuracy Class: 0.2%

	Serial Number: MT 0806 A 388 - 01 Calibration Frequency : every 5 years Date of last Calibration: N/A belongs to the grid Validity: N/A belongs to the grid Wayang Windu 2 check kWh meter (primary data): Accuracy Class: 0.2% Serial Number: PT-0802A192-01 Calibration Frequency : every 2 years Date of last Calibration: 6 Jan 2011 Validity: 6 Jan 2013
Measuring/ Reading/ Recording frequency:	The meter reading is recorded every half hourly and recorded automatically at load profile at the transaction kWh meters.
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

Data / Parameter:	**$EG_{existing,y}$**
Data unit:	MWh
Description:	Electricity supplied by the existing power generation unit to the grid (net electricity generated by Wayang Windu Unit 1)
Measured /Calculated /Default:	Measured
Source of data:	The reading of the electricity from the transaction meters from Wayang Windu Unit 1
Value(s) of monitored parameter:	See CER spreadsheets
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Wayang Windu 1 main kWh meter: Accuracy Class: 0.2% Serial Number: MT-0809A063-01 Calibration Frequency : every 5 years Date of last Calibration: N/A belongs to the grid Validity: N/A belongs to the grid Wayang Windu 1 check kWh meter (primary data): Accuracy Class: 0.2% Serial Number: PT-0807A249-01 Calibration Frequency : every 2 years Date of last Calibration: 6 Jan 2011 Validity: 6 Jan 2013
Measuring/ Reading/ Recording frequency:	The meter reading is recorded every half hourly and recorded automatically at load profile at the transaction kWh meter.
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

Data / Parameter:	$PE_{FC,j,y}$
Data unit:	tCO_2/yr
Description:	CO_2 emissions from fossil fuel combustion in the operation of the power plant (diesel genset and fire pump) in year y
Measured /Calculated /Default:	Calculated
Source of data:	Calculated according to procedure outlined in the 'Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion'
Value(s) of monitored parameter:	See CER spreadsheets
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	Calculated on the monthly basis
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

Data / Parameter:	$FC_{i,j,y}$
Data unit:	ton/yr
Description:	Quantity of diesel fuel combusted in power plant operation during the year y
Measured /Calculated /Default:	Measurement
Source of data:	Measurement of diesel fuel consumption for emergency genset and fire pump multiplied with the national data of the diesel fuel density
Value(s) of monitored parameter:	See CER spreadsheets
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Flowmeter at the inlet of the daily tank for the diesel fuel consumption for emergency genset Serial Number: AO-FQ-2033 Calibration Frequency : annually Date of last Calibration: 31 Jan 2011 Validity: 31 Jan 2012 Flowmeter at the inlet diesel tank for the fire pump Serial Number: AO-FQ-2032 Calibration Frequency : annually Date of last Calibration: 31 Jan 2011

	Validity: 31 Jan 2012
Measuring/ Reading/ Recording frequency:	The data is collected monthly
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

Data / Parameter:	**$NCV_{i,y}$**
Data unit:	GJ/ton
Description:	Weighted average net calorific value of diesel fuel in year y
Measured /Calculated /Default:	Default
Source of data:	National value
Value(s) of monitored parameter:	42.73
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/ Recording frequency:	The value is recorded annually
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

Data / Parameter:	**$EF_{CO2,i,y}$**
Data unit:	tCO_2/GJ
Description:	Weighted average CO_2 emission factor of diesel fuel in year y
Measured /Calculated /Default:	Default
Source of data:	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol.2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
Value(s) of monitored parameter:	0.0748
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	N/A
Measuring/ Reading/	The value is recorded annually

Recording frequency:	
Calculation method (if applicable):	N/A
QA/QC procedures applied:	Detailed procedures are described in the CDM Monitoring Manual

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

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The formula used for determination of the baseline emissions are described in section B.6.1 of the Project Design Document v3 dated 2 December 2010, and available upon the UNFCCC website (http://cdm.unfccc.int/Projects/DB/TUEV-SUED1260194062.48/view).

Baseline emissions are calculated as follows:

$$BE_y = (EG_y - EG_{baseline}) \cdot EF_{grid,CM,y}$$

Where:

BE_y = Baseline emission in year y (tCO_2/yr)
EG_y = Electricity supplied by the project activity to the grid (MWh)
$EG_{baseline}$ = Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For new power plants this value is taken as zero
$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y (calculated by using "tool to calculate the emission factor for an electricity system version 01.1")

The project activity is the installation of additional power units at an existing grid-connected renewable power plant:

$$EG_{baseline} = MAX\ (EG_{historical}\ ,\ EG_{existing,y}),\ until\ DATE_{BaselineRetrofit}$$

$$EG_{baseline} = EG_{y},\ on/after\ DATE_{BaselineRetrofit}$$

Where:

$EG_{baseline}$ = Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh)
$EG_{historical}$ = Average of historical electricity delivered by the existing facility to the grid (MWh)
$EG_{existing,y}$ = Electricity supplied by the existing grid-connected power plant (MWh)
$DATE_{BaselineRetrofit}$ = Point in time when the existing equipment would need to be replaced in the absence of the project activity (date)

Calculation of $EG_{historical}$

$EG_{historical}$ was calculated based on the historical electricity delivered by Wayang Windu Phase 1 from the start of its operation in June 2000 up to February 2009, i.e. 912,476 MWh/year

Calculation of $DATE_{BaselineRetrofit}$

The technical lifetime of the existing facility, i.e. Wayang Windu Phase 1, in the absence of the project activity is taken to be 30 years. This is a conservative number, considering many of the power plants in Indonesia are operated even after its technical lifetime.

Wayang Windu 1 started operation in June 2000, hence the $DATE_{BaselineRetrofit}$ is 01 June 2030.

Calculation of $EF_{grid,CM,y}$

The combined margin emissions factor ($EF_{grid\ CM,y}$) of JAMALI grid is calculated using the "Tool to calculate the emission factor for an electricity system version 01.1". It consists of the combination of operating margin ($EF_{grid\ OM,y}$) and build margin ($EF_{grid\ BM,y}$) emission factors calculated *ex-ante* using following equation:

$$EF_{grid\ CM,y} = w_{OM} \cdot EF_{grid\ OM,y} + w_{BM} \cdot EF_{grid\ BM,y}$$

Where:

$EF_{grid\ CM,y}$	= Combined margin CO_2 emission factor for JAMALI grid connected power generation for in year y (tCO_2/MWh)
$EF_{grid\ OM,y}$	= Operating margin CO_2 emission factor for JAMALI grid connected power generation in year y (tCO_2/MWh)
$EF_{grid\ BM,y}$	= Build margin CO_2 emission factor for JAMALI grid connected power generation in year y (tCO_2/MWh)
w_{OM}	= weighting for operating emission factor (50%)
w_{BM}	= weighting for build margin emission factor (50%)

The combined margin emission factor of the JAMALI grid for 2004-2006 is 0.891 tCO_2/yr

Calculation of $EF_{grid\ OM,y}$

Average OM is chosen since the fuel consumption and net electricity generation of each power plant unit-not including low-cost/must-run- is available. Therefore, the formula applied for *($EF_{grid\ OM,y}$)* is as follows:

$$EF_{grid,OM,y} = \frac{\sum_{i,m} FC_{i,m,y} \bullet NCV_{i,y} \bullet EF_{CO2,i,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,m,y}$	=	Amount of fossil fuel type i consumed by power plant / unit m in year y (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
$EG_{m,y}$	=	Net electricity generated and delivered to the grid by power plant / unit m in year y (MWh)
m	=	All power plants / units serving the grid in year y except low-cost / must-run power plants / units

i = All fossil fuel types combusted in power plant / unit m in year y

y = The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

The Operating Margin Emission Factor for Jamali Grid for year 2006 has been calculated by Department of Energy and Mineral Resources of Indonesia - Directorate General of Electricity and Energy Utilization and endorsed by Indonesian DNA.

$EF_{grid,OM,,2004-2006}$ = 0.844 tCO_2/MWh (Refer to PDD Section 6.3, table 6,7,8,9,10 for the detailed data)

Calculation of $EF_{grid,BM,}$

The build margin is calculated using the following equation:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2/MWh)

$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)

$EF_{EL,m,y}$ = CO_2 emission factor of power unit m in year y (tCO_2/MWh)

m = Power units included in the build margin

y = Most recent historical year for which power generation data is available

The Build Margin Emission Factor for Jamali Grid for year 2006 has been calculated by Department of Energy and Mineral Resources of Indonesia - Directorate General of Electricity and Energy Utilization and endorsed by Indonesian DNA.

$EF_{grid,BM,2006}$ = 0.937 tCO_2/MWh (Refer to PDD Section 6.3, table 6,7,8,9,11 for the detailed data)

Monitored Baseline Emission Calculation

EG[1]	Electricity supplied by the project activity to the grid	886,993	MWh
$EG_{existing}$[2]	Monitored	427,667	MWh
Duration Monitoring Period	2 Dec 2010 – 31 Mar 2011	172	days

[1] Refer to Annex 1 for daily generation data from Wayang Windu Phase 1 and Wayang Windu Phase 2 geothermal power project

[2] Refer to Annex 1 for daily generation data from Wayang Windu Phase 1 geothermal power project

$EG_{historical,y}$	Yearly average of historical electricity delivered by the existing facility to the grid	912,476	MWh
$EG_{historical,MP}$	172/365*912,476	429,989	MWh
$EG_{baseline}$	MAX ($EG_{historical,MP}$, $EG_{existing,MP}$)	429,989	MWh
$EG - EG_{baseline}$		457,004	MWh
BE	$(EG - EG_{baseline}) . EF_{grid,CM,y}$	**406,962**	**t CO2e**

E.2. Project emissions calculation

>>

The formula used for determination of the project emissions are described in section B.6.1 of the Project Design Document v3 dated 2 December 2010, and available upon the UNFCCC website (http://cdm.unfccc.int/Projects/DB/TUEV-SUED1260194062.48/view).

Project emissions are calculated as follows:

$$PE_y = PES_y + PEFF_y$$

Where:

PE_y = Project emission in year y (tCO_2/yr)

PES_y = Project emission of CH_4 and CO_2 due to the release of non-condensable gases from the stream produced in geothermal power plant in year y (tCO_2/yr)

$PEFF_y$ = Project emission from combustion of fossil fuels related to the operation of the geothermal power plant in year y (tCO_2/yr)

Project emission of CO_2 and CH_4 due to the release of non-condensable gases from the steam produced in the geothermal power plant is calculated as:

$$PES_y = (\omega_{main,CO2} + \omega_{main,CH4} . GWP_{CH4}) . M_{S,y}$$

Where:

PES_y = Project emission of CH_4 and CO_2 due to the release of non-condensable gases from the stream produced in geothermal power plant in year y (tCO_2/yr)

$\omega_{main,CO2}$ = average mass fraction of CO_2 in the produced steam (non-dimensional)

$\omega_{main,CH4}$ = average mass fraction of CH_4 in the produced steam (non-dimensional)

GWP_{CH4} = global warming potential of CH_4 valid for the relevant commitment period (tCO_2/tCH_4)

$M_{S,y}$ = Quantity of steam produced during the year y (tonnes)

Project emissions from combustion of fossil fuel related to the operation of geothermal power plant is calculated as:

$PEFF_y = PE_{FC,j,y}$

Where:

$PEFF_y$ = Project emission from combustion of fossil fuels related to the operation of the geothermal power plant in year y (tCO_2/yr)

$PE_{FC,j,y}$ = CO_2 emissions from fossil fuel combustion in process j during the year y (tCO_2/yr). This parameter will be calculated by the "tool to calculate project or leakage CO_2 emissions from fossil fuel combustion version 02"

$PE_{FC,j,y} = \sum FC_{diesel,j,y} . COEF_{i,y}$

Where:

$FC_{diesel,j,y}$ = quantity of diesel combusted in emergency genset and fire pump multiplied with the national data of the diesel fuel density (ton)

$COEF_{i,y}$ = CO_2 emission coefficient of diesel fuel (tCO_2/ton)

$COEF_{i,y}$ is calculated based on net calorific value and CO_2 emission factor of diesel fuel, as follows:

$COEF_{i,y} = NCV_{diesel,y} . EF_{CO2,diesel,y}$

Where:

$NCV_{diesel,y}$ = weighted average net calorific value of diesel fuel in year y (Values provided by the fuel supplier, or regional or national average default values, or IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol.2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories) (GJ/ton)

$EF_{CO2,diesel,y}$ = weighted average CO_2 emission factor of diesel fuel in year y (Values provided by the fuel supplier, or regional or national average default values, or IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol.2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories) (tCO_2/GJ)

Monitored Project Emission

Month	Diesel Consumption [litres]
Dec-10	207
Jan-11	50
Feb-11	900
Mar-11	477
Apr-11	307

$\sum FC_{diesel}$	$\sum FC_{diesel,j} . \rho_{diesel,j}$[3]	1.95	t
PEFF	$\sum FC_{diesel,j,y} . NCV_{diesel,y} . EF_{CO2,diesel,y}$[4]	6.23	t CO2e

[3]Diesel density, Source: national value of 0.87 kg/Litre. Fossil fuel consumption is recorded on the monthly basis.

PES_y	$(\omega_{main,CO2} + \omega_{main,CH4} . GWP_{CH4}) . M_{S,y}$[5]	28,310	t CO2e
PE	$PES_y + PEFF_y$	**28,316**	**t CO2e**

E.3. Leakage calculation

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Since ACM0002 version 9 does not consider the emission due to power plant construction and fuel handlings, no leakage is considered ($L_y = 0$).

E.4. Emission reductions calculation / table

>>

The emission reduction $ER_y(tCO_2/yr)$ by the project activity during a given year y is the difference between the baseline emission (BE_y), project emission (PE_y) and emissions due to leakage (L_y), as follows:

$$\boldsymbol{ER_y = BE_y – PE_y - L_y}$$

Baseline Emissions	406,962	t CO2e
Project Emissions	28,316	t CO2e
Leakage	-	t CO2e
Total Emission Reduction in MP	**378,646**	**t CO2e**

Total CERs: 2 December 2010 – 22 May 2011 (inclusive of both days) = **378,646** tCO_2eq.

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

>>

This section shall include a comparison of actual values of the emission reductions achieved during the monitoring period with the estimations in the registered CDM-PDD.

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	374,551	**378,646**

* The value applied in the *ex ante* calculation of the PDD provided here is calculated by pro-rating the annual estimated emission reductions: Values Applied in the Ex-ante Calculation of the PDD for the Monitoring Period = Annual Estimation of Emission reductions in the PDD × Number of Days in the Monitoring Period / Number of Days per Year = 794,832 tCO_2e/year × 172 Days in the Monitoring Period / 365 days per year = 374,551 tCO_2e.

[4] Diesel net calorific value, Source: Source: Bahan Bakar Minyak ELPIJI dan BBG of 42.73 GJ/ton. Diesel effective CO_2 emission factor, Source: IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol.2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories of 0.0748 tCO_2/GJ

[5] Refer to Annex 1 for daily steam data from Wayang Windu Phase 1 geothermal power project. PES is recorded on the daily basis

E.6. Remarks on difference from estimated value in the PDD

>>

The maximum emission reduction generated by this project activity within the proposed Monitoring period is 374,551 ton of CO_2 and the actual emission reduction is **378,646** ton of CO_2. The actual CER generation is 1.1 % higher than the values applied in ex-ante estimation of the registered PDD.

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Annex 1

Daily generation data from Wayang Windu Phase 1 and Wayang Windu Phase 2 geothermal power project (EG), Daily generation data from Wayang Windu Phase 1 ($EG_{existing}$), and Quantity of steam produced (M_s) during Monitoring Period

Date	EG MWh	EGexisting MWh	$M_{s,conservative}$ Wells/Brine+Main Steam	M_s Tons
02 December 2010	5242.38	2530.50	Wells	22,309.20
03 December 2010	5162.44	2446.50	Wells	22,112.00
04 December 2010	5246.81	2530.31	Wells	22,206.08
05 December 2010	5236.50	2529.81	Wells	22,191.44
06 December 2010	5262.69	2546.00	Wells	22,179.82
07 December 2010	5252.32	2545.19	Wells	22,157.20
08 December 2010	5235.50	2522.00	Wells	21,932.10
09 December 2010	5076.56	2556.50	Wells	21,954.13
10 December 2010	5276.94	2556.31	Wells	22,108.20
11 December 2010	5256.25	2544.75	Wells	22,100.40
12 December 2010	5219.31	2504.81	Wells	21,821.80
13 December 2010	4937.63	2222.69	Brine+Main Steam	21,160.00
14 December 2010	4908.25	2204.44	Brine+Main Steam	21,276.00
15 December 2010	4915.25	2214.50	Brine+Main Steam	20,976.00
16 December 2010	4921.69	2216.38	Brine+Main Steam	21,110.00
17 December 2010	4918.38	2212.44	Brine+Main Steam	21,092.00
18 December 2010	4919.88	2210.19	Brine+Main Steam	21,115.00
19 December 2010	4927.88	2216.50	Brine+Main Steam	21,074.00
20 December 2010	4908.31	2197.00	Brine+Main Steam	21,405.00
21 December 2010	5162.19	2456.06	Wells	23,010.44
22 December 2010	5279.81	2568.75	Wells	22,483.64
23 December 2010	4877.44	2160.75	Wells	22,472.08
24 December 2010	5226.44	2513.50	Wells	22,343.44
25 December 2010	5310.62	2598.81	Wells	22,306.08
26 December 2010	5222.19	2513.19	Wells	21,895.84
27 December 2010	4732.56	2026.00	Brine+Main Steam	21,280.00
28 December 2010	4695.25	1994.94	Brine+Main Steam	21,126.00
29 December 2010	5105.12	2396.81	Brine+Main Steam	21,218.00
30 December 2010	5252.19	2546.69	Wells	22,451.44
31 December 2010	5271.94	2559.56	Wells	22,372.44
01 January 2011	5268.94	2559.50	Wells	22,339.44
02 January 2011	5259.50	2559.25	Wells	22,310.08
03 January 2011	5258.69	2551.25	Wells	22,253.08
04 January 2011	5243.94	2544.94	Wells	22,223.08
05 January 2011	5248.31	2543.50	Wells	22,169.16
06 January 2011	4949.37	2404.31	Wells	22,174.44
07 January 2011	5286.69	2578.75	Wells	22,148.08
08 January 2011	5274.69	2569.50	Wells	22,125.08
09 January 2011	5254.75	2553.44	Wells	22,113.08
10 January 2011	5245.00	2544.00	Wells	22,100.08
11 January 2011	5228.06	2529.81	Wells	22,075.08
12 January 2011	5230.06	2531.06	Wells	22,049.44
13 January 2011	5223.19	2508.44	Wells	22,037.80
14 January 2011	5307.38	2594.69	Brine+Main Steam	22,110.00
15 January 2011	5194.44	2484.38	Wells	22,047.44
16 January 2011	5328.38	2616.44	Wells	21,989.08
17 January 2011	5318.81	2605.75	Wells	21,975.08
18 January 2011	5286.25	2573.50	Wells	21,954.08
19 January 2011	5281.38	2575.00	Wells	21,928.08
20 January 2011	5301.94	2583.94	Wells	21,876.44
21 January 2011	5288.50	2575.69	Wells	21,867.08
22 January 2011	5270.38	2561.38	Wells	21,864.08
23 January 2011	5271.00	2561.50	Wells	21,856.08
24 January 2011	5277.81	2566.25	Wells	21,843.08
25 January 2011	5258.32	2554.88	Wells	21,852.08
26 January 2011	5260.25	2553.69	Wells	21,837.08
27 January 2011	5251.50	2549.69	Wells	21,825.08
28 January 2011	5241.94	2541.44	Wells	21,800.08
29 January 2011	5244.19	2539.50	Wells	21,780.08
30 January 2011	5237.31	2539.00	Wells	21,776.08
31 January 2011	5252.64	2555.31	Wells	21,766.08

01 February 2011	5231.15	2532.00	Wells	21,698.96
02 February 2011	5265.14	2557.00	Wells	21,770.72
03 February 2011	5234.58	2537.75	Wells	21,759.72
04 February 2011	5234.80	2523.81	Wells	21,752.72
05 February 2011	5228.48	2518.69	Wells	21,667.96
06 February 2011	5224.28	2524.00	Wells	21,666.96
07 February 2011	5218.57	2514.06	Wells	21,659.96
08 February 2011	5220.90	2519.25	Wells	21,658.96
09 February 2011	5241.79	2530.19	Wells	21,607.96
10 February 2011	5231.72	2581.00	Wells	20,884.52
11 February 2011	5214.72	2518.06	Wells	21,556.96
12 February 2011	5236.97	2527.00	Wells	21,601.60
13 February 2011	5212.27	2520.50	Wells	21,572.96
14 February 2011	5150.99	2444.44	Wells	21,498.96
15 February 2011	5156.99	2448.06	Wells	21,556.60
16 February 2011	5210.49	2503.44	Brine+Main Steam	21,516.00
17 February 2011	5207.34	2506.19	Wells	21,488.60
18 February 2011	5216.04	2506.69	Wells	21,467.60
19 February 2011	5233.22	2515.81	Brine+Main Steam	21,475.00
20 February 2011	5240.84	2528.88	Wells	21,484.24
21 February 2011	4887.83	2557.25	Wells	20,822.22
22 February 2011	3693.80	2687.75	Wells	17,448.29
23 February 2011	3420.14	2691.31	Wells	16,664.38
24 February 2011	4827.31	2687.94	Wells	20,685.49
25 February 2011	5346.39	2638.75	Wells	22,284.16
26 February 2011	5304.79	2601.13	Wells	22,238.16
27 February 2011	5280.18	2583.31	Wells	21,876.96
28 February 2011	5265.17	2555.06	Wells	21,728.96
01 March 2011	5299.68	2586.44	Wells	21,810.72
02 March 2011	5313.57	2601.56	Wells	21,794.72
03 March 2011	5267.63	2558.00	Wells	21,784.72
04 March 2011	5292.28	2583.09	Wells	21,771.72
05 March 2011	5282.33	2573.33	Wells	21,746.72
06 March 2011	5273.65	2576.94	Wells	21,692.72
07 March 2011	5270.65	2563.36	Wells	21,667.72
08 March 2011	5257.95	2554.57	Wells	21,651.72
09 March 2011	5267.63	2559.94	Wells	21,641.72
10 March 2011	5257.62	2554.17	Wells	21,642.72
11 March 2011	5292.06	2590.95	Wells	21,624.72
12 March 2011	5239.28	2539.88	Wells	21,619.72
13 March 2011	5233.55	2536.15	Wells	21,609.36
14 March 2011	5232.70	2536.30	Wells	21,573.36
15 March 2011	5242.27	2538.86	Wells	21,562.36
16 March 2011	5215.29	2515.59	Wells	21,532.00
17 March 2011	5207.61	2511.01	Brine+Main Steam	21,531.00
18 March 2011	5011.23	2512.93	Wells	21,388.86
19 March 2011	5194.93	2504.13	Wells	21,547.36
20 March 2011	5193.38	2498.88	Wells	21,474.36
21 March 2011	5205.76	2506.26	Wells	21,416.72
22 March 2011	5201.61	2511.41	Brine+Main Steam	21,509.00
23 March 2011	5200.68	2507.98	Brine+Main Steam	21,470.00
24 March 2011	5192.75	2500.84	Brine+Main Steam	21,545.00
25 March 2011	4916.61	2214.61	Brine+Main Steam	21,499.00
26 March 2011	4873.28	2165.78	Brine+Main Steam	21,479.00
27 March 2011	4854.62	2159.12	Brine+Main Steam	21,509.00
28 March 2011	4858.26	2153.87	Brine+Main Steam	21,526.00
29 March 2011	4850.10	2148.49	Brine+Main Steam	21,545.00
30 March 2011	4834.76	2135.46	Brine+Main Steam	21,549.00
31 March 2011	4841.89	2141.89	Brine+Main Steam	21,568.00

01 April 2011	4,840.53	2,136.53	Brine+Main Steam	21,513.00
02 April 2011	4,846.09	2,141.39	Brine+Main Steam	21,495.00
03 April 2011	4,859.85	2,155.66	Brine+Main Steam	21,483.00
04 April 2011	4,847.70	2,139.70	Brine+Main Steam	21,465.00
05 April 2011	5,150.54	2,447.34	Brine+Main Steam	21,483.00
06 April 2011	5,216.96	2,511.55	Brine+Main Steam	21,462.00
07 April 2011	5,199.18	2,499.09	Brine+Main Steam	21,459.00
08 April 2011	5,186.83	2,483.92	Brine+Main Steam	21,470.00
09 April 2011	5,193.28	2,485.48	Brine+Main Steam	21,460.00
10 April 2011	5,175.80	2,481.30	Brine+Main Steam	21,425.00
11 April 2011	5,183.13	2,476.04	Brine+Main Steam	21,446.00
12 April 2011	5,164.33	2,463.42	Brine+Main Steam	21,446.00
13 April 2011	5,154.03	2,456.53	Brine+Main Steam	21,426.00
14 April 2011	5,225.39	2,525.30	Brine+Main Steam	21,447.00
15 April 2011	5,197.70	2,512.09	Brine+Main Steam	21,459.00
16 April 2011	5,178.30	2,489.50	Brine+Main Steam	21,292.00
17 April 2011	5,186.20	2,500.00	Brine+Main Steam	21,392.00
18 April 2011	5,170.30	2,476.50	Brine+Main Steam	21,411.00
19 April 2011	5,126.12	2,450.03	Brine+Main Steam	21,356.00
20 April 2011	5,138.31	2,456.90	Brine+Main Steam	21,452.00
21 April 2011	5,138.41	2,449.50	Brine+Main Steam	21,334.00
22 April 2011	5,127.19	2,439.10	Brine+Main Steam	21,453.00
23 April 2011	5,121.20	2,434.00	Brine+Main Steam	21,433.00
24 April 2011	5,121.80	2,431.60	Brine+Main Steam	21,401.00
25 April 2011	5,145.29	2,450.09	Brine+Main Steam	21,433.00
26 April 2011	5,071.11	2,378.61	Brine+Main Steam	21,521.00
27 April 2011	4,546.60	2,295.30	Wells	20,954.00
28 April 2011	5,109.48	2,419.39	Brine+Main Steam	21,474.00
29 April 2011	5,119.70	2,425.00	Brine+Main Steam	21,495.00
30 April 2011	5,105.22	2,408.11	Brine+Main Steam	21,371.00
01 May 2011	5,125.39	2,421.89	Brine+Main Steam	21,564.00
02 May 2011	5,132.50	2,429.70	Brine+Main Steam	21,398.00
03 May 2011	5,116.50	2,413.20	Brine+Main Steam	21,460.00
04 May 2011	5,082.50	2,384.50	Brine+Main Steam	21,433.00
05 May 2011	5,272.00	2,570.59	Brine+Main Steam	21,615.00
06 May 2011	5,302.41	2,604.41	Brine+Main Steam	21,389.00
07 May 2011	5,287.60	2,590.41	Brine+Main Steam	21,624.00
08 May 2011	5,304.40	2,601.59	Brine+Main Steam	21,376.00
09 May 2011	5,296.70	2,600.70	Brine+Main Steam	21,482.00
10 May 2011	5,283.80	2,593.30	Brine+Main Steam	21,499.00
11 May 2011	5,280.19	2,584.41	Brine+Main Steam	21,469.00
12 May 2011	5,283.00	2,583.50	Brine+Main Steam	21,446.00
13 May 2011	5,275.63	2,577.00	Brine+Main Steam	21,481.00
14 May 2011	5,345.80	2,641.80	Brine+Main Steam	23,142.00
15 May 2011	5,358.58	2,655.30	Brine+Main Steam	24,010.00
16 May 2011	5,366.31	2,658.59	Brine+Main Steam	23,472.00
17 May 2011	5,359.70	2,652.20	Brine+Main Steam	23,771.00
18 May 2011	5,351.91	2,646.41	Brine+Main Steam	23,675.00
19 May 2011	5,350.30	2,648.30	Brine+Main Steam	23,713.00
20 May 2011	5,341.56	2,633.70	Brine+Main Steam	23,717.00
21 May 2011	5,334.50	2,626.59	Brine+Main Steam	23,822.00
22 May 2011	5,378.29	2,677.20	Brine+Main Steam	23,563.00