



Monitoring report form (Version 03.1)

Monitoring report

Title of the project activity	Wayang Windu Phase 2 Geothermal Power Project
Reference number of the project activity	3193
Version number of the monitoring report	01
Completion date of the monitoring report	15/01/2013
Registration date of the project activity	02/12/2010
Monitoring period number and duration of this monitoring period	Monitoring period number 4, Duration of this monitoring period (first and last days included): 01/06/2012 – 31/12/2012.
Project participant(s)	Star Energy Geothermal (Wayang Windu) Limited Sindicatum Carbon Capital Ltd Standard Chartered Bank Plc
Host Party(ies)	Republic of Indonesia
Sectoral scope(s) and applied methodology(ies)	Sectoral scope: 1 – Energy industries (renewable/non-renewable sources) Applied Methodology: ACM0002 version 9.
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	466,011 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	407,983 tCO ₂ e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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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 reduces greenhouse gas emissions through the displacement of fossil fuel electricity generation with a clean, renewable energy source.

The project activity, Wayang Windu Phase 2 Geothermal Power Project, involves the installation of the additional main 117 MW 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, supplying 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 date when the EPC contract was signed was considered as the starting date of the project activity, i.e. on 30/01/2007. Project construction start date is 30/01/2007 and the commercial operation of the project started from 04/03/2009. The project activity is currently in the operational phase and has been registered with the United Nations Framework Convention on Climate Change (UNFCCC) as a CDM project activity (Reference No. 3193) on 02/12/2010. The details can be viewed on <http://cdm.unfccc.int/Projects/DB/TUEV-SUED1260194062.48/view>

The total emission reductions achieved in this monitoring period is 407,983 tCO₂e.

A.2. Location of project activity

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Wayang Windu Geothermal Power Plant is located in Pangalengan approximately 40 km south of Bandung, West Java in Indonesia. 7° 12' 26.79" S, 107° 37' 44.12" E



Figure 1 Location of Bandung

The map illustrates the Wayang Windu Geothermal Project area. A green line delineates the 'PRODUCTION FOREST' boundary. Within this area, a red line marks the 'Power Plan Area'. Numerous wells are identified with red crosshair symbols and labels: WWVR, WWL, WWJ, WVE, WWN Pad, WWP, WWF, WWA, WWT, WWD, WWS, WWQ, MBD, and MBE. Other locations include Pangalengan, Cipanas, Citere, Babakan, Cibolang, Kertamanah, Cibitung, and Margamukti. Infrastructure shown includes a 'Public Road' and a 'Plantation Road'. A north arrow is located in the upper right corner.

A.3. Parties and project participant(s)

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Republic of Indonesia (host)	Private entity: Star Energy Geothermal (Wayang Windu) Limited (MNL)	No
United Kingdom of Great Britain and Northern Ireland	Private entity: Sindicatum Carbon Capital Ltd	No
United Kingdom of Great Britain and Northern Ireland	Public limited entity: Standard Chartered Plc	No

A.4. Reference of applied methodology

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The applied methodology: ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources” (version 9)

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)
- “Tool for the demonstration of additionality” (Version 5.2),
- “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (Version 02)

More information can be found on the UNFCCC CDM website:

(<http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT>)

A.5. Crediting period of project activity

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A renewable 7 year crediting period was chosen for the project activity. The start of the crediting period was 02/12/2010. This monitoring period is 01/06/2012 – 31/12/2012 (first and last days included).

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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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 consists 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.

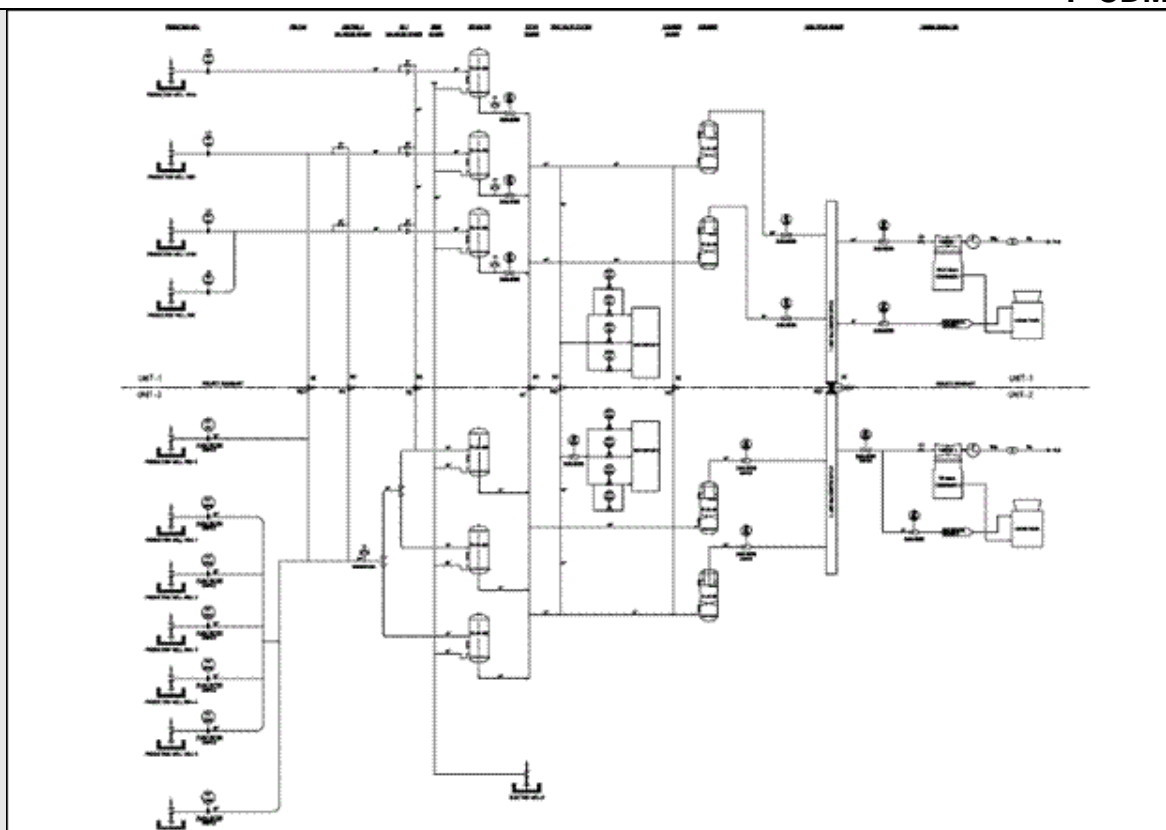


Figure 4 Diagram of the Technical Process (also see Figure 5)

Information on the main equipment:

Main equipment	Steam Turbine	Generator
Manufacturer	Fuji Electric Systems Co. Ltd.	Fuji Electric Systems Co. Ltd.
Type or model no.	Single Casing Condensing	GTLRI544/63-2
Serial number	K1B10159G1	K1B10159L1
Rated capacity or output	117.000 kW	137500 kVA
Rated voltage	-	13800 V
Rated Power Factor	-	0.85 Cos ϕ

The commercial operation of Wayang Windu Phase 2 Geothermal Power Project Plant started from 04/03/2009 and the project activity was registered as a CDM activity on 02/12/2010.

During this monitoring period, planned and unplanned outages occurred to Wayang Windu Phase 1 and 2. Refer to Annex 1 for further details and refer to Annex 4 Monitoring Equipments for calibration activities during this monitoring period.

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

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No temporary deviations from the registered monitoring plan or applied methodology have been applied for this monitoring period.

B.2.2. Corrections

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No corrections to project information or parameters fixed at validation for this monitoring period.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

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There have been no permanent changes from registered monitoring plan or applied methodology submitted or approved during this monitoring period with this monitoring report.

B.2.4. Changes to project design of registered project activity

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There have been no changes to the project design of the project activity submitted or approved during this monitoring period with this monitoring report.

B.2.5. Changes to start date of crediting period

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There have been no changes to the start date of crediting period submitted or approved during this monitoring period with this monitoring report.

B.2.6. Types of changes specific to afforestation or reforestation project activity

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Not applicable

SECTION C. Description of monitoring system

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The location of measurement devices installed is presented in figures 5,6,7,8 below:

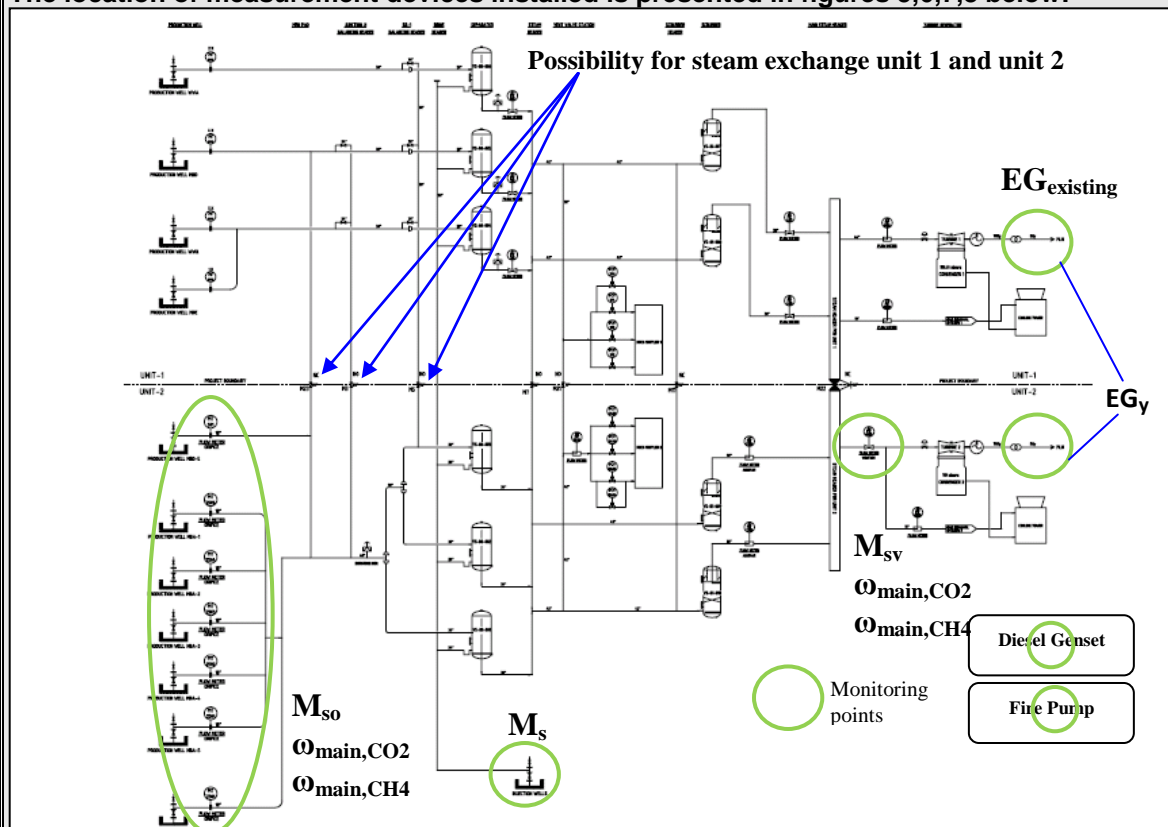


Figure 5 Simplified Process Flow Diagram for Monitoring

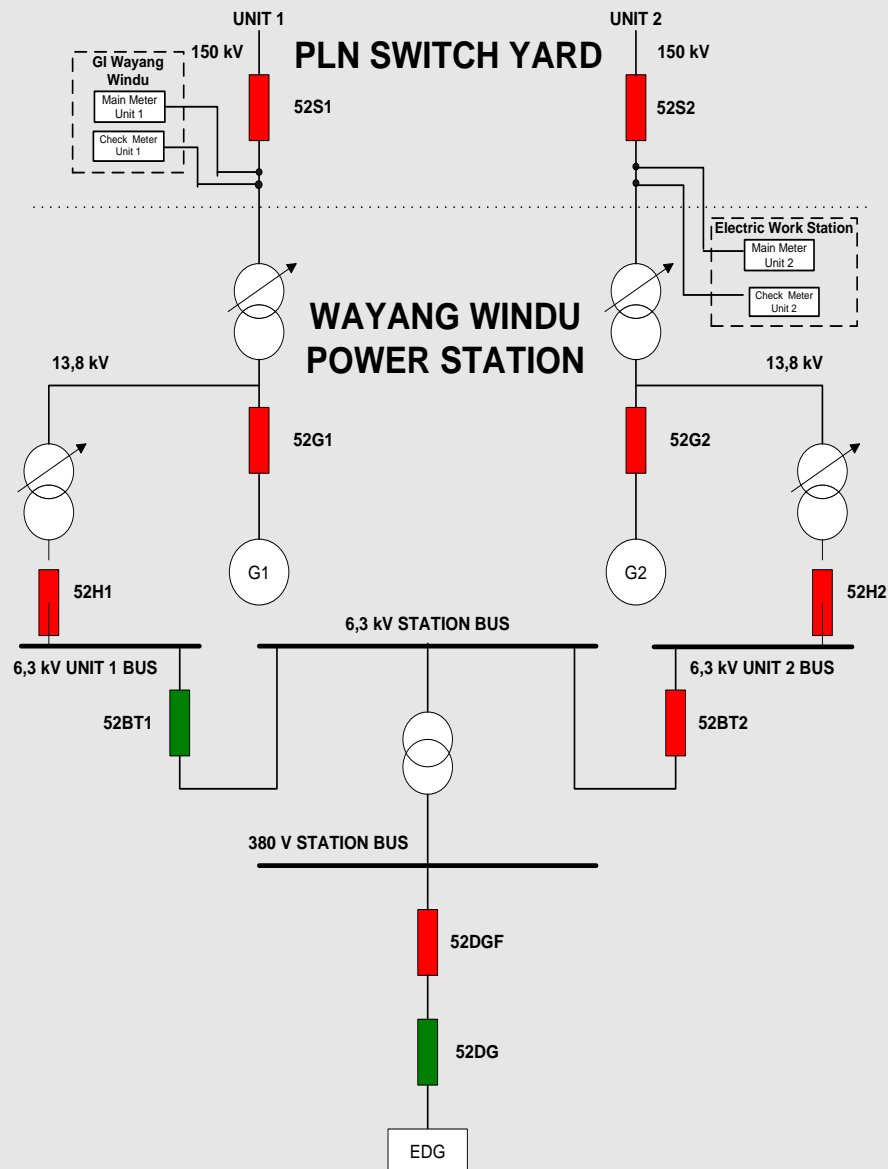


Figure 6 Electrical Layout Drawing

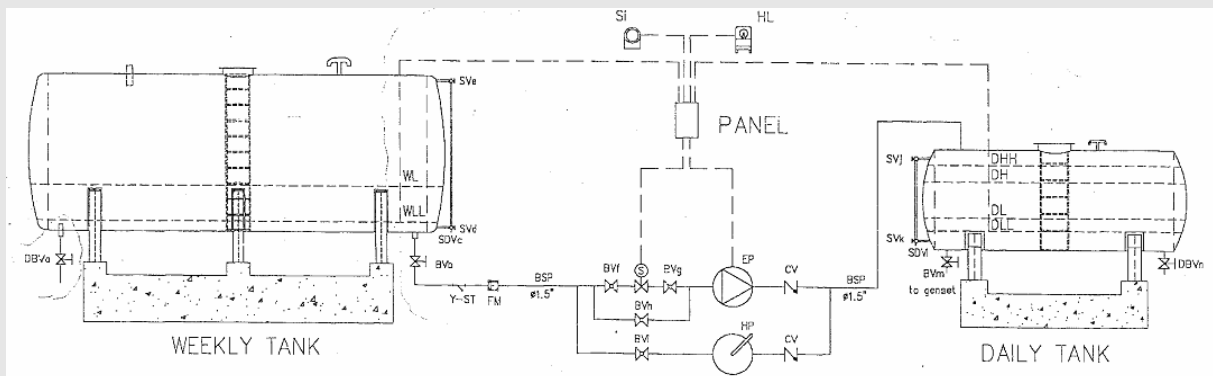


Figure 7 Fire Pump Fuel System

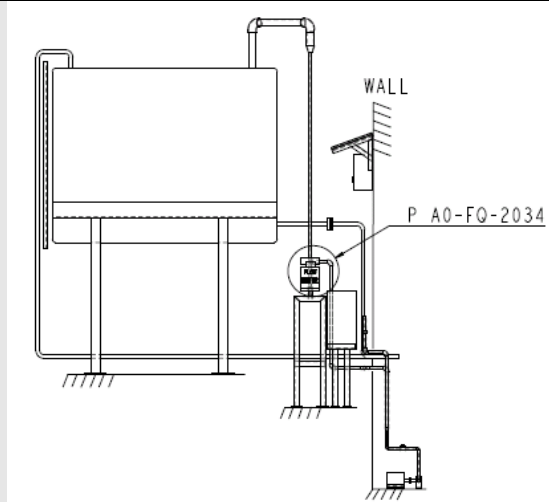


Figure 8 Diesel Generator Set Fuel System

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.

Other operation and maintenance procedures developed for the project activity that are related to the monitoring system will be available during verification. Refer to Annex 2 for the list of the procedures.

An overview of the data collection process is provided in table 1 underneath. Detailed formulas for the calculation of emissions are presented in Section E below.

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

Calculation of emissions reduction:

The data required to calculate baseline emissions and project emissions are fed into a protected spreadsheet which calculates the emission reductions according to the formulae described in section E. Access to the spreadsheet is controlled. The spreadsheet is regularly audited to ensure it is operating correctly.

Quality control

Data is 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 is rechecked. Where preceding or following values are not available, reference values may be taken from published data as appropriate such as 2006 IPCC guideline.

Preparation of monitoring report

The data is 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 is prepared. Prior to the submission of the first monitoring report, an internal technical review process was conducted and documented before the report was submitted for verification.

Accuracy and calibration of instruments

All meters purchased are maintained to ensure a high level of accuracy. The exact specifications of each meter were determined during the detailed design of the project. Thereafter the meter accuracies are included in this procedure and steps taken to maintain those levels of accuracy. The accuracy levels and procedures are set out in detail on monitoring manual.

All key meters are subjected to a quality control regime that includes regular maintenance and calibration. A record is 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 are retained for all meters until two years after the end of the crediting period.

Archiving of data

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

Document Control

The Project Manager implements a document control system that ensures that the current versions of necessary documents are available at the point of use. All documents are maintained in English (with local translations if necessary).

Manual data recording system

The monitoring team implements a manual data recording system to act as a back-up for the online system. This involves completion of a daily log sheet that records electricity meter readings at the start of the day (which is also the end of the previous day).

Treatment of missing or corrupted data

Where data are corrupted or missing whilst the plant is operating, the missing data can be estimated by taking the lower of the average value for the parameter before the error arose.

Audit function and management review

The Project Manager arranges for an audit of the management system periodically and at least once per year. The auditor is not involved in the daily operation of the project and if necessary, may be sourced from a third party. The auditor assesses the implementation of the monitoring procedure and the preparation of the monitoring report. Audit findings, and steps taken to address findings are recorded and reviewed by the management, which also reviews 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

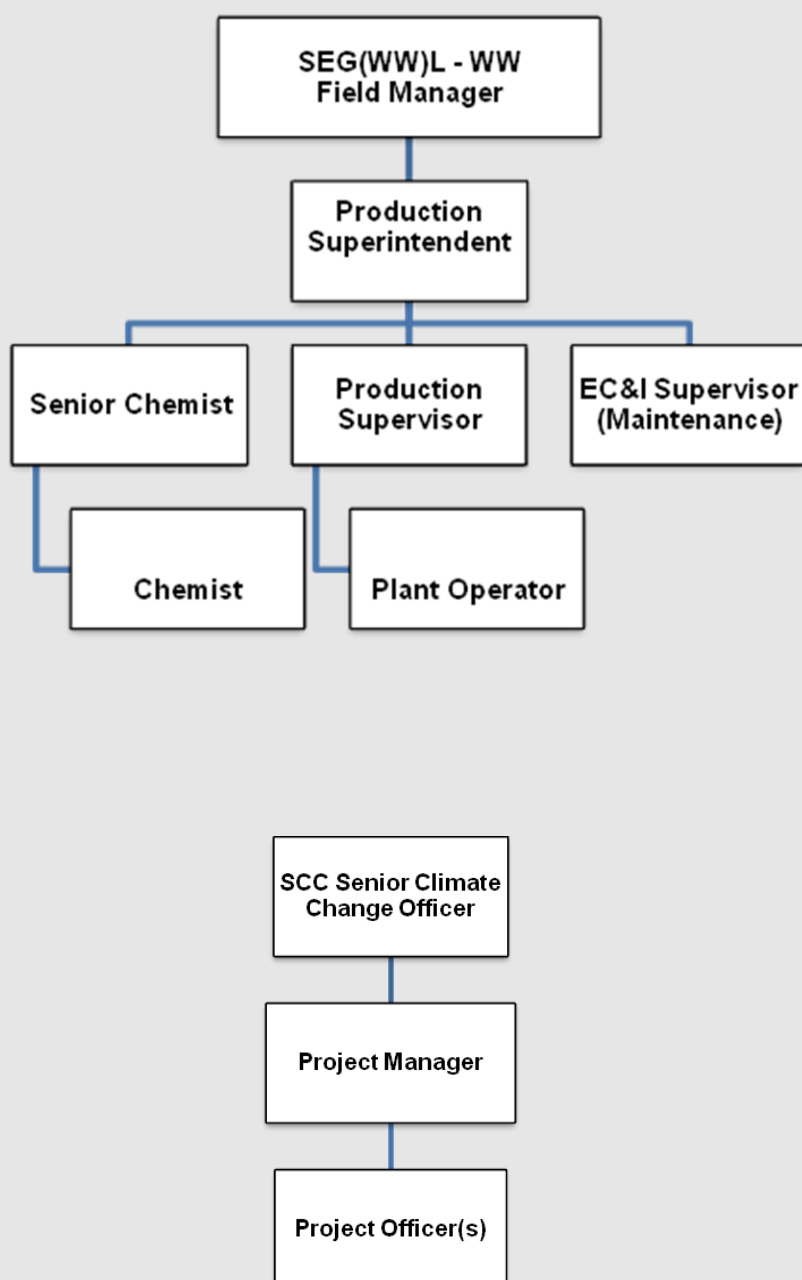
measurement devices

- 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**D.1. Data and parameters fixed ex ante or at renewal of crediting period**

(Copy this table for each piece of data and parameter.)

Data/Parameter	GWP_{CH4}
Unit	tCO ₂ /tCH ₄
Description	Global warming potential of methane valid for the relevant commitment period
Source of data	IPCC
Value(s) applied	Default value for the first commitment period = 21 tCO ₂ /tCH ₄
Purpose of data	Project emission calculations
Additional comment	-

Data/Parameter	$EG_{historical}$
Unit	MWh
Description	Average of historical electricity delivered by the existing facility to the grid
Source of data	Project activity site.
Value(s) applied	912,476
Purpose of data	Baseline emission calculations
Additional 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	$DATE_{BaselineRetrofit}$
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	Project activity site.
Value(s) applied	01/06/2030
Purpose of data	Baseline emission calculations
Additional comment	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 01/06/2030.

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO ₂ /MWh
Description	Grid emission factor for JAMALI
Source of data	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 19/01/2009.
Value(s) applied	0.891
Purpose of data	Baseline emission calculations
Additional 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

(Copy this table for each piece of data and parameter.)

Data/Parameter	$\omega_{\text{main, CO}_2}$																	
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	<table><tr><th>CO₂ (tCO₂ /t steam)</th><th>Wells</th><th>Main Steam</th></tr><tr><td>09/03/2012</td><td>0.00630</td><td>0.00996</td></tr><tr><td>06/06/2012</td><td>0.00617</td><td>0.00908</td></tr><tr><td>05/09/2012</td><td>0.00677</td><td>0.01100</td></tr><tr><td>08/12/2012</td><td>0.00705</td><td>0.01262</td></tr></table>			CO ₂ (tCO ₂ /t steam)	Wells	Main Steam	09/03/2012	0.00630	0.00996	06/06/2012	0.00617	0.00908	05/09/2012	0.00677	0.01100	08/12/2012	0.00705	0.01262
CO ₂ (tCO ₂ /t steam)	Wells	Main Steam																
09/03/2012	0.00630	0.00996																
06/06/2012	0.00617	0.00908																
05/09/2012	0.00677	0.01100																
08/12/2012	0.00705	0.01262																
Monitoring equipment	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 is 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	Detailed procedures are described in the CDM Monitoring Manual																	
Purpose of data	Project emission calculation																	
Additional comment	-																	

Data/Parameter	$\omega_{\text{main, CH}_4}$																	
Unit	tCH 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	<table><tr><th>CH₄ (tCH₄ /t steam)</th><th>Wells</th><th>Main Steam</th></tr><tr><td>09/03/2012</td><td>2.13E-05</td><td>7.57E-05</td></tr><tr><td>06/06/2012</td><td>1.65E-04</td><td>9.05E-05</td></tr><tr><td>05/09/2012</td><td>4.00E-05</td><td>2.95E-05</td></tr><tr><td>08/12/2012</td><td>2.71E-04</td><td>2.84E-04</td></tr></table>			CH ₄ (tCH ₄ /t steam)	Wells	Main Steam	09/03/2012	2.13E-05	7.57E-05	06/06/2012	1.65E-04	9.05E-05	05/09/2012	4.00E-05	2.95E-05	08/12/2012	2.71E-04	2.84E-04
CH ₄ (tCH ₄ /t steam)	Wells	Main Steam																
09/03/2012	2.13E-05	7.57E-05																
06/06/2012	1.65E-04	9.05E-05																
05/09/2012	4.00E-05	2.95E-05																
08/12/2012	2.71E-04	2.84E-04																
Monitoring equipment	The CH ₄ 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 is 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	Detailed procedures are described in the CDM Monitoring Manual
Purpose of data	Project emission calculation
Additional comment	-

Data/Parameter	M _{s,y}		
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	Refer to Annex 3 Daily Steam Data Wayang Windu Phase 2		
Monitoring equipment	Steam flow to WW-2 turbine		
	Tag number	A2-FIT-0106	
	Serial number	91L410293	
	Accuracy class	0.04%	
	Calibration frequency	Biannually	
	Previous calibration	08/02/2012	
	Calibration	08/08/2012	
	Last calibration	10/12/2012	
	Validity	10/06/2013	
	MBB-1 Well steam flow		
	Tag number	FIT-2301	PIT-2302
	Serial number	01830354	01830135
	Accuracy class	0.065%	0.065%
	Calibration frequency	Biannually	
	Previous calibration	09/03/2012	05/12/2011
	Calibration	07/06/2012	05/06/2012
	Last calibration	05/12/2012	05/12/2012
	Validity	05/06/2013	05/06/2013
	MBA-1 Well steam flow		
	Tag number	FIT-2501	PIT-2502
	Serial number	01830374	01830130
	Accuracy class	0.065%	0.065%
	Calibration frequency	Biannually	
	Previous calibration	07/12/2011	01/12/2011
	Calibration	06/06/2012	01/06/2012
	Last calibration	02/12/2012	02/12/2012
	Validity	02/06/2013	02/06/2013
	MBA-2 Well steam flow		
	Tag number	FIT-2502	PIT-2504
	Serial number	02065517	01830131
Accuracy class	0.065%	0.065%	
Calibration frequency	Biannually		
Previous calibration	07/12/2011	01/12/2011	
Calibration	06/06/2012	01/06/2012	
Last calibration	02/12/2012	02/12/2012	
Validity	02/06/2013	02/06/2013	

MBA-3 Well steam flow

Tag number	FIT-2503	PIT-2506
Serial number	01830360	01830132
Accuracy class	0.065%	0.065%
Calibration frequency	Biannually	
Previous calibration	08/12/2011	01/12/2011
Calibration	05/06/2012	01/06/2012
Last calibration	03/12/2012	01/12/2012
Validity	03/06/2013	01/06/2013

MBA-4 Well steam flow

Tag number	FIT-2504	PIT-2508
Serial number	01830361	01830133
Accuracy class	0.065%	0.065%
Calibration frequency	Biannually	
Previous calibration	08/12/2011	01/12/2011
Calibration	05/06/2012	04/06/2012
Last calibration	04/12/2012	01/12/2012
Validity	04/06/2013	01/06/2013

MBA-5 Well steam flow

Tag number	FIT-2505	PIT-2510
Serial number	01830359	01830134
Accuracy class	0.065%	0.065%
Calibration frequency	Biannually	
Previous calibration	08/12/2011	01/12/2011
Calibration	04/06/2012	04/06/2012
Last calibration	04/12/2012	01/12/2012
Validity	04/06/2013	01/06/2013

MBD-5 Well steam flow

Tag number	FIT-501	PIT-506
Serial number	01845811	01593780
Accuracy class	0.065%	0.065%
Calibration frequency	Biannually	
Previous calibration	12/12/2011	05/12/2011
Calibration	06/06/2012	05/06/2012
Last calibration	06/12/2012	06/12/2012
Validity	06/06/2013	06/06/2013

WWW-1 Brine injection well

Tag number	FIT-984		PIT-918
Serial number	02061116	91M523067	8F196683
Accuracy class	0.08%	0.08%	0.08%
Calibration frequency	Biannually		
Previous calibration	09/01/2012	-	05/01/2012
Calibration	05/07/2012	-	05/07/2012
Last calibration	-	29/12/2012	
Validity	05/01/2013	29/06/2013	05/01/2013

FIT-984 Rosemount S/N 02061116 was replaced with Yokogawa S/N 91M523067 on 29/12/2012

Flow meters are calibrated using internal calibrator.
Refer to Annex 4 Monitoring Equipments for further details.

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

	<p>new steam fields 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 ($M_{S,v}$) is given by:</p> $M_{S,y} = \max((M_{sv,y} + M_{sb,y}), \sum_i M_{so,y})$
QA/QC procedures	<p>Flow meters' instruments are calibrated using internal calibrator by SEG(WW)L EC&I Supervisor. The internal calibrator is calibrated every 2 years by accredited laboratory.</p> <p>In accordance to the SEG(WW)L internal procedure, calibration is to be conducted every 6 months</p> <p>Following the industry's practice, it is acceptable for the calibration to be conducted between 6 months to 1-year period from the last calibration date. , The calibration procedure is described in the CDM monitoring manual and plant routine inspection procedure, the maximum permissible error is 0.1%. Detailed procedures are described in the CDM Monitoring Manual.</p>
Purpose of data	Project emission calculation
Additional comment	Details information about the calibration of the calibrators has been provided to the DoE

Data / Parameter:	EG_y
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. Primary data is sourced from the check kWh meters.
Value(s) of monitored parameter:	Refer to Annex 5 Daily Data Wayang Windu Unit 1 and Unit 2

Monitoring equipment:	<p>Wayang Windu 1 main kWh meter which is owned by PLN</p> <table> <tr> <td>Serial number</td><td>MT-0809A063-01</td></tr> <tr> <td>Accuracy class</td><td>0.2%</td></tr> <tr> <td>Calibration frequency</td><td>Every 5 years</td></tr> <tr> <td>Last calibration</td><td>10/10/2008</td></tr> <tr> <td>Validity</td><td>10/10/2013</td></tr> </table> <p>Wayang Windu 1 check kWh meter which is owned by SEG(WW)L (primary data):</p> <table> <tr> <td>Serial number</td><td>PT-0807A249-01</td></tr> <tr> <td>Accuracy class</td><td>0.2%</td></tr> <tr> <td>Calibration frequency</td><td>Every 2 years</td></tr> <tr> <td>Previous calibration</td><td>06/01/2011</td></tr> <tr> <td>Last calibration</td><td>17/12/2012</td></tr> <tr> <td>Validity</td><td>17/12/2014</td></tr> </table> <p>Wayang Windu 2 main kWh meter which is owned by PLN:</p> <table> <tr> <td>Serial number</td><td>MT-0806A388 - 01</td></tr> <tr> <td>Accuracy class</td><td>0.2%</td></tr> <tr> <td>Calibration frequency</td><td>Every 5 years</td></tr> <tr> <td>Last calibration</td><td>10/10/2008</td></tr> <tr> <td>Validity</td><td>10/10/2013</td></tr> </table> <p>Wayang Windu 2 check kWh meter which is owned by SEG(WW)L (primary data):</p> <table> <tr> <td>Serial number</td><td>PT-0802A194-01</td></tr> <tr> <td>Accuracy class</td><td>0.2%</td></tr> <tr> <td>Calibration frequency</td><td>Every 2 years</td></tr> <tr> <td>Previous calibration</td><td>06/01/2011</td></tr> <tr> <td>Last calibration</td><td>17/12/2012</td></tr> <tr> <td>Validity</td><td>17/12/2014</td></tr> </table> <p>Refer to Annex 4 Monitoring Equipments for further details</p>	Serial number	MT-0809A063-01	Accuracy class	0.2%	Calibration frequency	Every 5 years	Last calibration	10/10/2008	Validity	10/10/2013	Serial number	PT-0807A249-01	Accuracy class	0.2%	Calibration frequency	Every 2 years	Previous calibration	06/01/2011	Last calibration	17/12/2012	Validity	17/12/2014	Serial number	MT-0806A388 - 01	Accuracy class	0.2%	Calibration frequency	Every 5 years	Last calibration	10/10/2008	Validity	10/10/2013	Serial number	PT-0802A194-01	Accuracy class	0.2%	Calibration frequency	Every 2 years	Previous calibration	06/01/2011	Last calibration	17/12/2012	Validity	17/12/2014
Serial number	MT-0809A063-01																																												
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Last calibration	17/12/2012																																												
Validity	17/12/2014																																												
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:	<p>Based on the Standard Operating Procedure of Metering System of PT PLN (Persero) P3B – Jawa Bali revision A, the data from the main meter and the check meter are compared on the monthly basis and any differences greater than 0.4% (the maximum difference of the main meter of 0.2 class and check meter of 0.2 class) will be investigated further. During this monitoring period, the difference between the data from main meter and check meter has never achieved a difference exceeding 0.4% and therefore is considered acceptable.</p> <p>Primary data (data applied to the CERs calculation) is sourced from the check meter.</p> <p>Refer to Annex 6 Main Meter and Check Meter Measurement.</p> <p>The data is double-checked with the records of the electricity transaction.</p> <p>Detailed procedures are described in the CDM Monitoring Manual.</p>																																												
Purpose of data:	Baseline emission calculation																																												
Additional comment:	-																																												
Data / Parameter:	EG_{existing,y}																																												
Unit:	MWh																																												

Description:	Electricity supplied by the existing power generation unit to the grid (total of 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. Primary data is sourced from the check kWh meters.																				
Value(s) of monitored parameter:	Refer to Annex 5 Daily Data Wayang Windu Unit 1																				
Monitoring equipment:	<p>Wayang Windu 1 main kWh meter which is owned by PLN</p> <table border="1"> <tr><td>Serial number</td><td>MT-0809A063-01</td></tr> <tr><td>Accuracy class</td><td>0.2%</td></tr> <tr><td>Calibration frequency</td><td>Every 5 years</td></tr> <tr><td>Last calibration</td><td>10/10/2008</td></tr> <tr><td>Validity</td><td>10/10/2013</td></tr> </table> <p>Wayang Windu 1 check kWh meter which is owned by SEG(WW)L (primary data):</p> <table border="1"> <tr><td>Serial number</td><td>PT-0807A249-01</td></tr> <tr><td>Accuracy class</td><td>0.2%</td></tr> <tr><td>Calibration frequency</td><td>Every 2 years</td></tr> <tr><td>Last calibration</td><td>06/01/2011</td></tr> <tr><td>Validity</td><td>06/01/2013</td></tr> </table> <p>Refer to Annex 4 Monitoring Equipments for further details</p>	Serial number	MT-0809A063-01	Accuracy class	0.2%	Calibration frequency	Every 5 years	Last calibration	10/10/2008	Validity	10/10/2013	Serial number	PT-0807A249-01	Accuracy class	0.2%	Calibration frequency	Every 2 years	Last calibration	06/01/2011	Validity	06/01/2013
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Serial number	PT-0807A249-01																				
Accuracy class	0.2%																				
Calibration frequency	Every 2 years																				
Last calibration	06/01/2011																				
Validity	06/01/2013																				
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:	<p>Based on the Standard Operating Procedure of Metering System of PT PLN (Persero) P3B – Jawa Bali revision A, the data from the main meter and the check meter are compared on the monthly basis and any differences greater than 0.4% (the maximum difference of the main meter of 0.2 class and check meter of 0.2 class) will be investigated further. During this monitoring period, the difference between the data from main meter and check meter has never achieved a difference exceeding 0.4% and therefore is considered acceptable.</p> <p>Primary data (data applied to the CERs calculation) is sourced from the check meter.</p> <p>Refer to Annex 6 Main Meter and Check Meter Measurement.</p> <p>The data is double-checked with the records of the electricity transaction.</p> <p>Detailed procedures are described in the CDM Monitoring Manual.</p>																				
Purpose of data:	Baseline emission calculation																				
Additional comment:	-																				

Data / Parameter:	PE_{FC,i,y}
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:	7.73
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Calculated on the monthly basis
Calculation method (if applicable):	N/A
QA/QC procedures:	Detailed procedures are described in the CDM Monitoring Manual
Purpose of data:	Project emission calculation
Additional comment:	-

Data / Parameter:	FC_{i,j,y}																								
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. Readings from the flowmeter at the inlet of the daily tank for emergency genset and readings from the flowmeter at the inlet diesel tank for the fire pump are recorded during the first week of the month.																								
Value(s) of monitored parameter:	2.42																								
Monitoring equipment:	<p>Flowmeter at the inlet of the daily tank for the diesel fuel consumption for emergency genset</p> <table border="1"> <tr><td>Tag number</td><td>AO-FQ-2033</td></tr> <tr><td>Accuracy class</td><td>2%</td></tr> <tr><td>Calibration frequency</td><td>Annually</td></tr> <tr><td>Previous calibration</td><td>31/01/2011</td></tr> <tr><td>Last calibration</td><td>25/01/2012</td></tr> <tr><td>Validity</td><td>25/01/2013</td></tr> </table> <p>Flowmeter at the inlet diesel tank for the fire pump</p> <table border="1"> <tr><td>Tag Number</td><td>AO-FQ-2032</td></tr> <tr><td>Accuracy class</td><td>1%</td></tr> <tr><td>Calibration frequency</td><td>Annually</td></tr> <tr><td>Previous calibration</td><td>31/01/2011</td></tr> <tr><td>Last calibration</td><td>25/01/2012</td></tr> <tr><td>Validity</td><td>25/01/2013</td></tr> </table>	Tag number	AO-FQ-2033	Accuracy class	2%	Calibration frequency	Annually	Previous calibration	31/01/2011	Last calibration	25/01/2012	Validity	25/01/2013	Tag Number	AO-FQ-2032	Accuracy class	1%	Calibration frequency	Annually	Previous calibration	31/01/2011	Last calibration	25/01/2012	Validity	25/01/2013
Tag number	AO-FQ-2033																								
Accuracy class	2%																								
Calibration frequency	Annually																								
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Accuracy class	1%																								
Calibration frequency	Annually																								
Previous calibration	31/01/2011																								
Last calibration	25/01/2012																								
Validity	25/01/2013																								
Measuring/ Reading/ Recording frequency:	The data is collected monthly																								
Calculation method (if applicable):	N/A																								
QA/QC procedures:	The consistency of measured diesel fuel consumption quantities was cross-checked by an annual energy balance that was based on engine specification fuel consumption (emergency genset and fire pump) and the working hour																								
Purpose of data:	Project emission calculation																								
Additional comment:	-																								

Data / Parameter:	NCV_{i,v}
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Unit:	GJ/ton
Description:	Weighted average net calorific value of diesel fuel in year y
Measured/ Calculated / Default:	Default
Source of data:	National value (Pertamina handbook – Bahan Bakar Minyak Elpiji dan BBG)
Value(s) of monitored parameter:	42.73
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	The value is recorded annually
Calculation method (if applicable):	N/A
QA/QC procedures:	Detailed procedures are described in the CDM Monitoring Manual
Purpose of data:	Project emission calculation
Additional comment:	-

Data / Parameter:	EF_{CO₂,i,y}
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
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	The value is recorded annually
Calculation method (if applicable):	N/A
QA/QC procedures:	Detailed procedures are described in the CDM Monitoring Manual
Purpose of data:	Project emission calculation
Additional comment:	-

TEG_y (Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y) is not monitored for the project activity. Based on ACM0002 ver 9, TEG_y is only applicable to be monitored for hydro power plants and is not a requirement for geothermal power plants.

D.3. Implementation of sampling plan

>>

Not applicable for this project activity.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

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 (tCO₂/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 CO₂ 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:

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

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

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 01/06/2030.

$EF_{grid,CM,y}$

The value applied is 0.891 tCO₂/yr based on ex-ante calculation in the registered PDD.

Monitored Baseline Emission Calculation

EG^1	Electricity supplied by the project activity to the grid	1,076,212	MWh
$EG_{existing}^2$	Monitored	524,862	MWh

¹ Refer to Annex 5 for daily generation data from Wayang Windu Phase 1 and Wayang Windu Phase 2 geothermal power project

² Refer to Annex 5 for daily generation data from Wayang Windu Phase 1 geothermal power project

Duration Monitoring Period	01/06/2012 – 31/12/2012	214	Days
$EG_{historical,y}$	Yearly average of historical electricity delivered by the existing facility to the grid	912,476	MWh
$EG_{historical,MP}$	$214/365 \times 912,476$	534,986	MWh
$EG_{baseline}$	$MAX (EG_{historical,MP}, EG_{existing,MP})$	534,986	MWh
$EG - EG_{baseline}$		541,227	MWh
BE	$(EG - EG_{baseline}) \cdot EF_{grid,CM,y}$	481,962	t CO ₂ e

E.2. Calculation of project emissions or actual net GHG removals by sinks

>>

The formula used for determination of the project emissions are described in section B.6.1 of the Project Design Document v3 dated 02/12/2010, 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 (tCO₂/yr)

PES_y = Project emission of CH₄ and CO₂ due to the release of non-condensable gases from the stream produced in geothermal power plant in year y (tCO₂/yr)

$PEFF_y$ = Project emission from combustion of fossil fuels related to the operation of the geothermal power plant in year y (tCO₂/yr)

Project emission of CO₂ and CH₄ due to the release of non-condensable gases from the steam produced in the geothermal power plant is calculated as:

$$PES_y = (\omega_{main,CO_2} + \omega_{main,CH_4} \cdot GWP_{CH_4}) \cdot M_{S,y}$$

Where:

PES_y = Project emission of CH₄ and CO₂ due to the release of non-condensable gases from the stream produced in geothermal power plant in year y (tCO₂/yr)

ω_{main,CO_2} = Average mass fraction of CO₂ in the produced steam (non-dimensional)

ω_{main,CH_4} = Average mass fraction of CH₄ in the produced steam (non-dimensional)

GWP_{CH_4} = Global warming potential of CH₄ valid for the relevant commitment period (tCO₂/tCH₄)

$M_{S,y}$ = 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:

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

Where:

$PEFF_y$ = Project emission from combustion of fossil fuels related to the operation of the geothermal power plant in year y (tCO₂/yr)

$PE_{FC,i,y}$ = CO₂ emissions from fossil fuel combustion in process j during the year y (tCO₂/yr). This parameter will be calculated by the "tool to calculate project or leakage CO₂ emissions from fossil fuel combustion version 02"

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

Where:

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

$COEF_{i,y}$ = CO₂ emission coefficient of diesel fuel (tCO₂/ton)

$COEF_{i,y}$ is calculated based on net calorific value and CO₂ emission factor of diesel fuel, as follows:

$$COEF_{i,y} = NCV_{diesel,y} \cdot EF_{CO_2,diesel,y}$$

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)

$EF_{CO_2,diesel,y}$ = Weighted average CO₂ 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) (tCO₂/GJ)

Monitored Project Emission

Period	Diesel Consumption [liters]
01/06/2012 - 30/06/2012	208
01/07/2012 - 31/07/2012	377
01/08/2012 - 31/08/2012	387
01/09/2012 - 30/09/2012	805
01/10/2012 - 31/10/2012	251
01/11/2012 - 30/11/2012	453
01/12/2012 - 31/12/2012	298

$\sum FC_{diesel}$	$\sum FC_{diesel,j} \cdot \rho_{diesel,j}^3$	2.42	t
$PEFF$	$\sum FC_{diesel,j,y} \cdot NCV_{diesel,y} \cdot EF_{CO_2,diesel,y}^4$	7.73	t CO2e
PES_y	$(\omega_{main,CO_2} + \omega_{main,CH_4} \cdot GWP_{CH_4}) \cdot M_{S,y}^5$	73,970	t CO2e
PE	$PES_y + PEFF_y$	73,979	t CO2e

E.3. Calculation of leakage

>>

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. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

³Diesel density, Source: national value of 0.87 kg/Litre (Pertamina handbook – Bahan Bakar Minyak Elpiji dan BBG). Fossil fuel consumption is recorded on the monthly basis.

⁴ Diesel net calorific value, Source: Source: Bahan Bakar Minyak ELPIJI dan BBG of 42.73 GJ/ton. Diesel effective CO₂ 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 tCO₂/GJ

⁵ Refer to Annex 5 for daily steam data from Wayang Windu Phase 2 geothermal power project. PES is recorded on the daily basis

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	481,962	73,979	-	407,983

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	466,011	407,983

* 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 tCO₂e/year × 214 Days in the Monitoring Period / 365 days per year = 466,011 tCO₂e.

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

>>

The maximum emission reduction generated by this project activity within the proposed Monitoring period is 466,011 tonnes of CO₂e, and the actual emission reduction is 407,983 tonnes of CO₂e. The actual CER generation is 12.45 % lower than the values applied in ex-ante estimation of the registered PDD. This is because of the wells performance which was subjected to depletion, but also planned and forced outages which occurred to Wayang Windu Phase 1 and 2.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO ₂ e)	1.561.773*	-

* including actual emission reduction achieved by this MR.

Annex 1
Downtime and Shutdown Records

WW Unit# 2 Un-Availability State							
DESYNCHRONIZED		SYNCHRONIZED		TOTAL HOURS	TOTAL GENERATION LOST (MWh)	State	UN-AVAILABILITY CAUSED
DATE	TIME	DATE	TIME				
27-Sep-12	15:47	27-Sep-12	21:46	5:59	678.6	Forced Outage (FO)	Unit trip due to over current at Transmission line
12-Oct-12	21:43	21-Oct-12	7:40	201:57	22,904.0	Planned Outage (PO)	Turbine Overhaul
21-Oct-12	8:01	21-Oct-12	21:44	13:43	1,499.0	Forced Outage (FO)	Turbine Trip due to reverse power
21-Oct-12	22:16	22-Oct-12	2:08	3:52	438.5	Forced Outage (FO)	Turbine Trip due to 87L active (differential line), unbalance current measured by CT PLN

WW Unit#1 Un-Availability State							
DESYNCHRONIZED		SYNCHRONIZED		TOTAL HOURS	TOTAL GENERATION LOST (MWh)	State	UN-AVAILABILITY CAUSED
DATE	TIME	DATE	TIME				
8-Jun-12	21:44	20-Jun-12	16:24	282:40	31,353.4	Planned Outage (PO)	Turbine Overhaul
20-Jun-12	20:20	20-Jun-12	21:48	1:28	162.7	Forced Outage (FO)	Turbine Trip due to steam high NCG content, condenser vacuum drop to -525 mbar
27-Sep-12	15:47	27-Sep-12	18:34	2:47	314.8	Forced Outage (FO)	Unit trip due to over current at Transmission line

Annex 2

List of Relevant Operation and Maintenance Procedures

FIT Routine & Venture Inspection Procedures
Routine Operation Procedures
Metering System Operation, Maintenance and Calibration
QA/QC Laboratory Analysis & Utilities Procedures
Gas Sampling Procedures

Annex 3

Daily steam production data from Wayang Windu Phase 2 geothermal power project (M_s), Daily steam generation data measured by Venturi flowmeter ($M_{sv,y}$), Daily losses of brine at the steam separator ($M_{sb,y}$), Daily steam generation data measured by Orifice plates ($M_{so,y}$) during Monitoring Period

Date	$M_{so,i,y}$ Wells	$M_{sb,y}$ Brine	$M_{sv,y}$ Main Steam	$M_{sb,y} + M_{sv,y}$ Brine+Main Steam	$M_{s,conservative}$ Wells/Brine+Main Steam	M_s Tons
01-Jun-12	17,734.00	3,052.00	18,850.00	21,902.00	Brine+Main Steam	21,902.00
02-Jun-12	18,799.00	2,997.00	18,840.00	21,837.00	Brine+Main Steam	21,837.00
03-Jun-12	18,779.00	3,011.00	18,840.00	21,851.00	Brine+Main Steam	21,851.00
04-Jun-12	18,784.00	2,995.00	18,840.00	21,835.00	Brine+Main Steam	21,835.00
05-Jun-12	18,791.00	2,925.00	18,850.00	21,775.00	Brine+Main Steam	21,775.00
06-Jun-12	18,414.00	3,015.00	18,840.00	21,855.00	Brine+Main Steam	21,855.00
07-Jun-12	18,505.00	2,814.00	18,850.00	21,664.00	Brine+Main Steam	21,664.00
08-Jun-12	17,377.00	1,817.00	18,850.00	20,667.00	Brine+Main Steam	20,667.00
09-Jun-12	15,529.00	233.00	18,840.00	19,073.00	Brine+Main Steam	19,073.00
10-Jun-12	15,423.00	871.00	18,850.00	19,721.00	Brine+Main Steam	19,721.00
11-Jun-12	15,351.00	170.00	18,840.00	19,010.00	Brine+Main Steam	19,010.00
12-Jun-12	15,362.00	66.00	18,850.00	18,916.00	Brine+Main Steam	18,916.00
13-Jun-12	15,399.00	716.00	18,850.00	19,566.00	Brine+Main Steam	19,566.00
14-Jun-12	15,389.00	288.00	18,840.00	19,128.00	Brine+Main Steam	19,128.00
15-Jun-12	15,403.00	900.00	18,850.00	19,750.00	Brine+Main Steam	19,750.00
16-Jun-12	15,459.00	853.00	18,840.00	19,693.00	Brine+Main Steam	19,693.00
17-Jun-12	15,951.00	10.00	18,850.00	18,860.00	Brine+Main Steam	18,860.00
18-Jun-12	17,023.00	538.00	18,850.00	19,388.00	Brine+Main Steam	19,388.00
19-Jun-12	17,977.00	1,168.00	18,840.00	20,008.00	Brine+Main Steam	20,008.00
20-Jun-12	18,595.00	1,165.00	18,850.00	20,015.00	Brine+Main Steam	20,015.00
21-Jun-12	19,036.00	1,000.00	18,270.00	19,270.00	Brine+Main Steam	19,270.00
22-Jun-12	17,938.00	1,230.00	18,830.00	20,060.00	Brine+Main Steam	20,060.00
23-Jun-12	18,259.00	1,344.00	18,850.00	20,194.00	Brine+Main Steam	20,194.00
24-Jun-12	18,478.00	1,372.00	18,830.00	20,202.00	Brine+Main Steam	20,202.00
25-Jun-12	18,661.00	2,003.00	18,840.00	20,843.00	Brine+Main Steam	20,843.00
26-Jun-12	18,669.00	1,708.00	18,850.00	20,558.00	Brine+Main Steam	20,558.00
27-Jun-12	18,690.00	1,568.00	18,850.00	20,418.00	Brine+Main Steam	20,418.00
28-Jun-12	18,322.00	1,590.00	18,840.00	20,430.00	Brine+Main Steam	20,430.00
29-Jun-12	18,428.00	1,632.00	18,850.00	20,482.00	Brine+Main Steam	20,482.00
30-Jun-12	16,522.00	1,646.00	16,550.00	18,196.00	Brine+Main Steam	18,196.00
01-Jul-12	14,959.00	1,683.00	14,750.00	16,433.00	Brine+Main Steam	16,433.00
02-Jul-12	18,985.00	1,732.00	18,850.00	20,582.00	Brine+Main Steam	20,582.00
03-Jul-12	18,837.00	1,749.00	18,840.00	20,589.00	Brine+Main Steam	20,589.00
04-Jul-12	18,732.00	1,797.00	18,850.00	20,647.00	Brine+Main Steam	20,647.00
05-Jul-12	18,681.00	1,798.00	18,910.00	20,708.00	Brine+Main Steam	20,708.00
06-Jul-12	18,634.00	1,728.00	18,840.00	20,568.00	Brine+Main Steam	20,568.00
07-Jul-12	16,619.00	1,771.00	17,630.00	19,401.00	Brine+Main Steam	19,401.00
08-Jul-12	15,910.00	1,807.00	17,120.00	18,927.00	Brine+Main Steam	18,927.00
09-Jul-12	18,886.00	1,810.00	18,840.00	20,650.00	Brine+Main Steam	20,650.00
10-Jul-12	18,828.00	1,829.00	18,850.00	20,679.00	Brine+Main Steam	20,679.00
11-Jul-12	18,831.00	1,834.00	18,850.00	20,684.00	Brine+Main Steam	20,684.00
12-Jul-12	18,689.80	1,829.00	18,840.00	20,669.00	Brine+Main Steam	20,669.00
13-Jul-12	18,753.40	1,847.00	18,850.00	20,697.00	Brine+Main Steam	20,697.00
14-Jul-12	18,753.40	1,867.00	18,840.00	20,707.00	Brine+Main Steam	20,707.00
15-Jul-12	16,531.80	1,865.00	16,670.00	18,535.00	Brine+Main Steam	18,535.00
16-Jul-12	15,868.00	1,825.00	16,160.00	17,985.00	Brine+Main Steam	17,985.00
17-Jul-12	15,855.00	1,878.00	16,130.00	18,008.00	Brine+Main Steam	18,008.00
18-Jul-12	15,871.00	1,889.00	18,480.00	20,369.00	Brine+Main Steam	20,369.00
19-Jul-12	15,827.00	1,913.00	18,840.00	20,753.00	Brine+Main Steam	20,753.00
20-Jul-12	15,833.00	1,934.00	18,850.00	20,784.00	Brine+Main Steam	20,784.00

Date	M _{so,i,y}	M _{sb,y}	M _{sv,y}	M _{sb,y} + M _{sv,y}	M _{s,conservative}	M _s
	Wells	Brine	Main Steam	Brine+Main Steam	Wells/Brine+Main Steam	Tons
21-Jul-12	18,698.00	2,814.00	18,840.00	21,654.00	Brine+Main Steam	21,654.00
22-Jul-12	18,555.00	2,394.00	18,820.00	21,214.00	Brine+Main Steam	21,214.00
23-Jul-12	18,586.00	2,054.00	18,850.00	20,904.00	Brine+Main Steam	20,904.00
24-Jul-12	18,667.20	2,020.00	18,840.00	20,860.00	Brine+Main Steam	20,860.00
25-Jul-12	18,736.68	2,005.00	18,850.00	20,855.00	Brine+Main Steam	20,855.00
26-Jul-12	18,724.68	2,022.00	18,840.00	20,862.00	Brine+Main Steam	20,862.00
27-Jul-12	18,714.68	1,989.00	18,850.00	20,839.00	Brine+Main Steam	20,839.00
28-Jul-12	18,718.68	2,020.00	18,850.00	20,870.00	Brine+Main Steam	20,870.00
29-Jul-12	18,721.68	1,993.00	18,820.00	20,813.00	Brine+Main Steam	20,813.00
30-Jul-12	18,714.68	1,996.00	18,850.00	20,846.00	Brine+Main Steam	20,846.00
31-Jul-12	18,708.68	2,003.00	18,840.00	20,843.00	Brine+Main Steam	20,843.00
01-Aug-12	18,706.68	2,033.00	18,850.00	20,883.00	Brine+Main Steam	20,883.00
02-Aug-12	18,732.68	2,044.00	18,850.00	20,894.00	Brine+Main Steam	20,894.00
03-Aug-12	18,706.68	2,029.00	18,840.00	20,869.00	Brine+Main Steam	20,869.00
04-Aug-12	18,704.68	2,068.00	18,850.00	20,918.00	Brine+Main Steam	20,918.00
05-Aug-12	18,704.68	2,065.00	18,820.00	20,885.00	Brine+Main Steam	20,885.00
06-Aug-12	18,293.40	2,070.00	18,840.00	20,910.00	Brine+Main Steam	20,910.00
07-Aug-12	16,205.00	2,042.00	18,850.00	20,892.00	Brine+Main Steam	20,892.00
08-Aug-12	16,204.00	2,021.00	15,430.00	17,451.00	Brine+Main Steam	17,451.00
09-Aug-12	16,223.00	2,015.00	18,840.00	20,855.00	Brine+Main Steam	20,855.00
10-Aug-12	16,223.00	2,011.00	18,850.00	20,861.00	Brine+Main Steam	20,861.00
11-Aug-12	16,214.00	2,023.00	18,850.00	20,873.00	Brine+Main Steam	20,873.00
12-Aug-12	16,196.00	2,073.00	18,820.00	20,893.00	Brine+Main Steam	20,893.00
13-Aug-12	16,171.00	2,073.00	18,840.00	20,913.00	Brine+Main Steam	20,913.00
14-Aug-12	16,152.00	2,089.00	18,850.00	20,939.00	Brine+Main Steam	20,939.00
15-Aug-12	16,145.00	2,092.00	18,840.00	20,932.00	Brine+Main Steam	20,932.00
16-Aug-12	16,145.00	2,090.00	18,850.00	20,940.00	Brine+Main Steam	20,940.00
17-Aug-12	16,117.00	2,090.00	18,850.00	20,940.00	Brine+Main Steam	20,940.00
18-Aug-12	14,619.00	2,026.00	17,970.00	19,996.00	Brine+Main Steam	19,996.00
19-Aug-12	15,162.00	2,100.00	18,100.00	20,200.00	Brine+Main Steam	20,200.00
20-Aug-12	16,163.00	2,223.00	18,850.00	21,073.00	Brine+Main Steam	21,073.00
21-Aug-12	16,118.00	2,229.00	18,850.00	21,079.00	Brine+Main Steam	21,079.00
22-Aug-12	16,094.00	2,227.00	18,840.00	21,067.00	Brine+Main Steam	21,067.00
23-Aug-12	17,140.00	2,223.00	18,850.00	21,073.00	Brine+Main Steam	21,073.00
24-Aug-12	18,565.10	2,157.00	18,840.00	20,997.00	Brine+Main Steam	20,997.00
25-Aug-12	20,112.80	2,203.00	18,850.00	21,053.00	Brine+Main Steam	21,053.00
26-Aug-12	20,121.80	2,312.00	18,820.00	21,132.00	Brine+Main Steam	21,132.00
27-Aug-12	18,692.80	2,219.00	18,840.00	21,059.00	Brine+Main Steam	21,059.00
28-Aug-12	18,961.16	2,343.00	18,850.00	21,193.00	Brine+Main Steam	21,193.00
29-Aug-12	16,919.00	2,243.00	18,850.00	21,093.00	Brine+Main Steam	21,093.00
30-Aug-12	16,935.00	2,176.00	18,840.00	21,016.00	Brine+Main Steam	21,016.00
01-Sep-12	16,923.00	2,259.00	18,840.00	21,099.00	Brine+Main Steam	21,099.00
02-Sep-12	16,901.00	2,159.00	18,810.00	20,969.00	Brine+Main Steam	20,969.00
03-Sep-12	16,881.00	2,302.00	18,850.00	21,152.00	Brine+Main Steam	21,152.00
04-Sep-12	16,851.00	2,213.00	18,840.00	21,053.00	Brine+Main Steam	21,053.00
05-Sep-12	16,822.00	2,268.00	18,880.00	21,148.00	Brine+Main Steam	21,148.00
06-Sep-12	16,861.60	2,196.00	18,880.00	21,076.00	Brine+Main Steam	21,076.00
07-Sep-12	19,283.80	2,298.00	18,920.00	21,218.00	Brine+Main Steam	21,218.00
08-Sep-12	17,737.00	2,187.00	18,930.00	21,117.00	Brine+Main Steam	21,117.00
09-Sep-12	17,739.00	2,250.00	18,820.00	21,070.00	Brine+Main Steam	21,070.00
10-Sep-12	17,710.00	2,257.00	18,850.00	21,107.00	Brine+Main Steam	21,107.00
11-Sep-12	17,734.00	2,169.00	18,840.00	21,009.00	Brine+Main Steam	21,009.00
12-Sep-12	17,703.00	2,266.00	18,850.00	21,116.00	Brine+Main Steam	21,116.00
13-Sep-12	17,699.00	2,239.00	18,840.00	21,079.00	Brine+Main Steam	21,079.00
14-Sep-12	17,696.00	2,236.00	18,840.00	21,076.00	Brine+Main Steam	21,076.00

Date	M _{so,i,y}	M _{sb,y}	M _{sv,y}	M _{sb,y} + M _{sv,y}	M _{s,conservative}	M _s
	Wells	Brine	Main Steam	Brine+Main Steam	Wells/Brine+Main Steam	Tons
15-Sep-12	17,661.00	2,203.00	18,850.00	21,053.00	Brine+Main Steam	21,053.00
16-Sep-12	17,662.00	2,421.00	18,830.00	21,251.00	Brine+Main Steam	21,251.00
17-Sep-12	17,651.00	2,242.00	18,840.00	21,082.00	Brine+Main Steam	21,082.00
18-Sep-12	20,057.00	2,347.00	18,850.00	21,197.00	Brine+Main Steam	21,197.00
19-Sep-12	19,771.00	2,476.00	18,840.00	21,316.00	Brine+Main Steam	21,316.00
20-Sep-12	18,658.00	2,373.00	18,850.00	21,223.00	Brine+Main Steam	21,223.00
21-Sep-12	19,288.00	2,394.00	18,850.00	21,244.00	Brine+Main Steam	21,244.00
22-Sep-12	19,691.00	2,467.00	18,840.00	21,307.00	Brine+Main Steam	21,307.00
23-Sep-12	19,670.00	2,369.00	18,830.00	21,199.00	Brine+Main Steam	21,199.00
24-Sep-12	19,811.00	2,422.00	18,840.00	21,262.00	Brine+Main Steam	21,262.00
25-Sep-12	19,854.00	2,357.00	18,850.00	21,207.00	Brine+Main Steam	21,207.00
26-Sep-12	19,871.00	2,348.00	18,840.00	21,188.00	Brine+Main Steam	21,188.00
27-Sep-12	18,645.06	3,305.99	13,370.00	16,675.99	Wells	18,645.06
28-Sep-12	20,026.12	2,292.59	20,090.00	22,382.59	Brine+Main Steam	22,382.59
29-Sep-12	19,888.36	2,478.48	20,060.00	22,538.48	Brine+Main Steam	22,538.48
30-Sep-12	20,087.71	2,327.93	20,100.00	22,427.93	Brine+Main Steam	22,427.93
01-Oct-12	20,025.81	2,372.13	19,510.00	21,882.13	Brine+Main Steam	21,882.13
02-Oct-12	19,652.78	2,260.90	19,460.00	21,720.90	Brine+Main Steam	21,720.90
03-Oct-12	19,517.82	2,368.19	19,320.00	21,688.19	Brine+Main Steam	21,688.19
04-Oct-12	19,243.43	2,287.70	19,180.00	21,467.70	Brine+Main Steam	21,467.70
05-Oct-12	19,937.62	2,426.61	19,330.00	21,756.61	Brine+Main Steam	21,756.61
06-Oct-12	20,200.44	2,321.31	19,230.00	21,551.31	Brine+Main Steam	21,551.31
07-Oct-12	20,191.30	2,288.27	19,360.00	21,648.27	Brine+Main Steam	21,648.27
08-Oct-12	20,141.10	2,451.96	19,190.00	21,641.96	Brine+Main Steam	21,641.96
09-Oct-12	20,221.67	2,333.01	19,700.00	22,033.01	Brine+Main Steam	22,033.01
10-Oct-12	20,162.15	2,434.11	19,580.00	22,014.11	Brine+Main Steam	22,014.11
11-Oct-12	20,271.99	2,329.28	19,660.00	21,989.28	Brine+Main Steam	21,989.28
12-Oct-12	16,077.79	2,337.53	11,140.00	13,477.53	Wells	16,077.79
13-Oct-12	10,329.19	2,261.17	4,040.00	6,301.17	Wells	10,329.19
14-Oct-12	4,470.55	2,186.63	4,040.00	6,226.63	Brine+Main Steam	6,226.63
15-Oct-12	3,057.49	2,157.55	4,040.00	6,197.55	Brine+Main Steam	6,197.55
16-Oct-12	3,668.63	2,093.27	4,040.00	6,133.27	Brine+Main Steam	6,133.27
17-Oct-12	4,223.52	2,124.25	4,030.00	6,154.25	Brine+Main Steam	6,154.25
18-Oct-12	4,141.46	2,045.81	4,040.00	6,085.81	Brine+Main Steam	6,085.81
19-Oct-12	4,572.07	2,023.37	4,040.00	6,063.37	Brine+Main Steam	6,063.37
20-Oct-12	5,572.20	1,998.01	7,480.00	9,478.01	Brine+Main Steam	9,478.01
21-Oct-12	12,811.34	2,029.22	16,870.00	18,899.22	Brine+Main Steam	18,899.22
22-Oct-12	20,486.96	2,046.22	19,490.00	21,536.22	Brine+Main Steam	21,536.22
23-Oct-12	21,359.68	2,082.28	19,550.00	21,632.28	Brine+Main Steam	21,632.28
24-Oct-12	21,846.28	2,047.91	19,790.00	21,837.91	Wells	21,846.28
25-Oct-12	20,617.95	2,061.74	19,070.00	21,131.74	Brine+Main Steam	21,131.74
26-Oct-12	21,668.68	2,125.19	19,830.00	21,955.19	Brine+Main Steam	21,955.19
27-Oct-12	21,628.34	2,112.55	19,980.00	22,092.55	Brine+Main Steam	22,092.55
28-Oct-12	21,535.81	2,120.50	20,080.00	22,200.50	Brine+Main Steam	22,200.50
29-Oct-12	20,105.16	2,144.09	20,160.00	22,304.09	Brine+Main Steam	22,304.09
30-Oct-12	20,364.09	2,188.41	20,160.00	22,348.41	Brine+Main Steam	22,348.41
31-Oct-12	20,401.51	2,184.41	20,170.00	22,354.41	Brine+Main Steam	22,354.41
1-Nov-12	20,706.82	2,239.70	20,190.00	22,429.70	Brine+Main Steam	22,429.70
2-Nov-12	20,577.36	2,293.52	20,190.00	22,483.52	Brine+Main Steam	22,483.52
3-Nov-12	20,397.67	2,225.24	20,190.00	22,415.24	Brine+Main Steam	22,415.24
4-Nov-12	20,442.31	2,195.64	20,130.00	22,325.64	Brine+Main Steam	22,325.64
5-Nov-12	20,549.71	2,278.10	20,180.00	22,458.10	Brine+Main Steam	22,458.10
6-Nov-12	20,490.64	2,313.61	20,190.00	22,503.61	Brine+Main Steam	22,503.61
7-Nov-12	20,324.09	2,281.65	20,200.00	22,481.65	Brine+Main Steam	22,481.65
8-Nov-12	20,436.00	2,206.30	20,190.00	22,396.30	Brine+Main Steam	22,396.30

Date	M _{so,i,y}	M _{sb,y}	M _{sv,y}	M _{sb,y} + M _{sv,y}	M _{s,conservative}	M _s
	Wells	Brine	Main Steam	Brine+Main Steam	Wells/Brine+Main Steam	Tons
9-Nov-12	20,433.55	2,273.29	20,170.00	22,443.29	Brine+Main Steam	22,443.29
10-Nov-12	20,459.19	2,189.97	20,190.00	22,379.97	Brine+Main Steam	22,379.97
11-Nov-12	20,423.19	2,253.10	20,190.00	22,443.10	Brine+Main Steam	22,443.10
12-Nov-12	20,410.83	2,192.30	20,180.00	22,372.30	Brine+Main Steam	22,372.30
13-Nov-12	20,201.28	2,205.60	20,180.00	22,385.60	Brine+Main Steam	22,385.60
14-Nov-12	20,298.48	2,259.70	20,190.00	22,449.70	Brine+Main Steam	22,449.70
15-Nov-12	19,912.39	2,325.50	20,190.00	22,515.50	Brine+Main Steam	22,515.50
16-Nov-12	19,930.16	2,189.00	20,170.00	22,359.00	Brine+Main Steam	22,359.00
17-Nov-12	20,089.12	2,238.80	20,160.00	22,398.80	Brine+Main Steam	22,398.80
18-Nov-12	20,322.89	2,501.30	19,950.00	22,451.30	Brine+Main Steam	22,451.30
19-Nov-12	20,376.48	2,454.40	19,830.00	22,284.40	Brine+Main Steam	22,284.40
20-Nov-12	20,373.05	2,250.20	18,850.00	21,100.20	Brine+Main Steam	21,100.20
21-Nov-12	19,859.54	2,286.80	18,850.00	21,136.80	Brine+Main Steam	21,136.80
22-Nov-12	19,510.37	2,474.80	18,840.00	21,314.80	Brine+Main Steam	21,314.80
23-Nov-12	19,519.09	2,276.00	18,850.00	21,126.00	Brine+Main Steam	21,126.00
24-Nov-12	19,594.84	2,512.80	18,830.00	21,342.80	Brine+Main Steam	21,342.80
25-Nov-12	19,627.03	2,315.59	18,850.00	21,165.59	Brine+Main Steam	21,165.59
26-Nov-12	19,660.73	2,409.30	18,840.00	21,249.30	Brine+Main Steam	21,249.30
27-Nov-12	19,631.84	2,340.91	18,850.00	21,190.91	Brine+Main Steam	21,190.91
28-Nov-12	19,650.97	2,372.09	18,850.00	21,222.09	Brine+Main Steam	21,222.09
29-Nov-12	19,633.45	2,284.80	18,840.00	21,124.80	Brine+Main Steam	21,124.80
30-Nov-12	19,600.57	2,374.41	18,850.00	21,224.41	Brine+Main Steam	21,224.41
1-Dec-12	19,507.42	2,363.41	18,840.00	21,203.41	Brine+Main Steam	21,203.41
2-Dec-12	19,548.83	2,429.19	18,850.00	21,279.19	Brine+Main Steam	21,279.19
3-Dec-12	19,770.41	2,336.41	18,850.00	21,186.41	Brine+Main Steam	21,186.41
4-Dec-12	19,991.36	2,264.59	18,840.00	21,104.59	Brine+Main Steam	21,104.59
5-Dec-12	19,785.56	2,391.11	18,850.00	21,241.11	Brine+Main Steam	21,241.11
6-Dec-12	19,662.07	2,551.59	18,840.00	21,391.59	Brine+Main Steam	21,391.59
7-Dec-12	19,688.71	2,468.30	18,850.00	21,318.30	Brine+Main Steam	21,318.30
8-Dec-12	19,620.36	2,286.41	18,840.00	21,126.41	Brine+Main Steam	21,126.41
9-Dec-12	19,634.07	2,515.70	18,850.00	21,365.70	Brine+Main Steam	21,365.70
10-Dec-12	19,950.99	2,251.00	13,770.00	16,021.00	Wells	19,950.99
11-Dec-12	19,896.76	2,456.59	18,850.00	21,306.59	Brine+Main Steam	21,306.59
12-Dec-12	19,875.85	2,409.00	18,840.00	21,249.00	Brine+Main Steam	21,249.00
13-Dec-12	19,792.09	2,401.50	18,850.00	21,251.50	Brine+Main Steam	21,251.50
14-Dec-12	19,947.83	2,226.20	18,840.00	21,066.20	Brine+Main Steam	21,066.20
15-Dec-12	19,985.87	2,353.20	18,850.00	21,203.20	Brine+Main Steam	21,203.20
16-Dec-12	19,894.73	2,287.50	18,840.00	21,127.50	Brine+Main Steam	21,127.50
17-Dec-12	19,833.59	2,493.70	18,850.00	21,343.70	Brine+Main Steam	21,343.70
18-Dec-12	19,906.59	2,506.50	18,850.00	21,356.50	Brine+Main Steam	21,356.50
19-Dec-12	20,079.92	2,318.39	18,840.00	21,158.39	Brine+Main Steam	21,158.39
20-Dec-12	20,157.97	2,401.70	18,850.00	21,251.70	Brine+Main Steam	21,251.70
21-Dec-12	19,993.44	2,399.91	18,840.00	21,239.91	Brine+Main Steam	21,239.91
22-Dec-12	20,120.17	2,335.00	18,850.00	21,185.00	Brine+Main Steam	21,185.00
23-Dec-12	20,064.70	2,412.50	18,840.00	21,252.50	Brine+Main Steam	21,252.50
24-Dec-12	20,036.94	2,313.39	18,850.00	21,163.39	Brine+Main Steam	21,163.39
25-Dec-12	19,916.08	2,313.39	18,850.00	21,163.39	Brine+Main Steam	21,163.39
26-Dec-12	20,192.09	2,251.00	18,840.00	21,091.00	Brine+Main Steam	21,091.00
27-Dec-12	20,120.99	2,251.00	18,850.00	21,101.00	Brine+Main Steam	21,101.00
28-Dec-12	20,141.21	7,585.69	18,840.00	26,425.69	Brine+Main Steam	26,425.69
29-Dec-12	20,159.41	4,136.81	18,850.00	22,986.81	Brine+Main Steam	22,986.81
30-Dec-12	20,114.20	2,354.59	18,850.00	21,204.59	Brine+Main Steam	21,204.59
31-Dec-12	20,078.11	2,342.09	18,840.00	21,182.09	Brine+Main Steam	21,182.09

Annex 4 Monitoring Equipment

Legends

	means historical calibration by Internal Lab
	means historical calibration by External Lab
	means future calibration to be conducted
	means equipment replaced/installed

Parameter	Measurement Device	Tag Number	Brand (serial number)	Calib. Report IX		Calib. Report X		Calib. Report XI		Remarks
				Calibration Date	Valid until	Calibration Date	Validity	Calibration Date	Validity	
Msv,y (Ms,y in section D.2)	Multi Variable Transmitter	A2-FIT-0106	Yokogawa (S/N 91L410293)	08/02/2012	08/08/2012	08/08/2012	08/02/2013	10/12/2012	10/06/2013	Steam flow to WW-2 turbine
Mso,y (Ms,y in section D.2)	Differential Pressure Transmitter - Orifice Plate	FIT-2301	Rosemount (S/N 01830354)	09/03/2012	09/09/2012	07/06/2012	07/12/2012	05/12/2012	05/06/2013	MBB-1 Well steam flow
	Pressure Transmitter - Orifice Plate	PIT-2302	Rosemount (S/N 01830135)	05/12/2011	05/06/2012	05/06/2012	05/12/2012	05/12/2012	05/06/2013	
Mso,y (Ms,y in section D.2)	Differential Pressure Transmitter - Orifice Plate	FIT-2501	Rosemount (S/N 01830374)	07/12/2011	07/06/2012	06/06/2012	06/12/2012	02/12/2012	02/06/2013	MBA-1 Well steam flow
	Pressure Transmitter - Orifice Plate	PIT-2502	Rosemount (S/N 01830130)	01/12/2011	01/06/2012	01/06/2012	01/12/2012	02/12/2012	02/06/2013	
Mso,y (Ms,y in section D.2)	Differential Pressure Transmitter - Orifice Plate	FIT-2502	Rosemount (S/N 02065517)	07/12/2011	07/06/2012	06/06/2012	06/12/2012	02/12/2012	02/06/2013	MBA-2 Well steam flow
	Pressure Transmitter - Orifice Plate	PIT-2504	Rosemount (S/N 01830131)	01/12/2011	01/06/2012	01/06/2012	01/12/2012	02/12/2012	02/06/2013	
Mso,y (Ms,y in section D.2)	Differential Pressure Transmitter - Orifice Plate	FIT-2503	Rosemount (S/N 01830360)	08/12/2011	08/06/2012	05/06/2012	05/12/2012	03/12/2012	03/06/2013	MBA-3 Well steam flow
	Pressure Transmitter - Orifice Plate	PIT-2506	Rosemount (S/N 01830132)	01/12/2011	01/06/2012	01/06/2012	01/12/2012	01/12/2012	01/06/2013	

Parameter	Measurement Device	Tag Number	Brand (serial number)	Calib. Report IX		Calib. Report X		Calib. Report XI		Remarks
				Calibration Date	Valid until	Calibration Date	Validity	Calibration Date	Validity	
Mso,y (Ms,y in section D.2)	Differential Pressure Transmitter - Orifice Plate	FIT-2504	Rosemount (S/N 01830361)	08/12/2011	08/06/2012	05/06/2012	05/12/2012	04/12/2012	04/06/2013	MBA-4 Well steam flow
	Pressure Transmitter - Orifice Plate	PIT-2508	Rosemount (S/N 01830133)	01/12/2011	01/06/2012	04/06/2012	04/12/2012	01/12/2012	01/06/2013	
Mso,y (Ms,y in section D.2)	Differential Pressure Transmitter - Orifice Plate	FIT-2505	Rosemount (S/N 01830359)	08/12/2011	08/06/2012	04/06/2012	04/12/2012	04/12/2012	04/06/2013	MBA-5 Well steam flow
	Pressure Transmitter - Orifice Plate	PIT-2510	Rosemount (S/N 01830134)	01/12/2011	01/06/2012	04/06/2012	04/12/2012	01/12/2012	01/06/2013	
Mso,y (Ms,y in section D.2)	Differential Pressure Transmitter - Orifice Plate	FIT501	Rosemount (S/N 01845811)	12/12/2011	12/06/2012	06/06/2012	06/12/2012	06/12/2012	06/06/2013	MBD-5 Well steam flow
	Pressure Transmitter - Orifice Plate	PIT506	Rosemount (S/N 01593780)	05/12/2011	05/06/2012	05/06/2012	05/12/2012	06/12/2012	06/06/2013	
Msb,y (Ms,y in section D.2)	Differential Pressure Transmitter	FIT-984	Rosemount (S/N 02061116)	09/01/2012	09/07/2012	05/07/2012	05/01/2013	Replaced with Yokogawa differential pressure-transmitter S/N 91M523067 on 29 December 2012	29/06/2013	WWW-1 Brine Injection Well
	Pressure Transmitter	PIT-918	Bailey (S/N 8F196683)	05/01/2012	05/07/2012	05/07/2012	05/01/2013	09/12/2012	09/06/2013	

F-CDM-MR

Parameter	Measurement Device	Tag Number	Brand (serial number)	Calib. Report IX		Calib. Report X		Calib. Report XI		Remarks
				Calibration Date	Valid until	Calibration Date	Validity	Calibration Date	Validity	
FC _{diesel,EDG} (FCi,j,y in section D.2)	Flow Totalizer	AO-FQ-2033	Fill Rite 900 Series (Y0194)	25/01/2012	25/01/2013	25/01/2013				Emergency diesel generator
FC _{diesel,fire pump} (FCi,j,y in section D.2)	Flow Totalizer	AO-FQ-2032	Fill Rite 800 Series (4905C)	25/01/2012	25/01/2013	25/01/2013				Fire pump
EG _y (Unit-1)	Unit-1, "Meter Utama" kWh meter reading (main meter owned by PLN)	-	Schneider ION8600 (MT-0809A063-01)	10/10/2008	10/10/2013	10/10/2013				WW-1 electricity meter
	Unit-1,"Meter Pembanding" kWh meter reading (check meter owned by SEG)	-	ION 8600 (PT-0807A249-01)	06/01/2011	06/01/2013	17/12/2012		17/12/2014		
EG _y (Unit-2)	Unit-2, "Meter Utama" kWh meter reading (main meter owned by PLN)	-	Schneider ION8600 (MT-0806A388 - 01)	10/10/2008	10/10/2013	10/10/2013				WW-2 electricity meter
	Unit-2,"Meter Pembanding" kWh meter reading (check meter owned by SEG)	-	ION 8600 (PT-0802A194-01)	06/01/2011	06/01/2013	17/12/2012		17/12/2014		

Annex 5

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}), Quantity of steam produced (M_s), and Project emissions from steam produced (PES) during Monitoring Period.

Date	EG	EG unit 1	M _s	PES
	MWh	MWh	Tons	tCO ₂
01-Jun-12	5,346.02	2,636.70	21,902.00	371.21
02-Jun-12	5,344.50	2,633.00	21,837.00	370.10
03-Jun-12	5,319.59	2,622.59	21,851.00	370.34
04-Jun-12	5,307.48	2,620.20	21,835.00	370.07
05-Jun-12	5,295.00	2,605.41	21,775.00	369.05
06-Jun-12	5,271.02	2,613.39	21,855.00	370.41
07-Jun-12	5,271.00	2,618.91	21,664.00	367.17
08-Jun-12	3,882.09	1,198.41	20,667.00	350.27
09-Jun-12	2,702.81	0.00	19,073.00	323.26
10-Jun-12	2,704.69	0.00	19,721.00	334.24
11-Jun-12	2,701.72	0.00	19,010.00	322.19
12-Jun-12	2,698.50	0.00	18,916.00	320.60
13-Jun-12	2,708.38	0.00	19,566.00	331.61
14-Jun-12	2,714.50	0.00	19,128.00	324.19
15-Jun-12	2,715.91	0.00	19,750.00	334.73
16-Jun-12	2,713.09	0.00	19,693.00	333.77
17-Jun-12	2,711.63	0.00	18,860.00	319.65
18-Jun-12	2,702.09	0.00	19,388.00	328.60
19-Jun-12	2,696.19	0.00	20,008.00	339.10
20-Jun-12	4,313.61	1,624.89	20,015.00	339.22
21-Jun-12	5,233.19	2,691.41	19,270.00	326.60
22-Jun-12	5,396.80	2,694.89	20,060.00	339.99
23-Jun-12	5,411.20	2,699.11	20,194.00	342.26
24-Jun-12	5,441.19	2,716.09	20,202.00	342.39
25-Jun-12	5,427.52	2,712.70	20,843.00	353.26
26-Jun-12	5,420.69	2,711.09	20,558.00	348.43
27-Jun-12	5,423.11	2,710.39	20,418.00	346.05
28-Jun-12	5,435.69	2,716.91	20,430.00	346.26
29-Jun-12	5,435.30	2,714.30	20,482.00	347.14
30-Jun-12	5,066.52	2,728.70	18,196.00	308.39
01-Jul-12	4,759.41	2,731.50	16,433.00	278.51
02-Jul-12	5,424.29	2,708.91	20,582.00	348.83
03-Jul-12	5,415.80	2,706.80	20,589.00	348.95
04-Jul-12	5,422.52	2,711.70	20,647.00	349.94
05-Jul-12	5,414.80	2,708.39	20,708.00	350.97
06-Jul-12	5,419.52	2,707.11	20,568.00	348.60
07-Jul-12	5,011.47	2,505.09	19,401.00	328.82
08-Jul-12	4,775.03	2,382.91	18,927.00	320.78
09-Jul-12	5,414.39	2,699.80	20,650.00	349.99
10-Jul-12	5,406.48	2,695.20	20,679.00	350.48
11-Jul-12	5,421.22	2,705.09	20,684.00	350.56
12-Jul-12	5,430.58	2,708.30	20,669.00	350.31
13-Jul-12	5,425.72	2,701.41	20,697.00	350.78
14-Jul-12	5,386.91	2,681.00	20,707.00	350.95
15-Jul-12	5,031.08	2,707.89	18,535.00	314.14
16-Jul-12	4,950.50	2,713.81	17,985.00	304.82
17-Jul-12	4,954.81	2,725.50	18,008.00	305.21
18-Jul-12	4,929.58	2,292.39	20,369.00	345.22
19-Jul-12	4,894.91	2,203.41	20,753.00	351.73
20-Jul-12	4,880.50	2,177.09	20,784.00	352.26

Date	EG	EG unit 1	M _s	PES
	MWh	MWh	Tons	tCO ₂
21-Jul-12	5,227.33	2,502.61	21,654.00	367.00
22-Jul-12	5,310.77	2,597.89	21,214.00	359.54
23-Jul-12	5,333.92	2,605.30	20,904.00	354.29
24-Jul-12	5,318.00	2,590.00	20,860.00	353.55
25-Jul-12	5,317.59	2,587.59	20,855.00	353.46
26-Jul-12	5,324.72	2,588.72	20,862.00	353.58
27-Jul-12	5,320.00	2,590.09	20,839.00	353.19
28-Jul-12	5,316.19	2,588.69	20,870.00	353.71
29-Jul-12	5,304.72	2,583.63	20,813.00	352.75
30-Jul-12	5,308.50	2,580.09	20,846.00	353.31
31-Jul-12	5,305.28	2,586.28	20,843.00	353.26
01-Aug-12	5,315.13	2,592.63	20,883.00	353.93
02-Aug-12	5,322.69	2,595.50	20,894.00	354.12
03-Aug-12	5,407.78	2,683.88	20,869.00	353.70
04-Aug-12	5,391.81	2,666.31	20,918.00	354.53
05-Aug-12	5,371.91	2,662.41	20,885.00	353.97
06-Aug-12	5,298.09	2,585.41	20,910.00	354.39
07-Aug-12	5,043.31	2,311.00	20,892.00	354.09
08-Aug-12	5,031.97	2,308.88	17,451.00	295.77
09-Aug-12	5,008.00	2,295.81	20,855.00	353.46
10-Aug-12	4,991.44	2,285.81	20,861.00	353.56
11-Aug-12	4,988.00	2,285.00	20,873.00	353.77
12-Aug-12	4,991.56	2,289.88	20,893.00	354.10
13-Aug-12	5,000.81	2,282.63	20,913.00	354.44
14-Aug-12	4,977.00	2,270.38	20,939.00	354.88
15-Aug-12	4,985.69	2,271.41	20,932.00	354.77
16-Aug-12	4,978.53	2,264.72	20,940.00	354.90
17-Aug-12	4,994.06	2,268.28	20,940.00	354.90
18-Aug-12	4,734.50	2,173.09	19,996.00	338.90
19-Aug-12	4,808.41	2,226.41	20,200.00	342.36
20-Aug-12	5,012.81	2,284.00	21,073.00	357.16
21-Aug-12	4,989.41	2,270.41	21,079.00	357.26
22-Aug-12	4,975.91	2,261.31	21,067.00	357.05
23-Aug-12	4,971.50	2,259.50	21,073.00	357.16
24-Aug-12	5,310.88	2,591.28	20,997.00	355.87
25-Aug-12	5,427.31	2,704.31	21,053.00	356.82
26-Aug-12	5,415.00	2,703.41	21,132.00	358.16
27-Aug-12	5,220.22	2,508.59	21,059.00	356.92
28-Aug-12	5,255.47	2,548.09	21,193.00	359.19
29-Aug-12	5,073.03	2,360.41	21,093.00	357.49
30-Aug-12	5,059.56	2,353.69	21,016.00	356.19
31-Aug-12	5,117.94	2,397.22	21,093.00	357.49
01-Sep-12	5,118.09	2,394.69	21,099.00	357.60
02-Sep-12	5,091.81	2,384.31	20,969.00	355.39
03-Sep-12	5,095.56	2,376.00	21,152.00	358.49
04-Sep-12	5,076.31	2,367.38	21,053.00	356.82
05-Sep-12	5,075.88	2,366.31	21,148.00	358.43
06-Sep-12	5,057.31	2,348.81	21,076.00	357.21
07-Sep-12	5,261.75	2,546.50	21,218.00	359.61
08-Sep-12	5,221.28	2,511.28	21,117.00	357.90
09-Sep-12	5,209.09	2,512.72	21,070.00	357.10
10-Sep-12	5,164.56	2,463.38	21,107.00	357.73
11-Sep-12	5,111.94	2,392.13	21,009.00	356.07
12-Sep-12	5,149.16	2,436.28	21,116.00	357.88
13-Sep-12	5,172.75	2,461.81	21,079.00	357.26
14-Sep-12	5,160.88	2,454.69	21,076.00	357.21

Date	EG	EG unit 1	M _s	PES
	MWh	MWh	Tons	tCO ₂
15-Sep-12	5,144.22	2,444.09	21,053.00	356.82
16-Sep-12	5,117.00	2,408.00	21,251.00	360.17
17-Sep-12	5,149.00	2,435.81	21,082.00	357.31
18-Sep-12	5,327.56	2,623.00	21,197.00	359.26
19-Sep-12	5,396.81	2,693.81	21,316.00	361.27
20-Sep-12	5,282.69	2,574.88	21,223.00	359.70
21-Sep-12	5,373.00	2,656.31	21,244.00	360.05
22-Sep-12	5,399.34	2,693.59	21,307.00	361.12
23-Sep-12	5,395.31	2,699.31	21,199.00	359.29
24-Sep-12	5,404.69	2,702.19	21,262.00	360.36
25-Sep-12	5,404.41	2,701.22	21,207.00	359.43
26-Sep-12	5,403.84	2,701.28	21,188.00	359.10
27-Sep-12	4,176.63	2,347.50	18,645.06	223.03
28-Sep-12	5,420.09	2,709.22	22,382.59	379.35
29-Sep-12	5,401.13	2,696.50	22,538.48	381.99
30-Sep-12	5,396.38	2,694.50	22,427.93	380.12
01-Oct-12	5,389.00	2,676.19	21,882.13	370.87
02-Oct-12	5,395.13	2,674.00	21,720.90	368.14
03-Oct-12	5,399.69	2,676.81	21,688.19	367.58
04-Oct-12	5,399.31	2,681.00	21,467.70	363.84
05-Oct-12	5,399.97	2,679.09	21,756.61	368.74
06-Oct-12	5,398.84	2,678.59	21,551.31	365.26
07-Oct-12	5,401.84	2,683.09	21,648.27	366.90
08-Oct-12	5,387.22	2,672.72	21,641.96	366.80
09-Oct-12	5,390.31	2,673.88	22,033.01	373.43
10-Oct-12	5,423.81	2,694.31	22,014.11	373.11
11-Oct-12	5,430.38	2,698.31	21,989.28	372.68
12-Oct-12	3,942.44	2,652.19	16,077.79	192.32
13-Oct-12	2,662.91	2,662.91	10,329.19	123.56
14-Oct-12	2,665.50	2,665.50	6,226.63	105.53
15-Oct-12	2,662.28	2,662.28	6,197.55	105.04
16-Oct-12	2,659.13	2,659.13	6,133.27	103.95
17-Oct-12	2,664.50	2,664.50	6,154.25	104.31
18-Oct-12	2,671.00	2,671.00	6,085.81	103.15
19-Oct-12	2,667.50	2,667.50	6,063.37	102.76
20-Oct-12	2,681.84	2,674.28	9,478.01	160.64
21-Oct-12	3,493.00	2,668.81	18,899.22	320.31
22-Oct-12	5,281.44	2,521.00	21,536.22	365.01
23-Oct-12	5,344.41	2,626.91	21,632.28	366.63
24-Oct-12	5,420.28	2,682.09	21,846.28	261.32
25-Oct-12	5,198.31	2,567.50	21,131.74	358.15
26-Oct-12	5,413.16	2,668.78	21,955.19	372.11
27-Oct-12	5,426.16	2,676.22	22,092.55	374.43
28-Oct-12	5,420.78	2,673.78	22,200.50	376.26
29-Oct-12	5,412.31	2,665.13	22,304.09	378.02
30-Oct-12	5,415.19	2,668.38	22,348.41	378.77
31-Oct-12	5,413.19	2,666.81	22,354.41	378.87
1-Nov-12	5,410.00	2,668.50	22,429.70	380.15
2-Nov-12	5,412.50	2,670.50	22,483.52	381.06
3-Nov-12	5,407.19	2,669.81	22,415.24	379.90
4-Nov-12	5,410.75	2,675.31	22,325.64	378.39
5-Nov-12	5,421.19	2,675.88	22,458.10	380.63
6-Nov-12	5,402.06	2,663.38	22,503.61	381.40
7-Nov-12	5,405.00	2,666.94	22,481.65	381.03
8-Nov-12	5,401.06	2,682.06	22,396.30	379.58
9-Nov-12	5,410.94	2,685.44	22,443.29	380.38

Date	EG	EG unit 1	M _s	PES
	MWh	MWh	Tons	tCO ₂
10-Nov-12	5,405.00	2,682.88	22,379.97	379.31
11-Nov-12	5,430.44	2,698.44	22,443.10	380.38
12-Nov-12	5,412.25	2,688.75	22,372.30	379.18
13-Nov-12	5,411.50	2,686.63	22,385.60	379.40
14-Nov-12	5,409.81	2,687.19	22,449.70	380.49
15-Nov-12	5,408.38	2,682.63	22,515.50	381.60
16-Nov-12	5,404.94	2,685.00	22,359.00	378.95
17-Nov-12	5,400.50	2,678.00	22,398.80	379.63
18-Nov-12	5,389.63	2,670.81	22,451.30	380.52
19-Nov-12	5,411.88	2,684.69	22,284.40	377.69
20-Nov-12	5,395.69	2,672.50	21,100.20	357.62
21-Nov-12	5,402.44	2,681.56	21,136.80	358.24
22-Nov-12	5,409.69	2,688.44	21,314.80	361.25
23-Nov-12	5,384.75	2,670.19	21,126.00	358.05
24-Nov-12	5,357.75	2,687.13	21,342.80	361.73
25-Nov-12	5,389.69	2,673.50	21,165.59	358.72
26-Nov-12	5,398.00	2,680.19	21,249.30	360.14
27-Nov-12	5,404.94	2,686.38	21,190.91	359.15
28-Nov-12	5,387.44	2,678.44	21,222.09	359.68
29-Nov-12	5,391.81	2,680.88	21,124.80	358.03
30-Nov-12	5,374.44	2,659.13	21,224.41	359.72
01-Dec-12	5,363.25	2,650.00	21,203.41	359.37
02-Dec-12	5,382.94	2,663.50	21,279.19	360.65
03-Dec-12	5,394.50	2,681.00	21,186.41	359.08
04-Dec-12	5,398.06	2,683.19	21,104.59	357.69
05-Dec-12	5,392.94	2,685.00	21,241.11	360.00
06-Dec-12	5,406.75	2,686.56	21,391.59	362.55
07-Dec-12	5,397.94	2,681.13	21,318.30	361.31
08-Dec-12	5,407.06	2,688.81	21,126.41	358.06
09-Dec-12	5,397.69	2,679.69	21,365.70	362.12
10-Dec-12	5,396.13	2,680.38	19,950.99	238.65
11-Dec-12	5,389.06	2,674.00	21,306.59	361.11
12-Dec-12	5,392.63	2,682.44	21,249.00	360.14
13-Dec-12	5,403.81	2,684.81	21,251.50	360.18
14-Dec-12	5,403.94	2,686.19	21,066.20	357.04
15-Dec-12	5,398.69	2,683.00	21,203.20	359.36
16-Dec-12	5,398.19	2,680.81	21,127.50	358.08
17-Dec-12	4,822.13	2,360.00	21,343.70	361.74
18-Dec-12	5,387.38	2,674.88	21,356.50	361.96
19-Dec-12	5,395.69	2,688.88	21,158.39	358.60
20-Dec-12	5,395.44	2,681.25	21,251.70	360.18
21-Dec-12	5,393.56	2,682.00	21,239.91	359.98
22-Dec-12	5,396.88	2,685.75	21,185.00	359.05
23-Dec-12	5,396.88	2,682.25	21,252.50	360.20
24-Dec-12	5,395.44	2,679.69	21,163.39	358.69
25-Dec-12	5,390.44	2,678.31	21,163.39	358.69
26-Dec-12	5,387.44	2,678.25	21,091.00	357.46
27-Dec-12	5,385.25	2,676.94	21,101.00	357.63
28-Dec-12	5,383.19	2,676.06	26,425.69	447.87
29-Dec-12	5,393.13	2,677.75	22,986.81	389.59
30-Dec-12	5,383.81	2,672.19	21,204.59	359.39
31-Dec-12	5,394.13	2,681.56	21,182.09	359.00

Annex 6

Check meter and Main meter measurement

Main Meter and Check Meter Measurement

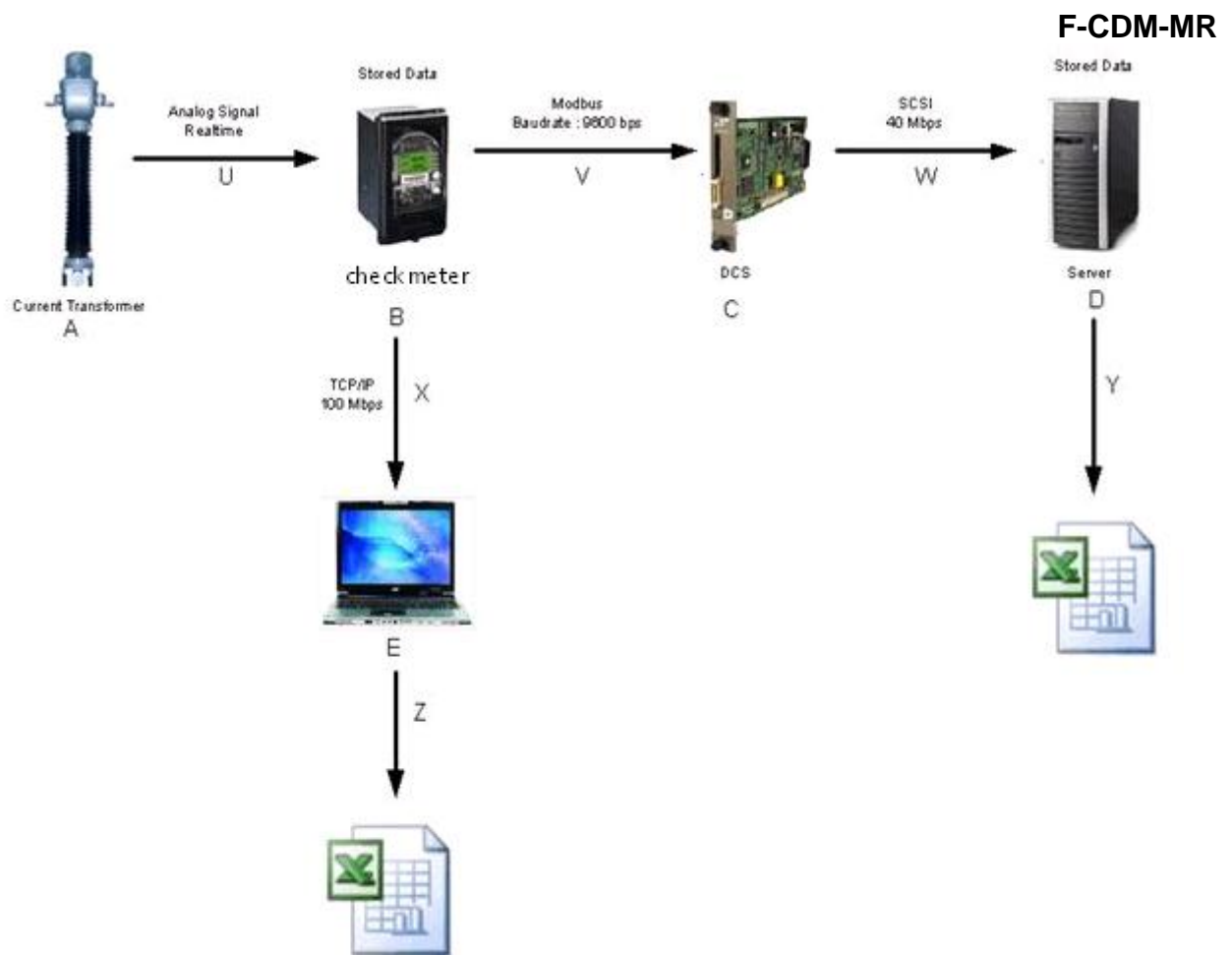
EG _{wayang windu unit 2}	Main Meter Downloaded monthly from kWh meter MWh	Check Meter Downloaded monthly from kWh meter MWh	Check Meter Downloaded daily from DCS MWh	Difference between Main meter and Check Meter (Downloaded monthly from meter)	Difference between Main meter and Check Meter (Downloaded daily from DCS)	Difference between Check Meter (downloaded monthly from kWh meter) and Check Meter (downloaded daily)
Jun-12	80,551.568	80,543.328	80,541.906	-0.010%	-0.012%	-0.002%
Jul-12	81,580.818	81,586.147	81,582.313	0.007%	0.002%	-0.005%
Aug-12	83,912.548	83,911.663	83,908.094	-0.001%	-0.005%	-0.004%
Sep-12	80,360.531	80,359.831	80,360.969	-0.001%	0.001%	0.001%
Oct-12	59,376.961	59,378.389	59,378.125	0.002%	0.002%	0.000%
Nov-12	81,700.708	81,703.964	81,700.500	0.004%	0.000%	-0.004%
Dec-12	84,133.981	84,137.190	83,878.063	0.004%	-0.305%	-0.308%

EG _y	Main meters Downloaded monthly from kWh meter MWh	Check meters Downloaded monthly from kWh meter MWh	Check meters Downloaded daily from DCS MWh	Difference between Main meter and Check Meter (Downloaded monthly from meter)	Difference between Main meter and Check Meter (Downloaded daily from DCS)	Difference between Check Meter (downloaded monthly from kWh meter) and Check Meter (downloaded daily from DCS)
Jun-12	128,823.881	128,814.447	128,811.000	-0.007%	-0.010%	-0.003%
Jul-12	162,158.333	162,161.190	162,156.500	0.002%	-0.001%	-0.003%
Aug-12	158,473.827	158,471.905	158,469.719	-0.001%	-0.003%	-0.001%
Sep-12	156,157.509	156,156.372	156,158.469	-0.001%	0.001%	0.001%
Oct-12	141,930.021	141,930.936	141,930.813	0.001%	0.001%	0.000%
Nov-12	162,064.084	162,066.534	162,061.625	0.002%	-0.002%	-0.003%
Dec-12	167,211.113	167,211.410	166,624.313	0.000%	-0.352%	-0.351%

EG _{existing}	Main meters Downloaded monthly from meter MWh	Check meters Downloaded monthly from meter MWh	Check meters Downloaded daily from DCS MWh	Difference between Main meter and Check Meter (Downloaded monthly from meter)	Difference between Main meter and Check Meter (Downloaded daily from DCS)	Difference between Check Meter (downloaded monthly from kWh meter) and Check Meter (downloaded daily from DCS)
Jun-12	48,272.31	48,271.12	48,269.09	-0.002%	-0.007%	-0.004%
Jul-12	80,577.52	80,575.04	80,574.19	-0.003%	-0.004%	-0.001%
Aug-12	74,561.28	74,560.24	74,561.63	-0.001%	0.000%	0.002%
Sep-12	75,796.98	75,796.54	75,797.50	-0.001%	0.001%	0.001%
Oct-12	82,553.06	82,552.55	82,552.69	-0.001%	0.000%	0.000%
Nov-12	80,363.38	80,362.57	80,361.13	-0.001%	-0.003%	-0.002%
Dec-12	83,077.13	83,074.22	82,746.25	-0.004%	-0.400%	-0.395%

It is to be noted that there is a slight difference between the check meter reading downloaded from the internal storage of the check kWh meter and the check meter reading from the DCS. However, both the check meter reading downloaded from the internal storage of the check kWh meter and the check meter reading from the DCS are within the tolerable 0.4% difference with the reading from the main kWh meter. Furthermore, the check meter reading from the DCS gives the lowest reading for both EG_y and EG_{existing}, and therefore this is considered conservative.

The slight difference between the check meter reading downloaded from the internal storage of the check kWh meter and the check meter reading from the DCS can be explained through the diagram below, i.e. the data from check kWh meter (figure B) is transmitted to DCS Process Control unit (DCS PCU) through serial communication protocol modbus and baudrate 9600 bps (figure V), which is then transmitted to PGP Server (DCS Human Machine Interface – figure D) through SCSI with baudrate 40 Mbps (figure W).



Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: issuance Keywords: monitoring report, performance monitoring		