MONITORING REPORT I

MEN-TANGERANG 13.6 MW NATURAL GAS COGENERATION PROJECT

This Report is prepared for purpose of Verification & Certification of resulting emission reduction from the project activity.

PROJECT DETAILS:

PROJECT REFERENCE ID	:	1313	
REGISTRATION DATE	:	26 FEBRUARY 2008	
PROJECT DEVELOPER	:	MANUNGGAL ENERGI NUSANTARA	
PROJECT PARTICIPANTS	:	MANUNGGAL ENERGI NUSANTARA	INDONESIA
		MITSUBISHI UFJ SECURITIES	JAPAN
REPORTING PERIOD	:	26/FEBRUARY/2008 TO 31/AUGUST/2008	
MONIORING REPORT NO.	:	I (FIRST)	
ACCOMPANYING DOCUMENTS	:	**DOCUMENT NAME**	**TYPE**
		080201 MONITORING REPORT VERSION 3.0.0	MONITORING REPORT
		080201 CONSOLIDATED REPORT MAR08 TO AUG08 VERSION 4.0	EXCEL SPREADSHEET
		EMISSION REDUCTION DELIVERY REPORT I	(INTERNAL) HARDCOPY REPORT

DOCUMENT HISTORY

Document Version	Description	Note	REVIEWER	APPROVAL
Version 1.0.0	First Issuance	N/A	C. Hendrayani	H. Soeyoto
Version 2.0.0	2nd Issuance	Updated based on issue identified during verification	C. Hendrayani	H. Soeyoto
Version 3.0.0	3rd Issuance	Updated based on issue identified during request of issuance	C. Hendrayani	H. Soeyoto

Zeus-Innavitas is a Carbon Asset Management Company and is commissioned by PT Manunggal Energi Nusantara to manage the Project's carbon asset portfolio.

This Monitoring Report is prepared based on operational data & information provided by the Project Developer/Operator. Zeus-Innavitas is not a Project Participant.

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PROJECT ACTIVITIES

1.1 BACKGROUND

PT Manunggal Energi Nusantara (hereafter referred as "MEN", "Project Developer", or "Project Operator") is an energy service company focusing in the field of clean and renewable energy. The company entered into engagement to partially supply electricity and steam to its subscribers using natural gas cogeneration technology. All subscribers (PT Argo Pantes Tangerang, PT Argo Fajar and PT Argo Beni) are located within the Argo Pantes Tangerang integrated textile industrial complex.

The new supply of electricity and steam from the new installation effectively reduces (a) the amount of electricity the complex imports from PLN and (b) the amount of coal/residue that the complex needs to generate steam.

The Project procures natural gas supply from PT Perusahaan Gas Negara ("PGN"), which is the state national gas distribution company.

1.2 IMPLEMENTATION STATUS

Physical Installations

Construction to renovate the existing site began in January 2007. The installation of the gas engine was completed and handed over to MEN by 26 of September 2007, and immediately entered into commissioning period, and commenced delivery of electricity by 01 November 2007.

The waste-heat-boiler was completed slightly later in December 2007. Upon completion, all units were immediately subjected to pressure and safety checks by the Workforce Agency (*Dinas Ketenagakerjaan),* following which the permit to operate the boiler was issued in December 19th 2007. Following an inspection by a national accreditation company (PT Sucofindo), the facility was declared to have met the operational safety (*Keselamatan Kerja)* and environmental (*Lingkungan Hidup)* requirements. Subsequently, a certificate was issued by the Energy and Mining Agency (*Dinas Pertambangan dan Energi)* effective up to 10th June 2013.

By end of January 2008, all equipments and instrumentations are already in-placed and the entire installations passed commissioning test without technical difficulty.

CDM Process

The Project was submitted for registration in 28 August 2007, however, corrections in the validation report were requested by the Executive Board. The Project was finally granted registration in 26 February 2008, although confirmation was not received until 15 of April 2008.

1.3 REPORTING PERIOD

This monitoring report is the first report submitted for purpose of verification and covers the period of 26 February 2008 (start of credit period) to 31 August 2008. However, for purpose of procedural simplification, only data between 01 March 2008 and 31 August 2008 are included in this report. No emission reduction is claimed for the last 4 days of February 2008.

1.4 DESCRIPTION OF PROJECT ACTIVITY

The project implementation doesn't change from its original intention as described in the PDD. It covers the installations of five natural gas power generation with waste heat boilers. It is designed with electrical generation capacity of 13.6 MW (gross) and steam generation capacity of 9.5 tonnes per hour, which can be varied depending on the required qualities. Simplified schematic diagram of the project activity is shown in the following figure.

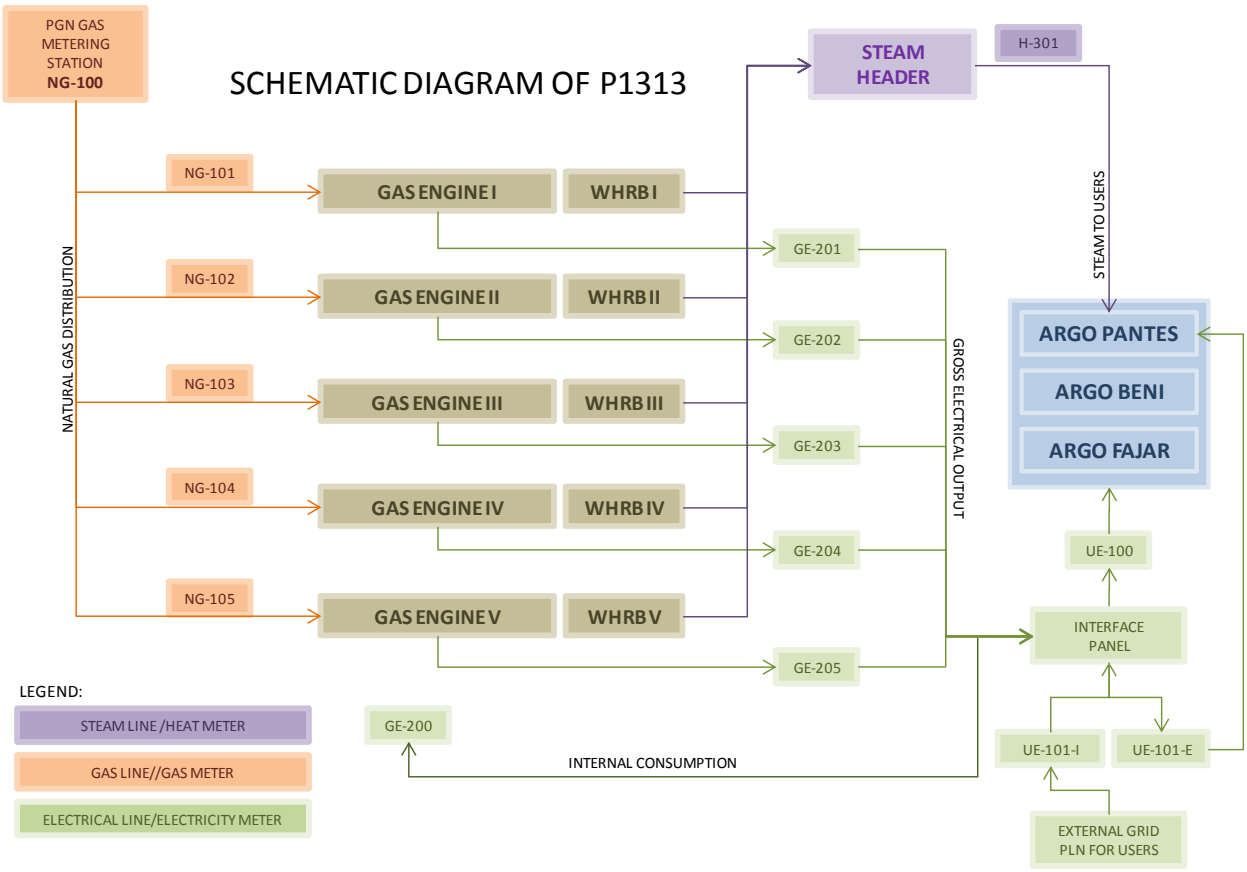

Figure 1. Project's Simplified Schematic Diagram, including position of its monitoring implements

Primary Instruments For purpose of this monitoring report, the primary instrument is defined as instrument which directly measures parameters that are specified in the Project Design Documents Section B.7.1. This includes:

- Gas flow meter **NG-100** belonging to PGN.
- Steam/heat meter **H-301** measuring aggregate flow-rate and conditions of steam delivered to the user.
- Eletricity meters **GE-201** to **GE-205** measuring gross electrical output from individual gas engine.
- Electricity meter **GE-200** measuring total electricity consumption of the facility.

Compliance of these primary instruments relative to the PDD requirements is described in Table 1 in the ensuing Section 1.5.

Secondary Instruments In this project activity, the secondary instruments are instruments employed to safeguard the credibility of critical data. This includes:

- INTERFACE PANEL Eletricity Meters consisting of electricity meters: **UE-100** and **UE-101(I/E)**. Net electricity supplied to the user as measured by the primary instruments is compared against balance of readings from these meters.
- Gas flow-rate to the individual gas engines **NG-101 to NG-105.** Gas consumption as measured by the primary meter is compared against the aggregate readings from these instruments.
- No secondary instrument is available for measurement of steam/heat to the user.

The emission reduction is calculated based on reading from the primary meter, except in situation where the magnitude of error is detected to be above the tolerance sets in the PDD.

1.5 KEY MONITORED PARAMETERS

Table 1 summarizes parameters that are monitored against requirement in the PDD. Readings from all instruments listed in this table are logged on daily basis as mandated by the PDD.

Table 1 – Key monitored parameters, its relevant instrument, and estimated values in the PDD.

PDD Ref.	Output of measurements	Source of Data as required in Section B.7.1 of PDD	Accuracy Mandated in PDD	Comparative Medium for Cross Checking
		Instruments Installed	*Instrument's Accuracy*	*Comparative Medium during Implementation.*
MCHO	Monthly heat recovered in the project waste heat boiler	Steam flow and heat metering device	4% or less	Sales Invoice to Argo Pantes
		H-301 *Heat Flow computer measuring steam flow-rate, temperature and pressure.*	*+/-0.5% at 95% confidence level.*	*Billing is based on measurement (mass flow-rate) of the same instrument.*
CEO	Amount of electricity generated by the Project net of its parasitic consumptions	Electricity meter measuring net delivery to individual users	4% or less	Sales Invoice to subscribers
		GE-201 to GE 205 *Built in gas-engine DIA.NXT System, metering (amongst others) electricity production from individual gas engines* **GE-200** *Independent electricity meter measuring parasitic consumptions.* *Calculated as aggregate readings of GE-201 to GE205 deducted by reading from GE-200.*	**GE-201 to GE-205**, *accuracy class of 0.5 or deviation of +/- 0.1 at cosphi 1.* **GE-200** *+/-0.15% reading + 0.025% full scale at 95% confidence level.*	*Only 1 subscriber so far.* *Billing is based on the same instrument.* *However reading is compared with balance of electricity recorded by instruments* **UE-100** *and* **UE-101I/E**
VNG	Amount of natural gas consumed in Normalized Volume	Gas meter entering MEN facility	4% or less	PGN Gas Bill
		NG-100 Gas meter measuring incoming gas controlled by PGN.	**NG-100** is calibrated to error level of less than 0.5%. This flow-meter is equipped with volume corrector sets to 1 bar, 27 degC as specified in the gas contract. For purpose of reconciliation with the secondary meter, the volume is corrected to normal (1bar, 0 degC)	*NG-101 o NG-105* *Gas meters measuring gas input to individual gas engines.* *Calculated as aggregate reading of NG-101 to NG 105 in Normal Volume.*
NCV_{NG}	Net calorific value of natural gas	Periodic gas analysis from gas suppliers	N/A	IPCC 2006 Table 1.2
		Periodic gas analysis quoted only Gross Calorific Value. Thus, equivalent Net Calorific Value is re-calculated using ASTM-compliance method.		
D_{NG}	Density of natural gas	Periodic gas analysis from gas suppliers	N/A	N/A
		Periodic gas analysis quoted only Gross Calorific Value. Thus, equivalent Net Calorific Value is re-calculated using ASTM-compliance method.		

1.6 CONSUMERS OF ELECTRICITY AND STEAM

The Project was initiated to supply electricity needed by three textile manufacturing facilities: PT Argo Beni, PT Argo Pantes, and PT Argo Fajar. However, within this monitoring period, Argo Beni and Argo Fajar have not commenced import of electricity from the Project citing un-favourable business climate. Electricity generated within this period is

absorbed solely by PT Argo Pantes. As consequence to this, the project installations has not been able to be operated at its expected utilization level, and subsequently its expected financial return.

If this situation continues, the Project Operator must take measures to find other possible subscriber to absorb the excess electricity. The Project Proponent intends to (separately) request clarification to allow excess electricity to be sold to the grid.

2 QUALITY CONTROL & MONITORING PROGRAM

2.1 STANDARD PROCEDURE FOR CDM MONITORING PROGRAM

In order to ensure consistency between monitoring implementation and the PDD, the Project Developer in collaboration with its consultant developed a CDM Standard Monitoring Procedure. The procedure was first tested for period of January 2008, and was fully implemented for month of February 2008. However, since the Project is not registered until 26th of February 2008, only data starting 01 March 2008 is included in this report.

The procedure provides interpretations of monitoring plan described in the PDD into actual step-by-step instructions/responsibilities for all members of CDM Team. It also defines the structure of monitoring implementations, reporting lines, consolidation process and internal evaluation process, and accompanied with pre-designed data collection forms.

2.2 ORGANIZATION STRUCTURE

In order to distribute the monitoring & reporting load throughout the entire year, the monitoring implementation is structured around three functional roles: (a) Plant Operator, (b) a CDM Manager, and (c) one Member of Management, heading the CDM Activity. The reporting structure is split into four layers of daily report, monthly report, mid-term report and final monitoring report, all simplified and delegated. The participants of the CDM Monitoring Program as well as their respective obligations are summarized in Figure 2 overleaf.

For quality control, each report is checked by functional group to which the report is submitted. For example, the CDM Manager evaluates the daily reports and the Emission Reduction Delivery Report prepared by the CDM Manager is audited by member of management prior to its approval.

In the plan, every reporting period is divided into two terms. At the end of each term, all monitoring information are consolidated and its resulting emission reduction is calculated. However, due to its short period, this monitoring report consists of only one term.

2.3 COMPLIANCE TO REPORTING OBLIGATIONS

The Project Operator has issued its first internal Emission Reduction Delivery Report (ERDR) in October 2008. The Reports compiles the following information and was made available to the Verifier.

- Daily Reports, Monthly Reports, Gas Analysis;
- Electricity Steam & Sales Invoices, Gas Invoices.
- 6-monthly Report, Calibration Summary Reports, Environmental Reports, Safety Permits;
- Results of Internal Audit.

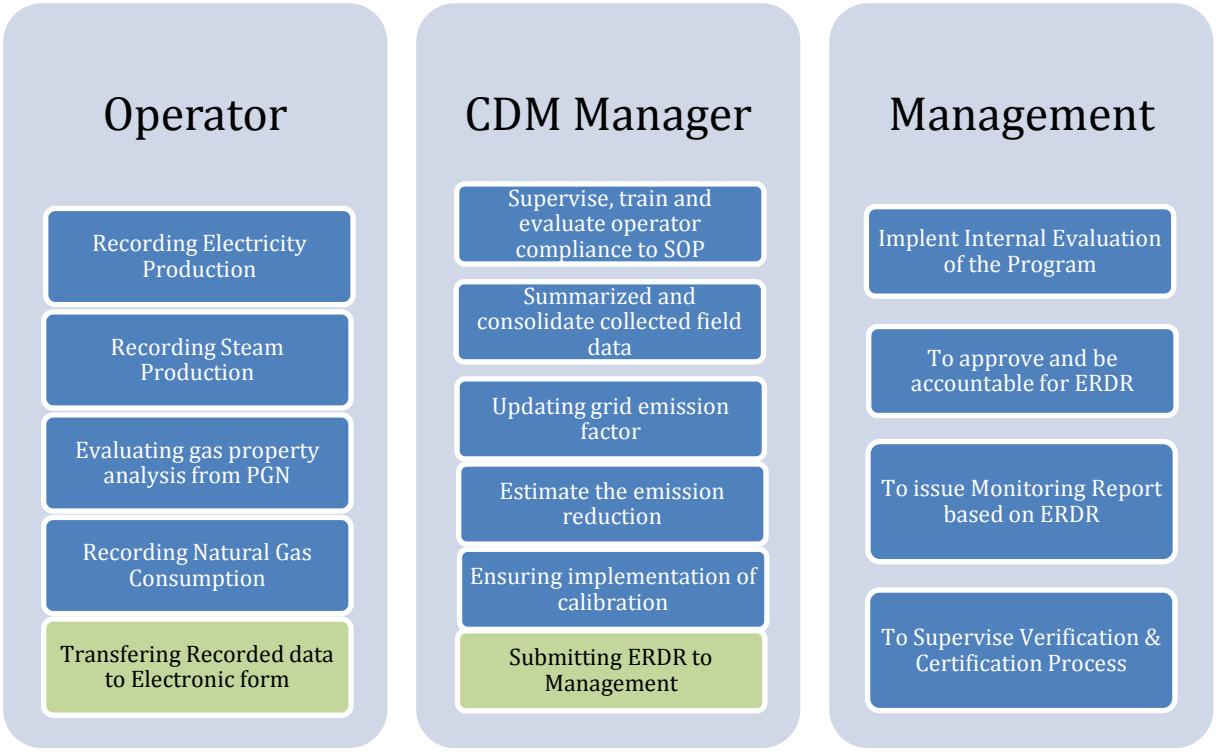

Figure 2 – Organization of the Monitoring Team

2.4 Instrumentation Maintenance & Calibration

Specification of the primary instruments is briefly detailed in Table 1, (Section 1.5). The PDD requires that all instruments must (a) have a valid calibration certificate and be regularly maintained and (b) meet the uncertainty range of +/- 4%.

The Project Operator believes it has taken all reasonable efforts to ensure that these requirements are met. The Project Operator maintains Instruments Log detailing the Instrument History, including calibration. All primary equipments are installed by the authorized supplier and have valid manufacturer calibration certificate or confirmation of accuracy provided by the manufacturer. In addition to this, the Project Operator also took additional measure to ensure that all secondary instruments are calibrated.

During this period, the primary and secondary electricity meters were found to be in agreement. By the end of this period, the total measured difference between the two set of meters is below 0.05% (see Table 2, Section 3.1)

Readings of the primary gas meters were detected to be lower by +/- 8% compared to the reading of the secondary gas meter. Following calibration of both sets of equipment, investigation concludes that the differences in the readings are caused by the differences of reference conditions adopted by the volume corrector. The primary equipment adopted Normal reference conditions (1 bar, 0 degC), whereas the secondary equipment uses reference conditions set at 1 bar, 27degC. Following correction, both equipments were found to be within 0.5% agreement (see Table 4, Section 3.3)

2.5 Prevention of Data Loss

In order to prevent data loss, all reports are kept in both MEN site office in Tangerang, and it's headquarters in Jakarta. The minimum frequency of data transfer as defined in the Standard Monitoring Procedure is performed once per month and done in both hard copy and soft copy.

3 RESULTS OF MONITORING ACTIVITIES

3.1 CONSOLIDATED ELECTRICAL OUTPUTS

This corresponds to the following:

- MCEO or monthly consolidated eletricity supplied to industrial users, referred in the methodology;
- CEO or amount of electricity generated by the project net of its parasitic consumption – referred in the PDD.

As explained above earlier, electricity supplied to subscribers are measured by 2 sets of instrumentations:

- **Primary** instruments: electricity meters **GE-201** to **GE-205,** and **GE-200**
- **Secondary** instruments: electricity meters **UE-100** and electricity Import/Export Meter **UE-101E**;

As electricity billing is based on the balances of primary meters, and comparison with sales invoice is less meaningful. Thus, for purpose of upholding the quality of data, the electrical reading is compared with balances from secondary instrument set.

Negligible differences are observed between the net electricity recorded by primary instruments and those recorded by secondary instruments. Both sets of equipments show a start-to-end-of-period deviation of less than 0.05% as summarized in Table 2.

Table 2 - Consolidated Electricity Deliveries

Month	Reading of Primary Instrument		Reading of Secondary Instruments (MWh)	Delta	
				MWh	%
March 08	001/III/O-1/MEN-TNG/08	7,602.9	7,628.2	25.3	0.33%
April 08	001/IV/O-1/MEN-TNG/08	7,320.6	7,343.8	23.2	0.32%
May 08	001/V/O-1/MEN-TNG/08	7,355.3	7,379.0	23.7	0.32%
June 08	001/VI/O-1/MEN-TNG/08	7,791.8	7,814.5	22.7	0.29%
July 08	001/VII/O-1/MEN-TNG/08	6,199.9	6,218.2	18.3	0.30%
Aug 08	001/VIII/O-1/MEN-TNG/08	6,825.4	6,842.6	17.2	0.25%
Total		**43,095.9**	**43,226.3**	**18.3**	**0.04%**

3.2 CONSOLIDATED STEAM OUTPUT, CAHO

This corresponds to the following:

- MCHO or monthly consolidated heat supplied to industrial plant, referred in the methodology, and
- CAHO or annual amount of heat generated by the project, referred in the PDD

The consolidated steam output within the reporting period is summarized in the following table. Data is reported in both mass unit (kg) and energy unit (MJ).

Table 3 – Consolidated Steam Output CAHO

Month	Source Report	Mass Recorded (kg)	Equivalent Energy MJ
Mar-08	004/III/M-1/MEN-TNG/08	6,483,230	12,552,409
Apr-08	004/IV/M-1/MEN-TNG/08	6,795,316	15,426,779
May-08	004/V/M-1/MEN-TNG/08	7,182,021	15,062,000
Jun-08	004/VI/M-1/MEN-TNG/08	6,974,905	14,861,000
Jul-08	004/VII/M-1/MEN-TNG/08	5,610,352	13,474,000
Aug-08	004/VIII/M-1/MEN-TNG/08	6,734,196	14,694,000
Total		39,780,020	86,070,188

Whilst meeting all of the PDD specification, the metering device H-301 was not equipped with memory device at the beginning of the credit period. As consequence to this, the heat values for period of 01 March 2008 to 18 April 2008 were aggregated manually using steam table based on recorded temperature, pressure, and mass-flow-rate. This situation is fully corrected by April 17th 2008.

3.3 CONSOLIDATED NATURAL GAS CONSUMPTION

This correponds to the followings:

- MEC_{NG} for monthly consolidated volume of natural gas consume, referred in the methodology, and
- VNG the amount of natural gas consumed for the project activity, referred in the PDD

Summary of readings of the primary gas meter (**NG-100**) as reflected in the monthly gas bills as well as aggregate readings from secondary gas meters (**NG-101** to **NG-105**) are summarized in the ensuing table. As has been explained earlier, the secondary meters report volume in Normal reference whereas the gas bills reports volume in reference conditions specified by PGN (1 bar, 27degC). For comparative purpose, readings from primary instrument has been adjusted to Normal Volume.

Table 4 – Consolidated Gas Consumption in Volumetric Unit

Month	Source Report	PGN Gas Meter/Billing (Primary Meter)		Aggregate of Secondary Meters	Observed deviation**
		m^3 (1 bar, 27 degC)	Nm^3	Nm^3	
Mar-08	004/III/M-1/MEN-TNG/08	2,096,395	1,907,814	1,917,687	0.52%
Apr-08	004/IV/M-1/MEN-TNG/08	2,040,987	1,857,390	1,847,102	-0.55%
May-08	004/V/M-1/MEN-TNG/08	2,014,890	1,833,641	1,864,951	1.71%
Jun-08	004/VI/M-1/MEN-TNG/08	2,186,310	1,989,632	1,986,549	-0.15%
Jul-08	004/VII/M-1/MEN-TNG/08	1,805,386	1,642,982	1,660,433	1.06%
Aug-08	004/VIII/M-1/MEN-TNG/08	1,911,787	1,739,812	1,747,621	0.45%
Total		12,055,755	10,971,271	11,024,343	0.48%

*relative to primary meter

The above results indicated a start-to-end of period deviation of less than 0.5% with the primary meter recorded slightly lower consumption. The diferences in readings reflect the time difference between the logging of both instruments.

3.4 CONSOLIDATED NATURAL GAS CONSUMPTION

This parameter corresponds to parameter AEC_{NG} in the methodology, which is annual natural gas consumption of the cogeneration facility in energy unit. However, as the reporting period is less than one year, it is adjusted to total energy consumption within the reporting period.

Using the gas properties (NCV and Density) described in the ensuing Section 3.5, and the primary gas meter readings (in Normal volume) as shown in Table 4, the equivalent energy consumption of natural gas is summarized below.

Table 5 - Consolidated Gas Consumption in Energy Unit, AEC_{NG}

Month	Source Report	Eqv. Energy (MJ)
Mar-08	004/III/M-1/MEN-TNG/08	68,714,070
Apr-08	004/IV/M-1/MEN-TNG/08	68,843,999
May-08	004/V/M-1/MEN-TNG/08	66,983,239
Jun-08	004/VI/M-1/MEN-TNG/08	73,099,586
Jul-08	004/VII/M-1/MEN-TNG/08	59,310,745
Aug-08	004/VIII/M-1/MEN-TNG/08	63,309,209
Total		400,260,848

3.5 GAS PROPERTIES: NCV AND D_{NG}

The PDD mandated Net Calorific Value (TJ/kt) dan Density (kg/Nm3) of Natural Gas to be analyzed on monthly basis. PGN had been able to supply monthly results of gas sample report from the gas source operator. The report contains (a) the molar fraction and (b) compressibility factor of the gas – from which the gas net calorific value and density are derived.

The method of evaluation complies with industry standard (ASTM). Spreadsheet of this calculation accompanies the Emission Reduction Delivery Report that is provided to the Verification team. The results are summarized in the following table.

Table 6 – Natural Gas Properties: Net Calorific Value and Density

Month	Source Report	LHV/NCV (TJ/kt)	Density (kg/Nm^3)
March 2008	004/III/M-1/MEN-TNG/08	46.93	0.76747
April 2008	004/IV/M-1/MEN-TNG/08	47.19	0.78544
May 2008	004/V/M-1/MEN-TNG/08	47.76	0.76487
June 2008	004/VI/M-1/MEN-TNG/08	47.89	0.76718
July 2008	004/VII/M-1/MEN-TNG/08	48.28	0.74771
August 2008	004/VIII/M-1/MEN-TNG/08	47.92	0.75936
Average		47.66	0.76534

The above evaluation shows that the calculated net calorific value of 47.66TJ/kt is within the range reported in Table 1.2 of 2006 IPCC for natural gas. There is no available national literature data to reliably benchmark the gas density.

3.6 GRID EMISSION FACTOR, $EF_{CM,2006}$

The project proponent chose *ex-post* approach for emission factor and thus is required to annually monitor several parameters for purpose of calculation of emission factor in the relevant electricity grid.

As stated in the PDD, the relevant electricity grid is the Java-Madura-Bali (JAMALI) Grid. Until the time of validation, this grid is not (yet) connected to any other national grid – although PLN has announced its future intention to connect the JAMALI Grid with the neighboring South Sumatra Grid.

Since the emission reduction occurred in 2008, the relevant emission factor should ideally be calculated using 2008, 2007, and 2006 data. However, PLN releases its 'official' data based on annual batches and 2 years behind the schedule. For such situation, guideline contained in the "*Tool to calculate emission factor for an electricity system*" (EB35 Annex 12) allows the use of data from previous 2 vintage years (y-2, or 2006).

Accordingly, for purpose of this monitoring report, the emission factor validated for registration is still considered appropriate. No update of emission factor is included in this monitoring report. The adopted emission factor for purpose of this monitoring report is therefore 0.901tCO_2 per year based on vintage years 2006, 2005, 2004 as has been validated in the PDD.

4 DELIVERED EMISSION REDUCTION

4.1 NON-MONITORED PARAMETERS

Non-monitored parameter adopted for calculation of emission reduction is summarized in the following table. These parameters are consistent with Section B.6.2 of the PDD.

Table 7 - Fixed Parameters for Calculation of Emission Reduction

Parameter		Green House Gas		
	PDD Reference	CO_2	CH_4	N_2O
Global Warming Potential of GHG	GWP_G	1 tCO_2/tCO_2	21 tCO_2/tCH_4	310 tCO_2/tN_2O
Emission Factor of GHG from combustion of residue oil (displaced)	EF_{G_R}	77.4 tCO_2/TJ	0.003 tCH_4/TJ	0.0006 tN_2O/TJ
Emission Factor of GHG from combustion of natural gas (Project)	EF_{G_NG}	56.1 tCO_2/TJ	0.001 tCH_4/TJ	0.0001tN_2O/TJ
Methane emission factor from activities related to the production of natural gas (Leakage)	$\sum_k MEF_k$	0.0287518 Gg-CH4/10^6 m^3 or 0.0287518×10^3 tCH4/Nm^3		
Efficiency of Baseline (Residue oil) Boiler	E_B	90%		

4.2 CALCULATED EMISSION SOURCES

Based on the results of monitoring activity as outlined in Section 3, and the non-monitored parameter summarized in Table 7, the emission sources are calculated in accordance with method set-out in the PDD.

4.2.1 BASELINE EMISSIONS

Table 8 - Summary of Baseline Emissions

PDD Ref.	Grid Electricity Displacement (Equation 3 of PDD)	Unit	Values
CEO	Total net consolidated electricity generated and supplied to the subscribers (Table 2, p. 8)	MWh	43,096
$EF_{CM,2006}$	2006 Combined Margin emission factor for Jawa-Madura Bali grid	tCO_2/MWh	0.901
BE_{ELEC}	Baseline emission associated with grid-power displacement	tCO_2	38,829
PDD Ref.	Residue Oil Displacement (Equation 2 of PDD)	Unit	Values
CAHO	Total net consolidated steam supplied to Argo Pantes (Table 3 p.8)	MJ	86,070,188
E_B	Efficiency of displaced residual oil boiler	unitless	0.900
ABEC	Energy baseline for thermal generation	TJ	95.63
EF_{CO2-R}	CO2 emission factor from combustion of residue oil	tCO2/TJ	77.4
EF_{CH4-R}	CH4 emission factor from combustion of residue oil (eqv. CO2)	tCO2/TJ	0.063
EF_{N2O-R}	N2O emission factor from combustion of residue oil (eqv. CO2)	tCO2/TJ	0.186
BE_R	Baseline emission associated with displacement of residue oil	tCO2	7,426

4.3 PROJECT & LEAKAGE EMISSIONS

Table 9 - Summary of Project & Leakage Emission

PDD Ref.	Natural Gas Combustion (Equation 7 of PDD)	Unit	Values
AEC_{NG}	Consolidated Natural Gas Consumption (Table 5, p. 9)	TJ	400.3
EF_{CO2-NG}	CO2 Emission factor from combustion of natural gas	tCO2/TJ	56.10
EF_{CH4-NG}	CH4 Emission factor from combustion of natural gas (eqv. CO2)	tCO2/TJ	0.021
EF_{N2O-NG}	N2O Emission factor from combustion of natural gas (eqv. CO2)	tCO2/TJ	0.031
PE_{NG}	Project emission from combustion of natural gas	tCO2	22,475
PDD Ref.	Natural Gas Production & Distribution (Equation 9 of PDD)	Unit	Values
AEC_{NG}	Consolidated Natural Gas Consumption (Table 5, p. 9)	TJ	400.3
ΣMEF_k	Total methane emission factor from gas production & distribution	tCH4/Nm3	2.87518E-05
GWP_{CH4}	Global Warming Potential of Methane	tCO2/tCH4	21
D_{NG}	Average Density of natural gas consumed	tgas/Nm3	0.00077
NCV_{NG}	Average Net Calorific Value of natural gas consumed	TJ/tgas	0.04766
LE	Leakage emission associated with gas production & distribution	tCO2	6,625

4.4 EMISSION AVOIDED DURING THIS MONITORING PERIOD

Table 10 -Delivered Emission Reduction for This Reporting Period

PDD Ref.	Project Activity Emission Reduction (Equation 10 of PDD)	Emission in tCO_2
BE_{ELEC}	Baseline emission from grid electricity displacement (Table 8, p. 11)	38,829
BE_R	Baseline emission from residue oil displacement (Table 8, p. 11)	7,426
PE_{NG}	Project emission from combustion of natural gas (Table 9, p. 12)	(22,475)
LE	Leakage emission from gas production & transportation (Table 9, p. 12)	(6,625)
ER	Emission Reduction (rounded down)	17,154

4.5 DISCUSSIONS

Within this reporting period, the indicated half-year delivery of 17,154 tCO_2 of emission reduction is short of the (conservative) expectation in the PDD, which is 42,622tCO2 per year or 21,311tCO_2 per half-year.

The shortage is primarily due to under-utilization of the facility compared to its design capacity, as two subscribers had not commenced procuring electricity from the Project until the end of this reporting period. Within this monitoring period, electricity production is only 81% of the total capacity, and creating a bottleneck in the production of steam.

In addition to this, pressure instability of the gas supplied reduces the overall generation efficiency, increasing the total consumption of natural gas. Despite the 20% lower than expected output, the gas consumption is not reduced by the same rate. Month-by-month efficiency monitoring indicated fluctuation between 58% and 62%, short of the 65% design expectation.[1]

[1] This is defined as total usable energy per energy intake

5 ENVIRONMENTAL PERFORMANCE

Since the Project commencement, one set of environmental assessment report has been submitted to local environmental agency. For this purpose, a series of test were carried out in June 2008 by a third party laboratory. Results of these tests are summarized in the following table.

Table 11 - Results of Stack Emission Test

Major Gases	Air Emission from Gas Exhaust	
	Project (13 June 2008)	Applicable Standards
SO_2 (Sulfur Dioxide)	20 µg/Nm^3	900 µg/Nm^3
CO (Carbon Monoxide)	208µg/Nm^3	26,000µg/Nm^3
NO_X (Nitrous Oxide)	6 µg/Nm^3	400µg/Nm^3
O_3 (Oxidant)	200 µg/Nm^3	235µg/Nm^3
Particulate	24 µg/Nm^3	230µg/Nm^3

Table 12 - Results of Noise Check

Location	Noise	
	Project (13 June 2008)	Applicable Standard
Project Site (K2)	82 dBA	70 dBA
Parking Area of Complex	68 dBA	70 dBA

The results of the checks show that the exhausts of gas engine are well within the national standard. However, it exceeded the allowable standard for noise at the Project site, and marginally meets the standard if measured from the parking area of the complex. As consequence to this, the Project is recommended to set a green-belt area in the surrounding empty land.

6 CONCLUSION

The management of PT Manunggal Energi Nusantara believes that it has implemented the Project in accordance with its original designation as reported in the registered Project Design Documentation (P1313). It has also met all expected statutory requirements, including operation & safety permits and environmental reporting.

The company management also believes that its CDM Team has taken all reasonable efforts to maintain credibility of data through proper administration and supervision. The Project Developer therefore wishes to immediately expedite the Verification process of the resulting emission reduction.