

B.7.1 Data and parameters monitored:

Data / Parameter:	FF_{project,y}
Data unit:	Nm ³
Description:	Quantity of natural gas combusted in the project boiler during the year y
Source of data to be used:	On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	23,046,286
Description of measurement methods and procedures to be applied:	Monitored continuously using meters.
QA/QC procedures to be applied:	<p>The meters (Tag No. FQ_7105) will be calibrated at least every 3 years. Once the erroneous measurement or malfunction is detected, corrective actions will be taken by LG Chem. The amount of natural gas combusted will be double checked with the receipt of purchase and consumption at other points in the plant. All the meters used in cross-check will be calibrated as national standard or related guideline. In case where the monitoring data is found to be incorrect in a certain month due to the malfunction, PP should formulate reasonable and conservative estimation. In the case of a malfunction, the PP shall calculate:</p> <p>a) the maximum monthly natural gas consumption value taken from a sample of the previous 12 months;</p> <p>b) back calculate monthly natural gas consumption value based on the amount of steam generated, the types of fuel consumed, and the concomitant net calorific values of each fuel type in the month when the malfunction occurred; and</p> <p>c) estimate the natural gas consumed by the project based on receipt of purchase and meter readings from all other natural gas consumption points in the plant.</p> <p>In the case of a malfunction, the most conservative value between a), b), and c)</p>

	shall be chosen, being the highest value of a), b), and c) for $\mathbf{FF}_{\text{project},y}$ as applied in the PE calculation and the lowest value of a), b), and c) for $\mathbf{FF}_{\text{project},y}$ as applied in the BE calculation.	
Any comment:	Specification of the meter is given below.	
	Type	Vortex meter
	Manufacture	Oval
	Accuracy Class	$\pm 1.0\%$

Data / Parameter:	$\mathbf{NCV}_{\text{NG},y}$
Data unit:	TJ/Nm ³
Description:	Net calorific value of natural gas in year y
Source of data to be used:	Standard Manual for Calorific Value
Value of data applied for the purpose of calculating expected emission reductions in section B.5	40.0×10^{-6}
Description of measurement methods and procedures to be applied:	The accurate and reliable national data will be used. The value is from the “Standard Manual for Calorific Value” (current version revised on 4 th , September 2006) approved by Ministry of Knowledge Economy / Korea Energy Management Corporation. Any further revision of the “Standard Manual for Calorific Value” will be taken into account.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	$\mathbf{Q}_{\text{total},y}$
Data unit:	TJ
Description:	Total quantity of steam generated by natural gas, purge gas and by-product liquid fuel in the project boiler during the year y
Source of data to be used:	On-site measurement
Value of data applied for the purpose of	1,233.70

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Monitored continuously using meters
QA/QC procedures to be applied:	The meters (Tag No. FQ_7102) will be calibrated periodically. Once the erroneous measurement or malfunction is detected, corrective actions will be taken by LG Chem.
Any comment:	

Data / Parameter:	PG_y
Data unit:	Nm ³
Description:	Quantity of purge gas combusted in the project boiler during the year y
Source of data to be used:	On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	4,401,320
Description of measurement methods and procedures to be applied:	Monitored continuously using meters
QA/QC procedures to be applied:	The meters (Tag No. FQ_7106) will be calibrated periodically. Once the erroneous measurement or malfunction is detected, corrective actions will be taken by LG Chem.
Any comment:	

Data / Parameter:	LF_y
Data unit:	Liter
Description:	Quantity of by-product liquid fuel combusted in the project boiler during the year y
Source of data to be	On-site measurement

used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	8,765,672
Description of measurement methods and procedures to be applied:	Monitored continuously using meters
QA/QC procedures to be applied:	The meters (Tag No. FQ_7104) will be calibrated periodically. Once the erroneous measurement or malfunction is detected, corrective actions will be taken by LG Chem.
Any comment:	

Data / Parameter:	NCV_{WG,y}
Data unit:	TJ/Nm ³
Description:	Net calorific value of purge gas
Source of data to be used:	On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	52.15 x 10 ⁻⁶
Description of measurement methods and procedures to be applied:	Monitored at least quarterly and yearly average value will be used.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	NCV_{LF,y}
Data unit:	TJ/liter
Description:	Net calorific value of by-product liquid fuel

Source of data to be used:	On-site measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	30.576×10^{-6}
Description of measurement methods and procedures to be applied:	Monitored at least quarterly and yearly average value will be used.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	$\mathcal{E}_{project,y}$
Data unit:	%
Description:	Energy efficiency of the boiler during the year y
Source of data to be used:	Calculated using the measured data
Value of data applied for the purpose of calculating expected emission reductions in section B.5	91 (Nameplate efficiency)
Description of measurement methods and procedures to be applied:	The energy efficiency of the boiler will be calculated by the direct method (dividing the net heat generation by the energy content of the fuels fired) at least quarterly.
QA/QC procedures to be applied:	The meters used for monitoring of the relevant parameters (steam generation, fuel consumption) will be calibrated periodically. Once the erroneous measurement or malfunction is detected, corrective actions will be taken by LG Chem.
Any comment:	The value of data applied above (91%) is from the nameplate of the boiler. For the monitoring during the crediting period, the direct method (dividing the net heat

	generation by the energy content of the fuels fired) will be used for the monitoring of the efficiency.
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B.7.2 Description of the monitoring plan:

LG Chem organizes an Operating and Monitoring Team, which composes of a manager and operators. The manager is responsible for monitoring and archiving all data associated with items depicted in the monitoring plan. Operators working under the manager are assigned to the task of monitoring different parameters on a timely basis as well as recording and archiving data in an orderly manner. All data collected as part of monitoring plan will be archived electronically and be kept at least 2 years after the end of the crediting period. Monitoring reports will be reviewed by the manager on a monthly basis in order to ensure that the Project activity meets all requirements as outlines above.

1. Introduction

The purpose of this Monitoring Plan (MP) is to provide a standard by which LG Chem. LG Chem will conduct monitoring and verification. The MP shall be in accordance with all relevant rules and regulations of the CDM. The MP is an integral part of this PDD and can be utilized to facilitate accurate and consistent monitoring of the Project's Certified Emission Reductions (CERs).

LG Chem will use the MP for the duration of the Project activity. The company will strictly follow the MP in order to measure and track the project impacts and prepare for the periodic verification process required to confirm the amount of CERs achieved.

Specifically, the MP facilitates the following;

- Establishing and maintaining a suitable monitoring system
- Guide for the implementation of necessary measurement and management operations
- Guide for meeting CDM requirements for verification and certification

2. Operational and Monitoring Obligations

In order to facilitate accurate CER determination, the project participant must fulfil a number of operational and data collection obligations. This will ensure that CERs are calculated in a transparent manner and monitoring is carried out as stipulated in the MP.

All data required for emission reduction determination shall be monitored as directed in Section B of this PDD.

3. Management and Operational Systems

In order to ensure a successful operation of the Project and the credibility and verifiability of the CERs achieved, the Project will have a well-defined management and operational system. A system will be put in place for the Project and include the operation and management of the monitoring and record keeping system that is described in this MP.

3.1 Allocation of Project management responsibilities

The management and operation of the Project is the responsibility of LG Chem, the Project operator. Ensuring the environmental credibility of the Project through accurate and systematic monitoring of the Project's implementation and operation for the purpose of achieving trustworthy CERs is the key responsibility and accountability of the operator.

3.2 Management and operational systems

The project developers implements a management and operational system that meets the requirements of the Project. This includes:

3.2.1 Data handling

- The establishment of a transparent system for the collection, computation and storage of data, including adequate record keeping and data monitoring systems. The project participants develop and implement a protocol that provides for these critical functions and processes, which will be fit for independent auditing.

3.2.2 Quality assurance

- LG Chem designates a competent manager who is in charge of and accountable for the generation of CERs including monitoring, record keeping, computation of CERs, audits and verification. The person officially sign-offs on all GHG Emission worksheets.
- Well-defined protocols and routine procedures, with good, professional data entry, extraction and reporting are encouraged to maximise transparency of data archiving.
- Proper management processes and recording of official data

3.2.3 Training

- Internal training is made available to operational staff to enable them to undertake the tasks required by this MP. Initial staff training is provided before the Project starts operating and generating CERs.

4. Corrective actions

When reading error of any of the meter exceeds the allowable range or any inconsistency occurs, the boiler will be shut down and will not be restated until the meter is properly repaired and followed by calibration in accordance with the standard. All the meters used in cross-check will be calibrated as national standard or related guideline. In case where the monitoring data is found to be incorrect in a certain month due to the malfunction, PP should formulate reasonable and conservative estimation. In the case of a malfunction, the PP shall calculate

- a) the maximum monthly natural gas consumption value taken from a sample of the previous 12 months;
- b) back calculate monthly natural gas consumption value based on the amount of steam generated, the types of fuel consumed, and the concomitant net calorific values of each fuel type in the month when the malfunction occurred; and
- c) estimate the natural gas consumed by the project based on receipt of purchase and meter readings from all other natural gas consumption points in the plant.

In the case of a malfunction, the most conservative value between a), b), and c) shall be chosen, being the highest value of a), b), and c) for **FF**_{project,y} as applied in the PE calculation and the lowest value of a), b), and c) for **FF**_{project,y} as applied in the BE calculation.