



**CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006**

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**SECTION A. General description of project activity****A.1 Title of the project activity:**

Point of Use Abatement Device to Reduce SF₆ emissions in LCD Manufacturing Operations in the Republic of Korea (South Korea)
Version 3
April 10, 2008

A.2. Description of the project activity:

LG Philips LCD (LPL) currently uses SF₆ in its LCD manufacturing process in six sister plants in Gumi, South Korea. The project will install abatement devices on all the CVD and etching processes to destroy much of the SF₆ currently vented from the process.

A.3. Project participants:

Name of Party Involved	Private or Public Entities	Indicate if the Party wishes to be considered a project participant (Yes/No)
Government of the Republic of Korea (Host)	<input checked="" type="checkbox"/> LPL <input checked="" type="checkbox"/> LG International <input checked="" type="checkbox"/> QualityTonnes, LLC	No No No
No Annex 1 Party yet identified		

A.4. Technical description of the project activity:**A.4.1. Location of the project activity:**

LG Philips LCD
Gumi, South Korea

A.4.1.1. Host Party(ies):

Republic of Korea

A.4.1.2. Region/State/Province etc.:

Gyeongsangbuk-do

A.4.1.3. City/Town/Community etc.:

Gumi

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

The six sister manufacturing facilities are based in Gumi which is located in the western part of Korea's North Gyeongsang Province, 277.5 km. south of Seoul and 167 km. north of Busan.

Dimensions : 617.28 km²

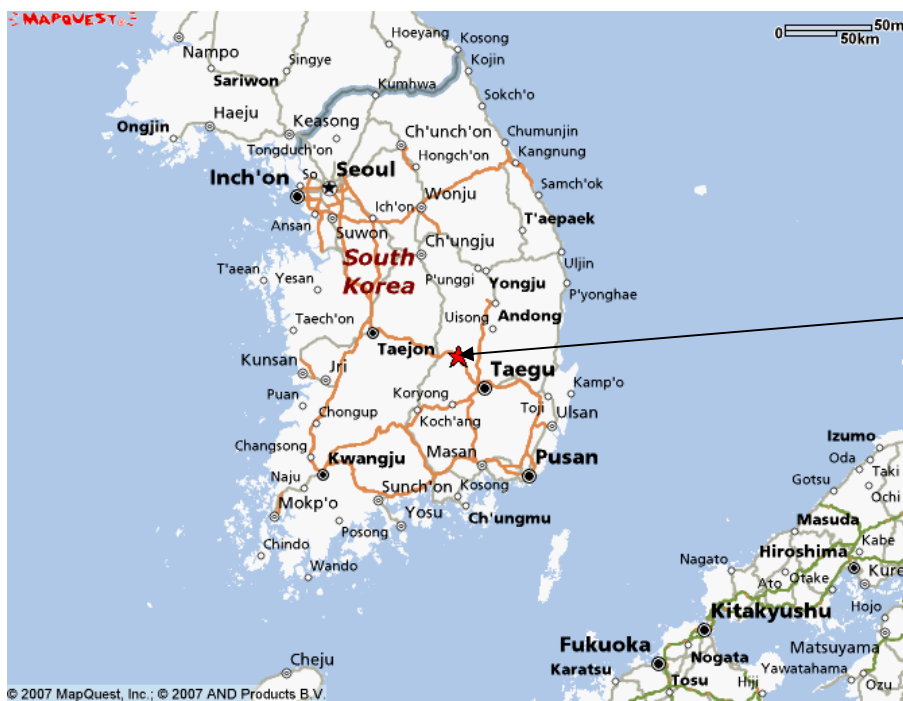
Population : 340.000 people (estimation 2003)

Climate : Annual average temperature (degrees celsius): 14.2

Average annual rainfall: 1323 mm

The Gyeongbu Railroad line and Gyeongbu Expressway cross the city. The Nakdong River flows north to south through Gumi.

Gumi is very important for South Korea's economy. It contains more than 725 companies with over 80,000 workers. Around 450 companies are located in Gumi National Industrial Complexes 1, 2, 3, and 4. The rest operate in the Sandong, Goa, and Haepyeong rural industry complexes. Major production: High-tech electronics like LCD's, CRT's, and telecommunication equipment. More than 10% of national export is generated in Gumi.



A.4.2. Category(ies) of project activity:

(11) Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride

**A.4.3. Technology to be employed by the project activity:**

This project will install the necessary abatement equipment required to destroy SF6 that is vented from the CVD and Etching processes in the manufacture of LCD panels. Specifically, the abatement technology destroys the SF6 using high temperatures greater than 1200 degrees C required to break down SF6.

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

Please indicate the chosen crediting period and provide the total estimation of emission reductions as well as annual estimates for the chosen crediting period. Information on the emission reductions shall be indicated using the following tabular format.

Year	Annual estimation of emission reductions in tonnes of CO ₂ e
Year 1	1,458,545
Year 2	1,458,545
Year 3	1,458,545
Year 4	1,458,545
Year 5	1,458,545
Year 6	1,458,545
Year 7	1,458,545
Year 8	1,458,545
Year 9	1,458,545
Year 10	1,458,545
Total estimated reductions (tonnes of CO₂e)	14,585,450
Total number of crediting years	10 years
Annual average over the crediting period of estimated reductions (tonnes of CO₂e)	1,458,545

A.4.5. Public funding of the project activity:

No public funding will be used for this activity

**SECTION B. Application of a baseline and monitoring methodology****B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:**

No approved methodology exists for this project activity. A new methodology, titled Point of Use Abatement Device to Reduce SF₆ emissions in LCD Manufacturing Operations, has been submitted with this PDD.

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

This project is applicable to this methodology because the following applicability criteria – proposed in the NM submission – apply to this project:

1. This group of LCD manufacturing facilities all currently use SF₆ which is then vented, are installing point of use abatement devices to eliminate SF₆ that would otherwise have been vented.
2. The maximum SF₆ flow from all chambers combined, with all mass flow controllers MFCs running at their full capacity is below the maximum capacity of the abatement system.
3. This group of LCD manufacturing facilities has no plans to substitute for SF₆ during the project and SF₆ will remain at least as high a percentage of FC (fluorocarbon) gas used in the process.
4. No law or regulation as per the CDM Executive Board guidance on E+ and E- policies exists, requiring the LCD plant to decompose, destroy, recycle or substitute SF₆.
5. No major process changes occur in the production line that would affect the SF₆ vented per m² of product are expected.

B.3. Description of the sources and gases included in the project boundary



	Source	Gas	Included?	Justification / Explanation
Baseline	Use as a cover gas	CO ₂	No	There are no CO ₂ emissions related to the project in the baseline case.
		SF ₆	Yes	This is the primary gas, which will be abated in the project scenario.
Project Activity	Produced in the operation of the abatement device from fuel and/or electricity consumption	CO ₂	Yes	The abatement device will consume fuel and/or electricity that would not be consumed in the baseline case.
	SF ₆ not destroyed in abatement device	SF ₆	Yes	Small amounts of SF ₆ will not be destroyed by the abatement device and will be counted as project emissions

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

The following are the potential baseline scenarios, as outlined in the NM submission:

1. ***Undertaking this project, using an abatement device without CDM.*** As with most abatement technology, there is no direct financial, productivity, or other reason to undertake the abatement. The abatement unit costs a considerable amount of money to purchase. It costs money to operate and maintain. It takes up valuable space within the operations of the product manufacturer. It adds absolutely not direct value to the producer in increased production or reduced cost of production. This makes it very unlikely that the company would undertake this action without a legal requirement.
2. ***Continuing using SF₆ without any abatement devices, the current situation*** - As described in the additionality section below, this is the most plausible baseline scenario.
3. ***Using a substitute gas for SF₆.*** SF₆ is almost uniquely suited for producing LCD screens. There is little opportunity to substitute for SF₆ especially with existing tools.



4. **Continuing to use SF₆ but undertaking a concerted effort to capture and reuse the SF₆.** Capture and reuse technology is still in its infancy. The cost and engineering requirements is much higher for this approach, the uncertainties are greater, and many tool manufacturers do not recommend recycled SF₆ for use in their machines. There is a perception at least that some impurities in recycled SF₆ might damage some of the extremely expensive tools that produce LCD screens. At this point this scenario is highly implausible.
5. **Process modifications/optimization to minimize SF₆ consumption.** LPL already has worked to minimize its use of SF₆ in the process so no major additional reductions are expected with existing tools. If consumption drops from any new techniques it will be captured in reduced emission reductions since the baseline is calculated every year based on actual SF₆ used.

Summary of Most Plausible Baseline Scenario

Baseline Scenarios	Financial	Barriers
1	This scenario would cost a significant amount of money and offer no return on the investment.- Not plausible	
2	Continuation of existing scenario does not cost any money or disrupt production.- Most Plausible	There are few if any recognizable barriers to maintaining the current scenario.-Plausible
3	It would cost money to switch over to any gas even if one were available.	The current chemistry is working well. SF ₆ is almost ubiquitous in LCD manufacturing and a technical replacement does not exist at this point especially given existing tools. Not Plausible.
4	Capture and Recycle Technology is expensive and requires a significant investment and risk beyond option 2 with little if any track record of success in the LCD industry. In addition, many tool manufacturers do not recommend recycled SF ₆ for their tools. –Not Most Plausible	This technology is extremely new and unproven. In the future it may represent an attractive course, but does not currently represent a reasonable option compared to abatement. –Not most Plausible.
5		Actions to reduce SF ₆ consumption have already been implemented. If additional actions are implemented it will not affect the efficacy of the methodology which recalculates emission reduction each year



		based on actual SF6 used.- Not most Plausible and does not affect successful outcome of the methodology.
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B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

Step 1. Applicability to national/local laws: All the alternatives described above are legal under Republic of Korea law.

2b. Option 1 Simple Investment Analysis -Financial Additionality -Perhaps the most relevant factor in the discussion of additionality is that there is no incentive to abate from SF₆. As the chart below estimate there will be a direct cost to LPL of US\$3,000,000 to abate SF₆ and zero financial benefit. Only the revenue from CDM will make the project financially viable.

Option	Capital Investment	Annual Operating Cost (per unit)	Number of units required	Total Ten Year Benefit	Simple Total 10 year Net Benefit (Cost)
SF ₆ Abatement Device	US 3.4 Million per device	\$180,000	6	\$0	(31,200,000)
No SF ₆ Abatement Device	\$0	\$0	0	\$0	\$0

Sub-step 3a. Identify barriers that would prevent the implementation of the proposed CDM project activity:

Barriers: Convincing management, overcoming uncertainty with abatement technologies, financing, finding floor space for, training staff on use are all critical barriers that this project faces.

Management is clearly concerned with production and productivity and is understandably sceptical of investing money, staff time, and floor space in a device that admittedly has no financial return. Since SF₆ presents almost no other problems or risks other than its GHG potential, without the incentive of CDM, it is very likely that this project would not go forward.

Step 4. Common practice analysis

Common Practice: Abatement technology for SF₆ in the Korean LCD manufacturing industry is not standard practice. Information gathered to date indicates this is a first of its kind comprehensive SF₆ abatement program in the LCD sector of Korea.

**B.6. Emission reductions:****B.6.1. Explanation of methodological choices:**

In reality, the proposed methodology is quite simple and straight forward and does not offer choices. To determine the baseline, the project developer continuously measures the SF₆ entering the abatement device adjusting for the measurement devices margin of error. The project emissions are simply the baseline emissions multiplied by the most conservative measured DRE. Each of the formulas presented will be used as both electricity and fuel are required to operate the abatement device. The fuel used in the project is anticipated to be LNG from Gas Grid.

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	GWP of SF₆
Data unit:	tCO ₂ eq/tSF ₆
Description:	Global Warming Potential of SF ₆
Source of data used:	IPCC
Value applied:	23,900
Justification of the choice of data or description of measurement methods and procedures actually applied :	Provided by the IPCC to calculate the global warming potential of SF ₆
Any comment:	

Data / Parameter:	Minimum Normal Abatement Device Operating Temp required for SF₆
Data unit:	Degrees C
Description:	the minimum required operating temperature for each abatement device installed-
Source of data used:	Manufacturer of Abatement Device
Value applied:	1200 C (to be confirmed upon validation)
Justification of the choice of data or description of measurement methods and procedures actually applied :	The manufacturer of the abatement systems provides the basic required operating conditions for the system.
Any comment:	

Data / Parameter:	Maximum Capacity for Abatement Device
Data unit:	Liters /minute (or other similar based on specific machine)
Description:	The maximum flow allowed for normal operation of abatement device.
Source of data used:	Manufacturer of Abatement Device
Value applied:	To be confirmed upon validation



Justification of the choice of data or description of measurement methods and procedures actually applied :	The manufacturer of the abatement systems provides the basic required operating conditions for the system.
Any comment:	

Data / Parameter:	Maintance Schedule For Abatement Device
Data unit:	List of maintance requirements
Description:	Complete Maintance Schedule for the Device
Source of data used:	Manufacturer of Abatement Device
Value applied:	To be confirmed upon validation
Justification of the choice of data or description of measurement methods and procedures actually applied :	The manufacturer of the abatement systems provides the basic required operating conditions for the system.
Any comment:	

Data / Parameter:	Total flow at inlet of SF6 abatement device
Data unit:	Liters per minute
Description:	Total flow measured at the inlet of the abatement system when using Calibration procedure
Source of data used:	Measurement to be taken prior to validation
Value applied:	To be provided at validation
Justification of the choice of data or description of measurement methods and procedures actually applied :	The flow will be measured at abatement device commissioning, halfway to the first maintenance, right before the first maintenance and right after the first maintenance in accordance with US EPA Guidelines for Measuring Flow. See section II.4, option 1 for more detail.
Any comment:	This parameter is directly measured when using calibration option 1, but is estimated when using calibration option 2

Data / Parameter:	Dilution factor at inlet of abatement device
Data unit:	fraction
Description:	Ratio of concentration of SF ₆ at injection point (100% pure) and at inlet of abatement system when process chambers are turned OFF (no plasma)
Source of data used:	Calibration procedure
Value applied:	To be provided prior to validation
Justification of the choice of data or	Should remain static throughout the project period as long as device is maintained and calibrated as per manufacturer’s specifications.



description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	Dilution factor through SF₆ abatement device
Data unit:	fraction
Description:	Ratio of concentration of Krypton at inlet and outlet of SF ₆ abatement system
Source of data used:	Calibration procedure
Value applied:	To be provided prior to validation
Justification of the choice of data or description of measurement methods and procedures actually applied :	Measurements will be taken as per methodology prior to validation
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:
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Estimated Annual Baseline Emissions

$$BE_y = E_{SF6,y} * GWP_{SF6}$$

EQ1

This would yield the following baseline emissions:

Facility (2006)	SF6 Entering Abatement Device tonnes in year y - $E_{SF6,y}$	TSF6 GWP Tonnes CO2 /Tonne SF6	TCO2eq emissions tonnes
#1	8.55	22,800	194,940
#2	2.90	22,800	66,120
#3	6.77	22,800	154,356
#4	9.19	22,800	209,532
#5	14.11	22,800	321,708
#6	28.16	22,800	642,048
Total Baseline Emissions	69.67		1,588,704



The following would yield project Emission Information:

$$PE_y = (BE_y * (1 - DRE_y)) + (NA_y * GWP_{SF6}) + C_{CO2y} \quad \text{EQ2}$$

Facility (2006)	Total SF6 Emissions from baseline BE _y	Amount of SF6 that is not destroyed by abatement device 1-DRE	SF6 exiting Abatement Device NA	TSF6 GWP Tonnes CO2 /Tonne SF6	CO2 emissions from fuel and electricity from the abatement device C _{CO2y} , TCO2	TCO2eq emissions tonnes
#1	194,940	.05	0	22,800	8454	18,201
#2	66,120	.05	0	22,800	8454	11,760
#3	154,356	.05	0	22,800	8454	16,172
#4	209,532	.05	0	22,800	8454	18,931
#5	321,708	.05	0	22,800	8454	24,539
#6	642,048	.05	0	22,800	8454	40,556
Total Project Emissions						130,159

Where the following formula would determine the CO2 from fuel and electricity consumption of the abatement device.

$$C_{CO2y} = (TE_y * EEF_y) + (TF_y * EFF_y) \quad \text{EQ 3}$$

Where C_{CO2y}, equals

Input into Abatement Device	Total Input	Emissions Factor	Total Tonnes CO2
Electricity	357.7 MWh	0.7559 TCO2/ MWh	270.3
Natural Gas	438000 Nm3/year	2.6 T CO2/1000Nm3	1138.8
Total			1409
Total for 6			8454

Year	Total Baseline Emissions	Total Project Emissions TCO2	TCO2eq emissions
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			Reductions
Year 1	1,588,704	130,159	1,458,545
Year 2	1,588,704	130,159	1,458,545
Year 3	1,588,704	130,159	1,458,545
Year 4	1,588,704	130,159	1,458,545
Year 5	1,588,704	130,159	1,458,545
Year 6	1,588,704	130,159	1,458,545
Year 7	1,588,704	130,159	1,458,545
Year 8	1,588,704	130,159	1,458,545
Year 9	1,588,704	130,159	1,458,545
Year 10	1,588,704	130,159	1,458,545
Total	15,887,040	1,301,590	14,585,450

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emission (tonnes of CO₂ e)	Estimation of baseline emission (tonnes of CO₂ e)	Estimated Leakage (tonnes of CO₂ e)	Estimation of emission reductions (tonnes of CO₂ e)
Year 1	130,159	1,588,704	0	1,458,545
Year 2	130,159	1,588,704	0	1,458,545
Year 3	130,159	1,588,704	0	1,458,545
Year 4	130,159	1,588,704	0	1,458,545
Year 5	130,159	1,588,704	0	1,458,545
Year 6	130,159	1,588,704	0	1,458,545
Year 7	130,159	1,588,704	0	1,458,545
Year 8	130,159	1,588,704	0	1,458,545



Year 9	130,159	1,588,704	0	1,458,545
Year 10	130,159	1,588,704	0	1,458,545
Total (tonnes of CO₂ e)	1,301,590	15,887,040	0	14,585,450

B.7 Application of the monitoring methodology and description of the monitoring plan:
B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	M-1 E _{SF6}												
Data unit:	kg												
Description:	emissions of SF6 gas												
Source of data to be used:	Monitored right before entering abatement device using FTIR												
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Each of the ten project years is expected to be roughly the same <table border="1" data-bbox="565 1115 829 1318"> <tr><td>#1</td><td>8.55</td></tr> <tr><td>#2</td><td>2.90</td></tr> <tr><td>#3</td><td>6.77</td></tr> <tr><td>#4</td><td>9.19</td></tr> <tr><td>#5</td><td>14.11</td></tr> <tr><td>#6</td><td>28.16</td></tr> </table>	#1	8.55	#2	2.90	#3	6.77	#4	9.19	#5	14.11	#6	28.16
#1	8.55												
#2	2.90												
#3	6.77												
#4	9.19												
#5	14.11												
#6	28.16												
Description of measurement methods and procedures to be applied:	The project developer will install and monitor an advanced FTIR measuring device. The will continuously measure the SF6 entering the abatement device												
QA/QC procedures to be applied:													
Any comment:													

Data / Parameter:	M-2 C _{CO₂ y}
Data unit:	tCO ₂
Description:	C _{CO₂ y} is the amount of CO ₂ produced in a year from the abatement machine from electricity and fuel combustion in year y
Source of data to be used:	Calculated from other parameters TE, EEf, TF, EFF



Value of data applied for the purpose of calculating expected emission reductions in section B.5	Each of the ten project years is expected to be roughly the same 1409 TCO ₂ per abatement device or 8454 for all six units
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Meters to measure electricity and fuel consumption will be calibrated as per manufacturer's specifications.
Any comment:	

Data / Parameter:	M-3 TE
Data unit:	kWh
Description:	Electricity used in operation of abatement device
Source of data to be used:	Metered
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Each of the ten project years is expected to be roughly the same 357.7 MWh per abatement device
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Meters to measure electricity consumption will be calibrated as per manufacturer's specifications.
Any comment:	

Data / Parameter:	M-4 TF
Data unit:	m ³ of LPG
Description:	Measured fuel consumption for operation of abatement device
Source of data to be used:	Metered
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Each of the ten project years is expected to be roughly the same 438000 Nm ³ /year per abatement device
Description of	



measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	Meters to measure fuel consumption will be calibrated as per manufacturer's specifications.
Any comment:	

Data / Parameter:	M-5 EFF
Data unit:	Tonnes CO ₂ per kWh
Description:	Electricity emissions factor
Source of data to be used:	Latest statistical data of KEPCO(Korea Electric Power Corporation) The latest data comes from the year 2005 (0.7559 kg-CO ₂ /kWh) will be updated for validation
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Each of the ten project years is expected to be roughly the same as 0.7559 Tonnes CO ₂ / MWh.
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	M-6 EFF
Data unit:	Tonnes CO ₂ per m ³ used
Description:	fuel emissions factor
Source of data to be used:	From local fuel supplier
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Each of the ten project years is expected to be roughly the same 0.0026 T CO ₂ / Nm ³
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	



Data / Parameter:	M-7 DRE
Data unit:	percentage
Description:	The efficacy of the abatement tool in destroying the waste stream of SF6
Source of data to be used:	Independent, qualified third party
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Each of the ten project years is expected to be roughly the same .95 is the minimum expected value for the abatement device
Description of measurement methods and procedures to be applied:	Four measurements will be made during the first year to confirm the DRE and the most conservative of the four will be used throughout the project. The measurements will be made using an advanced FTIR device.
QA/QC procedures to be applied:	The calibration of the FTIR will be as per manufacturer's specifications.
Any comment:	

Data / Parameter:	M-8 (Abatement Device Operating Parameters Flow and Temperature)
Data unit:	C and flow liters/minute
Description:	The operational parameters for each abatement device will be monitored consistently to ensure the operational parameters have not changed beyond the manufacturers specifications in a way that would alter DRE.
Source of data to be used:	metered
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Will be updated prior to validation
Description of measurement methods and procedures to be applied:	If the abatement device operates under the minimum operating parameters as stated by the manufacturer, the project will eliminate the SF6 emission reductions calculated from that time period. (The quantity of SF6 entering the process during that time period will be subtracted and the amount of SF6 destroyed during the same period will be zero.) If the abnormal operating conditions persist, a new initial monitoring study will have to be completed in order for credits to resume.
QA/QC procedures to be applied:	Meters will be calibrated as per manufacturers' specifications.
Any comment:	This is very conservative since the abatement device is still likely to eliminate some SF6 even when it is operating outside normal parameters and the project developer will claim no credits.

Data / Parameter:	M-9 (Nitrogen dilution - Flow)
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Data unit:	Liters/minute or other similar SI units
Description:	Nitrogen is used to dilute the process effluents at various points of the exhaust line to ensure reliable operations of the vacuum pumps, and to ensure that the effluents are safely diluted in the case of toxic or flammable byproducts.
Source of data to be used:	metered
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Will be updated prior to validation
Description of measurement methods and procedures to be applied:	The operator will document all sources of dilution during the determination of the emissions baseline. Thereafter, the operator will periodically measure the N ₂ dilution flow (e.g. at the inlet of the pumps) and ensure that the set points are constant.
Monitoring frequency:	Periodic; after every maintenance of the abatement system.
QA/QC procedures:	Meters will be calibrated as per manufacturers' specifications.
Any comment:	The purpose for measuring the N ₂ dilution is to ensure that the total flow at the inlet of the abatement device does not change over time. If the dilution factor changes, or if the total flow at the inlet of the abatement system is expected to have changed by more than 5% due to a modification of the exhaust configuration, the operator will be required to perform another SF ₆ calibration according to the methodology described in section II-4 (Calibration of baseline emissions).

Data / Parameter:	M-10 Non-Abated SF₆ (NA)
Data unit:	Tonnes SF ₆
Description:	The operational parameters for each abatement device will be monitored consistently to ensure the operational parameters have not changed beyond the manufacturers specifications in a way that would alter DRE. In case the basic operational parameters are not met for a certain period of time, the SF ₆ flow during that time period will not be included for reduction credits
Source of data to be used:	SF ₆ non-abated metered by FTIR as par of baseline emission time period of non-abatement will be determined by continuous measurement of abatement device operating parameters.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	It is assumed that the basic operating parameters will be met.
Description of measurement methods	If the abatement device operates beyond the original normal operating parameters as stated by the manufacturer, the project will eliminate the SF ₆



and procedures to be applied:	emission reductions calculated from that time period. (The quantity of SF ₆ entering the process during that time period will be subtracted and the amount of SF ₆ destroyed during the same period will be zero.)
QA/QC procedures to be applied:	Meters will be calibrated as per manufacturers' specifications.
Any comment:	This is very conservative since the abatement device is still likely to eliminate some SF ₆ even when it is operating outside normal parameters and the project developer will claim no credits.

Data / Parameter:	M-11 SF₆ purchased
Data unit:	Canister or other standard quantity used in purchase of SF ₆
Description:	The quantity of SF ₆ purchased in a year (as estimation of SF ₆ used in a year)
Source of data to be used:	SF ₆ purchase records or usage records.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	It is assumed that the SF ₆ /m ² of substrate is not increasing. Documentation will be provided at validation
Description of measurement methods and procedures to be applied:	Purchase or usage records will be analyzed.
QA/QC procedures to be applied:	Records to be retained
Any comment:	

Data / Parameter:	M-12 LCD substrates processed
Data unit:	m ²
Description:	The total m ² of substrates processed to be used with the M11 to determine the ration of SF ₆ /m ² of substrate to ensure no intentional increase in SF ₆ use per product output.
Source of data to be used:	Production records.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	It is assumed that the SF ₆ /m ² of substrate is not increasing. Documentation will be provided at validation
Description of measurement methods and procedures to be	Records of production will be analyzed.



applied:	
QA/QC procedures to be applied:	Records of production will be retained
Any comment:	

B.7.2 Description of the monitoring plan:

Monitoring plan will cover the following key questions and will be presented upon project validation:

- Is the authority of project management clearly described?
- Is the authority for registration, monitoring, measurement and reporting clearly described?
- Are procedures identified for training of monitoring personnel?
- Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?
- Are procedures identified for calibration of monitoring equipment?
- Are procedures identified for maintenance of monitoring equipment and installations?
- Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?
- Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?
- Are procedures identified for review of reported results/data?

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

Kevin James, QualityTonnes
818 Aspen Street, NW
Washington, DC 20012 USA
202-518-9809
kjames@qualitytonnes.com

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

January 1, 2009

C.1.2. Expected operational lifetime of the project activity:

10 years

**C.2 Choice of the crediting period and related information:****C.2.1. Renewable crediting period****C.2.1.1. Starting date of the first crediting period:**

Option Not Selected

C.2.1.2. Length of the first crediting period:

Option Not Selected

C.2.2. Fixed crediting period:**C.2.2.1. Starting date:**

January 1, 2009

C.2.2.2. Length:

10 years

SECTION D. Environmental impacts**D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:**

Environmental impacts of this project are expected to be small. The abatement device uses a small amount of electricity and natural gas. There will be no other significant environmental impact.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

The environmental impact statement will be provided to the DOE upon project validation

SECTION E. Stakeholders' comments**E.1. Brief description how comments by local stakeholders have been invited and compiled:**

To be provided upon project validation

E.2. Summary of the comments received:

To be provided upon project validation

E.3. Report on how due account was taken of any comments received:



To be provided upon project validation

**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY.**

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

NO PUBLIC FUNDING IS USED FOR THIS PROJECT ACTIVITY

Annex 3

Estimated Annual Baseline Emissions

$$BE_y = E_{SF6,y} * GWP_{SF6}$$

EQ1

This would yield the following baseline emissions:

Facility (2006)	SF6 Entering Abatement Device tonnes in year y - $E_{SF6,y}$	TSF6 GWP Tonnes CO2 /Tonne SF6	TCO2eq emissions tonnes
#1	8.55	22,800	194,940
#2	2.90	22,800	66,120
#3	6.77	22,800	154,356
#4	9.19	22,800	209,532
#5	14.11	22,800	321,708
#6	28.16	22,800	642,048
Total Baseline Emissions	69.67		1,588,704

The following would yield project Emission Information:

$$PE_y = (BE_y * (1 - DRE_y)) + (NA_y * GWP_{SF6}) + C_{CO2y}$$

EQ2

Facility (2006)	Total SF6 Emissions from baseline BE_y	Amount of SF6 that is not destroyed by abatement device $1 - DRE$	SF6 exiting Abatement Device NA	TSF6 GWP Tonnes CO2 /Tonne SF6	CO2 emissions from fuel and electricity from the abatement device $C_{CO2y}, TCO2$	TCO2eq emissions tonnes
#1	194,940	.05	0	22,800	8454	18,201
#2	66,120	.05	0	22,800	8454	11,760
#3	154,356	.05	0	22,800	8454	16,172
#4	209,532	.05	0	22,800	8454	18,931
#5	321,708	.05	0	22,800	8454	24,539



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#6	642,048	.05	0	22,800	8454	40,556
Total Project Emissions						130,159

Where the following formula would determine the CO₂ from fuel and electricity consumption of the abatement device.

$$C_{CO_2y} = (TE_y * EEF_y) + (TF_y * EFF_y)$$

EQ 3

Where C_{CO₂y}, equals

Input into Abatement Device	Total Input	Emissions Factor	Total Tonnes CO ₂
Electricity	357.7 MWh	0.7559 TCO ₂ /MWh	270.3
Natural Gas	438000 Nm ³ /year	2.6 T CO ₂ /1000Nm ³	1138.8
Total			1409
Total for 6			8454

Year	Total Baseline Emissions	Total Project Emissions TCO ₂	TCO ₂ eq emissions Reductions
Year 1	1,588,704	130,159	1,458,545
Year 2	1,588,704	130,159	1,458,545
Year 3	1,588,704	130,159	1,458,545
Year 4	1,588,704	130,159	1,458,545
Year 5	1,588,704	130,159	1,458,545
Year 6	1,588,704	130,159	1,458,545
Year 7	1,588,704	130,159	1,458,545
Year 8	1,588,704	130,159	1,458,545
Year 9	1,588,704	130,159	1,458,545
Year 10	1,588,704	130,159	1,458,545



Total	15,887,040	1,301,590	14,585,450
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Annex 4

MONITORING INFORMATION

Monitoring plan will cover the following key questions and will be presented upon project validation:

- Is the authority of project management clearly described?
- Is the authority for registration, monitoring, measurement and reporting clearly described?
- Are procedures identified for training of monitoring personnel?
- Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?
- Are procedures identified for calibration of monitoring equipment?
- Are procedures identified for maintenance of monitoring equipment and installations?
- Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?
- Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?
- Are procedures identified for review of reported results/data?
