Monitoring report form for CDM project activity
(Version 06.0)

MONITORING REPORT		
Title of the project activity	Kaladonger wind power project in Rajasthan	
UNFCCC reference number of the project activity	9342	
Version number of the PDD applicable to this monitoring report	04	
Version number of this monitoring report	01	
Completion date of this monitoring report	22/02/2018	
Monitoring period number	01	
Duration of this monitoring period	31/12/2012 to 06/01/2014	
Monitoring report number for this monitoring report	01	
Project participants	Bindu Vayu Urja Private Limited (BVUPL)	
Host Party	India	
Sectoral scopes	Sectoral Scope: 1 - Energy industries (renewable / non-renewable sources)	
Applied methodologies and standardized baselines	Methodology: ACM0002 Consolidated baseline methodology for grid-connected electricity from renewable energy" version 12.3.0 (EB 66) Standardized baselines: Not Applicable	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	91	126713
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	129,248	

SECTION A. Description of project activity

A.1. General description of project activity

The project activity envisages implementation of a 75.6 MW wind power project consisting of 36 Wind Electric Generators (WTGs) of individual capacity 2.1 MW, at Kaladonger village in Rajasthan, India by M/s Bindu Vayu Urja Private Limited (BVUPL). The electricity generated by the project is exported to the NEWNE electricity grid. The project activity is therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The project proponent plans to avail CDM benefits for the project.

The project activity is in line with the sustainable development priorities of the country. The electricity generated from the wind farm will be exported to the NEWNE grid and sold to the state electricity utility, thereby marginally contributing to reducing the energy demand supply gap in the state of Rajasthan[1].

Technology

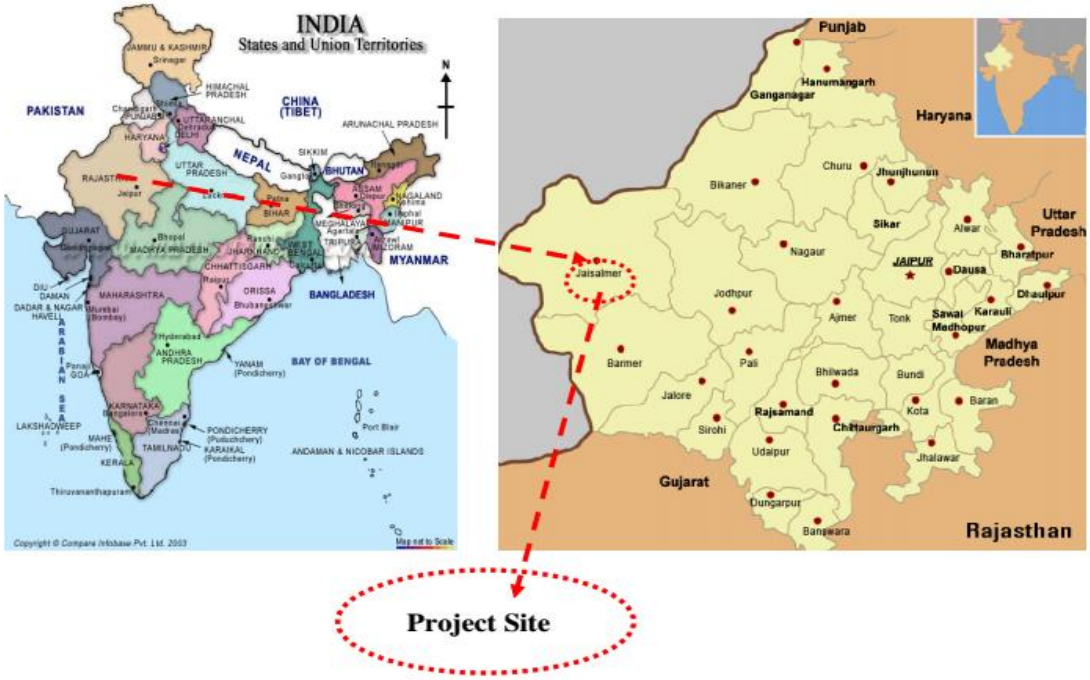
The project uses Suzlon's wind energy technology. The project activity implements S95 model 2100kW WTGs, specifications for which are provided in section A.4.3 of the registered PDD.

Emission Reductions from anthropogenic sources

The wind power generated from the project site is displacing the electricity generated from thermal power stations feeding into NEWNE grid and would be replacing the usage of diesel generators for meeting the power demand during shortage periods. Since wind power is Green House Gas (GHG) emissions free, the power generated is preventing the anthropogenic green house gas (GHG) emissions generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas. The estimation of GHG reductions by this project is limited to carbon dioxide (CO2) only. Thus the proposed project activity leads to an emission reduction of 126,817 tCO2e per year over the chosen crediting period of ten years. During this monitoring period, 126,804 tCO_2e CER is generated.

A.2. Location of project activity

The project activity is located in Kaladonger Site of Jaisalmer District Rajasthan State, India



The geo-coordinates of location of the project activity are as follows:

[1] http://www.cea.nic.in/reports/yearly/annual rep/2009-10/ar 09 10.pdf

S.No.	Loc.No.	LATITUDE			LONGITUDE			Date of Commissioning
		Deg	Min	Sec	Deg	Min	Sec	
1	KD-001	27	5	35.4	70	59	59	20.07.2012
2	KD-002	27	5	54.9	70	59	53.5	20.07.2012
3	KD-003	27	6	16.8	70	59	54.4	20.07.2012
4	KD-004	27	6	27.3	70	59	42.5	20.07.2012
5	KD-005	27	6	38.7	70	59	30.8	20.07.2012
6	KD-006	27	6	49.8	70	59	18.6	20.07.2012
7	KD-007	27	7	1.7	70	59	4.3	20.07.2012
8	KD-012	27	7	26.1	70	59	48	30.03.2012
9	KD-013	27	7	14.1	70	59	59.1	30.03.2012
10	KD-014	27	7	1.8	71	0	9.9	30.03.2012
11	KD-024	27	7	9.5	71	2	4.5	23.03.2012
12	KD-027	27	7	36.3	71	1	28.8	31.03.2012
13	KD-028	27	7	41.5	71	1	13	31.03.2012
14	KD-029	27	7	51.5	71	0	54.8	28.03.2012
15	KD-030	27	7	54.5	71	0	33.3	27.03.2012
16	KD-035	27	8	40.9	71	0	46.3	14.03.2012
17	KD-036	27	8	34.2	71	1	3.8	18.02.2012
18	KD-037	27	8	27.5	71	1	23.9	14.03.2012
19	KD-038	27	8	17.6	71	1	39.8	25.03.2012
20	KD-039	27	8	10.4	71	1	56.5	14.03.2012
21	KD-040	27	7	59.8	71	2	4.9	23.03.2012
22	KD-042	27	7	44.8	71	2	35.6	10.09.2012
23	KD-054	27	8	22.4	71	2	59.3	27.03.2012
24	KD-055	27	8	30.7	71	2	49.9	25.03.2012
25	KD-056	27	8	38.2	71	2	38.8	25.03.2012
26	KD-057	27	8	45.1	71	2	26.5	14.03.2012
27	KD-058	27	8	52.9	71	2	6.3	31.03.2012
28	KD-059	27	9	2.5	71	1	51.7	14.03.2012
29	KD-060	27	9	11	71	1	31.3	14.03.2012
30	KD-061	27	9	17	71	1	17.4	14.03.2012
31	KD-067	27	9	21.4	71	2	54.1	28.03.2012
32	KD-068	27	9	14.6	71	3	9.3	27.03.2012
33	KD-076	27	8	23.5	71	4	55.5	28.03.2012
34	KD-077	27	8	39.3	71	4	47.2	27.03.2012
35	KD-078	27	8	48.3	71	4	31.9	23.03.2012
36	KD-079	27	9	2.9	71	4	29.8	27.03.2012

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host Party)	M/s Bindu Vayu Urja Private Limited (BVUPL)	No

A.4. Reference to applied methodologies and standardized baselines

Applied Methodology: ACM0002 Consolidated baseline methodology for grid-connected electricity from renewable energy" version 12.3.0[2] (EB 66)
Standard baselines: Not applicable".

A.5. Crediting period type and duration

Type of crediting period	Fixed
Crediting period from	31/12/2012 to 30/12/2022
Length of the Crediting Period	10 Years
Monitoring period from	31/12/2012 to 06/01/2014
Length of the Monitoring Period	372 Days

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

Power generation using wind is achieved by deploying 36 wind turbine generators (WTGs). Wind power generation is an environmentally safe and sound technology. The WTGs supplied by Suzlon Energy Limited to the project participant. The components were manufactured in India and assembled at the project site. There is no transfer of technology from outside the host country for this project activity.

The project uses Suzlon's wind energy technology and implements 36 number of WTGs of S95 model with a capacity of 2100kW each. The technical details are shown below:

OPERATING DATA	
Rated power	2100 kw
Rotor speed	12.1 to 17.6 rpm
Power regulation	Active pitch regulated
Cut-in wind speed	3.5 metre/second
Rated wind speed	11 metre/second
Cut-off wind speed	25 metre/second
Restart wind speed	23 metre/second
Wind class	IEC IIA
Estimated service life	20 years
Ambient temperature range-operation	-10°to+ 40°C
A factor	9.59 m/s
ROTOR DATA	
Diameter	95 metre
Rotor cone angle	5°
Rotor speed at rated power	15.83 rpm
Tip speed at rated power	78.7 m/s
Swept area	7085 metre^2
BLADES	
Type	SUZLON SB46
Length	46.3 m
Material	Glass fibre reinforced plastic / Epoxy
Type of aerodynamic brake	
GENERATOR	

[2] http://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L

Type	Asynchronous 3 phase induction generator with slip rings operated with rotor circuit inverter system.
Rated power	2.1 MW
Number of poles/Synchronous speed	4/1500 rpm
Frequency	50 Hz
Rated generator speed	1568 rpm
TOWER	
Type	Tubular steel tower
Tower Height	80m

No events or situations happened during the reported monitoring period that can alter the applicability of the applied methodology.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies or standardized baselines

There is no request for deviation applied during this monitoring period.

B.2.2. Corrections

There have not been any corrections to project information or parameters fixed at validation during the current monitoring period.

B.2.3. Changes to the start date of the crediting period

There is no changes in the start date of the crediting period.

B.2.4. Inclusion of monitoring plan

There has not been any change in the monitoring plan during the current monitoring period.

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

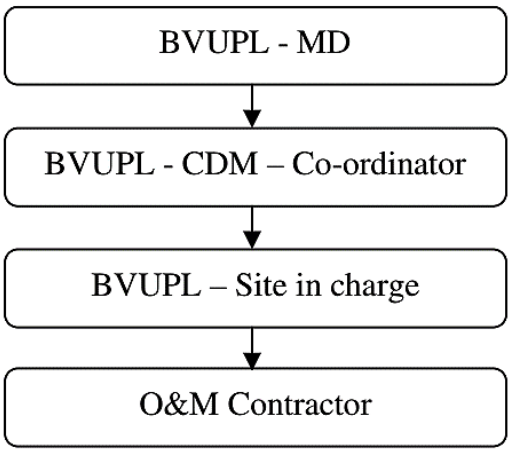
Not Applicable.

B.2.6. Changes to project design

There has not been any change in the PDD during the current monitoring period.

SECTION C. Description of monitoring system

The organisational structure of this CDM project activity is as follows:



The project proponent has entered into agreement with the WTG- Supplier - Suzlon Energy Limited for the operation and maintenance of WTGs. The WTG supplier has dedicated and technically well equipped O&M team[3] for day-to-day Operation and maintenance of each WTG. O&M contractor provides a monthly report, which includes generation data, major breakdown events and machine availability. Site in-charge is responsible for recording of monthly Meter Readings of export and import. Monthly power export and import data is sent regularly to CDM coordinator of BVUPL. The detailed monitoring plan has been described in Annex 4 of the registered PDD.

Measurement of Energy and Metering:

- Since there are power producers other that the project proponent injecting electricity produced by them using the common evacuation / injection system and through the common metering equipment, Suzlon Energy Limited has been identified 'as the common agency responsible for joint metering.

- The joint meter reading taken at the common evacuation / injection system is supported by controller readings of individual power producers using the common evacuation / injection system.

- WTG controller meter does not require calibration due to the following reason: "The Controller is a micro processor based intelligent device which has been specially designed for the control of wind turbines. It uses a Woodward Multi function Reply that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current /voltage are converted to digital signal internally using AD convertors at very high sampling rates. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed/stored. Woodward rely does not have a display and needs special protocol to view energy readings as this rely communicates digital signal through special communication protocol hence; it is not possible to calibrate. Moreover, turbine cannot run without this relay hence it cannot be removed for calibration during operation"

- Based on this breakup, limited to the total energy injection, net electricity exported by the project proponent.

[3] Suzlon Energy limited is an ISO certified company with all training needs identified and document as per the ISO requirement. O&M is one of their service offering for which they have trained staff.

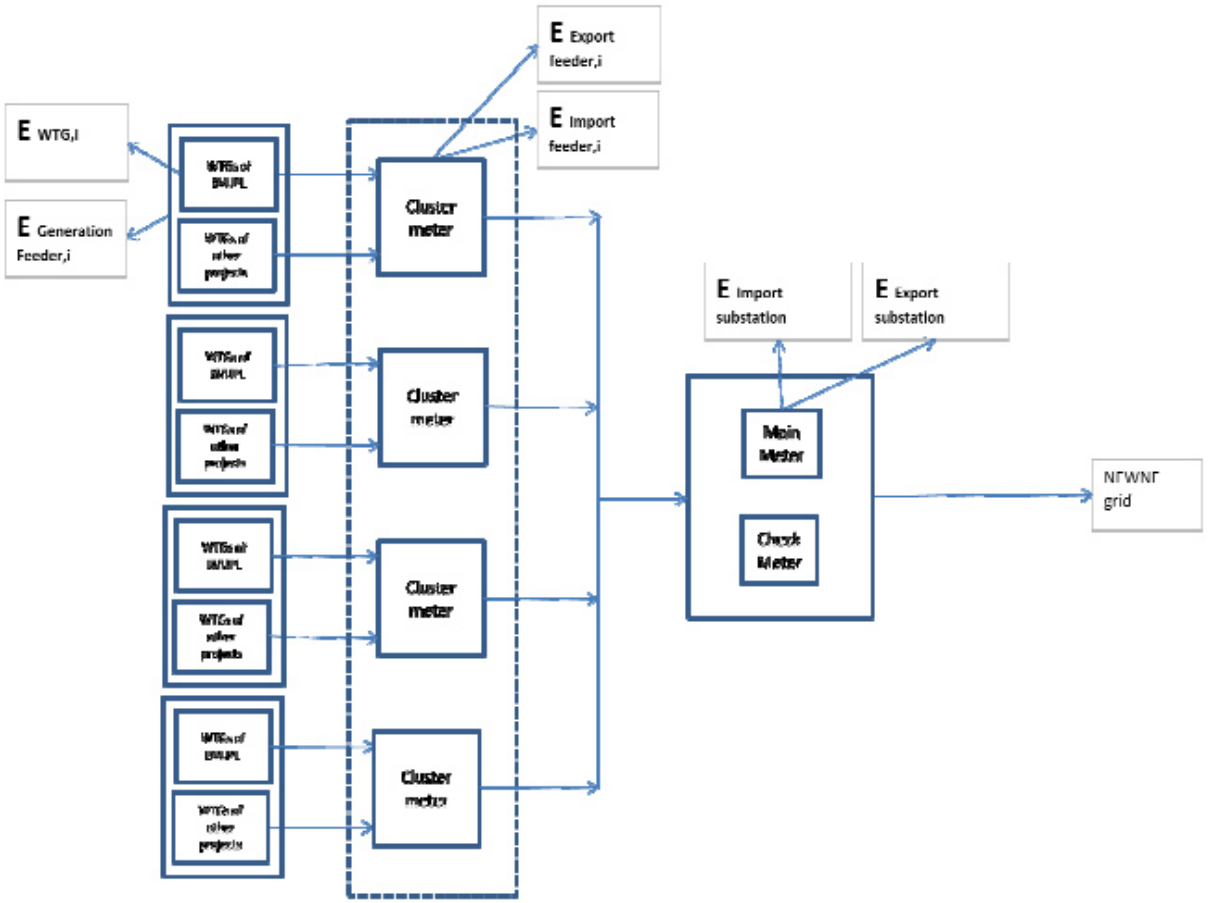


Figure 1. A schematic diagram indicating the metering system.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**$EF_{grid,OM\ simple,y}$**
Unit	tCO_2/MWh
Description	Operating margin CO2 emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO2 Emission Database CEA CO2 Baseline database Version 07[4]
Value(s) applied	0.9841
Choice of data or measurement methods and procedures	The operating margin emission factor data has been deduced from CO_2 Database.
Purpose of data/parameter	The parameter is used for calculation of the baseline emissions.
Additional comments	The operating margin emission factor is a 3-year generation-weighted average data, based on the most recent data available on CEA database at the time of submission of the CDM-PDD to the DOE for validation

[4] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Data/Parameter	$EF_{grid,BM,y}$
Unit	tCO_2/MWh
Description	Build margin CO2 emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO2 Emission Database CEA CO2 Baseline database Version 07[4]
Value(s) applied	0.8587
Choice of data or measurement methods and procedures	The build margin emission factor data has been deduced from CO_2 Database.
Purpose of data/parameter	The parameter is used for calculation of the baseline emissions.
Additional comments	The build Margin would be calculated ex ante and fixed during the crediting period. For ex ante calculation the most recent data available has been used and the build margin thus calculated is 0.8587

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor of NEWNE grid
Source of data	Central Electricity Authority:CO2 Emission Database CEA CO2 Baseline database Version 07[4]
Value(s) applied	0.9527
Choice of data or measurement methods and procedures	Calculated as per the procedures in “Tool to calculate the emission factor for an electricity system” with data deduced from CEA
Purpose of data/parameter	The parameter is used for calculation of the baseline emissions.
Additional comments	The Combined Margin would be calculated ex ante and fixed during the crediting period.

D.2. Data and parameters monitored

Data/Parameter	$EG_{facility, y}$
Unit	MWh
Description	Quantity of Net Electricity exported to the grid during the year y.
Measured/calculated/ default	Calculated value based on Measured electricity export and import values
Source of data	Monthly billing records issued by JVVNL
Value(s) of monitored parameter	133099.819 MWh
Monitoring equipment	Net electricity supplied is calculated based on the difference between calculated values of “export” and calculated value “import” on the JVVNL energy meter at the common evacuation point and the percentage transmission loss as prescribed in the PPA for metering at 220 kV. Refer to Annex 4 of the registered PDD for more details on the calculation procedure
Measuring/reading/recording frequency	Monthly recording of electricity export and import.
Calculation method (if applicable)	Net electricity supplied to the grid by the project activity will be crosschecked with invoices submitted to JVVNL. The meter(s) shall be calibrated and maintained by the state utility as per their own schedule, and this frequency of meter calibration is not within the control of the Project Proponent.
QA/QC procedures	All Energy meters will be tested for accuracy at least once in a years. The accuracy class of the energy meter is 0.2s.
Purpose of data/parameter	Calculation of the baseline emission

Additional comments	-

D.3. Implementation of sampling plan

There is no sampling plan is required for current monitoring plan.

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

The project activity reduces carbon dioxide by displacing thermal coal fired grid electricity generation with renewable energy based generation. The emission reduction ERy by the project activity during a given year y is the difference between baseline emissions (BEy) and project emissions (PEy) as per the consolidated methodology ACM002 version 12.3.0 as follows:, Emission reductions are calculated as follows:

$ER_y = BE_y – PE_y$

As per ACM002 version 12.3.0, baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

$BE_y = EG_{facility,\ y} * EF_{grid,CM,y}$

BE_y = Baseline emissions in year y (tCO_2)

$EG_{facility,y}$ = Quality of net electricity generation that is produced and fed into the grid as a result of the implementation of CDM project activity in year y (MWh)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system (tCO_2/MWh)"

Baseline emission factor (Combined Margin) is 0.9527 tCO_2e.

E.2. Calculation of project emissions or actual net removals

As the project activity is wind power project, project emissions are zero and the resulting emission reduction is as follows.

Therefore,

$ER_y = BE_y$

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$

$BE_y = 133099.819 \times 0.9527$

$BE_y = 126{,}804\ tCO_2$

E.3. Calculation of leakage emissions

No leakage emissions have been considered and hence the leakage emission is zero.
So the emission reductions is equal to baseline emissions ERy = BEy.

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals ($t CO_2e$)	Project GHG emissions or actual net GHG removals ($t CO_2e$)	Leakage GHG emissions ($t CO_2e$)	GHG emission reductions or net anthropogenic GHG removals ($t CO_2e$)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	126,804	0	0	91	126,713	126,804

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante (t CO_2e)
126,804	129,248

E.6. Remarks on increase in achieved emission reductions

From E.5 above, we can observe that actual emission reduction for the monitoring is lower than estimated emission reductions by -1.89% due the change in expected wind flow patterns.

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Document information

Version	*Date*	*Description*
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
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 GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, 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).

Version	*Date*	*Description*
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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