



**Monitoring report form
(Version 05.1)**

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT

| | | |
|--|---|---|
| Title of the project activity | Wind Power Project at Tadas, Karnataka | |
| UNFCCC reference number of the project activity | 9376 | |
| Version number of the monitoring report | 1 | |
| Completion date of the monitoring report | 26/01/2016 | |
| Monitoring period number and duration of this monitoring period | Monitoring period: 1 st , Duration of this monitoring period: 31/12/2012 to 31/12/2015 | |
| Project participant(s) | M/s ReNew Wind Energy (Karnataka) Private Limited | |
| Host Party | India | |
| Sectoral scope(s) | Sectoral Scope 1: Energy Industries (renewable - / non-renewable sources) | |
| Selected methodology(ies) | Methodology : ACM0002 version 13.0.0, - Consolidated methodology for grid connected electricity generation from renewable sources | |
| Selected standardized baseline(s) | NA | |
| Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD | 254,505 tCO ₂ e | |
| Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period | GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012 | GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards |
| | NA | 209,825 tCO ₂ e |

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The project activity involves setting up of 63 numbers of Enercon make E-53, 800 kW Wind Turbine Generators (WTGs) by ReNew Wind Energy (Karnataka) Private Limited (RNWEKPL) at Tadas in Haveri & Darwada district of Karnataka, India. The total installed capacity of the project activity is 50.4 MW and Enercon (India) Limited is the supplier of WTGs for this project activity. The project activity is expected to generate 94,570 MWh of electricity per year. The net electricity generated from this project activity will be supplied to individual customers in the Southern grid through open access sale for first 10 years of operation to improve the financial viability of project. The model of power sale is group captive model. From 11 years onwards, it is assumed that power will be sold to grid under preferential tariff till entire lifetime of project activity.

The Enercon make E-53, 800 kW WTGs are direct drive horizontal axis wind turbine with variable rotor speed. The hub heights of WTGs are 73 m and the rotor diameter is 52.9 meters. The project is environmentally safe as it uses renewable sources for electricity generation and technologically sound as it uses latest advanced technology¹ with 3 independent pitch control systems with emergency power supply, rotor brake, and rotor lock.

The project activity is a grid connected renewable energy project that supplies electricity to the Southern grid, thus it comes under the Sectoral Scope²: 1 Energy industries (renewable / non-renewable sources)

Purpose of the Project activity:

The purpose of the project activity is to generate electricity using wind energy and to supply the net electricity generated to the individual customers in the Southern grid through open access sale. This would reduce the dependency on fossil fuels for electricity generation and reduce the Green House Gas (GHG) emissions that would have happened in a baseline scenario.

Scenario existing prior to the project activity:

The project activity involves the installation of 63 new WTGs of 800 kW each. The scenario existing prior to the implementation of the project activity is electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Baseline scenario:

The baseline scenario for the project activity is identical to the scenario existing prior to the implementation of the project activity.

The annual estimated emission reduction from this project activity is 84,835 tCO₂e and a total 593,845 tCO₂ of over the first crediting period of 7 years.

¹ <http://www.enercon.de/en-en/59.htm>

² <http://cdm.unfccc.int/DOE/scopelst.pdf>

The commissioning details of 63 WTG's are given below:

| S. No. | Date of Commissioned | No. of WTG's Commissioned |
|--------|----------------------|---------------------------|
| 1 | 07.12.2012 | 3 |
| 2 | 24.12.2012 | 5 |
| 3 | 04.01.2013 | 7 |
| 4 | 28.01.2013 | 6 |
| 5 | 08.02.2013 | 4 |
| 6 | 13.03.2013 | 2 |
| 7 | 30.03.2013 | 11 |
| 8 | 30.03.2013 | 5 |
| 9 | 16.04.2013 | 17 |
| 10 | 03.05.2013 | 3 |
| | Total | 63 |

Turbines are continuously operating from the dates of their commissioning.

The current verification is the second verification for the project and it is from 31/12/2012 to 31/12/2015.

The net electricity exported to grid during this verification period is 233,892.57 MWh, which results to a net emission reduction of 209,825 tCO₂e. Details of monthly electricity export to grid, import from grid and net electricity supplied to grid is provided in Annexure 1.

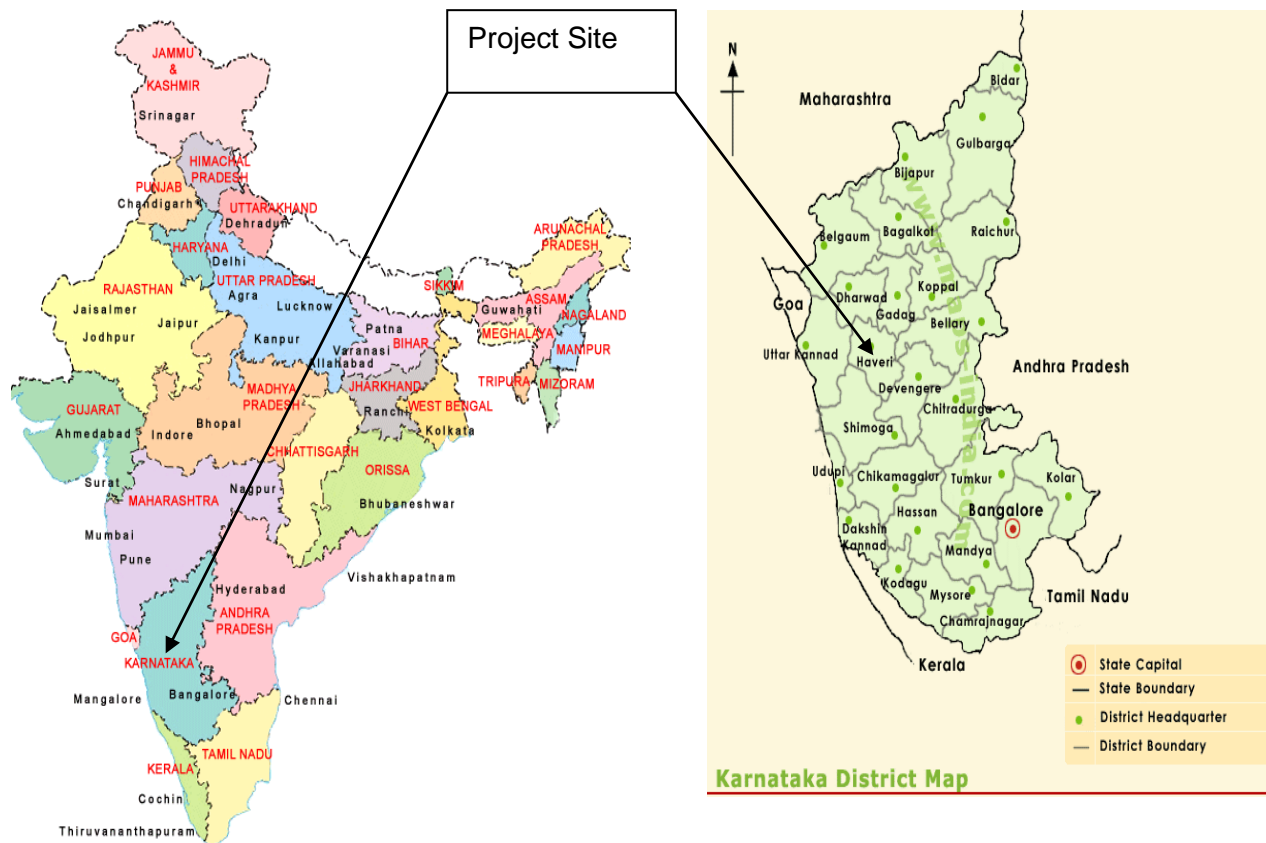
A.2. Location of project activity

Project activity is located in Tadas of Haveri & Darwada districts in the state of Karnataka, India. The project site is well connected with major cities in Karnataka. Haveri & Darwada the district head quarter and a prominent town, is at 50 Km distance. This is also the nearest railway and Air connectivity point.

Wind turbine-wise detailed co-ordinates are tabulated below.

| WTG Location | | | | | |
|--------------|------------|-----------------------|--------|------------|-----------------------|
| Sr No. | Turbine ID | Coordinates | Sr No. | Turbine ID | Coordinates |
| 1 | 96 A | E 52.1705; N 16.67327 | 33 | 427 | E 52.5999; N 16.76583 |
| 2 | 305 | E 52.6028; N 16.65302 | 34 | 428 | E 52.5980; N 16.76252 |
| 3 | 373 | E 52.9340; N 16.68784 | 35 | 429 | E 52.6651; N 16.76222 |
| 4 | 377 | E 52.9135; N 16.70042 | 36 | 430 | E 52.6541; N 16.75949 |
| 5 | 378 | E 52.8794; N 16.70240 | 37 | 431 | E 52.6477; N 16.75663 |
| 6 | 379 | E 52.8811; N 16.70536 | 38 | 432 | E 52.6904; N 16.75071 |
| 7 | 380 | E 52.9042; N 16.70959 | 39 | 433 | E 52.6874; N 16.74602 |
| 8 | 381 | E 52.9193; N 16.71320 | 40 | 434 | E 52.7355; N 16.74220 |

| | | | | | |
|----|-------|-----------------------|----|-------|-----------------------|
| 9 | 382 | E 52.9548; N 16.71623 | 41 | 435 | E 52.7779; N 16.74344 |
| 10 | 383 | E 53.0023; N 16.71231 | 42 | 436 | E 52.7927; N 16.73963 |
| 11 | 384 A | E 52.9876; N 16.70452 | 43 | 437 | E 52.7543; N 16.73770 |
| 12 | 385 B | E 53.0114; N 16.70072 | 44 | 438 | E 52.8002; N 16.73698 |
| 13 | 386 | E 53.0218; N 16.69699 | 45 | 439 | E 52.8963; N 16.74504 |
| 14 | 389 A | E 53.1343; N 16.71175 | 46 | 440 | E 52.8837; N 16.74767 |
| 15 | 390 B | E 53.1248; N 16.71635 | 47 | 441 A | E 52.9068; N 16.73991 |
| 16 | 391 A | E 53.1065; N 16.72071 | 48 | 442 | E 52.8935; N 16.73796 |
| 17 | 392 A | E 53.1104; N 16.72416 | 49 | 443 | E 52.9067; N 16.73493 |
| 18 | 393 | E 53.0656; N 16.72762 | 50 | 444 | E 52.8052; N 16.73125 |
| 19 | 394 | E 53.0748; N 16.73067 | 51 | 445 | E 52.7940; N 16.73398 |
| 20 | 395 | E 53.0832; N 16.73380 | 52 | 446 | E 52.7903; N 16.72854 |
| 21 | 396 | E 53.1354; N 16.73499 | 53 | 447 | E 52.8059; N 16.72503 |
| 22 | 397 | E 53.1443; N 16.73221 | 54 | 448 | E 52.8032; N 16.72215 |
| 23 | 398 | E 53.1257; N 16.72921 | 55 | 449 | E 52.8430; N 16.71984 |
| 24 | 399 | E 53.1549; N 16.72611 | 56 | 450 A | E 52.9290; N 16.71896 |
| 25 | 400 A | E 53.2366; N 16.72274 | 57 | 451 | E 52.9531; N 16.72353 |
| 26 | 401 | E 53.2017; N 16.73364 | 58 | 452 | E 52.9679; N 16.72661 |
| 27 | 421 | E 52.6975; N 16.77312 | 59 | 453 A | E 52.8005; N 16.69007 |
| 28 | 422 | E 52.7058; N 16.77664 | 60 | 454 | E 52.7488; N 16.69260 |
| 29 | 423 | E 52.5799; N 16.77633 | 61 | 455 | E 52.7025; N 16.69552 |
| 30 | 424 | E 52.5707; N 16.77359 | 62 | 456 | E 52.7329; N 16.69962 |
| 31 | 425 | E 52.5736; N 16.77071 | 63 | 457 A | E 52.6695; N 16.69940 |
| 32 | 426 | E 52.5651; N 16.76809 | | | |



A.3. Parties and project participant(s)

| Party involved ((host) indicates a host Party) | Private and/or public entity(ies) project participants (as applicable) | Indicate whether the Party involved wishes to be considered as project participant (yes/no) |
|--|--|--|
| India (host) | ReNew Wind Energy (Karnataka) Private Limited (Private entity) | No |

A.4. Reference of applied methodology and standardized baseline

a) Selected Approved Baseline Methodology:

Methodology No : ACM 0002³,
 Title : "Consolidated baseline methodology for grid-connected electricity
 generation from renewable sources"
 Version : 13
 Approved in : EB 67

Reference:

³ <http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT>

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

b) ACM0002, Version 13, draws upon the following tools which have been used in the PDD:

1. Tool to calculate the emission factor for an electricity system (Version 02.2.1)
2. Tool for demonstration and assessment of additionality (Version 06.1.0)

A.5. Crediting period of project activity

31st December 2012 to 30th December 2019 (Renewable)

A.6. Contact information of responsible persons/entities

Rohit Joshi
Manager
ReNew Wind Energy (Karnataka) Pvt. Ltd.

The entity is also the project participant mentioned in Appendix 1

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

The project activity involves installation of 63 numbers of Enercon make E-53, 800 KW WTGs. The total installed capacity of the project activity is 50.4 MW. The net electricity generated by the project activity will be supplied to Southern grid. The technology is clean as there are no GHG emissions associated with the generation of electricity from renewable source such as wind.

The technical specification⁴ of WTGs installed in the project activity are shown below-

| General | |
|----------------------------|---|
| Rated power | 800 kW |
| Rotor diameter | 52.9 m |
| Hub height | 73 m |
| Wind class (IEC) | IEC/NVN Class S, (vav = 7.5 m/s, vext = 57 m/s) |
| Turbine concept | Gearless, variable speed, single blade adjustment |
| Rotor | |
| Type: | Upwind rotor with active pitch control |
| Rotational direction | Clockwise |
| No. of blades | 3 |
| Swept area | 2,198 m ² |
| Blade material | GRP (epoxy resin); integrated lightning protection |
| Rotational speed | Variable, 12 - 28.3 rpm |
| Pitch control | ENERCON single blade pitch system, one independent pitch system per rotor blade with allocated emergency supply |
| Drive train with generator | |
| Hub | Rigid |
| Main bearing | Tapered roller bearing pair |
| Generator | ENERCON direct-drive annular generator |
| Grid feeding | ENERCON inverter |
| Brake systems | 3 independent pitch control systems with emergency power supply, rotor brake, rotor lock |

⁴ <http://www.enercon.de/en-en/59.htm>

| | |
|--------------------|---|
| Yaw control | Active via adjustment gears, load-dependent damping |
| Cut-out wind speed | 28 - 34 m/s (with ENERCON storm control) |
| Remote monitoring | ENERCON SCADA |

Apart from the WTGs, the project activity also involves the installation of transformers, transmission lines/ cables and other equipment required for the generation and transfer of electricity to the grid. The project life time is 25 years.

B.2. Post-registration changes

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

No such temporary deviations have taken place.

B.2.2. Corrections

No corrections are applicable.

B.2.3. Changes to start date of crediting period

No such changes to start date of crediting period taken place.

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

Not Applicable

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

Changes in the Monitoring Plan:

1. In the registered PDD the net electricity supplied to grid is mentioned as measured parameter but in actual it is a calculated parameter.

The net energy export is calculated by:

$$(EG_{\text{facility},y}) = EG_{\text{export},y} - (EG_{\text{export},y} * \text{Transmission loss \%}) - 115\% EG_{\text{import},y}$$

2. The calibration frequency in the registered PDD is mentioned as once in five year but in actual the meters are under the jurisdiction of KPTCL and their calibration is determined by KPTCL, however once in 5-year calibration of meters is the CEA norm of calibration.

3. The metering structure is defined in the revised PDD as:

Here 16 MW (20 WTG's) are connected in one feeder, 16 MW (20 WTG's) in second feeder and 18.4 MW (23 WTG's) are connected in third feeder. All three are connected in KPTCL substation.

4. Metering, metering equipment, meter readings, inspection of energy meters, meter test checking details are provided in Appendix 5 of the revised PDD, and however some unnecessary apportioning information is removed from the Appendix 5 of revised PDD.

B.2.6. Changes to project design of registered project activity

In registered PDD the sale of power from the project activity is considered to grid at preferential tariff of INR 3.70/Kwh, while in actual implementation the project is designed as Group Captive

project for 1st 10 years of operation, in which power is sold to individual customers in the southern grid through open access sale. Hence tariff is different from the preferential tariff. In the group captive model (open access sale) 7% Wheeling and Banking charges are also applicable.

PLF in the registered PDD is considered from KERC tariff order which is 26.50% while in the third party PLF study report the PLF is 21.42% at P75 level. Hence the PLF is also revised according to the third party PLF study report. The actual PLF achieved during two consecutive and complete years of operation are 19.32% and 18.95% for the period June 2013- May 2014 and June 2014-May 2015 respectively, which is lower than the estimated PLF value.

The primary reason of the change is to improve the financial returns of the project on account of lower site specific PLF value reported by third party agency, the PLF in the third party report was much lower than estimated during project decision as per the KERC order. Besides this declining carbon market and lower CER revenues were also factors of these changes in order to improve the financial returns from the project.

The equity IRR is revised based on these changed input parameters and is 13.10% while in registered PDD it was 11.33%.

The changes are already approved on 4 January 2016

B.2.7. Types of changes specific to afforestation or reforestation project activity

Not Applicable

SECTION C. Description of monitoring system

- **Metering:** Electricity supplied to the grid is metered at the metering point connecting 63 machines of the project activity. The meter reading is taken in the presence of representatives of Enercon (O&M Contractor for the project activity) and KPTCL.
- **Metering Equipment:** Metering system for the project activity consists of main and check meter. Both the meters are two-way trivector meters capable of recording import and export of electricity
- **Meter Readings:** The electricity supplied to the grid is recorded by taking a Joint Meter Reading (JMR) in the presence of Officials from the Utility and Enercon, O&M contractor, on behalf of project owner. The Joint meter reading contains the value of energy imported and exported. Thus the monitoring parameters for the project activity are the electricity import and electricity export to the grid as mentioned in the JMR. The readings are then adjusted for the transmission loss in the JMR, which can be crosschecked with the value mentioned in the invoices.
- **Inspection of Energy Meters:** All main and check energy meters (export and import) installed at the project are of 0.2% accuracy class (as per the state regulation). Each meter is jointly inspected and sealed on behalf of the parties and is not to be interfered with by either party except in the presence of the other party or its accredited representatives.
- **Meter Test Checking:** There is a separate check and main meter. The Main and Check Meters are close to each other and are tested for accuracy, with a standard meter, by the KPTCL's testing Division in an interval decided by KPTCL. The KPTCL carry out the periodical testing (and calibration if required), sealing and maintenance of meters. The KPTCL provides a copy of the test reports.

If during the meter test checking,

- the main meter is found to be within the permissible limit of error and the corresponding check meter is beyond the permissible limits, then the meter reading will be as per the main meter as usual. The check meter shall, however, be calibrated immediately.
- the main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within permissible limit of error, then the meter reading for the month up to the date and time of such test shall be as per the check meter.
- If both the main meters and the corresponding check meters are found to be beyond the permissible limits of error, both the meters shall be immediately calibrated and the correction will be applied to the reading registered by the main meter to arrive the correct reading of energy supplied to the grid for the period up to last test.
- If during any of the monthly meter readings, the variation between the main meter and the check meter is more than the permissible limit for meters, all the meters shall be re-tested and calibrated immediately and the correction will be applied to the reading registered by the main meter to arrive the correct reading of energy supplied to the grid for the period up to last test.
- In case of the failures such as burning of the meter and the erratic display of the metered parameters and when the error found in testing the meters is beyond the permissible limit of error, the meter shall be calibrated immediately and the correction will be applied to the reading registered by the main meter to arrive the correct reading of energy supplied to the grid for the period up to last test.

The daily records for parameters such as power generation, frequency and voltage of the individual machines are noted by the SCADA system. These records are maintained by Enercon India Limited (the O&M contractor) and the PP.

Here 16 MW (20 WTG's) are connected in one feeder, 16 MW (20 WTG's) in second feeder and 18.4 MW (23 WTG's) are connected in third feeder. Both are connected in KPTCL substation, transmission losses are calculated between substation and feeders (procedure is in form B) and net energy export is calculated by:

$$(EG_{\text{facility},y}) = EG_{\text{export},y} - (EG_{\text{export},y} * \text{Transmission loss } \%) - 115\% EG_{\text{import},y} \text{ Import}$$

Apportioning Procedures in case the dates of monitoring period do not match with billing cycle dates:

The dates of the monitoring period for the project activity may not coincide with the dates of the Credit Note issued by distribution licensee. In such a scenario, the net electricity generation data would have to be apportioned. For carrying out the apportioning procedures, WTG controller data (data recorded by the WTG controller software) would be utilized. The electricity generation from WTG controllers is recorded on a daily basis in the Power Generation Reports maintained by the O&M contractors. The data from Power Generation Reports would be referred for determination of the apportioning ratio. The following steps will be applied to carry out the apportioning:

$$\frac{\text{Generation at WTG controller for apportioning Period}}{\text{WTG controller for period covered under Credit Note period}}$$

(i) *Apportioning Ratio* =

(ii) Apportioned Electricity Export = Apportioning Ratio x Electricity Export as per Credit Note

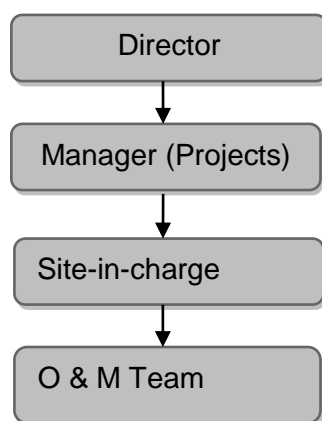
(iii) Apportioned Electricity Import = Apportioning Ratio x Electricity Import as per Credit Note

(iv) Apportioned Net Electricity Supplied to Grid =

Apportioned Electricity Export – Apportioned Electricity Import

Evaluation and verification procedures: This involves recording, data collection of all wind turbines, metering of electricity generated at substation, on daily basis as well as on monthly basis. The general conditions for metering, recording, meter readings, meter inspections, Test & Checking and communication shall be as per the Power Purchase Agreement with the state utility.

The project proponent proposes following arrangements in order to carry out metering and O & M activities for all wind turbines.



Meter readings are taken jointly at the appointed date by PP's representative, O&M contractors and Discom officials. The same reported to the site-in-charge and the compiled reports are sent to the Manager (Projects) and Director. The Manager monitors overall activity of the project and report to the Director. As per O & M schedule, the operation and maintenance activities are carried out by trained and qualified technical staff of O&M contractor.

Each party maintains complete and accurate records and all other data required by each of them for the purposes of proper administration and the operation of the project.

Calibration details of meters are provided below:

| Feeder | Capacity (MW) | Meter Details | Serial Number | Calibration Dates | | | | |
|--------|---------------|---------------|---------------|-------------------|------------|------------|------------|------------|
| | | | | 2013 | 2013 | 2014 | 2014 | 2015 |
| 1 | 18.4 MW | Main Meter | 12092899 | 09.04.2013 | 12.07.2013 | 24.05.2014 | 14.10.2014 | 23.07.2015 |
| | | Check Meter | 12092896 | 09.04.2013 | 12.07.2013 | 24.05.2014 | 14.10.2014 | 23.07.2015 |
| 2 | 16 MW | Main Meter | 12092918 | 09.04.2013 | 12.07.2013 | 24.05.2014 | 14.10.2014 | 23.07.2015 |
| | | Check Meter | 12092919 | 09.04.2013 | 12.07.2013 | 24.05.2014 | 14.10.2014 | 23.07.2015 |
| 3 | 16 MW | Main Meter | 12092897 | | 12.07.2013 | 24.05.2014 | 14.10.2014 | 23.07.2015 |

| | | | | | | | | |
|--|--|----------------|----------|--|------------|------------|------------|------------|
| | | Check Meter | 12093826 | | 12.07.2013 | 24.05.2014 | 14.10.2014 | 23.07.2015 |
|--|--|----------------|----------|--|------------|------------|------------|------------|

SECTION D. Data and parameters

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

| | |
|---|---|
| Data / Parameter | W_{BM} |
| Unit | % |
| Description | Weightage of build margin emissions factor |
| Source of data | Latest version of the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1) |
| Value(s) applied | 0.25 |
| Choice of data or Measurement methods and procedures | Default values used as per the "Tool to calculate the emission factor for an electricity system" Version 02.2.1 |
| Purpose of data | Calculation of combined margin emission factor of SOUTHERN grid |
| Additional comment | The value is ex-ante and will remain same throughout the crediting period of the project activity. |

| | |
|---|---|
| Data / Parameter | W_{OM} |
| Unit | % |
| Description | Weightage of operating margin emissions factor |
| Source of data | Latest version of the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1) |
| Value(s) applied | 0.75 |
| Choice of data or Measurement methods and procedures | Default values used as per the "Tool to calculate the emission factor for an electricity system" Version 02.2.1 |
| Purpose of data | Calculation of combined margin emission factor of SOUTHERN grid |
| Additional comment | The value is ex-ante and will remain same throughout the crediting period of the project activity. |

| | |
|---|---|
| Data / Parameter | EF_{grid,BM,y} |
| Unit | tCO ₂ e/MWh |
| Description | Build margin for Southern grid |
| Source of data | CO ₂ baseline database (Version 7.0) |
| Value(s) applied | 0.7339 |
| Choice of data or Measurement methods and procedures | Default values used as per the "Tool to calculate the emission factor for an electricity system" Version 02.2.1 |
| Purpose of data | Calculation of combined margin emission factor of Southern grid |
| Additional comment | The value is ex-ante and will remain same throughout the crediting period of the project activity. |

| | |
|-------------------------|--------------------------------|
| Data / Parameter | EF_{grid, OM,y} |
| Unit | tCO ₂ e/MWh |

| | |
|---|---|
| Description | Simple operating margin for Southern grid |
| Source of data | CO ₂ baseline database (Version 7.0) |
| Value(s) applied | 0.9515 |
| Choice of data or Measurement methods and procedures | This value is calculated by taking weighted average of 3 years values for Simple Operating Margin of Southern grid viz. 2008/09, 2009/10 and 2010/11. |
| Purpose of data | Calculation of combined margin emission factor of Southern grid |
| Additional comment | The value is ex-ante and will remain same throughout the crediting period of the project activity. |

| | |
|---|---|
| Data / Parameter | EF_{grid, CM, y} |
| Unit | tCO ₂ e/MWh |
| Description | Emission factor for Southern grid |
| Source of data | Calculated as per the procedure described in PDD section B.6.1 |
| Value(s) applied | 0.8971 |
| Choice of data or Measurement methods and procedures | This value is calculated using EF _{grid,OM,y} and EF _{grid,BM,y} values as per Version 02.2.1 of methodological tool to calculate the emission factor for an electricity system |
| Purpose of data | Calculation of Baseline emission of the project activity |
| Additional comment | The value is ex-ante and will remain same throughout the crediting period of the project activity. |

D.2. Data and parameters monitored

| | |
|---|---|
| Data / Parameter | EG_{facility,y} |
| Unit | MWh |
| Description | Quantity of net electricity generation supplied by the project plant/unit to the grid from 31/12/2012 to 31/12/2015 |
| Source of data | Joint meter reading OR break up sheet provided by KPTCL (referred as 'Form B') |
| Value(s) applied | 233,892.57 |
| Measurement methods and procedures | <p>The JMR is usually taken once in month for the feeder meters. The JMR gives electricity export, import and losses till common substation. By using these data, net export by the WTGs in the Project activity is calculated</p> <p>The net electricity supplied to grid is a calculated value and determined as the difference between the electricity exported to the grid and the electricity imported from the grid by the project activity and transmission losses mentioned in the Form B. The emission reduction would be computed on the basis of <i>EG_{facility,y}</i>.</p> <p>Net export (<i>EG_{facility,y}</i>) = EG_{export,y} - (EG_{export,y} *Transmission loss %)-115% EG_{import,y}</p> |
| Monitoring frequency | Continuous measurement and monthly recording. |
| QA/QC procedures | 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, however annual calibration have been done during the verification period and details are provided in section C above |
| Purpose of data | Baseline emissions calculation |
| Additional comment | The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. |

| | |
|---|---|
| Data / Parameter | EG_{export,y} |
| Unit | MWh |
| Description | The quantity of electricity supplied by the project plant/unit to the grid in year y |
| Source of data | Joint meter reading OR break up sheet provided by KPTCL (referred as 'Form B') J |
| Value(s) applied | 237,090.6 |
| Measurement methods and procedures | <p>The electricity generated and fed into the grid is continuously monitored using energy meters.</p> <p>For measuring the electricity exported by the project activity, the state electricity board has installed energy meters at the common feeders of the project activity. Monthly readings are taken jointly by the representative of State Electricity Transmission Co. Ltd. and site in charge of Project Proponent and a statement is prepared and</p> |

| | |
|-----------------------------|---|
| | <p>signed by the representatives of both parties.</p> <p>The meters have an accuracy class of 0.2S (as per state regulation)</p> <p><u>Measurement by:</u> electricity meters (feeder meters)</p> <p><u>Monitoring:</u> Continuous measurement and monthly recording.</p> <p><u>Recording:</u> Electronic/ Paper</p> <p><u>Recording Frequency:</u> Continuous monitoring and monthly recording</p> <p><u>Responsibility:</u> The operators/ O&M team will be responsible for measurement</p> <p><u>Archiving:</u> Crediting Period + 2 years</p> <p><u>Calibration Frequency:</u> As determined by state utility, once in five years is the CEA norm of calibration⁵, however annual calibrations have been performed and details are provided in Section C above</p> |
| Monitoring frequency | Continuous measurement and monthly recording. |
| QA/QC procedures | 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, however annual calibration have been done during the verification period and details are provided in section C above |
| Purpose of data | Baseline emissions calculation |
| Additional comment | The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. |

⁵ As per CEA publication in Gazette of India, dated, 17th March 2006; a copy of the same is submitted to the DOE

| | |
|---|--|
| Data / Parameter | EG_{import,y} |
| Unit | MWh |
| Description | The quantity of electricity imported by the project plant/unit from the grid in year y |
| Source of data | Joint meter reading OR break up sheet provided by KPTCL (referred as 'Form B') |
| Value(s) applied | 163.8 |
| Measurement methods and procedures | <p>The electricity imported shall be continuously monitored using energy meters.</p> <p>For measuring the electricity imported by the project activity, the state electricity board has installed energy meters at the common feeders of the project activity. Monthly readings are taken jointly by the representative of State Electricity Transmission Co. Ltd. and site in charge of Project Proponent and a statement is prepared and signed by the representatives of both parties.</p> <p>The meters have an accuracy class of 0.2S (as per state regulation)</p> <p><u>Measurement by:</u> electricity meters (feeder meters)</p> <p><u>Recording:</u> Electronic and paper</p> <p><u>Recording Frequency:</u> Continuous monitoring and monthly recording</p> <p><u>Responsibility:</u> The operators/ O&M team will be responsible for measurement</p> <p><u>Calibration Frequency:</u> As determined by state utility, once in five years is the CEA norm of calibration⁶, however annual calibrations have been performed and details are provided in Section C above</p> |
| Monitoring frequency | Continuous measurement and monthly recording. |
| QA/QC procedures | 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, however annual calibration have been done during the verification period and details are provided in section C above |
| Purpose of data | Baseline emissions calculation |
| Additional comment | The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. |

⁶ As per CEA publication in Gazette of India, dated, 17th March 2006; a copy of the same is submitted to the DOE

| | |
|---|--|
| Data / Parameter | EG_{WTG} |
| Unit | MWh |
| Description | Daily electricity generation at the WTG controller |
| Source of data | Power Generation Reports from O&M Contractor |
| Value(s) applied | 0 |
| Measurement methods and procedures | <p>The data will be monitored via project activity WTG Controllers and will be recorded daily in Power Generation Reports by the O&M Contractors. This data will be used only for determination of apportioning ratio, and will be applied only in cases where the monitoring period does not coincide with the initial/final meter reading dates in the Credit Notes.</p> <p>In the current monitoring period, for 31 December 2012 the generation is zero as plant started generation only from 1st January 2013.</p> |
| Monitoring frequency | <p><u>Monitoring</u>: Continuous measurement.</p> <p><u>Recording</u>: Electronic/ Paper</p> <p><u>Recording Frequency</u>: Continuous monitoring and monthly recording</p> <p><u>Responsibility</u>: The plant management shall be responsible for the regular recording of data.</p> <p><u>Archiving</u>: Crediting Period + 2 years</p> |
| QA/QC procedures | In case of any fault with the WTG Controller, the same would be immediately identified through an interlocking mechanism. In such a scenario the WTG Controller would be automatically shut down. The WTG Controller would then be replaced. |
| Purpose of data | The data will be used for calculation of emission reductions. |
| Additional comment | The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. |

D.3. Implementation of sampling plan

>>

Not Applicable

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

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

The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y} \dots \dots \dots (1)$$

Combined margin CO₂ emission factor for grid connected power generation ($EF_{grid,CM,y}$) is calculated as follows:

$$\begin{aligned}
 EF_{grid,CM,y} &= W_{OM} * EF_{grid,OM,y} + W_{BM} * EF_{grid,BM,y} \\
 &= 0.75 * 0.9515 + 0.25 * 0.7339 \\
 &= 0.8971 \text{ tCO}_2\text{e/MWh}
 \end{aligned}$$

Thus for ex-ante emission reduction calculations, the baseline emission factor for the grid
= 0.8971 tCO₂e/MWh

Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity ($EG_{PJ,y}$)

$$EG_{PJ,y} = EG_{\text{facility},y} = 233892.57 \text{ MWh}$$

Hence, substituting values in above equation 1, we get:

$$\begin{aligned} BE_y &= 233,892.57 * 0.8971 \\ &= 209,825.03 \text{ tCO}_2\text{e} \\ &= 209,825 \text{ tCO}_2\text{e} \end{aligned}$$

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

The Project activity does not envisage any fossil fuel consumption. Therefore, the parameter $PE_{FF,y} = 0 \text{ tCO}_2\text{e/ annum}$. Also, as the proposed CDM Project activity is not a geothermal project activity or a hydro project activity, hence, the Project emissions as per parameters $PE_{GP,y}$ and $PE_{HP,y}$ are also zero.

Therefore, $PE_y = 0 \text{ tCO}_2\text{e/annum}$

E.3. Calculation of leakage

$$\text{Leakage (LE}_y\text{)} = 0$$

E.4. Summary of calculation of emission reductions or net GHG removals by sinks

| Item | Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e) | Project emissions or actual net GHG removals by sinks (t CO ₂ e) | Leakage (t CO ₂ e) | GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period | | |
|--------------|--|---|-------------------------------|--|-----------------|--------------|
| | | | | Up to 31/12/2012 | From 01/01/2013 | Total amount |
| Total | 209,825 | 0 | 0 | 0 | 209,825 | 209,825 |

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

| Item | Values estimated in ex ante calculation of registered PDD | Actual values achieved during this monitoring period |
|--|---|--|
| Emission reductions or GHG removals by sinks (t CO ₂ e) | 254,505 | 209,825 |

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

>>

The difference of emission reduction as achieved during the monitoring period from estimated value is due to the lower wind availability in the project area during the monitoring period.

Appendix 1. Contact information of project participants and responsible persons/entities

| | |
|--|---|
| Project participant and/or responsible person/ entity | <input checked="" type="checkbox"/> Project participant <input checked="" type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM |
| Organization name | ReNew Wind Energy (Karnataka) Private Limited |
| Street/P.O. Box | Jacaranda Marg |
| Building | 10 th Floor, DLF Square |
| City | Gurgaon |
| State/region | Haryana |
| Postcode | 122002 |
| Country | India |
| Telephone | +91-124- 4896670 |
| Fax | +91-124-4896672 |
| E-mail | parag@renewpower.in |
| Website | www.renewpower.in |
| Contact person | Parag Sharma |
| Title | Chief Operating Officer |
| Salutation | Mr. |
| Last name | Sharma |
| Middle name | |
| First name | Parag |
| Department | - |
| Mobile | - |
| Direct fax | +91-124-4896672 |
| Direct tel. | - |
| Personal e-mail | parag@renewpower.in |

Annexure 1

Monthly Electricity Generation Details

For 18.4 MW

| Month | Supplied to Grid (kWh) | Imported from Grid (kWh) | Transmission Loss (kWh) | Net Exported (kWh) |
|----------|------------------------|--------------------------|-------------------------|--------------------|
| Dec - 12 | 0 | 0 | 0 | 0 |
| Jan-13 | 163200 | 0 | 1956 | 161244 |
| Feb-13 | 141600 | 0 | 1445 | 140155 |
| Mar-13 | 584400 | 3600 | 7916 | 572344 |
| Apr-13 | 1638000 | 1200 | 22275 | 1614345 |
| May-13 | 2455200 | 0 | 27227 | 2427973 |
| Jun-13 | 4963200 | 1200 | 74933 | 4886887 |
| Jul-13 | 5924400 | 1200 | 42120 | 5880900 |
| Aug-13 | 3824400 | 0 | 73104 | 3751296 |
| Sep-13 | 2014800 | 2400 | 15594 | 1996446 |
| Oct-13 | 1776000 | 2400 | 9576 | 1763664 |
| Nov-13 | 2222400 | 0 | 19062 | 2203338 |
| Dec-13 | 3042000 | 1200 | 58148 | 2982472 |
| Jan-14 | 2222400 | 1200 | 42481 | 2178539 |
| Feb-14 | 1282800 | 2400 | 11674 | 1268366 |
| Mar-14 | 1604400 | 3600 | 17021 | 1583239 |
| Apr-14 | 1149600 | 3600 | 15672 | 1129788 |
| May-14 | 2185200 | 1200 | 22105 | 2161715 |
| Jun-14 | 4045200 | 1200 | 56868 | 3986952 |
| Jul-14 | 6914400 | 0 | 119072 | 6795328 |
| Aug-14 | 3475200 | 0 | 42338 | 3432862 |
| Sep-14 | 2762400 | 1200 | 29440 | 2731580 |
| Oct-14 | 1628400 | 2400 | 16793 | 1608847 |
| Nov-14 | 2409600 | 1200 | 21145 | 2387075 |
| Dec-14 | 2022000 | 1200 | 18692 | 2001928 |
| Jan-15 | 1984800 | 1200 | 18145 | 1965275 |
| Feb-15 | 1742400 | 2400 | 16249 | 1723391 |
| Mar-15 | 1207200 | 3600 | 15089 | 1187971 |
| Apr-15 | 1293600 | 3600 | 14398 | 1275062 |
| May-15 | 1504800 | 0 | 17767 | 1487033 |
| Jun-15 | 4856400 | 1200 | 83908 | 4771112 |
| Jul-15 | 4702800 | 0 | 69974 | 4632826 |
| Aug-15 | 2997600 | 1200 | 35628 | 2960592 |
| Sep-15 | 1764000 | 1200 | 17721 | 1744899 |
| Oct-15 | 1232400 | 4800 | 14830 | 1212050 |

| | | | | |
|--------|---------|------|-------|---------|
| Nov-15 | 1968000 | 2400 | 20036 | 1945204 |
| Dec-15 | 2268000 | 3600 | 25874 | 2237986 |

For 16 MW

| Month | Supplied to Grid (kWh) | Imported from Grid (kWh) | Transmission Loss (kWh) | Net Exported (kWh) |
|----------|------------------------|--------------------------|-------------------------|--------------------|
| Dec - 12 | 0 | 0 | 0 | 0 |
| Jan-13 | 832500 | 900 | 9976 | 821489 |
| Feb-13 | 1394100 | 1800 | 14230 | 1377800 |
| Mar-13 | 1523700 | 2700 | 20640 | 1499955 |
| Apr-13 | 1246500 | 1800 | 16951 | 1227479 |
| May-13 | 1878300 | 0 | 20830 | 1857470 |
| Jun-13 | 3896100 | 0 | 58822 | 3837278 |
| Jul-13 | 4990500 | 0 | 35480 | 4955020 |
| Aug-13 | 3449700 | 900 | 65942 | 3382723 |
| Sep-13 | 1749600 | 1800 | 13541 | 1733989 |
| Oct-13 | 1477800 | 900 | 7968 | 1468797 |
| Nov-13 | 1686600 | 900 | 14467 | 1671098 |
| Dec-13 | 2412000 | 900 | 46105 | 2364860 |
| Jan-14 | 1855800 | 900 | 35474 | 1819291 |
| Feb-14 | 1016100 | 2700 | 9247 | 1003748 |
| Mar-14 | 1303200 | 3600 | 13825 | 1285235 |
| Apr-14 | 1082700 | 2700 | 14760 | 1064835 |
| May-14 | 1830600 | 1800 | 18518 | 1810012 |
| Jun-14 | 3656700 | 0 | 51407 | 3605293 |
| Jul-14 | 5775300 | 0 | 99456 | 5675844 |
| Aug-14 | 2860200 | 900 | 34845 | 2824320 |
| Sep-14 | 2366100 | 1800 | 25216 | 2338814 |
| Oct-14 | 1363500 | 1800 | 14061 | 1347369 |
| Nov-14 | 1976400 | 900 | 17343 | 1958022 |
| Dec-14 | 1597500 | 900 | 14768 | 1581697 |
| Jan-15 | 1505700 | 1800 | 13765 | 1489865 |
| Feb-15 | 1456200 | 1800 | 13580 | 1440550 |
| Mar-15 | 1099800 | 3600 | 13747 | 1081913 |
| Apr-15 | 1190700 | 3600 | 13253 | 1173307 |
| May-15 | 2170800 | 900 | 25630 | 2144135 |
| Jun-15 | 4211100 | 900 | 72759 | 4137306 |
| Jul-15 | 4135500 | 0 | 61533 | 4073967 |
| Aug-15 | 2663100 | 900 | 31652 | 2630413 |
| Sep-15 | 1547100 | 1800 | 15542 | 1529488 |
| Oct-15 | 1064700 | 4500 | 12812 | 1046713 |
| Nov-15 | 1662300 | 900 | 16924 | 1644341 |
| Dec-15 | 1906200 | 3600 | 21746 | 1880314 |

For 16 MW

| Month | Supplied to Grid (kWh) | Imported from Grid (kWh) | Transmission Loss (kWh) | Net Exported (kWh) |
|--------|------------------------|--------------------------|-------------------------|--------------------|
| Dec-12 | 0 | 0 | 0 | 0 |
| Jan-13 | 0 | 0 | 0 | 0 |
| Feb-13 | 0 | 0 | 0 | 0 |
| Mar-13 | 0 | 0 | 0 | 0 |
| Apr-13 | 336600 | 900 | 4577 | 330988 |
| May-13 | 1755000 | 900 | 19462 | 1734503 |
| Jun-13 | 3861000 | 0 | 58292 | 3802708 |
| Jul-13 | 4881600 | 0 | 34706 | 4846894 |
| Aug-13 | 3339000 | 900 | 63826 | 3274139 |
| Sep-13 | 1802700 | 1800 | 13952 | 1786678 |
| Oct-13 | 1498500 | 900 | 8079 | 1489386 |
| Nov-13 | 1655100 | 900 | 14196 | 1639869 |
| Dec-13 | 2227500 | 900 | 42579 | 2183886 |
| Jan-14 | 1791900 | 900 | 34252 | 1756613 |
| Feb-14 | 978300 | 3600 | 8903 | 965257 |
| Mar-14 | 1326600 | 3600 | 14073 | 1308387 |
| Apr-14 | 1100700 | 2700 | 15005 | 1082590 |
| May-14 | 1872000 | 1800 | 18937 | 1850993 |
| Jun-14 | 3489300 | 0 | 49053 | 3440247 |
| Jul-14 | 5773500 | 0 | 99425 | 5674075 |
| Aug-14 | 2819700 | 900 | 34352 | 2784313 |
| Sep-14 | 2377800 | 1800 | 25341 | 2350389 |
| Oct-14 | 1271700 | 1800 | 13114 | 1256516 |
| Nov-14 | 1831500 | 900 | 16072 | 1814393 |
| Dec-14 | 1400400 | 1800 | 12946 | 1385384 |
| Jan-15 | 1263600 | 1800 | 11552 | 1249978 |
| Feb-15 | 1169100 | 1800 | 10903 | 1156127 |
| Mar-15 | 910800 | 2700 | 11384 | 896311 |
| Apr-15 | 1260900 | 3600 | 14034 | 1242726 |
| May-15 | 2104200 | 1800 | 24844 | 2077286 |
| Jun-15 | 4132800 | 900 | 71406 | 4060359 |
| Jul-15 | 4240800 | 0 | 63100 | 4177700 |
| Aug-15 | 2707200 | 900 | 32176 | 2673989 |
| Sep-15 | 1620900 | 1800 | 16283 | 1602547 |
| Oct-15 | 1018800 | 4500 | 12259 | 1001366 |
| Nov-15 | 1649700 | 900 | 16796 | 1631869 |

| | | | | |
|--------|---------|------|-------|---------|
| Dec-15 | 1813500 | 3600 | 20689 | 1788671 |
|--------|---------|------|-------|---------|

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Document information

| <i>Version</i> | <i>Date</i> | <i>Description</i> |
|----------------|-----------------|--|
| 05.1 | 4 May 2015 | Editorial revision to correct version numbering. |
| 05.0 | 1 April 2015 | Revisions to: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • 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 (EB70, Annex 11). |
| 02.0 | 13 March 2012 | Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20). |
| 01 | 28 May 2010 | EB 54, Annex 34. Initial adoption. |

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: monitoring report