Verified Carbon Standard

33.9 MW BUNDLED WIND POWER PROJECT IN STATES OF KARNATAKA AND TAMIL NADU

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Document Prepared by EKI Energy Services Limited

Project Title	33.9 MW BUNDLED WIND POWER PROJECT IN STATES OF KARNATAKA AND TAMIL NADU
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity consists of the 19 machines of Suzlon make of 1.5 MW each, and 9 nos of 0.6 MW each totalling to the capacity of 33.9 MW. The Project considered harnessed renewable resources in the region, thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development.

The project is a bundled project activity having two investors. The project involves a total of 19 nos. of WEGs of 1.5 MW each and 9 nos of 0.6 MW each.

The project under consideration is located in the states of Karnataka and Tamil Nadu. The project is owned by Super Wind Project Private Ltd. and Simran Wind Project Private Ltd.

The first machine under the project activity was commissioned on 30-March-2008 and the last machine under the project activity was commissioned on 05-February-2009. The expected operational lifetime of the project is for 20 years.

The total emission reductions achieved under this monitoring period is 290,721 tCO_2.

1.2 Sectoral Scope and Project Type

The project activity is considered under zero-emissions „grid-connected electricity generation from renewable sources" that generates electricity in excess of 15 MW (limit for small scale project). Therefore as per the scope of the project activity enlisted in the „list of sectoral scopes and related approved baseline and monitoring methodologies", the project activity may principally be categorized in Scope Number 1, Sectoral Scope - Energy industries (renewable/ non-renewable sources).

1.3 Project Proponent

Organization name	Simran Wind Project Private Limited
Contact person	Mr. Satish Raval
Title	Manager
Address	2F and 3F, Park Plaza, North Block, 71 Park Street Kolkata, West Bengal-700019
Telephone	+91 33 30213100
Email	satish.raval@technoenergy.co.in

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Anjali
Title	Project Manager

Address	Office No. 201, EnKing Embassy, Plot No. 48, Scheme No. 78, Part II, Vijay Nagar INDORE – 452010, India.
Telephone	+91 7489924003
Email	anjali@enkingint.org/ registry@enkingint.org

1.5 Project Start Date

30-March-2008, being the date of commissioning of first WEG in the project

1.6 Project Crediting Period

The crediting period start date is 01-April-2008 and the end date is 31-March-2018. This project activity is registered under VCS mechanism only and has taken VCS benefits for monitoring period of 01-April-2008 to 20-December-2010.

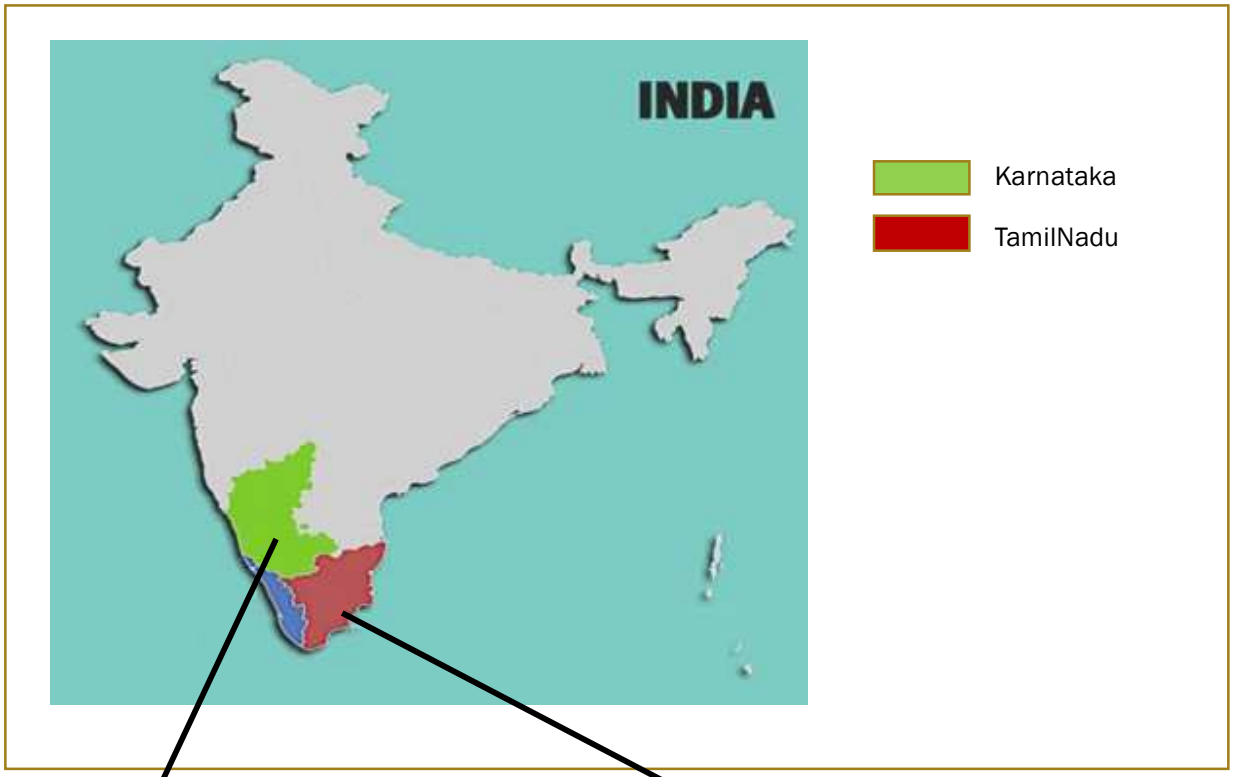
1.7 Project Location

The project is located located in the states of Karnataka and Tamil Nadu and spreads over the Gadag and Chitradurga district in Karnataka and Dindigul, Coimbatore and Erode in Tamil Nadu. The details of the Wind Energy Generators are-

Sl.No	Loc. No	MW	Site	District	Longitude	Latitude
KARNATAKA (Super)						
1	K342	1.50	Mallikarjunpur	Gadag	76°07'43.6"E	13°11'40.9"N
2	K345	1.50	Jalwadgi	Gadag	75°47'35.8"E	15°05'07.8"N
3	K346	1.50	Jalwadgi	Gadag	75°47'41.7"E	15°05'01.9"N
4	K347	1.50	Jalwadgi	Gadag	75°47'47.3"E	15°04'55.1"N
5	K350	1.50	Jalwadgi	Gadag	75°48'06.7"E	15°04'32.3"N
6	K69	1.50	Elkurnahalli	Chitradurga	76°27'07.9"E	14°05'11.6"N
7	K70	1.50	Elkurnahalli	Chitradurga	76°27'09.5"E	14°05'04.0"N
8	K71	1.50	Elkurnahalli	Chitradurga	76°27'10.1"E	14°04'56.4"N

Sl.No	Loc. No	MW	Site	District	Longitude	Latitude
TAMILNADU (Simran)						

1	E767	0.60	Kolumangondan	Dindigul	77°27'24.6"E	10°34'18.5"N
2	E777	0.60	Kolumangondan	Dindigul	77°28'09.7"E	10°34'23.4"N
3	E778	0.60	Kovilammapalayam	Dindigul	77°28'00.7"E	10°34'14.6"N
4	E779	0.60	Kovilammapalayam	Dindigul	77°28'00.9"E	10°33'43.3"N
5	E780	0.60	Kovilammapalayam	Dindigul	77°27'36.3"E	10°33'20.7"N
6	E781	0.60	Kovilammapalayam	Dindigul	77°27'53.2"E	10°34'32.8"N
7	E782	0.60	Kovilammapalayam	Dindigul	77°27'40.3"E	10°33'42.6"N
8	E797	0.60	Kattur	Coimbatore	77°23'46.7"E	10°55'41.8"N
9	E86	1.50	Kattur	Coimbatore	77°22'21.4"E	10°56'14.1"N
10	G-557	0.60	Midapadi	Dindigul	77°24'22.1"E	10°33'09.7"N
11	G-970	1.50	Kannamanaickanur	Coimbatore	77°18'27.7"E	10°33'00.7"N
12	Q48	1.50	V.Kallipalayam	Coimbatore	77°20'21.3"E	10°55'19.8"N
13	Q51	1.50	V.Kallipalayam	Coimbatore	77°21'20.4"E	10°55'27.6"N
14	Q199	1.50	Kundadam	Erode	77°26'05.6"E	10°49'48.7"N
15	Q220	1.50	Kethairev	Erode	77°26'06.9"E	10°48'15.3"N
16	Q394	1.50	Kethairev	Erode	77°26'30.3"E	10°48'05.3"N
17	H29	1.5	Koppala halli	Hassan	76°07'43.6"E	13°11'40.9"N
18	H34	1.5	Koppalahalli	Hassan	76°08'05.8"E	13°12'23.9"N
19	K75	1.5	Elkurnahalli	Chitradurga	76°07'57.2"E	13°12'15.6"N
20	K76	1.5	Elkurnahalli	Chitadurga	76°26'23.7"E	14°05'20.5"N



1.8 Title and Reference of Methodology

The project is part of the Voluntary Carbon Standards, which is a GHG program that has been approved by the VCS Board. Accordingly, under the VCS program, as per the modalities and procedures for large-scale CDM project activities, the type and category of the project activity is as under:

Sectoral Scope: 1, Energy industries (renewable/ non-renewable sources)

Project Category: ACM0002, Version-10, "Consolidated baseline methodology for grid connected electricity generation from renewable sources

1.9 Participation under other GHG Programs

The Project activity has not applied for any other GHG programs.

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits: The project proponent is not participating in any other emission trading program and other binding limits.

Other Forms of Environmental Credit: The project activity neither has nor intends to generate any other form of GHG related environmental credit for GHG emission reductions or removals claimed under the VCS Program. PP not participating for REC benefits can be verified from this link- https://www.recregistryindia.nic.in/index.php/publics/accredited_regens

1.11 Sustainable Development

The Ministry of Environment, Forest and Climate Change, Govt. of India has stipulated the social wellbeing, economic wellbeing, environmental wellbeing and technological well being as the four indicators for sustainable development in the interim approval guidelines by host country for Clean Development Mechanism (CDM) projects" approval. The following paragraphs details the project adherence to the indicators

Social wellbeing:

- "The CDM project activity is leading to alleviation of poverty by generating additional employment, removal of social disparities and contribution to provision of basic amenities to people leading to improvement in quality of life of people"
- The candidate CDM project has resulted in investment in rural sector thereby creating employment opportunities for the skilled, semi-skilled and unskilled manpower available in and around project facility.

Economic wellbeing:

- "The CDM project activity is bringing additional investment consistent with the needs of the people"
- The project invests in a region which would not have happened without the CDM project.
- Southern grid, being a power deficit grid, needs additional power generating units. It's highly desirable that deficit be met with renewable energy generating sources so as to reduce the harmful impact on the environment.
- The project is increasing availability of power in the grid generated from an emission-free resource; it is positively contributing towards reduction in (demand) use of finite natural resource like Coal.

Technological wellbeing:

- "The CDM project activity leads to transfer of environmentally safe and sound technologies with a priority to the renewables sector or energy efficiency projects that are comparable to best practices in order to assist in upgradation of technological base"
- The project promotes high capacity MW class Suzlon WEGs at the project site that paves the way for future investments in this sector.
- This is also giving rise to increased interest in wind energy in the country. This in turn would push the investment into research into creating better wind turbines.

Environmental wellbeing:

- This includes a discussion of impact of the project activity on resource sustainability and resource degradation, if any, due to proposed activity; bio-diversity friendliness; impact on human health; reduction of levels of pollution in general;"
- The Project brings about environmental wellbeing by-
  - Generating power from wind energy, being a renewable source, contributes to resource conservation. There is no emissions from the project activity CO_2 abatement and reduction of greenhouse gas emissions through development of renewable technology;
  - Having no harmful impact on human health because of zero emissions for the generating source.

2 SAFEGUARDS

2.1 No Net Harm

The project does not involve any potential negative environmental and socio economic impacts and hence this criteria is not applicable to this project activity.

The report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013. This report clearly mentioned that wind project activity operations do not result in direct air pollution, noise pollution. Please refer below web link for the same.

Thus, there are no any significant impacts due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

2.2 Local Stakeholder Consultation

As a part of continual improvement process, feedback from the associated stakeholders is vital, therefore a dedicated Visitor register cum grievance register has been placed at the project site which is accessible to stakeholders to provide their feedback on the project. It is appropriate publicly accessible location at which local stakeholders can provide their feedback on the project. This location is also conducive to continuous and regular checks for stakeholder comments.

The stakeholders are requested to share their experiences and grievances on continuous basis. Registers is used to records the grievances and feedback. During the current monitoring period, positive feedbacks had been received regarding site operation. No any grievances received during the current monitoring period. therefore, no any mitigation measures were required. In case of grievances, the nature of probable resolution is discussed with the plant head office and implemented by the site in charge

2.3 AFOLU-Specific Safeguards

This section is not applicable here as the project activity is a wind project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity involves generation of 33.9 MW by installation of wind electric generators (WEGs) in the states of Karnataka and Tamilnadu. The project is a bundled project activity having two investors. The project involves in total of 19 nos. of WEGs of 1.5 MW each and 9 nos. of 0.6 MW each.

The first WEG was commissioned on 30-March-2008 and the last machine was commissioned on 05-February-2009. The commissioning schedule is provided below:

VCS (Simran)					
Sl.No	**Loc. No**	**MW**	**Commissioning Date**	**Site**	**District**
TAMILNADU					
1.	E767	0.60	30-September-2008	Kolumangondan	Dindigul
2.	E777	0.60	28-July-2008	Kolumangondan	Dindigul
3.	E778	0.60	30-September-2008	Kovilammapalayam	Dindigul
4.	E779	0.60	28-July-2008	Kovilammapalayam	Dindigul
5.	E780	0.60	28-July-2008	Kovilammapalayam	Dindigul
6.	E781	0.60	28-July-2008	Kovilammapalayam	Dindigul
7.	E782	0.60	5-August-2008	Kovilammapalayam	Dindigu
8.	E797	0.60	28-September-2008	Kattur	Coimbatore
9.	E86	1.50	01-September-2008	Kattur	Coimbatore
10.	G-557	0.60	31-March-2008	Midapadi	Dindigul
11.	G-970	1.50	31-March-2008	Kannamanaickanur	Coimbatore
12.	Q48	1.50	30-March-2008	V.Kallipalayam	Coimbatore
13.	Q51	1.50	31-March-2008	V.Kallipalayam	Coimbatore
14.	Q199	1.50	31-March-2008	Kundadam	Erode
15.	Q220	1.50	31-March-2008	Kethairev	Erode

16.	Q394	1.50	30-March-2008	Kethairev	Erode

KARNATAKA					
1.	H29	1.5	30-September-2008	Koppala halli	Hassan
2.	H34	1.5	30-September-2008	Koppalahalli	Hassan
3.	K75	1.5	31-December-2008	Elkurnahalli	Chitradurga
4.	K76	1.5	05-February-2009	Elkurnahalli	Chitadurga

VCS (Super)					
Sl.No	**Loc. No**	**MW**	**Commissioning Date**	**Site**	**District**
1.	K342	1.50	31-December-2008	Mallikarjunpur	Gadag
2.	K345	1.50	31-Decemeber-2008	Jalwadgi	Gadag
3.	K346	1.50	30-September-2008	Jalwadgi	Gadag
4.	K347	1.50	31-Decemeber-2008	Jalwadgi	Gadag
5.	K350	1.50	30-September-2008	Jalwadgi	Gadag
6.	K69	1.50	30-September-2008	Elkurnahalli	Chitradurga
7.	K70	1.50	30-September-2008	Elkurnahalli	Chitradurga
8.	K71	1.50	30-September-2008	Elkurnahalli	Chitradurga

The project has supplied 307,709.7 MWh of electricity to the grid in the monitoring period, which indicates that the project has performed reasonably well during the monitoring period. Referring to the data available, it can be inferred that there has not been any major event that may impact the GHG emission reductions or removals and monitoring of the project activity. During December-2010, only HTSC nos. of below mentioned WEGs got changed due to shifting of load from one distribution circle to another distribution circle.

WEG IDs	Old HTSC numbers	New HTSC numbers
E797	765	638
E86	754	631
Q-48	708	589
Q-51	707	588

The project activity consists of energy meters (main and check meter) installed at the substation are of accuracy class of 0.2s and 0.5s are calibrated as per the calibration frequency mentioned in monitoring plan and in VCS PD. During current monitoring period delayed calibration has been observed and the details of which are provided in appendix I of this monitoring report. Due to delay in calibration, error

factor has been applied in accordance with the accuracy class of the meters installed as a conservative approach.

There are no other changes in the project activity.

As a part of regular maintenance, the machines are stopped for mechanical and electrical maintenance and for visual inspection in the current monitoring period.

3.2 Deviations

2.1.1 Methodology Deviations

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

2.1.2 Project Description Deviations

Deviation 01:

PP has requested for deviation in the HTSC number of four WEGs from the registered VCS PD. During the time of validation E797, E86 Q-48 and Q-51 438 were having HT SC numbers as 765, 754, 708 and 707 respectively which has been changed to 638, 631, 589 and 588 respectively. The details of the same is mentioned below: -

WEG IDs	Old HTSC numbers	New HTSC numbers
E797	765	638
E86	754	631
Q-48	708	589
Q-51	707	588

This deviation does not have any impact on the applicability of the methodology, additionality, or the appropriateness of the baseline scenario of this project activity.

The above changes are checked from the JMRs/Invoices and therefore deviation is sought for the same from the registered PD.

Deviation 02:

PP has requested for addition of "EKI Energy Services Limited" as other entity involved during current monitoring period.

This deviation does not have any impact on the applicability of the methodology, additionality, or the appropriateness of the baseline scenario of this project activity and thus deviation is sought for the same from the registered PDD.

3.3 Grouped Projects

There is no Project description deviations applied during current monitoring period.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2e/MWh
Description	Operating Margin Emission Factor of Indian Grid
Source of data	"CO_2 Baseline Database for Indian Power Sector" published by the CentralElectricity Authority, Ministry of Power, Government of India. The "CO_2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value applied	0.9871
Justification of choice of data or description of measurement methods and procedures applied	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with "Tool to calculate the emission factor for an electricity system" version 7.0.
Purpose of Data	Calculation of baseline emissions
Comments	Fixed ex-ante for the third crediting period

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2e/MWh
Description	Build Margin Emission Factor of Indian Grid
Source of data	"CO_2 Baseline Database for Indian Power Sector" published by the CentralElectricity Authority, Ministry of Power, Government of India.
Value applied	0.8179
Justification of choice of data or description of measurement methods and procedures applied	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with "Tool to calculate the emission factor for an electricity system" version 7.0.
Purpose of Data	Calculation of baseline emissions
Comments	Fixed ex-ante for the third crediting period

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{PJ,y}$

Data unit	MWh (Mega-watt hour)
Description	Electricity exported to the grid by the Project
Source of data	Electricity exported by the project activity to the grid as per as per JMR(Form - B)
Description of measurement methods and procedures to be applied	Net electricity exported to the grid is measured by the two-way export/import Trivector meter. The procedures for metering and meter reading are as per the PPA
Frequency of monitoring/recording	Frequency: The meter reading is taken in the first week of every month. Recording: The recording of the meter reading is done in the hard copy format once in a month in the form of JMR certificates. Archiving Policy: The data will be archived for a period of 2 years after the end of the crediting period in the hard copy format.
Value monitored	Electricity supplied to the grid by the Project = 307,709.7 MWh
Monitoring equipment	Trivector meters of accuracy class 0.2s and 0.5s
QA/QC procedures to be applied	QA/QC procedures are elaborated in the monitoring plan
Purpose of the data	Calculation of baseline emissions
Calculation method	Please refer section 4.3 below
Comments	Archiving policy: Project data and statement of generation will be archived for aperiod of crediting period + 2 years in paper form.

4.3 Monitoring Plan

Reporting Period

This is the second monitoring report for the project activity. The monitoring period is from 21 December-2010 to 20-December-2016 (both days including).

Monitoring Methodology

The project is part of the Voluntary Carbon Standards, which is a GHG program that has been approved by the VCS Board. Accordingly, under the VCS program, as per the modalities and procedures for large-scale CDM project activities, the type and category of the project activity is as under:

Sectoral Scope: 1, Energy industries (renewable/ non-renewable sources)

Project Category: ACM0002, Version-10, "Consolidated baseline methodology for grid connected electricity generation from renewable sources"

The approved consolidated baseline and monitoring methodology ACM0002 is the choice of the baseline and monitoring methodology because:

- The project represents electricity capacity additions from wind sources;
- The project is a Greenfield electricity generation from wind sources;
- The geographical and system boundaries of the grid can be clearly identified and information on the characteristics of the grid is available.

The monitoring requirements for the project activity includes: -

- Metering procedures
- Calibration Frequency
- Data Archiving
- Monitoring roles and responsibility

Origin of the data

The Project is operated and managed by Suzlon. The organization follows the documentation practices to ensure the reliability and availability of the data for operation of the wind power project. The monitored data can be found from the monthly JMR reports.

Monitoring procedure is described below:

a. Meter reading: Meter readings are taken jointly by the representatives of TNEB & KPTCL/BESCOM, HESCOM and Suzlon. Such meter readings are treated as the accurate and final measurement of the energy supplied to grid by the power producer for preceding month for the period of payment. Electronic format of daily meter readings of the respective WTG"s are collected and the same is sent to the PP and the received data is reviewed against the performance guarantee clause mentioned in the O&M contract and accordingly PP is compensated by Suzlon. PP will archive this data for a period of 2 years after the crediting period.

b. Frequency: The meter reading is taken in the first week of every month.

c. Recording: The recording of the meter reading is done in the hard copy format once in a month in the form of JMR certificates.

d. Archiving Policy: The data will be archived for a period of 2 years after the end of the crediting period in the hard copy format.

Managing data quality

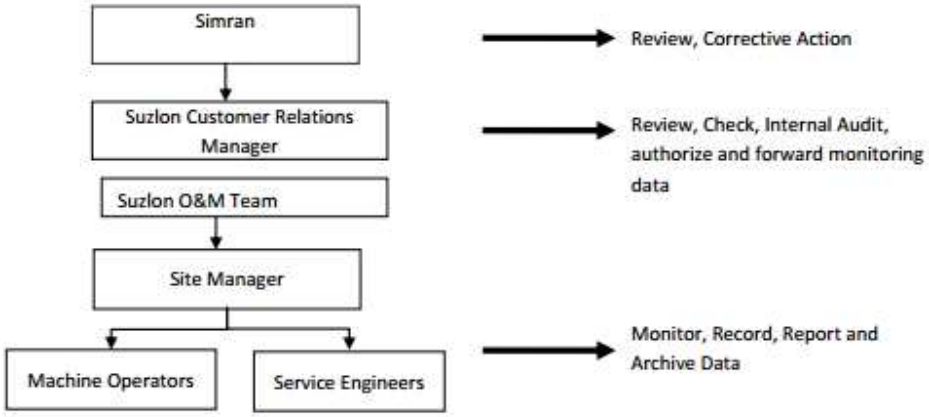
The accuracy of monitoring parameter is ensured by adhering to the calibration and testing procedure. The project adheres to all the mandatory regulatory and statutory requirements at the state as well as national level. The data will be archived for a period of 2 years after the end of the crediting period in the hard copy format.

Monitoring roles and responsibilities

The authority and responsibility of project overall project coordination in relation to the VCS validation would be with the project proponent. EPC Contractor is responsible for apportioning of the electricity generated.

The daily generation report received from Suzlon (Customer Relations Manager) is compiled by the PP for the entire month and the same is cross checked against the credit notes received from the Discom for any discrepancies.

The operational and management structure implemented by Simran along with Suzlon as follows



Description of the monitoring plan

Metering:

Electricity supplied to the grid is metered by the Parties (KPTCL, Suzlon and the PP) at the high voltage side of the step-up transformer installed at the Project Site.

Metering Equipment:

Metering system for the project activity consists of one main and one check meter. Both the meters are two-way Trivector meters capable of recording import and export of electricity and provide output in the form of net electricity supplied to the grid. The main meter is installed and owned by the Project, whereas check meters are owned by KPTCL. The metering equipment is maintained in accordance with electricity standards prevalent in Karnataka. The meters installed are capable of recording and storing half hourly readings of all the electrical parameters for a minimum period of 35 days with digital output.

Meter Readings:

The Net electricity supplied to the grid is recorded by taking a Joint Meter Reading (JMR) in the presence of Officials from off-taking Utility and Suzlon representatives. The Joint meter reading contains the value of energy imported and exported and the net export to the grid during the recording period. This Joint meter reading is certified by the Executive engineer of the utility and by Suzlon Officials. These certified readings are then used by the Discom officials to prepare the tariff invoices. Thus, the sole monitoring parameter for the project activity is the net electricity supplied to the grid as mentioned in the JMR, which can be crosschecked with the value mentioned in the invoices.

Procedure for Billing:

The PP submit to the designated officer of the Discom a monthly invoice for each billing period in the format prescribed by the discom from time to time setting forth those amounts payable by the discom for the delivered energy in accordance with the clauses mentioned in the PPA"s

Monthly invoices are:

DE = X1-(X1*Z %)

Where,

DE is the delivered energy pertaining to the project

X_1 is the reading of the energy meter installed at the project site

Z is the % transmission line loss incurred in the transmission line between the project and the receiving station and is

$Z=[(X_1+X_2+X_3+.....)-Y/(X_1+X_2+X_3+....)]*100\%$

Where

Y is the reading of the bulk energy meter installed on the 66 KV side of the receiving station X_2,X_3,X_4 etc are the readings of the energy meters installed at the various individual wind mill power projects being developed/proposed to be set up in the area and connected to the receiving station.

Inspection of Energy Meters:

All main and check energy meters (export and import) and all associated instruments, transformers installed at the Project are of 0.2% accuracy class. 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:

All main and check meters are tested for accuracy with reference to a portable standard meter. The portable standard meter is owned by KPTCL. The main and check meters shall be deemed

to be working satisfactorily if the errors are within specifications for meters of 0.2 %accuracy class. The consumption registered by the main meters alone holds good for the purpose of metering electricity supplied to the grid as long as the error in the main meters is within the permissible limits.

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 is 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 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. There should be a revision in the meter reading for the period from the previous calibration test up to the current test based on the readings of the check meter. The main meter shall be calibrated immediately and meter reading for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.
- Both the main meters and the corresponding check meters are found to be beyond the permissible limits of error, both the main meters shall be immediately calibrated and the correction applied to the reading registered by the main meter to arrive the correct reading of energy supplied for metering electricity supplied to the grid for the period from the last month"s meter reading up to the current test. Meter reading for the period thereafter till the next monthly reading shall be as per the calibrated main meter.
- 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 of 0.2% accuracy class, all the meters shall be re-tested and calibrated immediately.

In case of the WEG's connected to TNEB grid the Monitoring procedure is as follows:

- Meters (Both main and check) are installed right next to each WEG
- The Wind Energy Generator provided with energy meters with facilities to record export and import of energy. The meter has 0.5 % class accuracy.
- The reading of the meters shall be taken periodically by authorized officers of TNEB and representative of Suzlon, if present.
- The meters shall be tested for accuracy and shall be calibrated once in two years. Both parties shall seal the meter. Defective meters shall be replaced immediately.
- If during the annual calibrations, both the main and the check meters are found to have errors beyond permissible limits, the bill shall be revised for the previous 3 months or the exact period of know and agreed upon by both the parties, by applying corrections as determined by the meter testing wing of TNEB to the consumption registered by the meter with lesser error.
- In cases were a WEG has only the main meter installed- The O&M team checks the meters on daily basis. If the meter is found to non-functional, TNEB would be informed

immediately and the meter should be replaced. Subsequent billing would happen according to the replaced meter. The generation for the intervening period would be forfeited.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline emission factor (Combined Margin) ($EF_{grid, CM, y}$) = 0.9448 tCO_2e/MWh

Annual electricity supplied to the grid by the Project ($EG_{PJ,y}$) = 158,298.184 MWh

Baseline Emissions Reduction: $BE_y = EF_{grid, CM, y} * EG_{PJ,y}$

= 0.9448 tCO_2e/MWh x 307,709.7 MWh

=290,721 (Round down) tCO_2e

5.2 Project Emissions

The project activity is a Greenfield wind power project and hence does not emit any carbon emissions.

Hence, PE_y= 0 tCO_2e

5.3 Leakage

There are no leakage emissions from the project.

Hence, LE_y= 0 tCO_2e

5.4 Net GHG Emission Reductions and Removals

$ER_y = BE_y - PE_y - LE_y$

=290,721- 0 – 0 = 290,721 (Round down) tCO_2e

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
21-December-2010 to 31-December-2010	1,565	0	0	1,565

01-January-2011 to 31-December-2011	63,433	0	0	63,433
01-January-2012 to 31-December-2012	66,392	0	0	66,392
01-January-2013 to 31-December-2013	56,738	0	0	56,738
01-January-2014 to 31-December-2014	51,396	0	0	51,396
1-January-2015 to 31-December-2015	25,081	0	0	25,081
1-January-2016 to 20-December-2016	26,116	0	0	26,116
Total	290,721	0	0	290,721

The actual GHG avoided during the current monitoring period is 290,721 tCO_2e. Considering the annual average emission reductions as per the registered PDD which is 81,947 tCO_2e per year, the number of days covered during the current monitoring period comes out to be 2,192 days, based upon which the estimated emission reductions attributed to this monitoring period comes out to be 492,131 tCO_2e. The actual VER is 40.93% lower than the estimated VER. This variation is majorly due to the variations in wind flow pattern, grid availability and other parameters which are not in the control of PP.

APPENDIX I: CALIBRATION DETAILS

WEG ID No.	HT SC No.	Make	Type	Meter Sl.No.	Accuracy Class	Fixed on	Valid till	Test 1	Valid till	Test 2	Valid till	Applicable period of correction
E767	D 171	Elster	Main	4954907	0.5%	30-Sep-2008	30-Sep-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-2013 to 10-Jan-2015
E777	6	Elster	Main	4954363	0.5%	28-Jul-2008	28-Jul-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-2013 to 10-Jan-2015
		Elster	Check	4954306	0.5%	28-Jul-2008	28-Jul-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	
E778	D 170	Elster	Main	4954892	0.5%	30-Sep-2008	30-Sep-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-

												2013 to 10-Jan-2015
E779	D155	Elster	Main	4954702	0.5%	28-Jul-2008	28-Jul-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-2013 to 10-Jan-2015
		Elster	Check	4954703	0.5%	28-Jul-2008	28-Jul-2010	26-Apr-2011	26-Apr-2013	11-Jan-2015	11-Jan-2017	
E780	D154	Elster	Main	4954705	0.5%	28-Jul-2008	28-Jul-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-2013 to 10-Jan-2015
		Elster	Check	4954706	0.5%	28-Jul-2008	28-Jul-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	
E781	D157	Elster	Main	4954307	0.5%	28-Jul-2008	28-Jul-2010	26-Apr-2011	25-Apr-2013	20-Jan-2015	19-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-2013 to 19-Jan-2015
		Elster	Check	4954664	0.5%	28-Jul-2008	28-Jul-2010	26-Apr-2011	25-Apr-2013	20-Jan-2015	19-Jan-2017	
E782	D158	Elster	Main	4954685	0.5%	05-Aug-2008	05-Aug-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-2013 to 10-Jan-2015
		Elster	Check	4954688	0.5%	05-Aug-2008	05-Aug-2010	26-Apr-2011	25-Apr-2013	26-Jan-2015	25-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-2013 to

												25-Jan-2015
E797	638	Elster	Main	4901341	0.5%	28-Sep-2008	28-Sep-2010	07-May-2011	06-May-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 06-May-2011, 07-May-2013 to 10-Jan-2015
E86	631	Elster	Main	4954683	0.5%	01-Sep-2008	01-Sep-2010	07-May-2011	06-May-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 06-May-2011, 07-May-2013 to 10-Jan-2015
G-557	D 146	Elster	Main	4940859	0.5%	31-Mar-2008	31-Mar-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 25-April-2011, 26-April-2013 to 25-Jan-2015
		Elster	Check	4940858	0.5%	31-Mar-2008	31-Mar-2010	26-Apr-2011	25-Apr-2013	11-Jan-2015	10-Jan-2017	
G-970	1529	Elster	Main	4940857	0.5%	31-Mar-2008	31-Mar-2010	28-Apr-2011	27-Apr-2013	28-Jan-2015	27-Jan-2017	21-Dec-2010 to 27-April-2011, 28-April-2013 to 27-Jan-2015
		Elster	Check	4940856	0.5%	31-Mar-2008	31-Mar-2010	28-Apr-2011	27-Apr-2013	28-Jan-2015	27-Jan-2017	
Q-48	589	Elster	Main	4901332	0.5%	30-Mar-2008	30-Mar-2010	07-May-2011	06-May-2013	13-Jan-2015	12-Jan-2017	21-Dec-2010 to 06-May-2011, 07-May-
					0.5%							

		Elster	Check	4940872		30-Mar-2008	30-Mar-2010	07-May-2011	06-May-2013	13-Jan-2015	12-Jan-2017	2013 to 12-Jan-2015
Q-51	588	Elster	Main	4901311	0.5%	31-Mar-2008	31-Mar-2010	07-May-2011	06-May-2013	13-Jan-2015	12-Jan-2017	21-Dec-2010 to 06-May-2011, 07-May-2013 to 12-Jan-2015
Q-199	1533	Elster	Main	4901307	0.5%	31-Mar-2008	31-Mar-2010	03-May-2011	02-May-2013	10-Jan-2015	09-Jan-2017	21-Dec-2010 to 02-May-2011, 03-May-2013 to 09-Jan-2015
		Elster	Check	4940998	0.5%	31-Mar-2008	31-Mar-2010	03-May-2011	02-May-2013	10-Jan-2015	09-Jan-2017	
Q-220	1535	Elster	Main	4901309	0.5%	31-Mar-2008	31-Mar-2010	03-May-2011	02-May-2013	10-Jan-2015	09-Jan-2017	21-Dec-2010 to 02-May-2011, 03-May-2013 to 09-Jan-2015
		Elster	Check	4940999	0.5%	31-Mar-2008	31-Mar-2010	03-May-2011	02-May-2013	10-Jan-2015	09-Jan-2017	
Q-394	1525	Elster	Main	4940874	0.5%	30-Mar-2008	30-Mar-2010	03-May-2011	02-May-2013	10-Jan-2015	09-Jan-2017	21-Dec-2010 to 02-May-2011, 03-May-2013 to 09-Jan-2015
		Elster	Check	4901428	0.5%	30-Mar-2008	30-Mar-2010	03-May-2011	02-May-2013	10-Jan-2015	09-Jan-2017	
H-29	NA	L&T	Main	6760723	0.2%	30-Sep-2008	30-Sep-2009	11-Jan-2011	10-Jan-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 10-Jan-2011, 11-Jan-

												2013 to 10-Jan-2015
		L&T	Check	7041036	0.2%	30-Sep-2008	30-Sep-2009	13-Jan-2011	12-Jan-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 12-Jan-2011, 13-Jan-2013 to 10-Jan-2015
H-34	NA	L&T	Main	7041049	0.2%	30-Sep-2008	30-Sep-2009	11-Jan-2011	10-Jan-2013	11-Jan-2015	10-Jan-2017	21-Dec-2010 to 10-Jan-2011, 11-Jan-2013 to 10-Jan-2015
		L&T	Check	7041050	0.2%	30-Sep-2008	30-Sep-2009	13-Jan-2011	12-Jan-2013	14-Jan-2015	13-Jan-2017	21-Dec-2010 to 12-Jan-2011, 13-Jan-2013 to 10-Jan-2015
K-75	NA	L&T	Main	8001330	0.2%	31-Dec-2008	31-Dec-2009	20-Jun-2010	19-Jun-2012	20-Jan-2015	19-Jan-2017	20-Jun-2012 to 19-Jan-2015
		L&T	Check	8001331	0.2%	31-Dec-2008	31-Dec-2009	20-Jun-2010	19-Jun-2012	20-Jan-2015	19-Jan-2017	
K-76	NA	L&T	Main	8001334	0.2%	05-Feb-2009	05-Feb-2010	20-Jun-2010	19-Jun-2012	20-Jan-2015	19-Jan-2017	20-Jun-2012 to 19-Jan-2015
		L&T			0.2%							

			Check	8001333		05-Feb-2009	05-Feb-2010	20-Jun-2010	19-Jun-2012	20-Jan-2015	19-Jan-2017	
K-342	NA	L&T	Main	7041790	0.2%	31-Dec-2008	31-Dec-2009	19-Nov-2010	18-Nov-2012	04-Jan-2015	03-Jan-2017	19-Nov-2012 to 03-Jan-2015
		L&T	Check	7041792	0.2%	31-Dec-2008	31-Dec-2009	19-Nov-2010	18-Nov-2012	04-Jan-2015	03-Jan-2017	
K-345	NA	L&T	Main	7041803	0.2%	31-Dec-2008	31-Dec-2009	20-Nov-2010	19-Nov-2012	15-Jan-2015	14-Jan-2017	19-Nov-2012 to 14-Jan-2015
		L&T	Check	7041821	0.2%	31-Dec-2008	31-Dec-2010	20-Nov-2010	19-Nov-2012	15-Jan-2015	14-Jan-2017	
K-346	NA	L&T	Main	7041796	0.2%	30-Sep-2008	30-Sep-2009	20-Nov-2010	19-Nov-2012	21-Jan-2015	20-Jan-2017	20-Nov-2012 to 20-Jan-2015
		L&T	Check	7041808	0.2%	30-Sep-2008	30-Sep-2009	20-Nov-2010	19-Nov-2012	21-Jan-2015	20-Jan-2017	
K-347	NA	L&T	Main	7041778	0.2%	31-Dec-2008	31-Dec-2009	20-Nov-2010	19-Nov-2012	24-Jan-2015	23-Jan-2017	20-Nov-2012 to 23-Jan-2015
		L&T	Check	8001337	0.2%	31-Dec-2008	31-Dec-2009	20-Nov-2010	19-Nov-2012	24-Jan-2015	23-Jan-2017	
K-350	NA	L&T	Main	7041817	0.2%	30-Sep-2008	30-Sep-2009	20-Nov-2010	19-Nov-2012	22-Jan-2015	21-Jan-2017	20-Nov-2012 to 21-Jan-2015
		L&T			0.2%							

			Check	7041818		30-Sep-2008	30-Sep-2009	20-Nov-2010	19-Nov-2012	22-Jan-2015	21-Jan-2017	
K-69	NA	L&T	Main	7341551	0.2%	30-Sep-2008	30-Sep-2009	18-Jun-2010	17-Jun-2012	15-Jan-2015	14-Jan-2017	18-Jun-2012 to 14-Jan-2015
		L&T	Check	7341558	0.2%	30-Sep-2008	30-Sep-2009	18-Jun-2010	17-Jun-2012	15-Jan-2015	14-Jan-2017	
K-70	NA	L&T	Main	7341559	0.2%	30-Sep-2008	30-Sep-2009	18-Jun-2010	17-Jun-2012	18-Jan-2015	17-Jan-2017	18-Jun-2012 to 17-Jan-2015
		L&T	Check	7341560	0.2%	30-Sep-2008	30-Sep-2009	18-Jun-2010	17-Jun-2012	18-Jan-2015	17-Jan-2017	
K-71	NA	L&T	Main	7341571	0.2%	30-Sep-2008	30-Sep-2009	19-Jun-2010	18-Jun-2012	19-Jan-2015	18-Jan-2017	19-Jun-2012 to 18-Jan-2015
		L&T	Check	7341577	0.2%	30-Sep-2008	30-Sep-2009	19-Jun-2010	18-Jun-2012	19-Jan-2015	18-Jan-2017	

APPENDIX II: BREAK DOWN DETAILS

Sl. No.	Months	Loc Nos.	Breakdown hours
1.	January-2011	E767, E782, E86, G970, Q48, Q51, Q199, Q394, K76, K75, K342, K345, K70	80.0 hrs
2.	February-2011	K780, H34, G557, G970, E778, E782, Q394, K75, K76, K342, K345, K350, K69	93.4 hrs.

3.	March-2011	631, Q48, Q51, Q199, Q220, Q-394,G557, G970, Q48, Q51, Q199, Q-394, H29, H34, K75, K76, K342, K346, K70	95.0 hrs
4.	April-2011	E777, E781, E86, G557, K70	58.6 hrs.
5.	May-2011	E782, Q51, Q199, H34, K71, K70, K342, K345	68.7 hrs.
6.	June-2011	E767, E782, Q48, Q51, Q199, H29, 638, 589	70.8 hrs.
7.	July-2011	E779, E767, Q51, G970, G557, 631, 589, H29, H34, 638	79.6 hrs.
8.	August-2011	E797, Q48, Q199, E780, Q394, H34, K342, K350, K69, K71	89.6 hrs.
9.	September-2011	E778, E782, E780, G557, Q51, Q199, Q220, H34, K75, K350, K70, K71	50.6 hrs.
10.	November-2011	E767, E777, E86, G970, Q48, Q199, Q394, H29, K75, K347, K69, K70, H34	65.0 hrs.
11.	December-2011	E780, G557, Q48, E767, Q199, Q220, H34, K347, K69, K71, H29, K75, E781	80.7 hrs.
12.	January-2012	K069, K071, 631, K345, K346, K347, K350, E767, E779, G557, Q48, Q199, E778	73.7 hrs.
13.	February-2012	E777, E778, E782, E767, E86, G970, Q-48, K347, K69, H34, Q-394	80.1 hrs.
14.	March-2012	E780, K71, E781, E782, E797, 631, Q48, Q51, Q-394, K69, K346, K76, K342, K345, K347, K350, K69, K70	90.3 hrs.
15.	April-2012	E781, G557, Q220, H34, K75, K76, K69, K70, K346, K342, H-29	60.9 hrs.
16.	May-2012	K342, E777, 588, E779, E780, E781, E782, E797, E86, G557, K71, Q48, Q51	85.2 hrs
17.	June-2012	E779, E780, G557, E782, K070, E86, G557, G970, K342, Q51, K346, Q220, Q394.	93.8 hrs
18.	July-2012	Q394, K350, H29, K45, E780, E781, E782, Q-220, E86, G557, G970, Q48, Q51, Q199, E777.	80.5 hrs.
19.	August-2012	K70, K346, E778, E779, E780, G970, Q48, K76 K342, Q220, Q-394, H29, 589, E767, E782	103 hrs
20.	September-2012	E86, G997,E780 Q-394, 589, H34, K75, K76, K342, K345, 588, K347, K350, K69, K70, K71	82.8 hrs.
21.	October-2012	E767, E797, E86, G557, G970, Q48, Q51, Q199, Q220, Q-394,G557, G970, Q48, Q51, Q199	57.9 hrs.
22.	November-2012	K71, E777, K345, K346, K347, K350, K69, E778, E779, E780, E781, E782 E86, G557	86.7 hrs.
23.	December-2012	Q48, E86, 638, 631, Q48, Q51, Q199, Q220, Q-394,G557, G970, Q48, Q51, Q199, Q-394, H29, H34, K75, K76, K342, K346, K70	83.5 hrs.

24.	January-2013	H34, K75, K76, K342, K345, K346, K347, E777, K345, K346, K347, K350, 638, E778, K347	61.4 hrs.
25.	February-2013	E767, 638, E778, K345, E781, E782, E797, G557, G970, K70, Q51, 588, K69, K347, H29, H34, 589, K76	58.6 hrs.
26.	March-2013	631, 589, E778, Q199, E780, E781, E782, E797, H34, K75, K76, K342, K345, K346, K347, K350, K69	60.0 hrs.
27.	April-2013	Q199, K346, 588, K69, Q199, Q220, Q48, Q51, Q199	40.9 hrs.
28.	May-2013	E778, E779, E780, E781, E782, E797, E86, G557, G970, G557, G970	54.3 hrs.
29.	June-2013	Q48, Q51, G557, G970, Q48, Q51, Q199, Q220, Q-394, H29, H34, K75, K76	60.1 hrs
30.	July-2013	K342, K345, Q220, Q-394,, Q220, E781, E782, E797, E86, G557, K70, K71, Q51, Q199, 631, H29,	84.9 hrs.
31.	August-2013	Q220, Q-394, K345, K347, E778, Q48, 638, E779, H29, K70	72. 0 hrs.
32.	September-2013	K345, E778, Q48, Q51, Q-394, K69, K347, G970, Q48	80.7 hrs.
33.	October-2013	E777, E778, E779, Q48, E781, E782, E797, E86, G5 Q220, Q-394, H29, H34, K75, K76, K342, K345	90.6 hrs.
34.	November-2013	E777, E780, E86, G970, Q-51, Q-199, H29, K350, K347, K69	40.8 hrs.
35.	December-2013	E779, E797, E767, G557, Q48, G970, Q-220, H34, K71, K350, K347, K70	60.0 hrs.
36.	January-2014	638, 588, 631, G970, Q48, E777, E778, Q51, Q48	50.6 hrs.
37.	February-2014	E767, E777, E782, G557, G970, Q-199, Q-51, 631, Q394, H29, K346	30.8 hrs
38.	March-2014	K71, K70, K69, K345, K342, Q394, H29, E777, G557, Q48, Q51	50.2 hrs.
39.	April-2014	E780, E781, E782, E797, E86, G557, G970, Q48, Q51, Q199, Q220, Q-394, H29, H34	60.1 hrs.
40.	May-2014	E782, G557, Q48, H29, Q199, H29, K347, K345	30.0 hrs.
41.	June-2014	638, 588, E777, E781, G970, G557, K346, E779, K70	40.5 hrs.
42.	July-2014	E781, E86, G557, G970, Q51, Q199, Q-394, K75, K347, K346, K70	33.0 hrs.
43.	August-2014	K350, K69, K342, H34, K75, Q48, E782, E780, G557, Q51	40.6 hrs.
44.	September-2014	E767, E778, E86, G970, Q48, Q51, Q220, H29, K346, K345, K71	56.4 hrs.
45.	October-2014	Q199, Q48, Q51, E767, E777, Q51, E782, H29, H34, K75, K350, K347	61.3 hrs.

46.	November-2014	E767, E777, H29, K75, K346, K345, K70, K69, E767, E780, E782	50.9 hrs.
47.	December-2014	E767, E777, G557, Q48, Q51, Q199, H29, H34, K346, K350, K70, K71	45.6 hrs.
48.	January-2015	E780, G970, Q48, Q51, E767, E86, Q220, Q394, H34, K346, K71	40.0 hrs.
49.	February-2015	638, 588, E780, K347, K342, K70, K75, H34, G557, E767, E777, E780	50.3 hrs.
50.	March-2015	G970, 589, Q51, E777, E782, K342	44.6 hrs.
51.	April-2015	588, 638, E767, E777, Q51, Q199, E8, K342	50.4 hrs.
52.	May-2015	E767, E777, E780, E86, G970, Q51, Q199, H34, K346, K71	60.0 hrs.
53.	June-2015	E797, G557, G970, Q51, Q220	30.6 hrs.
54.	July-2015	EG970, Q51, Q199,	41.8 hrs.
55.	August-2015	E797, Q48, Q51, Q199, Q220	35.6 hrs.
56.	September-2015	E797,G557, G970, Q48, Q51,	40.2 hrs.
57.	October-2015	E86, G557, Q48, Q51, Q220	60.3 hrs.
58.	November-2015	E797, E86, G557, G970, Q220	41.0 hrs.
59.	December-2015	G557, G970, Q48, Q51, Q199, Q220	22.5 hrs
60.	January-2016	E797, E86, G557, Q51, Q199, Q220	45.0 hrs.
61.	February-2016	E797, E86, G557, G970, Q48, Q51, Q199,	46.2 hrs.
62.	March-2016	E797, G970, Q48, Q51, Q199, Q220	56.8 hrs.
63.	April-2016	E86,G970, Q48, Q51, Q199, Q220	35.9 hrs.
64.	May-2016	E86, G557, G970, Q48, Q51, Q199, Q220	66.5 hrs.
65.	June-2016	, E86, G557, G970, Q48, Q51, Q199	40.0 hrs
66.	July-2016	E797, E86, Q48, Q51, Q199, Q220	34.8 hrs
67.	August-2016	E86, G557, G970, Q48, Q51, Q199,	50.0 hrs
68.	September-2016	G970, Q48, Q51, Q2	38.9 hrs.
69.	October-2016	E797, E86, G557, G970, Q48, Q51, Q199, Q220	40.6 hrs.
70.	November-2016	E797, E86, G557, G970, Q48, Q51, Q199, Q220	29.3 hrs
71.	December-2016	E797, E86, G557, G970, Q48, Q51, Q199, Q220	46.5 hrs.