

PROJECT TITLE: 51 MW Wind Power Project at Chitradurga

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Project Title	51 MW Wind Power Project at Chitradurga
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1 PROJECT DETAILS

1.1 Summary Description of Project

The project activity titled “**51 MW Wind Power Project at Chitradurga**” is registered under Voluntary Carbon Standard (VCS) with reference number 706. The project details can be referred from the below web link:

<https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=706&lat=14.233333&lon=76.433333&bp=1>

Nuziveedu Seeds Limited registered the project titled “**51 MW Wind Power Project at Chitradurga**” under VCS, in which the project activity involves installation and operation of Wind Turbine Generators (WTGs) of total capacity 51 MW (34 Nos * 1.5 MW) at Bhimasamudra site Chikkandavadi and Kallavanagathihalli village, Chitradurga District of Karnataka in India to generate electricity as per the capacity stated in the wind power assessment report prepared by Elcimech Engineers and Enterprises and submitted to ReGen Powertech Private Limited (RPPL) who is the supplier of the WTGs. Nuziveedu Seeds Limited had made an application for conversion to private company under section 31(1) of the companies act and received approval from central government for name change as “Nuziveedu Seeds Private Limited” on 26/06/2008. In continuation to that, on 16/06/2010, the central government approved for the name change as “NSL Renewable Power Private Limited” (**hereafter referred as NSL**) in line with section 21 of the companies act.

"On 10/12/2007, NSL had released purchase order to RPPL for 34 nos WTGs (1.5 MW each) for a capacity of 51 MW. RPPL had supplied 9 WTGs on time out of this 34 WTGs. From the balance 25 nos of WTGs, RPPL could supply only 19 WTGs and informed NSL (on 12/09/2009) that the balance 6 WTGs could be supplied only later (after June 2010). So, considering the delay in supply of WTGs from RPPL, NSL decided to replace Regen make of 6 nos WTGs with 4 nos of WTGs of Suzlon make each having capacity of 2.1 MW. Based on this, NSL released new purchase order to Suzlon Energy Limited (SEL) for 4 no WTGs. Hence the current capacity amounts to 50.4 MW which is lower than the capacity mentioned in the title. However, the PP is also developing the project under CDM and received HCA with the same title. PP is still using the same title for consistency between their CDM and VCS project."

The main purpose of the project activity is to generate electricity by using renewable wind resources and the electricity generation from wind power is an environmental friendly power generation technology. Thus, the project activity results in the reduction of greenhouse gas

(GHG) emissions associated with generation of equivalent amount of power in the fossil fuel dominant regional electricity grid. The electricity generated from the project activity would potentially reduce around **228,851 tCO₂e** in this monitoring period. The monitoring report covers the monitoring period from: **01/07/2010 – 30/09/2012**.

1.2 Sectoral Scope and Project Type

The project activity falls under the following guidelines set in the Clean Development Mechanism under the Kyoto Protocol:

- **Sectoral Scope** : 1, Energy industries (renewable / non-renewable sources)
- **Type** : Renewable Energy Projects

The project activity is not a grouped or a bundled project.

1.3 Project Proponent

The project activity is owned by “**NSL Renewable Power Private Limited**”. The contact details of the project participant are provided below:

Mr. Anupam Mathur

Vice President - Wind Energy

M/s. NSL Renewable Power Private Limited

NSL ICON, 4th Floor,

Road No.12, Banjara Hills,

Hyderabad, Andhra Pradesh, Pin code - 500 034

Contact number: +91 40 3051 4444

E- Mail: anupam.m@nslpower.com

1.4 Other Entities Involved in the Project

Not Applicable – no other entities involved in the project

1.5 Project Start Date

06/06/2008 – The date of commissioning of the first WTG (HK 3)

1.6 Project Crediting Period

Crediting Period Start Date : 06/06/2008

Crediting Period End Date : 06/06/2018

Total Number of Years : 10

1.7 Project Location

The project site is located at Bhimasamudra site, Chikkandavadi and Kallavanagathihalli village, Chitradurga District of Karnataka in India. Chitradurga is approximately around 200 KM from Bangalore, capital of Karnataka state. The physical location is provided below:

WTG HT SC No	Locati on No	Village	District	State	Latitude	Longitude
1	HK 1	Chikkandavadi	Chitradurga	Karnataka	N14 11 02.7	E76 12 32.2
2	HK 2	Chikkandavadi	Chitradurga	Karnataka	N14 10 49.7	E76 12 25.7
3	HK 3	Chikkandavadi	Chitradurga	Karnataka	N14 10 42.1	E76 12 26.8
4	HK 4	Chikkandavadi	Chitradurga	Karnataka	N14 10 33.7	E76 12 26.6
5	HK 5	Chikkandavadi	Chitradurga	Karnataka	N14 10 23.2	E76 12 26.0
6	HK 6	Chikkandavadi	Chitradurga	Karnataka	N14 10 08.8	E76 12 25.6
7	HK 7	Chikkandavadi	Chitradurga	Karnataka	N14 10 00.7	E76 12 25.0
8	HK 8	Chikkandavadi	Chitradurga	Karnataka	N14 09 53.1	E76 12 23.3
9	HK 9	Chikkandavadi	Chitradurga	Karnataka	N14 09 45.3	E76 12 22.1
10	HK 10	Kallavanagathihalli	Chitradurga	Karnataka	N14 13 10.6	E76 08 43.7
11	HK 11	Kallavanagathihalli	Chitradurga	Karnataka	N14 12 43.4	E76 08 39.2
12	HK 12	Kallavanagathihalli	Chitradurga	Karnataka	N14 12 23.7	E76 08 57.4
13	HK 13	Kallavanagathihalli	Chitradurga	Karnataka	N14 12 18.9	E76 09 02.5
14	HK 14	Kallavanagathihalli	Chitradurga	Karnataka	N14 12 12.5	E76 09 07.5
15	HK 15	Kallavanagathihalli	Chitradurga	Karnataka	N14 12 06.4	E76 09 11.9
16	HK 16	Kallavanagathihalli	Chitradurga	Karnataka	N14 11 59.5	E76 09 16.8
17	HK 17	Kallavanagathihalli	Chitradurga	Karnataka	N14 11 37.0	E76 09 38.3
18	HK 18	Kallavanagathihalli	Chitradurga	Karnataka	N14 11 30.3	E76 09 43.3
19	HK 19	Kallavanagathihalli	Chitradurga	Karnataka	N14 11 24.4	E76 09 48.0
20	HK 20	Kallavanagathihalli	Chitradurga	Karnataka	N14 11 16.6	E76 09 50.9

21	HK 21	Kallavanagathihalli	Chitradurga	Karnataka	N14 11 10.9	E76 09 56.4
22	HK 22	Kallavanagathihalli	Chitradurga	Karnataka	N14 11 04.4	E76 09 59.9
23	HK 23	Kallavanagathihalli	Chitradurga	Karnataka	N14 10 57.8	E76 10 03.4
24	HK 24	Kallavanagathihalli	Chitradurga	Karnataka	N14 10 41.1	E76 10 39.9
25	HK 25	Kallavanagathihalli	Chitradurga	Karnataka	N14 10 34.0	E76 10 44.3
26	HK 26	Kallavanagathihalli	Chitradurga	Karnataka	N14 10 26.9	E76 10 47.8
27	HK 27	Kallavanagathihalli	Chitradurga	Karnataka	N14 10 19.8	E76 10 51.3
28	HK 29	Kallavanagathihalli	Chitradurga	Karnataka	N14 10 02.1	E76 11 14.3
29	HK 30	Kallavanagathihalli	Chitradurga	Karnataka	N14 09 55.0	E76 11 18.0
30	HK 31	Kallavanagathihalli	Chitradurga	Karnataka	N14 09 48.9	E76 11 23.0
31	HK 32	Kallavanagathihalli	Chitradurga	Karnataka	N14 09 42.0	E76 11 26.8
32	HK 33	Kallavanagathihalli	Chitradurga	Karnataka	N14 09 35.0	E76 11 30.4

1.8 Title and Reference of Methodology

The baseline methodology applied for this project activity is as follows:

Type : I – Renewable Energy Projects
 Category : **ACM0002. Consolidated baseline methodology for grid connected electricity generation from renewable sources**.
 Version : 11, EB 62.
 Reference : http://cdm.unfccc.int/filestorage/H/G/Y/HGY3TLRFPQVM016WA4I7XCZD92KE5S/EB52_repan07_ACM0002_ver11.pdf?t=U3B8bWVtemZjfDBx_f1H0dEfORFSDfU71vzP

Tools referred in the methodology are as follows:

- Version 05.2 of “Tool for the demonstration and assessment of additionality” .
- Version 02 of “Tool to calculate the emission factor of an electricity system

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

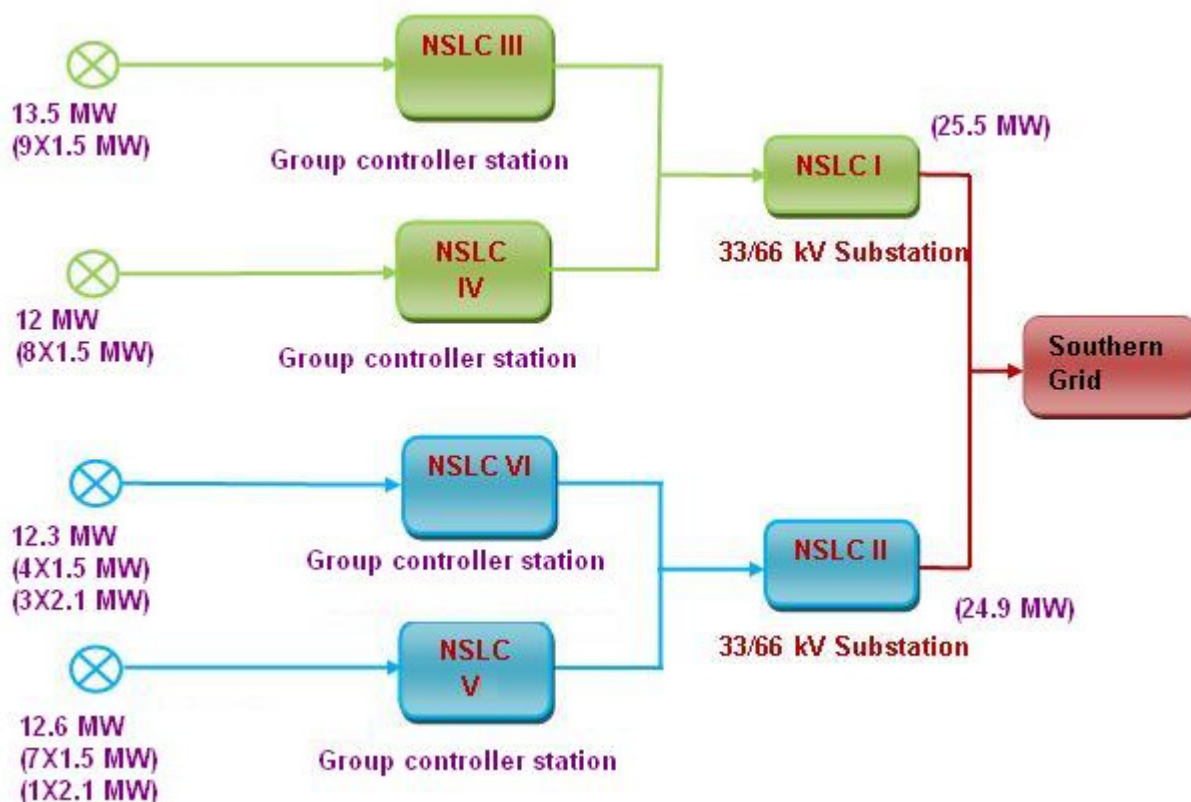
As given in section 1.1, the project activity has an aggregate installed capacity of 50.4 MW (29 number of 1.5 MW WTGs and 4 number of 2.1 MW WTGs). All the WTG's are located in the state of Karnataka¹. The commissioning details of the WTGs are given in the table below:

Sl. No	WTG Number	WTG Capacity (MW)	Commissioning date
1	HK 1	1.5	29/09/2008
2	HK 2	1.5	01/07/2008
3	HK 3	1.5	06/06/2008
4	HK 4	1.5	09/09/2008
5	HK 5	1.5	09/09/2008
6	HK 6	1.5	29/09/2008
7	HK 7	1.5	08/12/2009
8	HK 8	1.5	08/12/2009
9	HK 9	1.5	08/12/2009
10	HK 10	1.5	15/12/2009
11	HK 11	1.5	15/12/2009
12	HK 12	1.5	21/01/2010
13	HK 13	1.5	15/12/2009
14	HK 14	1.5	21/01/2010
15	HK 15	1.5	15/12/2009
16	HK 16	1.5	30/09/2011
17	HK 17	1.5	30/09/2011
18	HK 18	1.5	30/09/2011
19	HK 19	2.1	30/09/2011
20	HK 20	2.1	30/09/2011
21	HK 21	2.1	30/09/2011
22	HK 22	1.5	21/01/2010
23	HK 23	1.5	21/01/2010
24	HK 24	1.5	30/09/2011
25	HK 25	1.5	30/09/2011
26	HK 26	2.1	30/09/2011
27	HK 27	1.5	30/09/2011
28	HK 29	1.5	01/10/2010

¹ The exact location details of each WTG are given in section 1.7 of the report.

29	HK 30	1.5	01/10/2010
30	HK 31	1.5	01/10/2010
31	HK 32	1.5	30/09/2011
32	HK 33	1.5	30/09/2011

Metering arrangements of WTGs



2.2 Deviations from the Monitoring Plan

There is no deviation involved in the monitoring plan.

2.3 Grouped Project

There is no grouping involved in the project activity.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	EF _{OM}
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Data unit:	tCO ₂ / MWh
Description:	Operational Margin of the Southern Grid
Source of data:	CO2 Baseline Database Version 5.0 dated November 2009 published by CEA http://cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
Value applied:	0.9876
Purpose of the data:	Baseline Emission calculation.
Any comment:	Fixed ex-ante for entire crediting period

Data Unit / Parameter:	EF _{BM}
Data unit:	tCO ₂ / MWh
Description:	Build Margin of the Southern Grid
Source of data:	CO2 Baseline Database Version 5.0 dated November 2009 published by CEA http://cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
Value applied:	0.8179
Purpose of the data:	Baseline Emission calculation.
Any comment:	Fixed ex-ante for entire crediting period

Data Unit / Parameter:	EF _{CO2, grid, y}
Data unit:	tCO ₂ / MWh
Description:	CO2 Baseline emission factor of the grid
Source of data:	CO2 Baseline Database Version 5.0 dated November 2009 published by CEA http://cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
Value applied:	0.9451
Purpose of the data:	Baseline Emission calculation.
Any comment:	Fixed ex-ante for entire crediting period

3.2 Data and Parameters Monitored

Data Unit / Parameter:	EG _y
Data unit:	kWh
Description:	Electricity supplied by the plant to the grid
Source of data:	Tariff invoices submitted to KPTCL for the electricity

	supplied to the grid
Description of measurement methods and procedures to be applied:	The metering points NSLC III, NSLC IV, NSLC V are connected to bulk metering point NSLC I and NSLC II till 30th Sep 2011. From 30th Sep 2011 onwards, the metering points NSLC III, NSLC IV are connected to bulk metering point NSLC I and metering point NSLC V, NSLC VI are connected to bulk metering point NSLC II. The WTGs of capacity load 13.5 MW (9X1.5 MW) are connected to metering point NSLC III, and WTGs of capacity load 12 MW (8X1.5 MW) are connected to metering point NSLC IV and WTGs of capacity load 12.6 MW (7X1.5 MW, 1X2.1 MW) are connected to the metering point NSLC V and WTGs of capacity load 12.3 MW (4X1.5 MW, 3X2.1 MW) are connected to metering point at NSLC VI located at group controller station, Hirekandavadi. Energy is fed to grid from NSLC III, NSLC IV, NSLC V, NSLC VI through bulk metering points NSLC I, NSLC II located at 66 KV substation, KN Halli. Actual power generated by WTGs of project activity is measured using energy meters (Main & Check) located at group controller station, Hirekandavadi. The main meter and check meter are installed at group controller station, Hirekandavadi. Net electricity exported to grid by the wind farm is measured using KPTCL meters installed at HT end of the 33/66 KV substation at KN Hali. The main meter and check meter are installed at the substation. Both of these are joint meter readings and are taken on monthly basis in the presence of KPTCL/BESCOM and representative of the project proponent. KPTCL & BESCOM will issue a certificate for the share of electricity generated every month. Monthly share of

	electricity certificate is prorated by KPTCL/BESCOM based on actual generation of WTGs and the net total electricity supplied by the Wind Farm. Reading recorded in this certificate for the WTGs in the project activity would be used for actual estimations.				
Frequency of monitoring/recording:	Measuring frequency – Continuous Recording frequency – Monthly				
Value monitored:	46223 – (01/07/2010 – 31/12/2010) 111060 – (01/01/2011 – 31/12/2011) 87665 – (01/01/2012 – 30/09/2012)				
Monitoring equipment:	<table border="1"> <thead> <tr> <th>Energy Meter</th><th>Accuracy Class</th></tr> </thead> <tbody> <tr> <td>Trivector meter</td><td>0.2S</td></tr> </tbody> </table>	Energy Meter	Accuracy Class	Trivector meter	0.2S
Energy Meter	Accuracy Class				
Trivector meter	0.2S				
QA/QC procedures to be applied:	The main and check energy meters are of 0.2S accuracy class. Calibration of energy meters at group controller end and substation end are carried out by BESCOM/KPTCL annually. The invoices raised to BSECOM/ KPTCL by NSL can be used for cross checking the electricity readings.				
Calculation method:	Not applicable				
Any comment:	The data will be archived for the crediting period plus two years in electronic format.				

Data Unit / Parameter:	TEG _y
Data unit:	kWh
Description:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y
Source of data:	Form B certificate issued by KPTCL/BESCOM.
Description of measurement methods and procedures to be applied:	The metering points NSLC III, NSLC IV, NSLC V are connected to bulk metering point NSLC I and NSLC II till 30 th Sep 2011. From 30 th Sep 2011 onwards, the metering points NSLC III, NSLC IV are connected to bulk metering point NSLC I and metering point NSLC V, NSLC VI are connected to bulk metering point NSLC II. The WTGs of capacity load 13.5 MW (9X1.5 MW) are

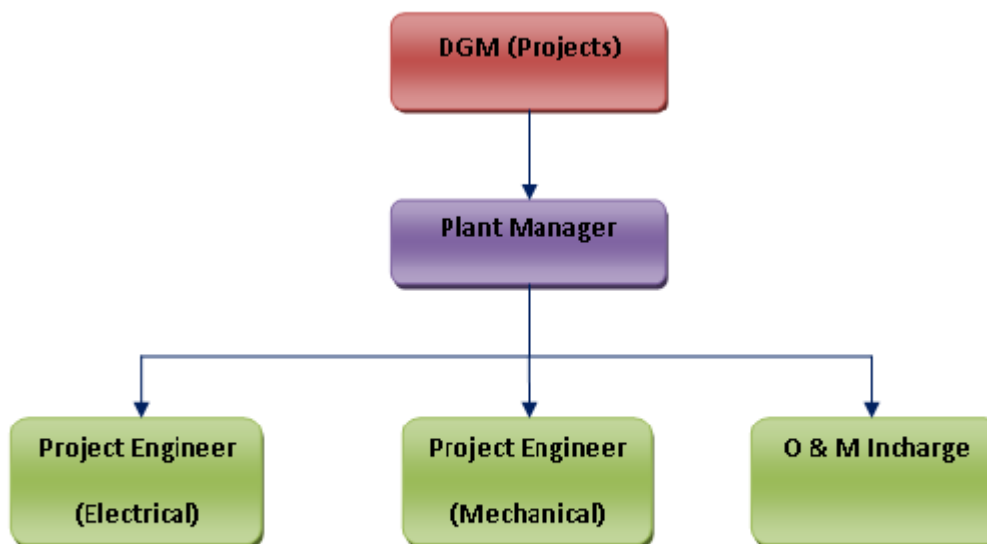
	connected to metering point NSLC III, and WTGs of capacity load 12 MW (8X1.5 MW) are connected to metering point NSCL IV and WTGs of capacity load 12.6 MW (7X1.5 MW, 1X2.1 MW) are connected to the metering point NSLC V and WTGs of capacity load 12.3 MW (4X1.5 MW, 3X2.1 MW) are connected to metering point at NSLC VI located at group controller station, Hirekandavadi. Energy is fed to grid from NSLC III, NSLC IV, NSLC V, NSLC VI through bulk metering points NSLC I, NSLC II located at 66 KV substation, KN Halli. Actual power generated by WTGs of project activity is measured using energy meters (Main & Check) located at group controller station, Hirekandavadi. The main meter and check meter are installed at group controller station, Hirekandavadi. Net electricity exported to grid by the wind farm is measured using KPTCL meters installed at HT end of the 33/66 KV substation at KN Hali. The main meter and check meter are installed at the substation. Both of these are joint meter readings and are taken on monthly basis in the presence of KPTCL/BESCOM and representative of the project proponent. KPTCL & BESCOM will issue a certificate for the share of electricity generated every month. Monthly share of electricity certificate is prorated by KPTCL/BESCOM based on actual generation of WTGs and the net total electricity supplied by the Wind Farm. Reading recorded in this certificate for the WTGs in the project activity would be used for actual estimations.
Frequency of monitoring/recording:	Measuring frequency – Continuous Recording frequency – Monthly
Value monitored:	46247 – (01/07/2010 – 31/12/2010)

	111121 – (01/01/2011 – 31/12/2011) 84929 – (01/01/2012 – 30/09/2012)				
Monitoring equipment:	<table> <tr> <th>Energy Meter</th><th>Accuracy Class</th></tr> <tr> <td>Trivector meter</td><td>0.2S</td></tr> </table>	Energy Meter	Accuracy Class	Trivector meter	0.2S
Energy Meter	Accuracy Class				
Trivector meter	0.2S				
QA/QC procedures to be applied:	The main and check energy meters are of 0.2S accuracy class. Calibration of energy meters at group controller end and substation end are carried out by BSECOM/KPTCL annually. The invoices raised to BSECOM/ KPTCL by NSL can be used for cross checking the electricity readings.				
Calculation method:	Not applicable				
Any comment:	The data will be archived for the crediting period plus two years in electronic format.				

3.3 Description of the Monitoring Plan

The operational and management structure implemented by NSL at the project site is as follows:

Organisational chart for data collection of Bhimasamudra Wind farm:



Roles and Responsibilities:

Designation	Responsibilities
Site In- charge	Certifying official (Authorized for signing invoice)
Ass Manager	Verification of correctness of data
Site Engineer	Staff who present during collection of data by BESCOM/KPTCL

Metering arrangements:

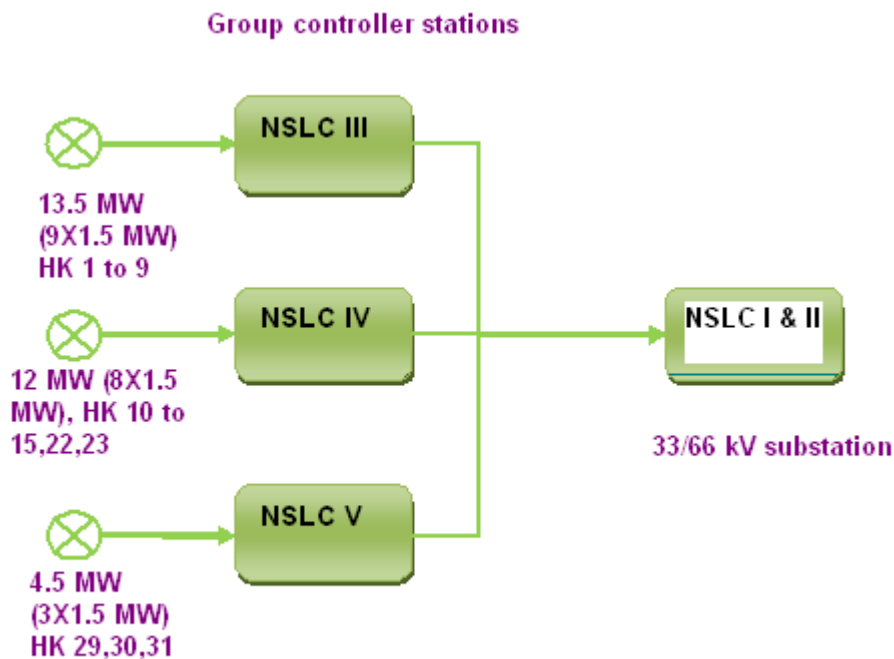
The metering points NSLC III, NSLC IV, NSLC V are connected to bulk metering point NSLC I and NSLC II till 30th Sep 2011. From 30th Sep 2011 onwards, the metering points NSLC III, NSLC IV are connected to bulk metering point NSLC I and metering point NSLC V, NSLC VI are connected to bulk metering point NSLC II..

The WTGs of capacity load 13.5 MW (9X1.5 MW) are connected to metering point NSLC III, and WTGs of capacity load 12 MW (8X1.5 MW) are connected to metering point NSCL IV and WTGs of capacity load 12.6 MW (7X1.5 MW, 1X2.1 MW) are connected to the metering point NSLC V and WTGs of capacity load 12.3 MW (4X1.5 MW, 3X2.1 MW) are connected to metering point at NSLC VI located at Group Control Station, Hirekandavadi. Energy is fed to grid from NSLC III, NSLC IV, NSLC V, NSLC VI through bulk metering points NSLC I, NSLC II located at 66 KV substation, KN Halli.

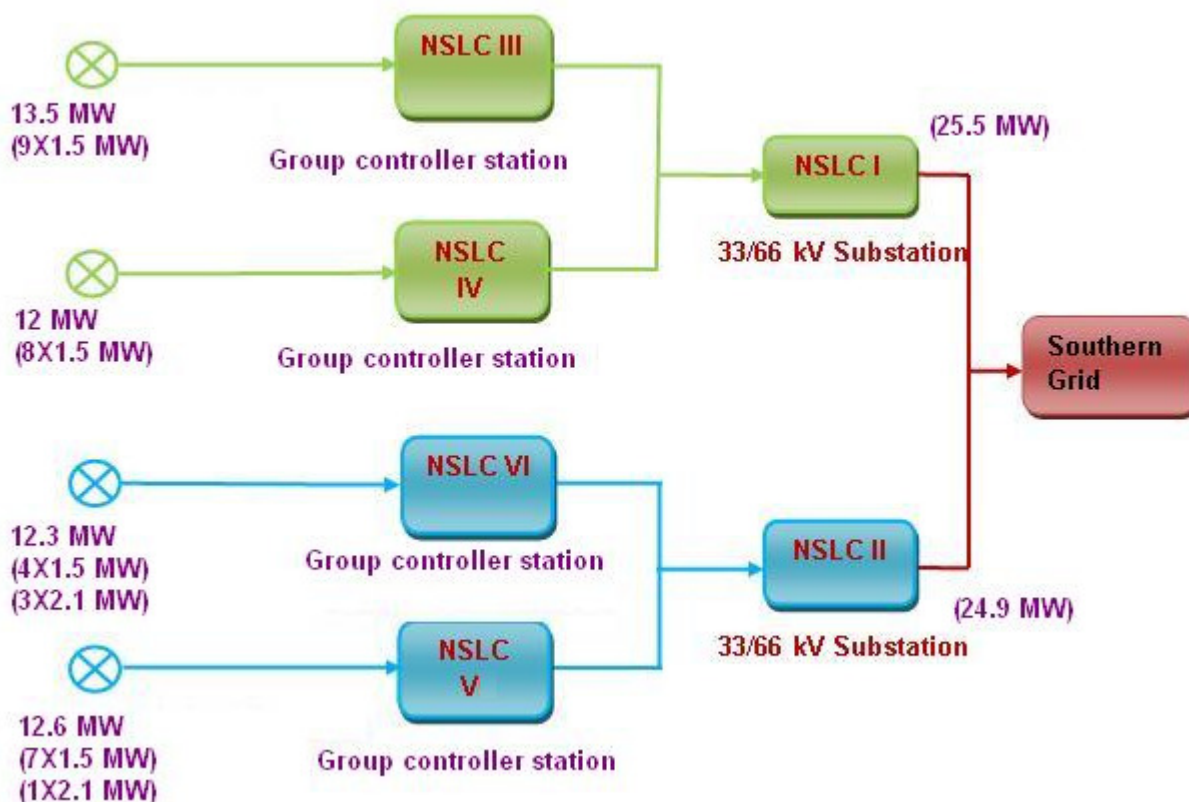
Metering points	WTGs No	Capacity of WTGs (MW)	Commissioning date
NSLC III	HK 1	1.5	29/09/2008
	HK 2	1.5	01/07/2008
	HK 3	1.5	06/06/2008
	HK 4	1.5	09/09/2008
	HK 5	1.5	09/09/2008
	HK 6	1.5	29/09/2008
	HK 7	1.5	08/12/2009
	HK 8	1.5	08/12/2009
	HK 9	1.5	08/12/2009
NSLC IV	HK 10	1.5	15/12/2009
	HK 11	1.5	15/12/2009
	HK 12	1.5	21/01/2010
	HK 13	1.5	15/12/2009
	HK 14	1.5	21/01/2010
	HK 15	1.5	15/12/2009
	HK 22	1.5	21/01/2010

	HK 23	1.5	21/01/2010
NSLC V	HK 25	1.5	30/09/2011
	HK 27	1.5	30/09/2011
	HK 29	1.5	01/10/2010
	HK 30	1.5	01/10/2010
	HK 31	1.5	01/10/2010
	HK 32	1.5	30/09/2011
	HK 33	1.5	30/09/2011
	HK 26	2.1	30/09/2011
NSLC VI	HK 16	1.5	30/09/2011
	HK 17	1.5	30/09/2011
	HK 18	1.5	30/09/2011
	HK 24	1.5	30/09/2011
	HK 19	2.1	30/09/2011
	HK 20	2.1	30/09/2011
	HK 21	2.1	30/09/2011

Metering arrangements before 30th Sep 2011



Metering arrangements after 30th Sep 2011



Actual power generated by WTGs of project activity is measured using energy meters located at Group Control Station, Hirekandavadi. The main meter and check meter of the WTGs are installed at Group Control Station, Hirekandavadi.

Net electricity exported to grid by the wind farm is measured using KPTCL meters installed at HT end of the 33/66 KV substation at KN Halli. The main meter and check meter of the net electricity exported to the grid is installed at the substation. Both of these are joint meter readings and are taken on monthly basis in the presence of KPTCL/BESCOM and representative of the project proponent.

KPTCL & BESCOM will issue a certificate for the share of electricity generated every month. Monthly share of electricity certificate is prorated by KPTCL/BESCOM based on actual generation of WTGs and the net total electricity supplied by the Wind Farm. Reading recorded in this certificate for the WTGs in the project activity would be used for actual estimations.

Calibration:

Metering Points	Meter Details					Test Result
	Serial no	Make	Type	Accuracy class	Date of Calibration	
NSLC I	Main meter – 11071857 Check meter - 11071859	L & T	3P4W	0.2S	21/05/2010	Satisfactory
					30/08/2010	Satisfactory
					28/12/2010	Satisfactory
					26/03/2011	Satisfactory
					24/06/2011	Satisfactory
					13/02/2012	Satisfactory
					20/6/2012	Satisfactory
NSLC II	Main meter – 11071861 Check meter - 11071863	L & T	3P4W	0.2S	30/08/2012	Satisfactory
					21/05/2010	Satisfactory
					30/08/2010	Satisfactory
					28/12/2010	Satisfactory
					26/03/2011	Satisfactory
					24/06/2011	Satisfactory
					13/02/2012	Satisfactory
NSLC III	Main meter – 07022896 Check meter – 07022921	L & T	3P4W	0.2S	20/6/2012	Satisfactory
					30/08/2012	Satisfactory
					16/06/2010	Satisfactory
					27/09/2010	Satisfactory
					14/12/2010	Satisfactory
					26/02/2011	Satisfactory
					31/05/2011	Satisfactory
NSLC IV	Main meter – 07022985 Check meter - 07022986	L & T	3P4W	0.2S	28/02/2012	Satisfactory
					20/6/2012	Satisfactory
					30/08/2012	Satisfactory
					16/06/2010	Satisfactory
					27/09/2010	Satisfactory
					14/12/2010	Satisfactory
					26/02/2011	Satisfactory
NSLC V	Main meter – 07022985 Check meter - 07022986	L & T	3P4W	0.2S	31/05/2011	Satisfactory
					28/02/2012	Satisfactory
					20/6/2012	Satisfactory
					30/08/2012	Satisfactory
					16/06/2010	Satisfactory
					27/09/2010	Satisfactory
					14/12/2010	Satisfactory

NSLC V	Main meter – 09142342 Check meter - 09141853	L & T	3P4W	0.2S	14/12/2010	Satisfactory
					26/02/2011	Satisfactory
					31/05/2011	Satisfactory
					28/02/2012	Satisfactory
					20/6/2012	Satisfactory
					30/08/2012	Satisfactory
NSLC VI	Main meter – 07022900 Check meter - 07022906	L & T	3P4W	0.2 S	28/02/2012	Satisfactory
					20/6/2012	Satisfactory
					30/08/2012	Satisfactory

QA/QC procedures & Data collection and archiving:

The reading can be cross verified with the actual invoices presented to BESCO/KTPCL by NSL. The daily data at the site is collected in electronic form. Monthly data is also collected and maintained in plant log books. The project proponent shall keep complete and accurate records of all the data as a part of monitoring for at least a period of 2 years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

As per ACM0002, baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

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

Where:

- BE_y = Baseline emissions in year y (tCO₂/yr)
- EG_{PJ,y} = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
- EF_{grid,CM,y} = Combined margin CO₂ 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” (tCO₂/MWh)

Calculation of EG_{PJ,y}:

The calculation of $EG_{PJ,y}$ is different for (a) greenfield plants, (b) retrofits and replacements, and (c) capacity additions.

Since the project activity is a Greenfield project activity, option (a) is applicable to the project activity:

(a) Greenfield renewable energy power plants

If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

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

Where:

- $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
- $EG_{\text{facility},y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

$EG_{PJ,y}$ is considered as EG_y in the registered VCS PD.

Combined margin CO_2 emission factor $EF_{\text{grid,CM},y}$ is 0.9451 t CO_2 /MWh considered based on the data provided in the registered PD.

Net Energy Generated (EG_y):

The net electricity supplied is calculated as the follows.

Net electricity supplied to the grid by the plant = Electricity exported to the grid by the project activity – Electricity imported from the grid by the project activity – Transmission losses

Electricity export to the grid is considered based on Form B certificate issued by BESCOM/KTPCL.

Electricity import from the grid is considered based on Form B certificate issued by BESCOM/KTPCL².

Transmission losses³ are considered based on Form B certificate issued by BESCOM/KTPCL.

Grid Emission Factor:

The GEF is fixed ex-ante as given below:

Parameter	Value
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² As per PPA, NSL is billed for 115% of the electricity imported by the project activity from grid.

³ Transmission losses:

Transmission losses = (Sum of electricity export recorded for the metering points NSLC III, NSLC IV, NSLC V, NSLC VI) – (Electricity export recorded at the substation) / (Sum of electricity export recorded for the metering points NSLC III, NSLC IV, NSLC V, NSLC VI) * 100

EF _{OM}	0.9876
EF _{BM}	0.8179
EF _{CM}	0.9451

Therefore, EF_{grid,CM,y} = **0.9451 tCO₂/MWh**

Baseline Emissions:

The formula for Baseline emissions as discussed is provided above.

Monitoring period	Electricity supplied to the grid by the plant ⁴ (MWh)	Grid emission factor (tCO ₂ /MWh)	Baseline emission (tCO ₂)
1/7/2010 - 31/07/2010	10919	0.9451	10319
1/8/2010 - 31/08/2010	9395	0.9451	8879
1/9/2010 - 30/09/2010	6890	0.9451	6511
1/10/2010 - 31/10/2010	5644	0.9451	5334
1/11/2010 - 30/11/2010	5635	0.9451	5325
1/12/2010 - 31/12/2010	7738	0.9451	7313
1/1/2011 - 31/01/2011	8622	0.9451	8149
1/2/2011 - 28/02/2011	6293	0.9451	5948
1/3/2011 - 31/03/2011	6161	0.9451	5823
1/4/2011 - 30/04/2011	3335	0.9451	3152
1/5/2011 - 31/05/2011	7071	0.9451	6683
1/6/2011 - 30/06/2011	16150	0.9451	15263
1/7/2011 - 31/07/2011	15309	0.9451	14469
1/8/2011 - 31/08/2011	12801	0.9451	12098
1/9/2011 - 30/09/2011	9834	0.9451	9294
1/10/2011 - 31/10/2011	4832	0.9451	4566
1/11/2011 - 30/11/2011	10772	0.9451	10181
1/12/2011 - 31/12/2011	9880	0.9451	9338
1/1/2012 - 31/01/2012	5808	0.9451	5489
1/2/2012 - 28/02/2012	7080	0.9451	6692

⁴ The electricity supplied to the grid by the plant is calculated as the lowest value of either the net energy generation at NSLC I, II, III, IV, V, VI as per the invoices raised by PP to grid or net energy generation at NSLC I, II, III, IV, V, VI as per the Form B certificate. The detailed calculation is provided in the emission reduction calculation sheet. The energy generation at NSLC III, IV, V, VI are calculated based on the formula (Energy export – Energy Import – Transmission losses)

1/3/2012 - 31/03/2012	4296	0.9451	4060
1/4/2012 – 30/04/2012	3172	0.9451	2998
1/5/2012 - 31/05/2012	8693	0.9451	8215
1/6/2012 - 30/06/2012	13242	0.9451	12515
1/7/2012 - 31/07/2012	16622	0.9451	15709
1/8/2012 - 31/08/2012	15627	0.9451	14769
1/9/2012 - 30/09/2012	10326	0.9451	9759
Total	242145		228851

4.2 Project Emissions

As per approved methodology ACM0002, for most renewable energy project activities,

$$PE_y = 0.$$

Since the project activity is a wind power project, the project emission is zero.

4.3 Leakage

No leakage emissions are considered for this Project activity since no energy generating equipment is transferred from another activity and/or the existing equipment is transferred to another activity.

4.4 Summary of GHG Emission Reductions and Removals

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year y (tCO₂e/yr)

BE_y = Baseline emissions in year y (tCO₂/yr)

PE_y = Project emissions in year y (tCO₂e/yr)

The details of emission reduction achieved by the project activity are as follows:

Year	Baseline Emissions, (BE _y) (tCO ₂ e)	Project Emissions, (PE _y) (tCO ₂ e)	Leakages, (L _y) (tCO ₂ e)	Emission Reductions, (ER _y) (tCO ₂ e)
01/07/2010 – 31/12/2010	43682	0	0	43682
01/01/2011 – 31/12/2011	104963	0	0	104963
01/01/2012 – 30/09/2012	80206	0	0	80206

Total	228851⁵
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The comparison of actual emission reductions by sinks with estimates in registered PDD is given below:

Year	Values estimated in ex ante calculation of CDM registered PDD	Actual value achieved during this monitoring period
01/07/2010 – 31/12/2010	64009	43682
01/01/2011 – 31/12/2011	127668	104963
01/01/2012 – 30/09/2012	95489	80206

The actual value achieved during this monitoring period is lesser than the estimated value since the wind flow during the monitoring period is very low.

5 ADDITIONAL INFORMATION

Calibration details:

Metering Points	Meter Details					Test Result
	Serial no	Make	Type	Accuracy class	Date of Calibration	
NSLC I	Main meter – 11071857 Check meter - 11071859	L & T	3P4W	0.2S	21/05/2010	Satisfactory
					30/08/2010	Satisfactory
					28/12/2010	Satisfactory
					26/03/2011	Satisfactory
					24/06/2011	Satisfactory
					13/02/2012	Satisfactory
					20/6/2012	Satisfactory
NSLC II	Main meter – 11071861 Check meter - 11071863	L & T	3P4W	0.2S	30/08/2012	Satisfactory
					21/05/2010	Satisfactory
					30/08/2010	Satisfactory
					28/12/2010	Satisfactory
					26/03/2011	Satisfactory
					24/06/2011	Satisfactory
					13/02/2012	Satisfactory

⁵ Detailed Calculation is given in the emission reduction calculation sheet.

					20/6/2012	Satisfactory
					30/08/2012	Satisfactory
NSLC III	Main meter – 07022896 Check meter – 07022921	L & T	3P4W	0.2S	16/06/2010	Satisfactory
					27/09/2010	Satisfactory
					14/12/2010	Satisfactory
					26/02/2011	Satisfactory
					31/05/2011	Satisfactory
					28/02/2012	Satisfactory
					20/6/2012	Satisfactory
					30/08/2012	Satisfactory
NSLC IV	Main meter – 07022985 Check meter - 07022986	L & T	3P4W	0.2S	16/06/2010	Satisfactory
					27/09/2010	Satisfactory
					14/12/2010	Satisfactory
					26/02/2011	Satisfactory
					31/05/2011	Satisfactory
					28/02/2012	Satisfactory
					20/6/2012	Satisfactory
					30/08/2012	Satisfactory
NSLC V	Main meter – 09142342 Check meter - 09141853	L & T	3P4W	0.2S	14/12/2010	Satisfactory
					26/02/2011	Satisfactory
					31/05/2011	Satisfactory
					28/02/2012	Satisfactory
					20/6/2012	Satisfactory
					30/08/2012	Satisfactory
NSLC VI	Main meter – 07022900 Check meter - 07022906	L & T	3P4W	0.2 S	28/02/2012	Satisfactory
					20/6/2012	Satisfactory
					30/08/2012	Satisfactory

As per registered PD, all the energy meters including pooling station meters are calibrated once in a year and the results are found to be satisfactory.