



**MONITORING REPORT FORM (F-CDM-MR)**  
**Version 02.0**

**MONITORING REPORT**

<b>Title of the project activity</b>	<b>Bundled wind energy power projects (2003 policy) in Rajasthan</b>
<b>Reference number of the project activity</b>	<b>1167</b>
<b>Version number of the monitoring report</b>	1.0
<b>Completion date of the monitoring report</b>	26/10/2012
<b>Registration date of the project activity</b>	17/05/2011
<b>Monitoring period number and duration of this monitoring period</b>	Monitoring period number: Second Monitoring period duration: 01/11/2011 to 30/09/2012 (Inclusive of both days)
<b>Project participant(s)</b>	1. Enercon (India) Limited 2. Japan Carbon Finance Ltd.
<b>Host Party(ies)</b>	India
<b>Sectoral scope(s) and applied methodology(ies)</b>	<b>Sectoral Scope:</b> 1, Energy industries (renewable / non-renewable sources)  <b>Methodology:</b> ACM0002 / Version 06  <b>Title:</b> Approved baseline and monitoring methodology title “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	<b>45,862 tCO<sub>2</sub>e</b>
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	<b>35,235 tCO<sub>2</sub>e</b>

**SECTION A. Description of project activity****A.1. Purpose and general description of project activity**

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**Purpose of the project activity and the measures taken to reduce greenhouse gas emissions:**

Bundled wind energy power projects of 29.76 MW (“Project”) is installed in the state of Rajasthan and provides reliable, renewable power to the Rajasthan state electricity grid. The Project leads to reduction of greenhouse gas emissions because it displaces electricity from fossil fuel based electricity generation plants. The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. Enercon (India) Ltd (“Enercon” or “EIL”) is the equipment supplier and the operations and maintenance contractor for the Project. The generated electricity is supplied to the utility (Discom) under a long-term power purchase agreement (PPA). The details of the sub-projects comprising the Project are as under:

SN	Name of the Customer	M/C Model	Capacity of M/C	No. of M/C	Capacity (MW)
1	Enercon Wind Farm (Rajasthan) Pvt. Ltd.	E-48	0.8	30	24
2	Modular Power	E-30	0.23	1	0.23
3	Vijay Traders	E-30	0.23	1	0.23
4	Vijay Developers	E-30	0.23	1	0.23
5	Vikas Agencies	E-30	0.23	1	0.23
6	G. C. Chemie Pharmie Ltd.	E-30	0.23	1	0.23
7	Cooper Metals Pvt. Ltd.	E-30	0.23	2	0.46
8	Kataria Infrastructure Corporation	E-40	0.6	1	0.6
9	D.P.Power	E-30	0.23	1	0.23
10	Kataria Infrastructure Corporation	E-30	0.23	1	0.23
11	Kataria Wires	E-30	0.23	1	0.23
12	Ratlam Wires	E-30	0.23	1	0.23
13	Kwality Tobacco Products	E-30	0.23	1	0.23
14	D P Power	E-40	0.6	1	0.6
15	Unique Power Corporation	E-40	0.6	1	0.6
16	P.V.Chandran	E-40	0.6	1	0.6
17	Srinivaas Sirigeri	E-40	0.6	1	0.6
<b>Total Capacity (MW)</b>				<b>47</b>	<b>29.76</b>

**Brief description of the installed technology and equipments:**

The Project involves 30 wind energy converters (WECs) of Enercon make 800 kW E-48, 4 WECs of Enercon make 600 kW E-40 and 13 WECs of Enercon make 230 kW E-30 with internal electrical lines connecting the Project with local evacuation facility. The WECs generates 3-phase power at 400V, which is stepped up to 33 KV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V  $\pm$  12.5%. The other salient features of the state-of-art-technology are:

- Gearless Construction - Rotor & Generator Mounted on same shaft eliminating the Gearbox.
- Variable speed function – has the speed range of 18 to 33 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times.
- Minimum drawal (less than 1% of kWh generated) of Reactive Power from the grid.

- No voltage peaks at any time.
- Operating range of the WEC with voltage fluctuation of -20 to +20%.
- Less Wear & Tear since the system eliminates mechanical brake, which are not needed due to low speed generator which runs at maximum speed of 33 rpm and uses Air Brakes.
- Three Independent Braking System.
- Generator achieving rated output at only 33 rpm.
- Incorporates lightning protection system, which includes blades.
- Starts Generation of power at wind speed of 3 m/s.

Enercon (India) Ltd has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH, has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured.



**Technology Diagram**

#### Relevant dates for the project activity:

The date of placement of purchase order for the first project in the bundle is 30 April, 2003. The first machine under the project activity was commissioned on 29/07/2003 and the last machine under the project activity was commissioned on 29/05/2005. The expected operational lifetime of the project is for 20 years. The crediting period of the project activity commenced on 17/05/2011. This is the second monitoring report. The details of issuance of CERs for the previous monitoring periods are as follows:

Monitoring Period No.	Monitoring Period (Inclusive of both days)	CER Requested
First Issuance	17/05/2011 – 31/10/2011	17809

#### Total emission reductions achieved in this monitoring period

This is the second monitoring report for the project activity. The total emission reductions achieved under this monitoring period 01/11/2011 to 30/09/2012 (Inclusive of both days) is **35,235 tCO<sub>2</sub>e**.

#### A.2. Location of project activity

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The project activity is located in Jaisalmer district of Rajasthan of India. The sites are located at a distance of 35 km from Jaisalmer by road. The nearest railway station is at Jaisalmer. The nearest railway station is at Jaisalmer. The unique identification details along with the geo – coordinates have been provided below:-

Sl. No.	Name of customers	Unique Identification No.	Latitude			Longitude		
			Deg.	Min.	Sec.	Deg.	Min .	Sec.
1.	Enercon Wind Farm Rajasthan	EWRL 01	26	38	44.5	70	51	23.4
		EWRL 02	26	38	50.4	70	51	19.7
		EWRL 03	26	38	54.2	70	51	12.3
		EWRL 04	26	38	56.5	70	51	37.4
		EWRL 05	26	38	48.3	70	51	44.0
		EWRL 06	26	38	32.3	70	51	54.0
		EWRL 07	26	38	27.2	70	51	43.1
		EWRL 08	26	38	19.0	70	51	52.5
		EWRL 09	26	38	16.9	70	52	4.3
		EWRL 10	26	38	10.6	70	52	8.7
		EWRL 11	26	38	14.6	70	52	27.8
		EWRL 12	26	38	18.1	70	52	21.8
		EWRL 13	26	38	26.2	70	52	15.0
		EWRL 14	26	38	35.1	70	52	9.2
		EWRL 15	26	38	51.5	70	51	58.5
		EWRL 16	26	38	55.1	70	51	52.9
		EWRL 17	26	39	0.9	70	52	9.2
		EWRL 18	26	38	56.4	70	52	15.0
		EWRL 19	26	38	49.6	70	52	19.7
		EWRL 20	26	38	47.0	70	52	26.4
		EWRL 21	26	38	42.9	70	52	32.2
		EWRL 22	26	38	36.7	70	52	36.8
		EWRL 23	26	38	30.5	70	52	41.6
		EWRL 24	26	38	36.6	70	52	56.9
		EWRL 25	26	38	42.7	70	52	51.9
		EWRL 26	26	38	47.3	70	52	46.5
		EWRL 27	26	38	56.3	70	52	43.3
		EWRL 28	26	39	2.6	70	52	39.3
		EWRL 29	26	39	8.7	70	52	35.3
		EWRL 30	26	39	23.2	70	52	45.2
2.	D.P. Power	DPP-02	26	44	43.5	70	54	0.3
3.	Unique Power Corporation	UPC-01	26	44	46.8	70	53	58.9
4.	Cooper Metals Pvt. Ltd.	CMPL-01	26	37	45.4	70	52	55.1
5.	Srinivaas Sirigeri	SS -01	26	43	29.1	70	53	5.5
6.	Cooper Metals Pvt. Ltd.	CMPL-02	26	37	28.0	70	52	54.7



7.	G. C. Chemie Pharmie Ltd.	GCCPL -01	26	37	15.9	70	53	20.9
8.	Modular Power	MPPL -01	26	37	24.9	70	52	56.2
9.	Jitendra K. Newaskar (formerly Perna Pharma Intermediates Pvt. Ltd.)	PPIPL-01	26	37	19.2	70	53	20.5
10.	Vijay Developers	VD-01	26	37	23.0	70	52	59.0
11.	Vijay Traders	VT -01	26	37	13.6	70	52	58.1
12.	Vikas Agencies	VA-01	26	37	22.1	70	53	4.8
13.	P.V. Chandran	PVC -01	26	42	53.6	70	53	14.3
14.	Kataria Infrastructure Corporation	KIC -01	26	45	1.3	70	53	57.3
15.	D.P. Power	DPP -01	26	45	38.6	70	53	22.4
16.	Kataria Infrastructure Corporation	KIC -02	26	45	42.7	70	53	21.2
17.	Kataria Wires	KWPL -02	26	45	45.3	70	53	19.0
18.	Kwality Tobacco Products	KTP -01	26	45	57.0	70	53	13.4
19.	Ratlam Wires	RWPL -02	26	45	51.1	70	53	15.8

### 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 if the Party involved wishes to be considered as project participant (Yes/No)
Government of India (Host Country)	Enercon (India) Limited (Private)	No
Government of Japan	Japan Carbon Finance, Ltd. (Private)	No

### A.4. Reference of applied methodology

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The approved consolidated baseline and monitoring methodology ACM0002, Version 6.0 (19 May, 2006) has been used. The title of the baseline and monitoring methodologies are “Consolidated baseline methodology for grid – connected electricity generation from renewable sources” and “Consolidated monitoring methodology for grid – connected electricity generation from renewable sources”.

The tool used for the project is as follows:

“Tool for the demonstration and assessment of additionality” version 3.0

References:

[http://cdm.unfccc.int/filestorage/C/D/M/CDMWF\\_AM\\_BW759ID58ST5YEEV6WUCN5744MN763/eb24\\_repan07\\_ACM0002\\_ver06\\_for\\_web.pdf?t=dDZ8bTRoNXU4fDDJREFkANTgQB3IquJNxmdQ](http://cdm.unfccc.int/filestorage/C/D/M/CDMWF_AM_BW759ID58ST5YEEV6WUCN5744MN763/eb24_repan07_ACM0002_ver06_for_web.pdf?t=dDZ8bTRoNXU4fDDJREFkANTgQB3IquJNxmdQ)

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v3.pdf>

**A.5. Crediting period of project activity**

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The length of the Crediting period of the project activity as per registered PDD is 10 years (Fixed). The crediting period start date is 17/05/2011 and length of crediting period is from 17/05/2011 to 16/05/2021 (first and last days included). This is the second monitoring period 01/11/2011 to 30/09/2012 (including first and last day) of the project activity.

**SECTION B. Implementation of project activity****B.1. Description of implemented registered project activity**

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The start date of the project activity is 30 April, 2003, which is the date of placement of purchase order for the first project in the bundle. The first machine under the project activity was commissioned on 29/07/2003 and last machine under the project activity was commissioned on 29/05/2005. The commissioning dates for all the machines included in the project activity are given in the table below:

S. No.	Name of customers	Unique Identification no.	Type of M/C	No. of M/C	Capacity (MW)	Date of Commissioning
1	Enercon Wind Farm Rajasthan	EWRL 01	0.80	30	24	29/05/2005
		EWRL 02				
		EWRL 03				
		EWRL 04				
		EWRL 05				
		EWRL 06				
		EWRL 07				
		EWRL 08				
		EWRL 09				
		EWRL 10				
		EWRL 11				
		EWRL 12				
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		EWRL 24				
		EWRL 25				
		EWRL 26				
		EWRL 27				
		EWRL 28				
		EWRL 29				
		EWRL 30				



2	Jitendra K. Newaskar (formerly Perna Pharma Intermediates Pvt. Ltd.)	PPIPL-01	0.23	1	0.23	29/03/2004
3	Modular Power	MPPL -01	0.23	1	0.23	29/03/2004
4	Vijay Traders	VT -01	0.23	1	0.23	29/03/2004
5	Vijay Developers	VD-01	0.23	1	0.23	29/03/2004
6	Vikas Agencies	VA-01	0.23	1	0.23	29/03/2004
7	G. C. Chemie Pharmie Ltd.	GCCPL -01	0.23	1	0.23	29/03/2004
8	Cooper Metals Pvt. Ltd.	CMPL-01	0.23	2	0.46	29/03/2004 & 12/06/2004
		CMPL-02				
9	Kataria Infrastructure Corporation	KIC -01	0.60	1	0.60	29/07/2003
10	Dempo Industries Pvt. Ltd. (has been de- commissioned)	DIPLG-01	0.60	1	0.60	10/03/2004
11	D.P. Power	DPP -01	0.23	1	0.23	29/07/2003
12	Kataria Infrastructure Corporation	KIC -02	0.23	1	0.23	29/07/2003
13	Kataria Wires	KWPL -02	0.23	1	0.23	29/07/2003
14	Ratlam Wires	RWPL -02	0.23	1	0.23	29/07/2003
15	Kwality Tobacco Products	KTP -01	0.23	1	0.23	29/07/2003
16	D P Power	DPP-02	0.60	1	0.60	30/06/2004
17	Unique Power Corporation	UPC-01	0.60	1	0.60	30/06/2004
18	P.V. Chandran	PVC -01	0.60	1	0.60	30/11/2003
19	Srinivaas Sirigeri	SS -01	0.60	1	0.60	03/03/2004

Enercon operation and maintenance activities are ISO 9001:2000 certified and all the events are recorded in the log book available at the project site. Referring to the data available it can be inferred that there have not been any major special events for any of the machines that are included in the project activity. As a part of regular maintenance the machines are stopped for mechanical and electrical maintenance for 16 to 18 hours annually and for visual inspection for 6 to 7 hours quarterly.

## B.2. Post registration changes

### B.2.1. Temporary deviations from registered monitoring plan or applied methodology

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There is no deviation from registered monitoring plan or applied methodology during this monitoring period.

**B.2.2. Corrections**

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There are no corrections from the registered PDD during this monitoring period.

**B.2.3. Permanent changes from registered monitoring plan or applied methodology**

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The registered monitoring plan is in line with the monitoring plan implemented for the project activity. However, to bring more clarity on the monitoring plan according to the real scenario, the other parameters as monitored along with EGy (as referred in the registered monitoring plan) have also been described in details along with the apportionment procedure followed for the project activity. The details of the apportionment procedure have been described in the section C & D.

**B.2.4. Changes to project design of registered project activity**

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The original capacity of the project was 30.59 MW at the time of project commissioning. Afterwards, from this bundle, the sub-project comprising of one WEC of 0.6 MW by Dempo Industries Pvt. Ltd. has been decommissioned and the ownership of the sub – project comprising of one WEC of 0.23 MW by Prerna Pharma Intermediates Pvt. Ltd. has been changed to Jitendra K. Newaskar. Dempo Industries Pvt. Ltd. decided to decommission this sub – project (one WEC) due to shortfall in generation of power during the project operational period. The change in ownership of this sub – project (one WEC) from M/s. Prerna Pharma Intermediates Pvt. Ltd. to M/s. Jitendra K. Newaskar was a normal business decision. As per the monitoring report, ER sheet and revised PDD version 8 submitted to UNFCCC for request for CER issuance (<http://cdm.unfccc.int/Projects/DB/SGS-KL1181738388.43/iProcess/RINA1322213407.05/view>) these two sub-projects have been excluded from the bundle and the revised capacity of this bundle is 29.76 MW.

**B.2.5. Changes to start date of crediting period**

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There are no changes to the start date of the crediting period.

**B.2.6. Types of changes specific to afforestation or reforestation project activity**

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Not applicable to the project activity.

**SECTION C. Description of monitoring system**

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Approved monitoring methodology ACM0002/ Version 06, Sectoral Scope: 1, “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”, by CDM - Meth Panel is proposed to be used to monitor the emission reductions.

This approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid, where *ex-post* determination of grid emission factor has been chosen

Since the baseline methodology is based on ex-ante determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required.

In order to determine the net electricity supplied to the grid by the project, the following procedure is followed:



All the WECs of the Project along with the other wind firms are connected to the backup/check meter at Temderai sub-station, which is further connected to the Sub-station at Amarsagar at 220 kV. The generation readings of all WECs of all the customers are collectively displayed at this Main Billing meter at 220 kV Amarsagar substation. Therefore, the main meter reading reflects the aggregate electricity supplied by all these wind farms, including the project activity. Representatives of Discom and Enercon will jointly take the main meter reading at Amarsagar and sign the meter reading on the first day of every month. Simultaneously, the joint meter reading of the backup metering system at Temderai substation will also be taken by representatives of the Discom and Enercon.

To calculate the net amount of electricity generation from each wind turbine, apportionment of this collective meter reading of the main billing meter (recorded at Main meter 1 & Main meter 2<sup>1</sup>) is done on the basis of the controller panel reading at the individual wind turbine end. This controller panel reading is recorded and maintained by Enercon.

The apportionment procedure has been explained as follows:

$EG_{JMR, Export}$	= Electricity exported, as recorded by the main meter at the substation
$EG_{JMR, Import}$	= Electricity imported, as recorded by the main meter at the substation
$EG_{Controller, Export}$	= Electricity exported by a WEC, as measured at the controller
$\Sigma EG_{Controller, Export}$	= Electricity exported by all the WECs connected to the main meter at the substation, measured at the controller of each WEC
$EG_{WEC, Export}$	= Electricity exported by a WEC to the grid, calculated
$EG_{WEC, Import}$	= Electricity imported by a WEC from the grid, calculated

Electricity exported by each WEC is apportioned on the basis of electricity export recorded at the controller of each WEC and the electricity export at the main meter as mentioned in the JMR. The export multiplication factor is calculated as follows:

$$\text{Export Multiplication factor} = EG_{JMR, Export} / \Sigma EG_{Controller, Export} \dots\dots\dots(1)$$

Therefore, the energy exported by a WEC to the grid is calculated as:

$$EG_{WEC, Export} = \text{Export Multiplication factor} \times EG_{Controller, Export} \dots\dots\dots(2)$$

As the controller meter doesn't record import, the apportioning of energy import by each WEC is also done on the basis of electricity exported recorded at the controller of each WEC and the electricity import at the main meter as mentioned in the JMR. The import multiplication factor is calculated as follows:

$$\text{Import Multiplication factor} = EG_{JMR, Import} / \Sigma EG_{Controller, Export} \dots\dots\dots(3)$$

Therefore, the energy imported by a WEC to the grid is calculated as:

$$EG_{WEC, Import} = \text{Import Multiplication factor} \times EG_{Controller, Export} \dots\dots\dots(4)$$

Hence, the net electricity exported by a WEC of the project is calculated as:

$$EG_{WEC, Export} - EG_{WEC, Import}$$

The net electricity exported by all the WECs of the project activity is calculated as:

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<sup>1</sup> Please refer to Appendix I.

$$\begin{aligned} \text{EGy} &= \Sigma \text{EG}_{\text{WEC, Export}} - \Sigma \text{EG}_{\text{WEC, Import}} \\ &= \text{EG}_{\text{Export}} - \text{EG}_{\text{Import}} \end{aligned}$$

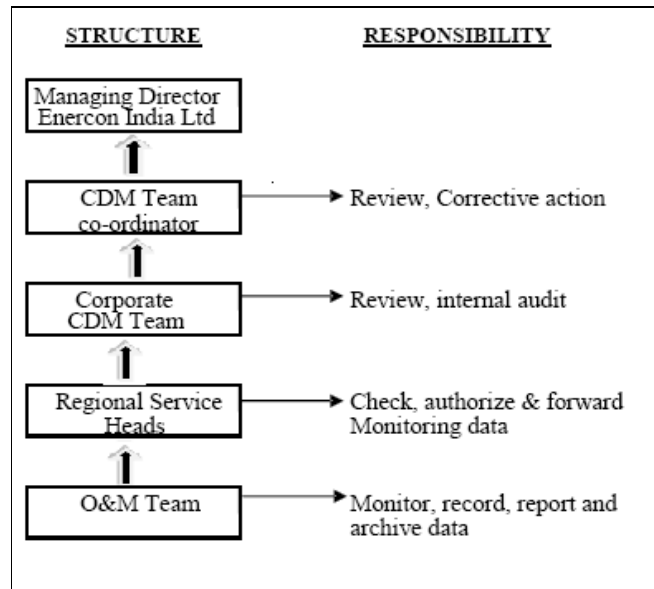
Where,

$\Sigma \text{EG}_{\text{WEC, Export}}$  = Export from all the WECs under the project activity

$\Sigma \text{EG}_{\text{WEC, Import}}$  = Import from all the WECs under the project activity

The summation is done considering the WECs which belong to the project activity.

The Project is operated and managed by Enercon (India) Ltd. According to the above mentioned procedure, the monthly credit notes are issued and the invoices are raised to the respective DISCOM and the copies are archived electronically as well as on paper. These documents are used for calculation of the emission reduction and cross checking of data. The operational and management structure implemented by Enercon is as follows:



The details of the metering arrangement have been described below:

#### Metering:

- The project along with the other wind firms are connected to grid through common metering point (backup meter) at Temderai substation and further connected to Amarsagar sub-station (EB main meter), where metering is done for billing purpose. The line diagram of the relevant metering points has been shown below as Appendix I.

#### Meter Reading:

- Representatives of Discom and Enercon will jointly take the main reading and sign the meter reading on the first day of every month at Temderai and Amarsagar substation.

- The export, import and net electricity supplied to the grid by individual customer will be sourced from the credit notes and can be cross-checked with the invoices raised to the DISCOM and will be used for calculation of emission reduction.

**Metering Equipment:**

- The meters used are Tri-vector of accuracy class 0.2 and the manufacturer is the Secure Meters Ltd. The meters are two-way meters and measure the electricity import and export.

**Meter Test Checking:**

- The main and backup/ check meters will jointly inspected/tested once in a year as per the terms of the PPA.
- The LCS meters (for panel reading) do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WECs. In case, there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system, the machine will stop working and generate the error report.

**Inspection of Energy Meters:**

- In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated. Whenever a main meter goes defective, the consumption recorded by the backup meter will be referred.
- The main and the backup metering systems will be sealed in presence of representatives of Enercon and RRVPNL/Jodhpur Discom.

**Calibration Details**

The metering equipments were inspected & calibrated by state utility. Meter details for the all the main and backup meters are as follows:-

Meter description	Serial No.	Make	Accuracy class	Metering point	Calibration before monitoring period	Calibration Due date	Latest date of calibration	Calibration Due date
Main meter (Line I)	TNU00946	Secure	0.2	Amarsagar	26-03-2011	25-03-2012	19-03-2012	18-03-2013
Backup meter (Line I)	RJB00052	Secure	0.2	Temdarai Substation	28-03-2011	27-03-2012	23-03-2012	22-03-2013
Main meter (Line II)	TNU00945	Secure	0.2	Amarsagar	26-03-2011	25-03-2012	19-03-2012	18-03-2013
Backup meter (Line II)	ABB00691	Secure	0.2	Temdarai Substation	28-03-2011	27-03-2012	23-03-2012	22-03-2013

The main and the backup meters are calibrated once each year. The LCS meters are do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WECs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. Therefore there is no data uncertainty.

**Training and maintenance:**

In order to ensure that Enercon's staffs who are positioned to take care all the activities starting from project construction to operation and maintenance, Enercon Training Academy provides need based periodical training to meet the requirements of the project. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all the trainees. The training facility is located at Daman and is fully functional and equipped with qualified trainers, training equipments, classrooms and hostel facilities.

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

<b>Data/Parameter</b>	$EF_{OM,y}$						
<b>Unit</b>	tCO <sub>2</sub> e/MWh						
<b>Description</b>	Operating Margin Emission Factor of Northern Regional Electricity Grid						
<b>Source of data</b>	<p>“CO<sub>2</sub> Baseline Database for Indian Power Sector”, version 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO<sub>2</sub> Baseline Database for Indian Power Sector”, version 01.1 is available at <a href="http://www.cea.nic.in">www.cea.nic.in</a>.</p>						
<b>Value(s) applied</b>	<table border="1"> <tr> <td>2002 – 03</td><td>0.9993</td></tr> <tr> <td>2003 – 04</td><td>0.9869</td></tr> <tr> <td>2004 – 05</td><td>0.9756</td></tr> </table>	2002 – 03	0.9993	2003 – 04	0.9869	2004 – 05	0.9756
2002 – 03	0.9993						
2003 – 04	0.9869						
2004 – 05	0.9756						
<b>Purpose of data</b>	Calculation of Baseline Emissions						
<b>Additional comment</b>	None						

<b>Data/Parameter</b>	$EF_{BM,y}$		
<b>Unit</b>	tCO <sub>2</sub> e/MWh		
<b>Description</b>	Build Margin Emission Factor of Northern Regional Electricity Grid		
<b>Source of data</b>	<p>“CO<sub>2</sub> Baseline Database for Indian Power Sector”, version 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO<sub>2</sub> Baseline Database for Indian Power Sector”, version 01.1 is available at <a href="http://www.cea.nic.in">www.cea.nic.in</a>.</p>		
<b>Value(s) applied</b>	<table border="1"> <tr> <td>2004 – 05</td><td>0.5335</td></tr> </table>	2004 – 05	0.5335
2004 – 05	0.5335		
<b>Purpose of data</b>	Calculation of Baseline Emissions		
<b>Additional comment</b>	None		



<b>Data/Parameter</b>	$EF_{CM,y}$
<b>Unit</b>	tCO <sub>2</sub> e/MWh
<b>Description</b>	Combined Margin Emission Factor of Northern Regional Electricity Grid
<b>Source of data</b>	“CO <sub>2</sub> Baseline Database for Indian Power Sector”, version 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India. The “CO <sub>2</sub> Baseline Database for Indian Power Sector” is available at <a href="http://www.cea.nic.in">www.cea.nic.in</a> .
<b>Value(s) applied</b>	0.87387
<b>Purpose of data</b>	Calculation of Baseline Emissions
<b>Additional comment</b>	None

## D.2. Data and parameters monitored

<b>Data/Parameter</b>	<b>EG<sub>y</sub></b>
<b>Unit</b>	MWh (Mega-Watt hour)
<b>Description</b>	Net electricity supplied to the grid by the Project
<b>Measured/Calculated/Default</b>	Calculated
<b>Source of data</b>	Calculated as the difference of EG <sub>Export</sub> and EG <sub>Import</sub> and sourced from the monthly credit notes. This value can be cross-checked from the invoices raised to the DISCOM.
<b>Value(s) of monitored parameter</b>	40320.621 MWh
<b>Monitoring equipment</b>	Calculated as per the procedures shown in section C.
<b>Measuring/Reading/Recording frequency</b>	Monthly basis
<b>Calculation method (if applicable)</b>	The net electricity supply is calculated as follows:  = (EG <sub>Export</sub> – EG <sub>Import</sub> )  This value is directly used for calculation of emission reduction. Detailed procedures have been described in section C.
<b>QA/QC procedures</b>	Details of the QA/QC procedures have been described in section C.  The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
<b>Purpose of data</b>	Calculation of Baseline Emissions
<b>Additional comment</b>	None



<b>Data/Parameter</b>	<b>EG<sub>JMR, Export</sub></b>
<b>Unit</b>	MWh (Mega-Watt hour)
<b>Description</b>	Electricity exported as recorded by the main meter at EB substation.
<b>Measured/Calculated /Default</b>	Measured
<b>Source of data</b>	Export value from the Joint Meter reading taken at the substation in the presence of Enercon representatives and the State Utility representatives.
<b>Value(s) of monitored parameter</b>	181531.750 MWh
<b>Monitoring equipment</b>	<p>Line I Type- Tri-vector Meter Accuracy Class-0.2 Serial Number of Main Meter: TNU00946 Serial Number of Backup Meter: RJB00052</p> <p>Line II Type- Tri-vector Meter Accuracy Class-0.2 Serial Number of Main Meter: TNU00945 Serial Number of Backup Meter: ABB00691</p> <p>Line I and Line II Main Meter Last date of Test-19 March 2012 Validity of Test-18 March 2013</p> <p>Line I and Line II Check Meter Last date of Test-23 March 2012 Validity of Test-22 March 2013</p> <p>Frequency of Calibration- Annual</p>
<b>Measuring/Reading/ Recording frequency</b>	Measured in continuous basis and recorded on Monthly basis
<b>Calculation method (if applicable)</b>	Not Applicable
<b>QA/QC procedures</b>	<p>The meters will be calibrated once in a year. Details of the QA/QC procedures have been described in section C.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
<b>Purpose of data</b>	Calculation of Baseline emissions
<b>Additional comment</b>	None



<b>Data/Parameter</b>	<b>EG<sub>JMR, Import</sub></b>
<b>Unit</b>	MWh (Mega-Watt hour)
<b>Description</b>	Electricity import as recorded by the main meter at EB substation.
<b>Measured/Calculated/Default</b>	Measured
<b>Source of data</b>	Import value from the Joint Meter reading taken at the substation in the presence of Enercon representatives and the State Utility representatives.
<b>Value(s) of monitored parameter</b>	308.500 MWh
<b>Monitoring equipment</b>	<p>Line I Type- Tri-vector Meter Accuracy Class-0.2 Serial Number of Main Meter: TNU00946 Serial Number of Backup Meter: RJB00052</p> <p>Line II Type- Tri-vector Meter Accuracy Class-0.2 Serial Number of Main Meter: TNU00945 Serial Number of Backup Meter: ABB00691</p> <p>Line I and Line II Main Meter Last date of Test-19 March 2012 Validity of Test-18 March 2013</p> <p>Line I and Line II Check Meter Last date of Test-23 March 2012 Validity of Test-22 March 2013</p> <p>Frequency of Calibration- Annual</p>
<b>Measuring/Reading/Recording frequency</b>	Measured in continuous basis and recorded on Monthly basis
<b>Calculation method (if applicable)</b>	Not Applicable
<b>QA/QC procedures</b>	<p>The meters will be calibrated once in a year. Details of the QA/QC procedures have been described in section C.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
<b>Purpose of data</b>	Calculation of Baseline emissions
<b>Additional comment</b>	None



<b>Data/Parameter</b>	<b><math>\Sigma</math>EG</b> Controller, Export
<b>Unit</b>	MWh (Mega-Watt hour)
<b>Description</b>	Electricity exported by all the WECs connected to the main meter at the substation, as measured at the controller panel.
<b>Measured/Calculated /Default</b>	40834.082 MWh
<b>Source of data</b>	This value is monitored on continuous basis by online monitoring system at the site and can also be seen at the electronic panel inside the WTG tower.
<b>Value(s) of monitored parameter</b>	As measured
<b>Monitoring equipment</b>	The LCS meters (for panel reading) do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WECs. In case, there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system, the machine will stop working and generate the error report.
<b>Measuring/Reading/ Recording frequency</b>	Monthly basis; This value is monitored on continuous basis by online monitoring system at the site.
<b>Calculation method (if applicable)</b>	Not Applicable
<b>QA/QC procedures</b>	<p>The LCS meters (for panel reading) do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WECs. In case, there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system, the machine will stop working and generate the error report.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
<b>Purpose of data</b>	Calculation of Baseline emissions
<b>Additional comment</b>	None





<b>Data/Parameter</b>	<b>EG<sub>Export</sub></b>
<b>Unit</b>	MWh (Mega-Watt hour)
<b>Description</b>	Electricity exported to the grid by the project activity
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	The calculation procedure has been shown in the section C.
<b>Value(s) of monitored parameter</b>	40392.725 MWh
<b>Monitoring equipment</b>	Calculated as per the procedures shown in section C.
<b>Measuring/Reading/Recording frequency</b>	Monthly basis
<b>Calculation method (if applicable)</b>	Calculated as per the procedures shown in section C.
<b>QA/QC procedures</b>	No separate QA/QC procedures will be followed.  The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
<b>Purpose of data</b>	Calculation of Baseline emissions
<b>Additional comment</b>	None

<b>Data/Parameter</b>	<b>EG<sub>Import</sub></b>
<b>Unit</b>	MWh (Mega-Watt hour)
<b>Description</b>	Electricity Import from the grid by the project activity
<b>Measured/Calculated /Default</b>	Calculated
<b>Source of data</b>	The calculation procedure has been shown in the section C.
<b>Value(s) of monitored parameter</b>	72.104 MWh
<b>Monitoring equipment</b>	Calculated as per the procedures shown in section C.
<b>Measuring/Reading/Recording frequency</b>	Monthly basis
<b>Calculation method (if applicable)</b>	Calculated as per the procedures shown in section C.
<b>QA/QC procedures</b>	No separate QA/QC procedures will be followed.  The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
<b>Purpose of data</b>	Calculation of Baseline emissions
<b>Additional comment</b>	None

**D.3. Implementation of sampling plan**

&gt;&gt;

Not applicable to the project activity.

**SECTION E. Calculation of emission reductions or GHG removals by sinks****E.1. Calculation of baseline emissions or baseline net GHG removals by sinks**

&gt;&gt;

As described in the registered PDD, the baseline emission ( $BE_y$ ) =  $EG_y * EF_y$ 

Where,

**BE** is baseline emissions in year y, tCO<sub>2</sub>e**EG<sub>y</sub>** is the net electricity supplied to the grid in year y and is sourced from the credit notes and can be cross-checked with the invoices raised to the DISCOM.**EF<sub>y</sub>** is the CO<sub>2</sub> emission factor of the grid (0.87387 tCO<sub>2</sub>e/ MWh; fixed ex-ante).

Baseline Emission reduction calculation for the period 01/11/2011 to 30/09/2012:

$$\begin{aligned} \text{Baseline Emission Reductions (BE}_y) &= 40,320.621 \text{ (MWh)} * 0.87387 \text{ (tCO}_2\text{e/ MWh)} \\ &= \mathbf{35,235 \text{ tCO}_2\text{e}} \end{aligned}$$

Therefore, total baseline emissions are **35,235 tCO<sub>2</sub>**.

Total project emissions: Zero

Total leakages: Zero

$$\begin{aligned} \text{Total Emission reductions, ER} &= \text{Baseline Emissions} - \text{Project Emissions} - \text{Leakages} \\ &= \mathbf{35,235} - 0 - 0 \\ &= \mathbf{35,235 \text{ tCO}_2} \end{aligned}$$

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

&gt;&gt;

The project activity uses wind power to generate electricity and hence, the emissions from the project activity have been taken as zero.

$$PE_y = 0$$

**E.3. Calculation of leakage**

&gt;&gt;

No leakage has been considered from the project activity as per approved methodology ACM0002.

$$\text{Hence, } Ly = 0$$

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

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2e</sub> )	Project emissions or actual net GHG removals by sinks (tCO <sub>2e</sub> )	Leakage (tCO <sub>2e</sub> )	Emission reductions or net anthropogenic GHG removals by sinks (tCO <sub>2e</sub> )
01/11/2011 to 30/09/2012	35,235	0	0	35,235
<b>Total</b>	<b>35,235</b>	<b>0</b>	<b>0</b>	<b>35,235</b>

**E.5. Comparison of actual emission reductions or net anthropogenic 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 (tCO <sub>2e</sub> )	45,862 (334 days equivalent of annually 50,119 emission reductions estimated in the registered PDD)	35,235

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

&gt;&gt;

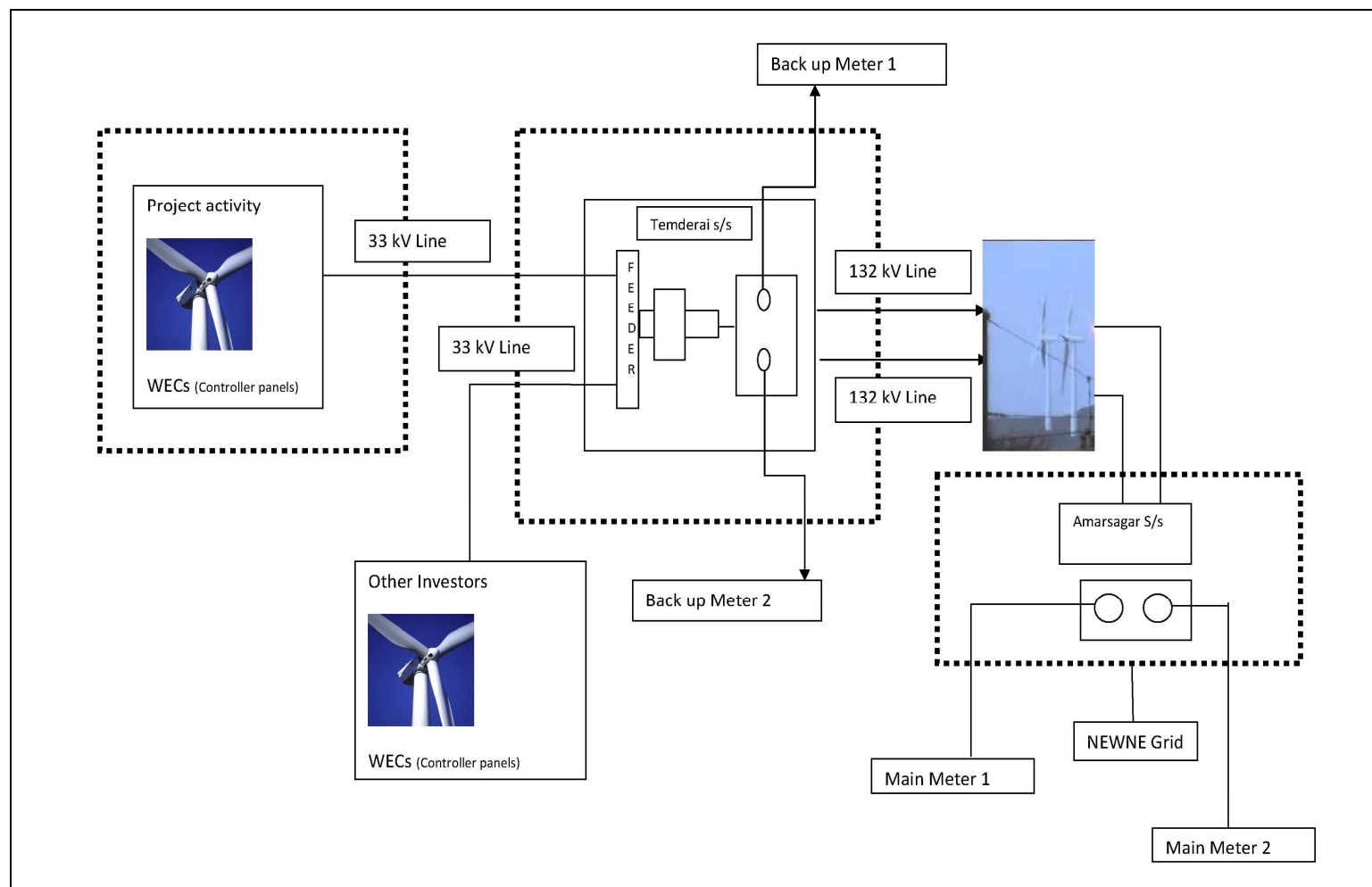
There is change of 23.17 % (downside) in the expected and actual emission reductions. The difference in the total CERs is due to low wind availability leading to low plant load factor.



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**History of the document**

<b>Version</b>	<b>Date</b>	<b>Nature of revision</b>
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
<b>Decision Class:</b> Regulatory <b>Document Type:</b> Form <b>Business Function:</b> Issuance		

**Appendix I: Line Diagram Showing Relevant Metering Points**



## Appendix 2: Net Electricity Exported to Grid (EGy)

Sr No	Name of the Customer	M/C Model	Capacity of M/C	No. of M/C	Capacity (MW)	Nov-11			Dec-11		
						EG <sub>Export</sub>	EG <sub>Import</sub>	EGy	EG <sub>Export</sub>	EG <sub>Import</sub>	EGy
1	Enercon Wind Farm (Rajasthan) Pvt. Ltd.	E-48	0.8	30	24	771543	14510	757033	1680812	9131	1671681
2	Modular Power	E-30	0.23	1	0.23	8492	160	8332	19247	105	19142
3	Vijay Traders	E-30	0.23	1	0.23	7649	144	7505	16845	92	16753
4	Vijay Developers	E-30	0.23	1	0.23	8377	158	8219	18088	98	17990
5	Vikas Agencies	E-30	0.23	1	0.23	7559	142	7417	18116	98	18018
6	G. C. Chemie Pharmie Ltd.	E-30	0.23	1	0.23	8963	169	8794	18882	103	18779
7	Cooper Metals Pvt. Ltd.	E-30	0.23	2	0.46	16571	312	16259	36590	199	36391
8	Kataria Infrastructure Corporation	E-40	0.6	1	0.6	10901	205	10696	19827	108	19719
9	D.P.Power	E-30	0.23	1	0.23	7851	148	7703	14469	79	14390
10	Kataria Infrastructure Corporation	E-30	0.23	1	0.23	7153	135	7018	13614	74	13540
11	Kataria Wires	E-30	0.23	1	0.23	7071	133	6938	13476	73	13403
12	Ratlam Wires	E-30	0.23	1	0.23	7021	132	6889	13275	72	13203
13	Kwality Tobacco Products	E-30	0.23	1	0.23	7503	141	7362	14339	78	14261
14	D P Power	E-40	0.6	1	0.6	12881	242	12639	32701	178	32523
15	Unique Power Corporation	E-40	0.6	1	0.6	14817	279	14538	33766	183	33583
16	P.V.Chandran	E-40	0.6	1	0.6	11124	209	10915	27713	151	27562
17	Srinivaas Sirigeri	E-40	0.6	1	0.6	11422	215	11207	30147	164	29983
<b>Total Capacity (MW)</b>			-	<b>47.00</b>	<b>29.76</b>	<b>926898</b>	<b>17434</b>	<b>909464</b>	<b>2021907</b>	<b>10986</b>	<b>2010921</b>



Jan-12			Feb-12			Mar-12			Apr-12			May-12		
EG Export	EG Import	EGy	EG Export	EG Import	EGy	EG Export	EG Import	EGy	EG Export	EG Import	EGy	EG Export	EG Import	EGy
1439046	5867	1433179	1885944	3418	1882526	2323634	4813	2318821	2380542	3490	2377052	3391700	1544	3390156
17800	73	17727	22116	40	22076	26664	55	26609	25951	38	25913	35442	16	35426
15832	65	15767	19220	35	19185	24535	52	24483	24225	36	24189	33564	15	33549
16439	67	16372	20203	37	20166	22860	47	22813	23644	35	23609	33916	15	33901
15705	64	15641	20147	37	20110	26664	55	26609	24255	36	24219	34109	16	34093
17485	71	17414	22923	42	22881	24826	51	24775	0	0	0	0	0	0
32613	133	32480	43570	80	43490	25583	54	25529	52668	77	52591	30540	14	30526
19601	80	19521	30224	55	30169	266986	553	266433	53080	78	53002	100523	46	100477
15009	61	14948	15582	28	15554	47985	99	47886	24114	35	24079	40439	18	40421
13994	57	13937	16544	30	16514	24520	51	24469	22993	34	22959	41098	19	41079
13889	57	13832	15585	28	15557	21301	44	21257	22696	33	22663	40388	18	40370
14280	58	14222	15536	28	15508	3884	8	3876	22828	33	22795	40814	19	40795
14907	61	14846	16899	31	16868	24174	50	24124	0	0	0	35836	16	35820
30995	125	30870	39785	72	39713	122798	254	122544	52808	77	52731	86729	39	86690
31528	129	31399	42020	76	41944	185340	384	184956	56380	83	56297	89748	41	89707
23703	97	23606	32234	58	32176	21770	45	21725	40357	59	40298	90300	41	90259
20937	85	20852	35197	64	35133	42383	88	42295	52754	77	52677	86364	39	86325
<b>1753763</b>	<b>7150</b>	<b>1746613</b>	<b>2293729</b>	<b>4159</b>	<b>2289570</b>	<b>3235907</b>	<b>6703</b>	<b>3229204</b>	<b>2879295</b>	<b>4221</b>	<b>2875074</b>	<b>4211510</b>	<b>1916</b>	<b>4209594</b>



Jun-12			Jul-12			Aug-12			Sep-12			Total		
EG <sub>Export</sub>	EG <sub>Import</sub>	EGy	EG <sub>Export</sub>	EG <sub>Import</sub>	EGy	EG <sub>Export</sub>	EG <sub>Import</sub>	EGy	EG <sub>Export</sub>	EG <sub>Import</sub>	EGy	ΣΓΕ <sub>ΧΕΩ</sub> τροπξΕ	ΣΓΕ <sub>τοοπι</sub> ΧΕΩ	EGy
7266334	1217	7265117	6927409	733	6926676	3317044	5559	3311485	1550881	8482	1542399	32934889	58764	32876125
77014	13	77001	71743	8	71735	35247	59	35188	18241	100	18141	357957	667	357290
73582	12	73570	69115	7	69108	34053	57	33996	16131	88	16043	334751	603	334148
75055	13	75042	69479	7	69472	35386	59	35327	17070	93	16977	340517	629	339888
66915	11	66904	68441	7	68434	35044	59	34985	15893	87	15806	332848	612	332236
0	0	0	0	0	0	0	0	0	0	0	0	93079	436	92643
135554	23	135531	149871	16	149855	75110	126	74984	35496	194	35302	634166	1228	632938
187975	31	187944	172228	18	172210	91581	153	91428	44064	241	43823	996990	1568	995422
63471	11	63460	56458	6	56452	30948	52	30896	14898	81	14817	331224	618	330606
65616	11	65605	56554	6	56548	30940	52	30888	15164	83	15081	308190	552	307638
64974	11	64963	57106	6	57100	30655	51	30604	15112	83	15029	302253	537	301716
65257	11	65246	59063	6	59057	12990	22	12968	15279	84	15195	270227	473	269754
63394	11	63383	56193	6	56187	28995	49	28946	14262	78	14184	276502	521	275981
135594	23	135571	149717	16	149701	72656	122	72534	29330	160	29170	765994	1308	764686
105235	18	105217	104216	11	104205	52819	89	52730	30874	169	30705	746743	1462	745281
183400	31	183369	163170	17	163153	77799	130	77669	43833	240	43593	715403	1078	714325
148665	25	148640	143720	15	143705	41755	70	41685	37648	206	37442	650992	1048	649944
<b>8778035</b>	<b>1472</b>	<b>8776563</b>	<b>8374483</b>	<b>885</b>	<b>8373598</b>	<b>4003022</b>	<b>6709</b>	<b>3996313</b>	<b>1914176</b>	<b>10469</b>	<b>1903707</b>	<b>40392725</b>	<b>72104</b>	<b>40320621</b>