



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

MONITORING REPORT

Title of the project activity	Kuyucak 25.6 MW Wind Farm Project, Turkey
Reference number of the project activity	GS576
Version number of the monitoring report	1.1
Completion date of the monitoring report	24/01/2013
Registration date of the project activity	15/04/2011
Monitoring period number and duration of this monitoring period	2 01/01/2012 - 31/12/2012 (first and last days included)
Project participant(s)	Alize Enerji Elektrik Üretim A.Ş. Mavi Consultants
Host Party(ies)	Turkey
Sectoral scope(s) and applied methodology(ies)	Energy Industries – Renewable Sources ACM0002, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 07
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	71,578 tCO ₂
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	46,893 tCO ₂

Prepared by:



SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The *Kuyucak 25.6 MW Wind Farm Project, Turkey*, hereafter referred to as the Project, involves a grid-connected onshore wind farm project in Manisa Province, consisting of 14 wind turbines with a total installed power generation capacity of 25.6 MW.

- 1. Purpose of the project activity and the measures taken to reduce greenhouse gas emissions:**
 The Project aims to generate electricity from wind energy and feed it to the national electricity grid. The national electricity settlement centre manages supply of power plants such that the power generation of thermal power plant-dominated generation system is reduced at the same amount the Project activity exports power. This ensures that the emissions are actually decreased.
- 2. Brief description of the installed technology and equipments:** The wind-driven blades are connected to an electricity generator, which produces electrical energy and supplies it to the grid without storage. When the wind speed is low, the wind farm might draw some electricity from the grid. Enercon, a German turbine manufacturer, has been selected as technology provider due to the quality of its products in terms of high reliability, grid friendliness, low maintenance requirements and low noise levels.
- 3. Relevant dates for the project activity:** The Project has started operating in November 2010. The first verification ended on 31.12.2011 and this monitoring period starts right after this date, 01.01.2012.
- 4. Total emission reductions achieved in this monitoring period:** 46,893 tCO₂.

A.2. Location of project activity

The project is located in Kuyucak region, Demirtaş village (distance 1.5 km), Akçakırsak village (distance 3 km), Gölcük town (distance 2.1 km), Kocaiskan village (3.4 km), Kırkağaç town (distance 35 km), Manisa province (distance 100 km).

The exact coordinates of the turbines are as the following¹:

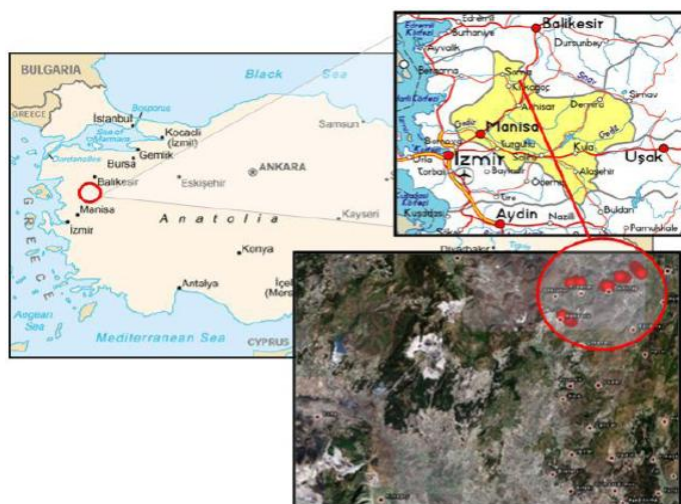


Table 1. Turbine Coordinates

Turbine Nr	E	N	E	N
	UTM Coordinates		Longitude / Latitude	
T1	580524	4351573	27° 56' 02"	39° 18' 35"
T2	580612	4351382	27° 56' 06"	39° 18' 29"
T3	581936	4352619	27° 57' 02"	39° 18' 09"
T4	582033	4352407	27° 57' 05"	39° 19' 02"
T5	582174	4352226	27° 57' 12"	39° 18' 56"
T6	582315	4352010	27° 57' 17"	39° 18' 49"
T7	582446	4351920	27° 57' 23"	39° 18' 46"

¹ Source: Generation License



T8	575661	4347256	27° 52' 38"	39° 16' 17"
T9	579189	4350599	27° 55' 06"	39° 18' 04"
T10	579009	4350576	27° 54' 59"	39° 18' 03"
T11	578880	4350549	27° 54' 53"	39° 18' 03"
T12	575551	4347387	27° 52' 33"	39° 16' 21"
T13	575434	4347540	27° 52' 28"	39° 16' 26"
T14	575230	4347589	27° 52' 20"	39° 16' 28"

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)
Turkey (host)	Alize Enerji Elektrik Üretim A.Ş. (private entity)	No
Turkey (host)	Mavi Consultants (private entity)	No

The name and contact information of responsible person(s)/entity(ies) are given below:

Name	Role and Responsibility	Contact Information
Salih Uysal, Managing Director, Demirer Enerji	Proper implementation of the monitoring plan and management of the monitoring and verification procedures in the name of the Project owner.	Alize Enerji Elektrik Üretim A.S. Mazhar Osman Sok. 9/1 Feneryolu, Kadıköy – Istanbul, TURKEY. Tel: +90 216 3364223 Fax: +90 216 3364223
Yagmur Karabulut, Mavi Consultants	Mavi Consultants is assigned by the Project owner as carbon consultant for the completion of the monitoring report and support during verification.	Mavi Consultants Kalamis Fener C. Tevfik Paşa S. 12/1 D.9 Fenerbahçe Mah. Kadıköy, Istanbul – TURKEY Tel: +90 216 3370659 Fax: +90 216 3370662

A.4. Reference of applied methodology²

- ACM0002, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” Version 07;
- “Tool to calculate the emission factor for an electricity system”, Version 01.1;
- “Tool for the demonstration and assessment of additionality”, Version 05.2.

A.5. Crediting period of project activity

Type of crediting period:	Renewable
Start date:	11.11.2010
Length:	7 years

² <http://cdm.unfccc.int/methodologies/PAMethodologies/approved>

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

The Project has started its official operations on 11.11.2010 with the approval of relevant authorities. The test operation has started before this date. At the same date, the Project was registered at the TEIAS' online financial settlement system (PMUM). Therefore, the crediting period conservatively starts on this date. The Project consists of one site and of two phases. The overview is given below:

Table 2. Project Phases

Project Phase	Commissioning Date	Added Capacity [MW]	Total Capacity [MW]
Phase 1: License number of the turbines: T8, T12, T13, T14	11.11.2010	2 MW x 4 = 8 MW	8
Phase 2: License number of the turbines: T1, T2, T3, T4, T5, T6, T7, T9, T10, T11	09.12.2010	2 MW x 8 + 0.8 MW x 2 = 17.6 MW	25.6

The installation is fully completed and the Project is in full commercial operation. There are no significant overhaul times, downtimes of equipment, exchange of equipment or any other similar special event.

The main equipment used in the Project is wind turbines with the following specifications;

Table 3. The technical details of the wind turbines used³

Manufacturer	Enercon
Type of Turbines Used	E70, 2000 kW each E44, 800 kW each
Number of Turbines	12 x E70 2 x E44
Specifications	Gearless, variable speed, variable pitch control. Rotor Diameter: 71 m (E70), 44 m (E44). Rotational speed: 6-21.5 rpm (E70), 12-34 rpm (E44) Cut-out wind speed: 28-34 m/s Remote monitoring: Enercon SCADA
Connection	154 kV high voltage to Soma B transformer station

When the wind speed is low, the wind farm will draw some electricity from the grid, which has to be produced partly by fossil fuel fired power plants. Although power augmentation during wind fluctuations may be necessary, these amounts are negligible and are already accounted for by considering only the net electricity generation of the Project.

B.2. Post registration changes

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

Temporary deviations from monitoring plan or applied methodology: N/A

For temporary or permanent monitoring plan deviations of individual Gold Standard sustainable development indicators, please refer to the ANNEX I of this report.

Forward Action Requests: The following issues have been raised during the Project validation, registration or verification phases;

³ Source: Wind turbine manufacturer's web site (www.enercon.de)

By:	Forward Request	Explanation of the Project Proponent
Gold Standard	<p>FAR#1: According to the bird migration map of Turkey (prepared by the Society of Nature which is a designated partner of Bird Life International) and based on the other literature findings, the project location is on a secondary (tali) migration route. Hence, a comprehensive ornithology study shall be conducted by an ornithologist with competent background and expertise prior to next verification. The study shall take into account of the following risk factors at minimum and shall include more other factors if needed:</p> <ul style="list-style-type: none"> - Migration factor - Bird species (both creeping birds (migration and local) and active migrating birds) - Bird flying figure/style - Turbine location - Meteorological factors (wind direction and other effective factors) <p>The study shall include a literature review together with site surveys and methodology used shall be explicitly presented. Site survey shall be well planned according to migration seasons with adequate number of days allowing observation of representative bird activities. The findings shall be precisely reported including time, species types and number of species and location/coordinates. Based on the study findings, a discussion and recommendations section shall be given at the end of the report and recommended mitigation measures shall be well discussed.</p>	<p>An ornithological report is prepared by a third party on October 2012⁴ based on the survey made during Spring 2012. According to the ornithological study, it is concluded that:</p> <ul style="list-style-type: none"> • The project is away from the major and minor migration routes. • An additional survey in autumn is not necessary. • The total number of migrant birds is very low and therefore no collision risk is calculated. • The estimated number of resident birds colliding with the turbines were calculated to be less than one bird (0.0003 birds) per year and can be ignored.
Gold Standard	<p>FAR#2: During the next verification site visit, verification DOE shall interview locals living in the vicinity of the project in order to gain feedback on bird activities including bird strikes and deaths if any occurred due to the project turbines.</p>	<p>Please refer to the verification report.</p>

B.2.2. Corrections

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

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

Permanent deviations from monitoring plan or applied methodology: The data reading system of TEIAS has changed from physical site visits to an online remote data reading system, OSOS. With the new system, power consumption and generation data of the Project are collected by TEIAS electronically, without any intervention by the Project owner.

⁴ The ornithological study is submitted to the DOE.



This deviation is applied during this monitoring period and is of permanent nature. It is out of control of the Project owner and does *not* lead to any incompatibility with the applied methodology and tools. This change is not limited to the Project activity only and is general, the reasons of which are not known to the Project owner. It has no (or positive) impacts on data quality; therefore the conservativeness of the monitoring plan is not compromised.

In the actual application of the monitoring plan, there will be no TEIAS protocols anymore which was prepared and signed monthly on site by TEIAS personnel. This does not have significant impact, as the data used for calculations are extracted from the PMUM reports, rather than protocols.

Details of this change are provided in Section D.2, monitoring parameter “ID.1 Annual net electricity amount fed to the grid by the project activity”.

For temporary or permanent monitoring plan deviations of individual Gold Standard sustainable development indicators, please refer to the ANNEX I of this report.

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

There have not been any changes concerning the project design of registered project activity.

B.2.5. Changes to start date of crediting period

There have not been any changes concerning the start date of crediting period.

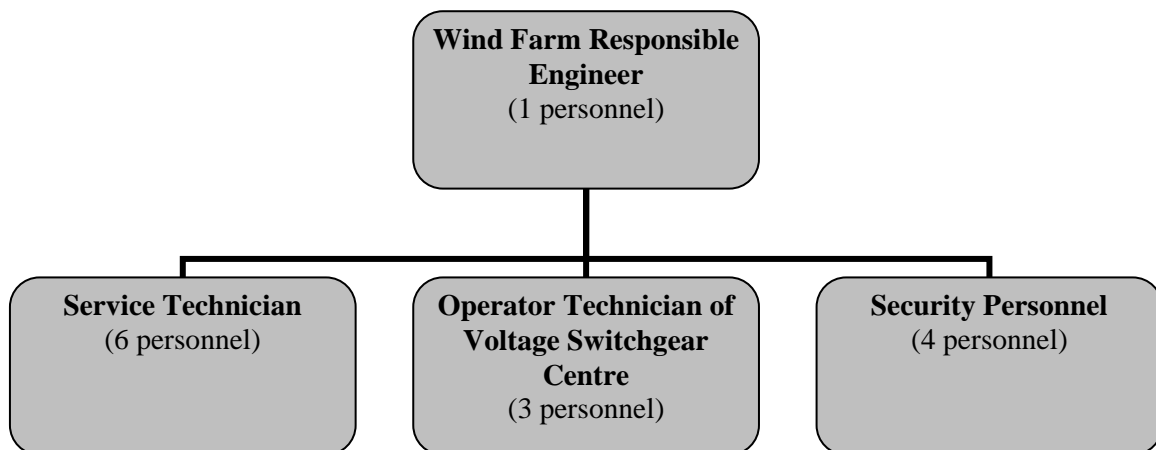
B.2.6. Types of changes specific to afforestation or reforestation project activity

N/A

SECTION C. Description of monitoring system

The monitoring plan involves the determination of the baseline emissions occurring within the project boundary during the crediting period. As the project boundary is defined as the national grid of Turkey, the baseline emissions from electricity generation activities in Turkey are calculated and monitored based on national official data.

Organizational structure⁵:



Responsibilities:

The *Managing Director* of Demirer Enerji (mother company of the Project) is responsible for the information flow and monitoring procedures in the name of the Project owner. These responsibilities include:

- Ensuring the information flow between the Project owner company and the DOE,
- Proper implementation of the monitoring plan,
- Management of the monitoring and verification procedures.

For monitoring-related tasks, the Wind Farm Responsible Engineer is responsible for management and organization of trainings and carrying out data handling.

Activities related to invoicing and human resources are managed by Demirer Enerji.

Mavi Consultants supports the Project owner in the preparation of the monitoring report and its verification.

Information flow:

The power generation data are stored by PMUM, the financial settlement centre of TEIAS (the national grid operator). The website of PMUM (<http://dgpys.teias.gov.tr/dgpys>) is accessible by the Project owner with their unique user ID and password. Once accessed, the Project owners are able to call electricity generation and consumption reports of their own projects. The same reports are used by the Project owner

⁵ Please note that all of the Service Technicians are part-time employees of the Project since they also work in a nearby wind farm by the same Project owner.

for invoicing purposes. The electricity generation data are reported on a monthly basis. The procedure involves the following tasks:

1. Accessing the website of PMUM (<http://dgpys.teias.gov.tr/dgpys>) using the user ID and password assigned to the Project owner,
2. Obtaining the electricity generation and consumption reports, for each month in the monitoring period,
3. Storing these monthly reports in electronic format (*.pdf or print-screen) and in printed hardcopies.

Data recording and aggregation:

The block diagram of the electricity circuit system is provided to the DOE separately.

There are two measurement devices; a primary measurement device and a secondary (i.e. back-up or check-meter) measurement device for quality assurance, to be used if the primary meter fails. Both the primary and back-up measurement devices measure and store the aggregate total electricity import and export for the whole Project in real-time. The Enercon SCADA system also stores various data (e.g. electricity generated by each turbine, energy supplied etc.) electronically.

The invoices are kept by the Project owner as hardcopies. Furthermore, the PMUM system stores the reports electronically, which is accessible to the Project owner whenever necessary.

After the monthly reports are obtained from PMUM, data are aggregated using a separate spreadsheet. The monthly generation and consumption data are entered to the spreadsheet, which automatically calculates the emission reductions during the monitoring period. This spreadsheet file is attached in the *ANNEX III* of this report. The procedure of data generation, aggregation, calculation and reporting are managed by the responsible people stated above.

Emergency procedures for the monitoring system:

In case of an organisational change within the Project owner, a qualified person is or will be assigned for carrying out and management of the monitoring and verification procedures.

In case of a fire, earthquake or other similar emergency situation, the electricity data after the settlement with TEIAS will be valid, i.e. the electricity generation and consumption figures used for invoicing purposes during or after the emergency will be used for the calculation of emission reductions.

In case the PMUM report cannot be reached online, the monthly generation protocols signed by both the Project owner and TEIAS will be used. These protocols are the source of the PMUM data and provide the same values, under normal circumstances, in hardcopy format. Therefore this is conservative.

Although SCADA data are not used for monitoring purposes, they are of high quality and can principally be used for monitoring purposes in case of emergencies conservatively.

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

Data / Parameter:	Combined Margin Emission Factor
Unit:	tCO₂/MWh
Description:	The combined margin emission factor is the weighted average of the operating and build margins and describes the emission factor of the baseline scenario.
Source of data:	Baseline calculations in the PDD
Value(s) applied :	0.635
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	The GHG emission reductions of the Project will be calculated by multiplying the ex-ante combined margin emission factor with the net electricity exported.

Data / Parameter:	Leakage
Unit:	tCO₂
Description:	Leakage is emissions arising due to activities such as power plant construction, fuel handling and land inundation.
Source of data:	The baseline methodology suggests not considering the leakage for this technology.
Value(s) applied :	0
Purpose of data:	Calculation of leakage
Additional comment:	

Data / Parameter:	Project Emissions
Unit	tCO₂
Description:	Project emissions involve direct emissions (such as fossil fuel consumption of construction equipment or vehicles for on-going operations and maintenance) by the Project activity.
Source of data:	This is suggested by the baseline methodology, and the quantity of fossil fuels used for the Project Activity is negligibly small.
Value(s) applied :	0
Purpose of data:	Calculation of project emissions or actual net GHG removals by sinks
Additional comment:	There is a diesel generator in the Project for emergency cases. This generator is only used for covering the electricity need of the control building on site, when the grid is offline. Therefore its use is very limited and the related emissions are negligible. This is in agreement with the used UNFCCC methodology.

D.2. Data and parameters monitored

Data / Parameter:	ID.1 Annual net electricity amount fed to the grid by the project activity (EG_v)
Unit:	MWh
Description:	The net electricity generated by the Project during the monitoring

	period																		
Measured /Calculated /Default:	Measured																		
Source of data:	<p>The PMUM website (http://dgpys.teias.gov.tr/dgpys).</p> <p>The data imported from this website are read from the primary measurement device (or the back-up device in case the primary device is inaccurate, malfunctioning etc.)</p>																		
Value(s) of monitored parameter:	<p>Net electricity generation of the Project activity is as the following:</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Start date</th> <th>End date</th> <th>Net power generation [kWh]</th> </tr> </thead> <tbody> <tr> <td>2012</td> <td>01.01.2012</td> <td>31.12.2012</td> <td>73,847,392 kWh</td> </tr> <tr> <td>Total</td> <td>01.01.2012</td> <td>31.12.2012</td> <td>73,847,392 kWh</td> </tr> </tbody> </table>	Year	Start date	End date	Net power generation [kWh]	2012	01.01.2012	31.12.2012	73,847,392 kWh	Total	01.01.2012	31.12.2012	73,847,392 kWh						
Year	Start date	End date	Net power generation [kWh]																
2012	01.01.2012	31.12.2012	73,847,392 kWh																
Total	01.01.2012	31.12.2012	73,847,392 kWh																
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<p>The measurement devices have the following specifications:</p> <p>Table 4. Specifications of measurement devices used</p> <table border="1"> <thead> <tr> <th>Serial Number</th> <th>Device Model</th> <th>Manufacturer</th> <th>Model Year</th> <th>Date of calibration⁶</th> <th>Accuracy</th> </tr> </thead> <tbody> <tr> <td>401681</td> <td>A1500⁷</td> <td>ELSTER</td> <td>2009</td> <td>17.11.2009</td> <td>0.2 S</td> </tr> <tr> <td>401680</td> <td>A1500⁸</td> <td>ELSTER</td> <td>2009</td> <td>17.11.2009</td> <td>0.2 S</td> </tr> </tbody> </table> <p>Calibration frequency: According to the Article 9 of the relevant regulation⁹, periodical inspections of “gauges for electric, water, coal gas, natural gas and, current and voltage measuring transformers will be made once in 10 years”. This is in line with the monitoring plan and national requirements. TEIAS will decide when to carry out the next calibration. The Project owner has no control over or access to the measurement devices and is <i>not</i> entitled to perform any type of maintenance or calibration.</p> <p>Date of last calibration:</p> <p>The measurement devices have not been calibrated again since their first calibration. Please see <i>Table 4</i> for details.</p> <p>Responsible personnel: TEIAS is responsible for monitoring and ensuring that the measurement devices satisfy the requirements. TEIAS is also responsible for the calibration of the measurement devices. In case of any detected problem (e.g. failure of one of the measurement devices, inconsistency between the readings of the primary and the back-up meter etc.), the plant manager in the name of the Project owner is responsible for coordinating the necessary maintenance and calibration procedure with TEIAS.</p>	Serial Number	Device Model	Manufacturer	Model Year	Date of calibration ⁶	Accuracy	401681	A1500 ⁷	ELSTER	2009	17.11.2009	0.2 S	401680	A1500 ⁸	ELSTER	2009	17.11.2009	0.2 S
Serial Number	Device Model	Manufacturer	Model Year	Date of calibration ⁶	Accuracy														
401681	A1500 ⁷	ELSTER	2009	17.11.2009	0.2 S														
401680	A1500 ⁸	ELSTER	2009	17.11.2009	0.2 S														

⁶ Calibration documents are provided to the DOE.

⁷ Primary measurement device

⁸ Secondary measurement device.

⁹ “Measurement and Measuring Tools Inspection Regulation”, Date: 24/07/1994, Official Gazette Number: 22000

	<p>Validity: The technical specifications and the calibration procedure are in agreement with the national regulations¹⁰ and the monitoring plan. The list of the incidents occurred during the monitoring period which might have an impact on the measurement devices is given below;</p> <p>Table 5. Extraordinary Events (during monitoring period)</p> <table border="1" data-bbox="592 434 1445 875"> <thead> <tr> <th>Potential Risks of Inaccuracy</th> <th>Occurrence?</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td>Calibration of the measurement devices (carried out by TEIAS)</td> <td>None</td> <td>This is in line with the monitoring plan.</td> </tr> <tr> <td>Malfunction, replacement, resetting, repair service or any other relevant activity regarding the measurement devices</td> <td>None</td> <td>This is in line with the monitoring plan.</td> </tr> <tr> <td>Accident (fire, technical equipment failure, theft of equipment etc.) which could compromise the accuracy</td> <td>None</td> <td>This is in line with the monitoring plan.</td> </tr> </tbody> </table> <p>As seen from the <i>Table 5</i>, there is not any extraordinary event which could be critical in assessing the accuracy of this monitoring parameter.</p>	Potential Risks of Inaccuracy	Occurrence?	Information	Calibration of the measurement devices (carried out by TEIAS)	None	This is in line with the monitoring plan.	Malfunction, replacement, resetting, repair service or any other relevant activity regarding the measurement devices	None	This is in line with the monitoring plan.	Accident (fire, technical equipment failure, theft of equipment etc.) which could compromise the accuracy	None	This is in line with the monitoring plan.
Potential Risks of Inaccuracy	Occurrence?	Information											
Calibration of the measurement devices (carried out by TEIAS)	None	This is in line with the monitoring plan.											
Malfunction, replacement, resetting, repair service or any other relevant activity regarding the measurement devices	None	This is in line with the monitoring plan.											
Accident (fire, technical equipment failure, theft of equipment etc.) which could compromise the accuracy	None	This is in line with the monitoring plan.											
Measuring/ Reading/ Recording frequency:	<p>The primary and back-up measurement devices measure, read and record various data such as electricity generated and consumed, in real-time.</p> <p>There is no sampling involved.</p>												
Calculation method (if applicable):	<p>The PMUM (TEIAS) Market Balancing Center website¹¹ is accessed and the monthly reports are recorded, using the Project Owner’s own user ID and password. These reports do not show the net electricity generation, but Power Export and Power Import data. Therefore, their difference is calculated to obtain the net electricity generation of the Project. These data in the PMUM interface are copied and pasted to a prepared spreadsheet, which will perform the calculations.</p> <p>For each month, the <i>Power Export</i> and the <i>Power Import</i> values are extracted from the PMUM monthly reports. The <i>Power Export</i> is denoted as “İletim Sisteminde Veris Miktarı” (ISVM) and the <i>Power Import</i> is denoted as “Uzlaşmaya Esas Cekis Miktarı” (UECM) in the monthly report in Turkish language.</p>												

¹⁰ According to the “Communiqué for Measurement Devices used in the Electricity Market”, Article 11, the measurement devices used for power plants are subject to the following requirements:

Capacity of the circuit, where the meter is connected	Larger than 100 MVA	Between 100 and 10 MVA (inclusive)	Less than 10 MVA
Active energy meters	IEC-EN 60687 0.2S class	IEC-EN 60687 0.5S class	IEC-EN 60687 0.5 class
Reactive energy meters	**IEC-EN 61268 0.2S class	**IEC-EN 61268 0.2S class	**IEC-EN 61268 0.2S class

The Project capacity falls into the second category. Sources:

Turkish: <http://www.epdk.gov.tr/mevzuat/teblig/elektrik/sayac/sayacson.doc>

English: <http://www.epdk.gov.tr/english/regulations/electric/meters.doc>

¹¹ <http://dgpys.teias.gov.tr/dgpys>



	<p>Net Electricity Generated = Power Export – Power Import</p> <p>This difference (which is equal to monthly net electricity generation) is added to each other for each month of the monitoring period to find the total net electricity generation of the Project.</p> <p>The monitoring spreadsheet, together with the scans of the PMUM reports, is submitted to the DOE. The calculation and formulae are clearly visible in the spreadsheet.</p>
<p>QA/QC procedures:</p>	<p>The initial values of the measurement devices are recorded with a protocol (submitted to the DOE) with TEIAS. This prevents any over-calculation of GHG emission reductions.</p> <p>There are two measurement devices continuously measuring and recording electricity generation and consumption of the Project activity. The primary measurement device is used for invoicing, and the secondary measurement device is used for quality control and back-up purposes. Both measurement devices comply with industry standards, UNFCCC and national requirements. This ensures the quality and continuity of monitored data.</p> <p>TEIAS reads monthly recorded values that were measured until 24:00 of the last day of the preceding month. Based on this reading, the invoices are prepared by the Project owner. The monthly measurement device readings are transferred and stored in the web server of PMUM (the financial settlement agency of TEIAS).</p> <p>A new system called OSOS (Automatic Meter Reading System) is introduced by TEIAS, which enables the remote reading of the measurement devices via GPRS technology. This is done through an external modem which has no impact on the quality and quantity of data reading. With the introduction of OSOS system, TEIAS personnel do not go to project site to perform the reading of the measurement devices. The meters are also read by the Project personnel at the end of each month (after 24.00 in the last day). The monthly reading protocols are filled by the Project personnel and sent to TEIAS. In this way, it is checked if there are inconsistencies between the values read by OSOS and the reading protocols. In case of malfunction of OSOS, TEIAS personnel will make the reading by going to the project site.</p> <p>The monthly measurement device reading protocols are stored as hardcopy by the Project owner. The electronic reports are stored by TEIAS and are accessible by the Project owner by any time. This ensures that the monitored data are stored both by the Project owner and the TEIAS PMUM system, both as hardcopy and softcopy, ensuring security and quality. Independent from PMUM, the Project owner stores the hardcopies of the monthly protocols until at least 2 years after the end of the crediting period.</p> <p>The baseline calculations are carried out electronically with a spreadsheet; therefore the calculations are transparent, easily reproducible and of high quality.</p> <p>The Enercon SCADA system enables real time monitoring and analysis of data (also for each turbine) and provides support for maintenance. This system automatically records all electricity generation data for</p>



	<p>each single wind turbine 7/24. This ensures that extraordinary situations can be identified quickly. This system improves quality control and reduces operational risks.</p> <p>The Project owner is able to monitor the electricity generation data by the use of a SCADA system, however it has no control over, or access to the measurement devices and cannot perform any type of maintenance or calibration.</p> <p>Involvement of other parties: The quality assurance and control for the plant operation is managed by a separate contract between the Project owner and the service company of the turbine manufacturer Enercon. Enercon Servis Ltd. performs repair and maintenance works for the wind energy converters during the monitoring period. This contract ensures successful operation and maintenance of the Project activity.</p>
Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comment:	

D.3. Implementation of sampling plan

N/A

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

The Project mainly involves electricity capacity addition, which reduces CO₂ through the substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity. According to the baseline methodology, the emission reduction ER_y by the project activity during a given year y is found as;

$$ER_y = BE_y - PE_y - LE_y \quad (1)$$

where BE_y is calculated as;

$$BE_y = (EG_y - EG_{baseline}) * EF_{grid,CM,y} \quad (2)$$

The combined emission factor EF_{grid,CM,y} for the project activity is calculated as a weighted average of Operating Margin emission factor and Build Margin emission factor as described in the baseline methodology;

$$EF_{grid,CM,y} = w_{OM} * EF_{grid,OM,y} + w_{BM} * EF_{grid,BM,y} \quad (3)$$

Where w_{OM} = 0.75 and w_{BM} = 0.25 by default according to the methodology.

Operating margin (OM): The following formula and data are used for OM calculations (using the ex-ante, simple OM method):

Table 6. Gross and Net Electricity Generation [GWh] in Turkey

	2002	2003	2004	2005	2006	Avg. Share	
Coal	4,093	8,663	11,998	13,246	14,217	6.7%	
Lignite	28,056	23,590	22,450	29,946	32,433	18.0%	
Fuel Oil	9,505	8,153	6,690	5,121	4,232	4.6%	
Diesel oil	271	4	7	3	58	0.1%	
LPG	35	3	33	34	0	0.0%	
Naphtha & Asphaltite	933	1,036	940	326	50	0.5%	
Natural Gas	52,497	63,536	62,242	73,445	80,691	43.6%	
low cost-must run	Renew, & Wastes	174	116	104	122	154	0,1%
	Hydro	33,684	35,330	46,084	39,561	44,244	26,3%
	Geothermal	105	89	93	94	94	0,1%
	Wind	48	61	58	59	127	0,0%
Gross Total	129,400	140,581	150,698	161,956	176,300	100%	
Gross Total, excluding low-cost-must run resources	95,389	104,985	104,360	122,120	131,681	73.5%	
Net generation	123,727	135,248	145,066	155,469	169,543		
Net Delivery Ratio [%]	95.6%	96.2%	96.3%	96.0%	96.2%		

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} * NCV_{i,y} * EF_{CO2,i,y}}{GEN_y} \quad (4)$$

Table 7. Calculation of the OM emission factor

Parameter	2004	2005	2006
CO ₂ Emissions [ktCO ₂]	76,185 ¹²	74,426	82,787
GEN _y [GWh]	100,923	117,864	127,208
EF _{grid,OMsimple,y} [tCO ₂ /MWh]	0.755	0.631	0.651
OM emission factor [tCO ₂ /MWh]	0.679		

Build margin (BM): The following formulae and data are used for MM calculations (using the ex-ante method):

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} * EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (5)$$

The EF_{EL,m,y} is found as;

$$EF_{EL,m,y} = \frac{EF_{CO_2,m,i,y} * 3,6}{\eta_{m,y}} \quad (6)$$

Table 8. CO₂ Emissions of Recent Capacity Additions by Fuel Type

Fuel Type	Generation of New Capacity Additions, GWh	Average Efficiency ¹³ , η	Emission Factor, tCO ₂ /TJ	CO ₂ Emissions, ktCO ₂
Coal	1,462.5	39.0%	89.5	1,208
Lignite	11,440.0	39.0%	90.9	9,599
Fuel Oil	565.3	39.5%	75.5	389
Diesel oil	4.1	39.5%	72.6	3
LPG	0.0	60.0%	61.6	0
Naphtha & Aphaltite	322.9	39.5%	69.3	204
Natural Gas	19,592.0	60%	54.3	6,383
Renewables and wastes	127.0	0%	0	0
Hydro	1,754.9	0%	0	0
Geothermal & Wind	167.4	0%	0	0
Total	35,436			17,786
Build Margin EF	0.502			

$$EF_{grid,CM,y} = 0.679 \text{ tCO}_2/\text{MWh} * 0.75 + 0.502 \text{ tCO}_2/\text{MWh} * 0.25 = \mathbf{0.635 \text{ tCO}_2/\text{MWh}}$$

Baseline emissions are calculated using formula (2);

$$BE_y = 73,847,392 \text{ kWh} * 0.635 \text{ tCO}_2/\text{MWh} = \mathbf{46,893 \text{ tCO}_2}$$

Data used for calculations and further details are available in the PDD. Definitions can be found in *Table 11*.

¹² Official 2004 emission figure stemming from electricity generation activities (Source: Statistical Year Book 2006, page 20). Used directly since the identified lc-mr sources do not generate CO₂ emissions.

¹³ Source: Annex 1 of the “Tool to calculate the emission factor for an electricity system”

The screenshot of the electronic spreadsheet presenting monthly calculations can be found in ANNEX III of this report.

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

As described in section D.1, project emissions are considered as ex-ante and to be zero.

E.3. Calculation of leakage

As described in section D.1, leakage is considered as ex-ante and to be zero.

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 ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO ₂ e)
Total	46,893	0	0	46,893

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

The Project results in the following GHG emission reductions;

Table 9. GHG Emission Reductions Achieved

Vintage year	Period ¹⁴	Emission Reductions, tCO ₂
2012	01.01.2012-31.12.2012	46,893

The total GHG emission reductions and ex-ante calculated estimation are provided below;

Item	Values in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO ₂ e)	71,578	46,893

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

It is clearly seen that the Project underperformed during the monitoring period.

¹⁴ The measurement devices' and PMUM records for each day start at 00.00 and end at 24.00.



History of the document

Version	Date	Nature of revision
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.
Decision Class: Regulatory Document Type: Form Business Function: Issuance		

ANNEX I -GOLD STANDARD INFORMATION

According to the PDD, two types of parameters are monitored for this Gold Standard project;

- i. **GHG Emission Reductions:** GHG Emission reductions are monitored in accordance with the UNFCCC requirements and the additional conservative approach of the Gold Standard.
- ii. **Sustainable Development Screen:** As required by the rules of the Gold Standard, the choice of indicators is based on the issues that have been highlighted to be important during the sustainable development assessment. These indicators are monitored to ensure the sustainable development contribution of the Project. During the sustainable development assessment, no issues have been highlighted as having a negative impact on sustainable development. The project provides power from a renewable resource and thereby contributes to local economy in various ways. It also creates positive environmental and social impacts, compared to the baseline of energy generation from fossil fuel resources.

Table 10. Summary of monitored parameters

ID number	Data variable	Source of data	Data unit	Way of obtaining data
ID.1	Annual net electricity amount fed to the grid by the project activity (EG _v)	Project Owner and TEIAS	MWh	Measured
ID.2	Local employment number	Project Owner	N/A	Counted
ID.3	Air quality	Project Owner and TEIAS	metric tons	Calculated
ID.4	Diesel oil consumption	Project Owner	liters	Measured
ID.5	Noise emission	Project Owner	N/A	Estimated

The monitoring report for the ID.1 has been provided above. The monitoring reports of the ID.2 - ID.5 are explained below.

**Sustainable Development Indicator: ID.2**

No	ID.2	
Indicator	Local Employment Number	
Mitigation measure	N/A (positive indicator)	
<i>Repeat for each parameter</i>		
Chosen parameter	Creation of local jobs	
Current situation of parameter	<p>14 people are employed, 9 of them working full-time and 5 of them working part-time⁵. All of the employees are locals of the Project region</p> <p>The Service Technicians are employed by Enercon Servis Ltd. Şti.. The Wind Farm Responsible Engineer, the Security Personnel and the Operator Technicians of Voltage Switchgear Centre are employed by Alize Enerji Elektrik Üretim A.Ş..</p> <p>Please see <i>Table 14</i> for details.</p>	
Future target for parameter	The Project aims to employ the same number of people each year.	
Way of monitoring	How	The number of permanent local employment is counted. Residence records of the Project personnel are checked.
	When	During verification.
	By who	Project manager on site.

Deviation from the monitoring plan:

N/A

Revision of the monitoring plan for this Gold Standard indicator:

N/A

QA/QC:

The number of employment has high accuracy because it is measured by counting people employed in the Project. The social security payment documents provide sufficient evidence to ensure data quality.

Conclusion:

The Project created local employment opportunities in the project region and the Project has demonstrated that it does not lead to any negative impacts.

Sustainable Development Indicator: ID.3

No	ID.3	
Indicator	Air Quality	
Mitigation measure	Reduction of baseline SO ₂ and NO _x emissions: The Project, by replacing electricity from fossil fuel combustion and the related fuel consumption, reduces the baseline SO ₂ and NO _x emissions from electricity generation. The reductions of SO ₂ and NO _x emissions will be calculated by multiplying net electricity generation of the Project activity with the SO ₂ and NO _x intensities referred above.	
<i>Repeat for each parameter</i>		
Chosen parameter	a) SO ₂ reductions b) NO _x reductions	
Current situation of parameter	a) SO₂ emissions: The Project's net electricity generation is 73,847,392 kWh, therefore the Project has resulted in a SO ₂ reduction of: $73,847,392 \text{ kWh} * 2.04 \text{ kg/MWh} = 150.5 \text{ tons SO}_2$ b) NO_x emissions: The Project's net electricity generation is 73,847,392 kWh, therefore the Project has resulted in a NO _x reduction of: $73,847,392 \text{ kWh} * 1.56 \text{ kg/MWh} = 115.0 \text{ tons NO}_x$ Information about the calculation of emission intensities for SO ₂ and NO _x are provided below. Conclusion: The Project contributes positively to air quality.	
Future target for parameter	The Project is expected to reduce the following emission amounts annually: SO ₂ : $2.04 \text{ kg/MWh} * 112,763 \text{ MWh} = 598.8 \text{ t SO}_2$ NO _x : $1.56 \text{ kg/MWh} * 112,763 \text{ MWh} = 175.9 \text{ t NO}_x$	
Way of monitoring	How	Calculation. By multiplying the net electricity generation of the Project with the NO _x and SO ₂ emission intensities.
	When	Every monitoring period.
	By who	Project manager on site.

Deviation from the monitoring plan:

The SO₂ and NO_x intensities that were included in the monitoring plan have been revised, since more recent data is available. These intensities will be updated in the coming monitoring reports, based on the availability of data.

The revised monitoring plan uses the following SO₂ and NO_x baseline emission intensities:

- a) **SO₂ emissions:** Total host country emissions are 413,784¹⁵ tons in 2010. Net system electricity generation in 2010 is 203,046¹⁶ GWh, corresponding to 2.04 kg/MWh SO₂ intensity.
- b) **NO_x emissions:** Total host country emissions are 316,136¹⁵ tons in 2010. Net system electricity generation in 2010 is 203,046¹⁶ GWh, corresponding to 1.56 kg/MWh NO_x intensity.

¹⁵ Source: National GHG inventory of Turkey, 1990-2010,

http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/tur-2012-crf-14apr.zip, Workbook TUR-2012-2010, Worksheet:Table1s1

¹⁶ Source: Annual Development of Electricity Generation- Consumption and Losses in Turkey

[http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/uretim%20tuketim\(22-45\)/33\(84-10\).xls](http://www.teias.gov.tr/T%C3%BCrkiyeElektrik%C4%B0statistikleri/istatistik2010/front%20page%202010-%C3%A7i%C3%A7ek%20kitap/uretim%20tuketim(22-45)/33(84-10).xls)

**QA/QC:**

SO₂ and NO_x intensities are used for the calculation. These intensities are based on publicly available official data from the 2010 national inventory report of Turkey that has been submitted to UNFCCC in 2012¹⁷. This report's Annex 7 does not specifically report the SO₂ and NO_x emission uncertainties; therefore an accurate uncertainty percentage is unavailable. However, considering Turkey's 2010 overall emission uncertainty (including sinks) of 10.3%, it can be concluded that the uncertainty of this indicator is within acceptable limits.

For QA/QC details of the net electricity generation, which is one of the input parameters of the calculations of SO₂ and NO_x reductions, please refer to the relevant section of the D.2, monitored parameter number ID.1.

Results:

The outcomes of the calculations suggest that the Project positively contributes to air quality by substituting fossil-fuel based power and thus effectively reducing SO₂ and NO_x emissions.

¹⁷ UNFCCC, National Inventory Submission 2012.

**Sustainable Development Indicator: ID.4**

No	ID.4	
Indicator	Diesel Oil Consumption	
Mitigation measure	N/A	
<i>Repeat for each parameter</i>		
Chosen parameter	The amount of diesel oil consumed by the Project during the monitoring period.	
Current situation of parameter	<p>The backup generator on site consumes diesel oil and is operated when there is a black out in the grid. The generated power is used only for office consumption and is not related to the wind turbines.</p> <p>During this monitoring period, no diesel oil purchase took place. The diesel oil consumption logs are examined and the total consumption during this monitoring period is found to be ~7 hours.</p> <p>Conclusion: The Project emissions can be neglected.</p>	
Future target for parameter	Project emissions will be negligible.	
Way of monitoring	How	Measured. Invoices of diesel oil purchases and diesel oil consumption logs.
	When	During verification.
	By who	Project manager on site.
<i>Repeat for each parameter</i>		

Deviation from the monitoring plan:

N/A

QA/QC:

The personnel periodically maintain the diesel generator, which is traceable with the maintenance log. Furthermore, the diesel oil purchases are also traceable with the invoices. Therefore, the diesel oil consumption is verifiable with documents and is of high quality.

Conclusion:

The outcomes suggest that the diesel oil consumption of the Project is none. Therefore, the project emissions are neglected.

**Sustainable Development Indicator: ID.5**

No	ID.5	
Indicator	Noise Emission	
Mitigation measure	N/A	
<i>Repeat for each parameter</i>		
Chosen parameter	Noise emission of wind turbines.	
Current situation of parameter	<p>The Project utilises Enercon wind turbines, which have the unique feature of gearless power transmission. This not only results in less heat generation, but it also means less waste oil and less noise because of lower friction.</p> <p>Local people interviewed during the site visit have not voiced any complaints about noise. Therefore noise emissions of the Project do not affect local people negatively.</p> <p>Conclusion: The Project's noise emissions is not disturbing for nearby residential areas.</p>	
Future target for parameter	The Project is expected to generate low noise that is acceptable.	
Way of monitoring	How	Estimated. Qualitative Assessment: Local interviews.
	When	Continuously.
	By who	Project manager on site.

Deviation from the monitoring plan:

N/A

Revision of the monitoring plan for this Gold Standard indicator:

N/A

QA/QC:

The interviews in the villages are carried out randomly, reducing the probability of biased opinions. Therefore, this indicator has been assessed with high quality.

Conclusion:

The outcomes suggest that the Project's noise emission levels are *not* significant and that the noise it generates is hardly audible or within acceptable limits for local people in the vicinity.

ANNEX II – INFORMATION ABOUT MONITORING PARAMETERS

Table 11. Definitions of the parameters

Parameter	Definition
$EF_{grid,OMsimple,y}$	Simple operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,BM,y}$	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,CM,y}$	Combined margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$FC_{i,y}$	Amount of fossil fuel type <i>i</i> consumed in year y (ton or 000m ³)
$NCV_{i,y}$	Net calorific value of fossil fuel type <i>i</i> in year y (TJ/kt or TJ/mil m3)
$EF_{CO_2,i,y}$	CO ₂ emission factor of fossil fuel type <i>i</i> in year y (tCO ₂ /TJ)
GEN_y	Net electricity delivered to the grid, excl. low-cost/must-run sources (MWh)
$EG_{m,y}$	Net electricity delivered to the grid by power unit <i>m</i> in year y [MWh]
$EF_{EL,m,y}$	CO ₂ emission factor of power unit <i>m</i> in year y [tCO ₂ /MWh]
BE_y	Baseline emissions in year y
EG_y	Net electricity delivered to the grid in year y
PE_y	Project emissions in year y
LE_y	Leakage in year y

Table 12. Health and safety precautions

Checklist	Assessment
Safety equipment is available and sufficient.	Positive. The available safety equipment include safety rope, rescue rope, working clothes, protection glasses, safety shoes, helmets, medicine box and fire extinguishers.
Personnel use safety equipment continuously and correctly.	Positive. The personnel on site effectively use the required equipment such as the working clothes, safety shoes and helmets, depending on their roles and responsibilities.
The project does not involve hazardous work.	Positive. The Project does not involve any activity that is hazardous.
No accident has happened during monitoring period.	Positive. There has not been any work accident (i.e. personal injury, first aid etc.) on site during the monitoring period.
Compliance with national health and safety regulations.	Positive. There has not been any incompliance with relevant regulations in the host country.

Table 13. Trainings

Description	Managed / Given By	Participants	Date / Duration	Certificate
Protection and Relay Systems in 154 kV Stations	Demirer Enerji	The Wind Farm Responsible and 3 Operator Technicians of Voltage Switchgear Centre.	11.04.2012 18.04.2012 25.04.2012 15.11.2012 22.11.2012	Attendance List and Certificates
Occupational Health and Safety	Enercon	6 Service Technicians	02.08.2012 06.11.2012	Certificates



Table 14. Employment Information

Position	Task	Number of Staff	Employer	How many of them are local people?
Plant Responsible Engineer	Responsible from operational and maintenance activities and management of the plant on site: <ul style="list-style-type: none">• responsible from HV and MV Systems• responsible from turbines	1	<i>Alize Enerji Elektrik Üretim A.S.</i>	1
Security Guard	Ensure security of the plant.	4	<i>Alize Enerji Elektrik Üretim A.S.</i>	4
Service Technician ⁵	Maintenance and control of the turbines.	6	<i>Enercon Servis Ltd.</i>	6
Operator Technician of Voltage Switchgear Centre	Routine controls, intervention in case of grid breakdowns, reading the electricity measurement devices.	3	<i>Alize Enerji Elektrik Üretim A.S.</i>	3
Total	9 full-time and 5 part-time	14	<i>By the Project Owner and its subcontractor Enercon Servis Ltd.</i>	14

**ANNEX III – EMISSIONS REDUCTIONS TABLE****Project Name:** Kuyucak Wind Farm Project, Turkey**Period start:** 01.01.2012**Period end:** 31.12.2012

Year	Month	Energy export to the grid (kWh)	Energy import from the grid (kWh)	Net energy export to the grid (kWh)	Emission Reductions (tCO ₂)
2012	January	7,276,858	3,401	7,273,457	4,619
2012	February	4,532,296	2,697	4,529,599	2,876
2012	March	5,770,593	2,587	5,768,006	3,663
2012	April	6,533,500	1,392	6,532,108	4,148
2012	May	3,024,957	1,796	3,023,161	1,920
2012	June	7,266,036	2,368	7,263,668	4,612
2012	July	9,410,258	6	9,410,252	5,976
2012	August	8,686,899	334	8,686,565	5,516
2012	September	5,557,329	1,652	5,555,677	3,528
2012	October	4,194,123	2,275	4,191,848	2,662
2012	November	6,482,021	497	6,481,524	4,116
2012	December	5,133,433	1,906	5,131,527	3,259
TOTAL		73,868,303	20,911	73,847,392	46,893