THE GOLD STANDARD:
Project Design Document for Gold Standard Voluntary Offset projects
(GS-VER-PDD)

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Emission reductions from grid connected electricity generation from renewable sources: Yuntdağ 42.5 MW Wind Power Project, Turkey

VOLUNTARY OFFSET PROJECTS

PROJECT DESIGN DOCUMENT FORM (GS-VER-PDD)
VERSION 01 - IN EFFECT AS OF: JANUARY 2006)

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SECTION A. General description of project activity

A.1 Title of the project activity

Grid-connected electricity generation from renewable sources:
Yuntdağ 42.5 MW Wind Power Project, Turkey

Document version: 03
Date of completion: 28 July 2008

Replaces Version 02 from 12 November 2007 with amendments mainly in the sustainable development matrix in Section A.2 according to the requests raised during the 6 weeks review by the Gold Standard.

Version 02 replaces Version 01 from 9 August 2007 with the following adjustments/amendments:

Nr.	Ref. to Finding Nr.	Ref. to Chapter	Comment
1	1	D.2.1.2.	Indicators for the monitoring of sustainable development are amended
2	2, 5	F	Formulation and documentation of environmental impacts, description of road construction are amended
3	3, 4	D.3, D.4	Details regarding data handling, data quality, processes and structure of staff at the plant are amended
4	7	B.2	BM calculation is revised. All accordant numbers in the PDD are adjusted
5		G	Description of main stakeholder process is amended
6		B.3, G	Formal adjustments following a comment by the ministry of environment and forestry

A.2. Description of the project activity

İnnores Elektrik Üretim AŞ (in the following: İnnores) plans to install a wind power plant in Yuntdağ/Bergama/İzmir in Turkey. The purpose of the project is to generate electricity and to feed it into the public grid. Yuntdağ WPP shall be registered as a Voluntary Emission Reduction project in order to enable the project implementation by means of financial inflows coming from the credits sale. Because of its significant contribution to climate protection and to sustainable development in the region, this project is expected to fulfil the requirements of the Gold Standard.

The project will help Turkey to stimulate and commercialise the use of grid connected renewable energy technologies and markets. Furthermore the project will demonstrate the viability of grid connected wind farms which can support improved energy security, improved air quality, alternative sustainable energy futures, improved local livelihoods and sustainable renewable energy industry development. The specific goals of the project are to:

- reduce greenhouse gas emissions in Turkey compared to the business-as-usual scenario,
- help to stimulate the growth of the wind power industry in Turkey,
- create local employment during the construction and the operation phase of the wind farm,
- reduce other pollutants resulting from power generation industry in Turkey, compared to a business-as-usual scenario,
- help to reduce Turkeys increasing energy deficit and
- differentiate the electricity generation mix and reduce import dependency.

The emission reductions will be generated by substituting electricity produced from the conventional mix representing electricity generation for the Turkish grid, which to a relevant extent depends on fossil fuels. The emission reductions will be calculated based on the Combined Margin (CM) emission factor.

The project contributes to sustainable development in Turkey in the following ways:

- Wind energy presents various environmental benefits compared to other primary energy sources: wind energy does not result in emissions of pollutants into the atmosphere nor does it emit residuals that can have a negative impact on soil, water etc. As a renewable energy source wind energy can be used without putting the supply of primary energy sources into danger for future generations. The proposed project will also contribute to a reduction in other emissions than GHG emissions related to conventional electricity generation, like emissions of sulphur dioxide, nitrogen oxides and particulates.
- The project of Yuntdağ WPP will result in extra employment – the realisation of the wind project will result in increased jobs in the local area, especially during the construction phase. Construction materials for foundations, cables and access roads will be sourced locally.

İnnores as the project owner from the very beginning was convinced of the positive influence of the project on the environment as well as to certain extent on social and economical situation in Turkey. The stakeholder meeting from 25 July 2007 and the gathered opinions of local people and of experts confirmed its positive impact. The collected opinions and also the information from other sources, like external surveys or experts opinions are included in the Sustainable Development Assessment Matrix Results from the matrix confirm the favourable effects on all discussed domains and lead to an overall score of +9.

Components • **Indicators**	**Score (-2 to 2)**	**Rationale**
Local / regional / global environment		
• Water quality and quantity	0	As compared to the baseline, no significant changes with regard to both, ground and surface waters are expected. The project does not have any positive or negative impacts on water quality and quantity. This result can be judged generally valid for wind power projects, as wind turbines do neither need nor release water. This is confirmed by the stakeholders (cf. questions 5 and 9 of stakeholder consultation checklist, Appendix 8 of Initial Stakeholder Consultation Report).
• Air quality (emissions other than GHGs)	+2	Besides Greenhouse Gases, all other air pollutants (e.g. SO_x, NO_x), particle and VOC emissions generally connected to fossil fuelled electricity generation are avoided by the use of wind power. This is considered to be a very positive effect by the stakeholders and project participants. A report by ECW[1] confirms this view, as well as the discussion with the stakeholders (cf. question 3 of the stakeholder consultation checklist). Every kilowatt hour of electricity produced by the wind farm does not have to be generated by a thermal power plant, which have a relevant share in the Turkish generation mix (especially gas and lignite, cf. Figure 1 on page 10).
• Other pollutants (including, where relevant, toxicity, radioactivity, POPs, stratospheric ozone layer depleting gases)	0	Possible impacts during the construction phase are considered to be negligible, do not involve materials that are deemed pollutants and do also occur with any other energy project (baseline). Noise generation by the turbines is not a problem as the distance to the next village is 1 km (cf. project's micrositing report, available for validation/verification).

[1] See Energy Center Wisconsin, http://www.ecw.org/prod/433-3.pdf, accessed in June 2008

		These issues are confirmed by the stakeholders (cf. question 2 and 4 of the stakeholder consultation checklist). The operation of a wind power plant does generally not lead to any pollutants. A score of zero is rather an understatement, as fossil fuelled (part of the baseline, cf. question above) and nuclear power plants do lead to further pollutants and radioactivity, other than wind. However, this effect is harder to describe and thus scored with 0 for conservativeness.
• Soil condition (quality and quantity)	0	As compared to the baseline, no significant changes are expected. No trees have to be cut for the project, neither for the turbine sites nor for the infrastructure. Both road construction works take place on empty and unused land without the need for tree cuttings and thus do not have any negative influence on the soil quality, while the reduction of soil is negligible due to the unfertile character of the soil. Pictures from the site are available and were checked at validation. The project developer's impression that the impact on soil condition is negligible was confirmed by the stakeholders' opinion (see question 1 of the stakeholder consultation checklist, Appendix 8 of the Initial Stakeholder Consultation report)
• * Biodiversity (species and habitat conservation)	0	Due to the experiences with other wind power plants in Turkey and according to the discussion at the stakeholder meeting (cf. question 1 of the stakeholder consultation checklist), no impacts on biodiversity are expected, especially as the ground cover on site consists of dry, rocky scrubland with some low lying vegetation (cf. micrositing report). This is confirmed by the certificate from the environmental authority, which, according to Turkish environmental law[2], states that no EIA is necessary for this project. The stakeholders who attended the ISC meeting did also not mention any impacts on birds (cf. question 8 of the stakeholder consultation checklist). There are no known bird migration routes crossing the project site. However, as no detailed studies of bird migration exist for the project area, this issue is included in the project's monitoring plan by observing bird strikes and reporting them for verification (cf. section D.2.1.2).
Sub total	*+2*	
Social sustainability and development		
• * Employment (including job quality, fulfilment of labour standards)	+2	Installation of the wind farm will provide employment to local people, who will assist in the building phase as well as in the maintenance of the wind farm. Within this project the stakeholder processes gives fulfilment of labour standards a public site. Public consultations like this are not common in Turkey and therefore this case enhances thoughtfulness including job quality and fulfilment of labour standards.

[2] Gazette No. 25318 from 16 December 2003 regulates the applicability of Environmental Impact Assessments for proposed projects.

		The positions at the wind farm require skilled workers, which will be achieved by adequate training (cf. job description in section D.4). Employment is part of the monitoring of the project (Local job creation, cf. section D.2.1.2) and will thus be documented and reported for the periodic verification.
• Livelihood of the poor (including poverty alleviation, distributional equity, and access to essential services)	0	Generating electricity from resources that were not used before in this region, and with this new jobs that are created, leads to an additional income for the local community. The use of domestic resources for electricity generation tends to have a positive effect on the balance of trade compared to the import of fuels and leaves the margins of the value chain as well as accordant taxes within the country. The project activity positively affects the regional economic and infrastructural development. However, the discussed issues do either overlap with other indicators (employment) or are difficult to monitor and verify, why this indicator is scored with zero.
• Access to energy services	0	As a local energy source, wind power helps to mitigate Turkey's high import dependency and thus improves the access to energy services, especially in the scenarios of import stops or energy price hikes. The International Energy Agency criticises dependency on oil and gas imports and demands for expansion of renewable energy in Turkey(cf. IEA: Energy Policies, Turkey 2005 review, 2005, pages 85, 100 and 129). However, as the improved access to energy services does not effect the local public (as the electricity is delivered to the grid) and cannot be assigned to specific consumers and therefore not be monitored, a conservative score of zero is applied.
• * Human and institutional capacity (including empowerment, education, involvement, gender)	+1	Operation of the plant requires distinct education and skills improvement for local people who will be employed at the site. A list with the expected jobs and accordant trainings is presented in D.4. The training of the staff shall be monitored by presenting training plans and certificates for verification (see parameter "Local job creation" in section D.2.1.2). The local public is intensively involved in the development and decision-making regarding the wind power plant within the stakeholder consultation processes, thus forming a new kind of institutional capacity on the local level.
Sub total	***+3***	
Economic and technological development		
• * Employment (numbers)	+2	Some 100 workers will be involved into the construction of the wind power plant that consists of civil works, electricity installation and turbine erection. The companies who are commissioned for this work committed to hire workers from the region where possible. In connection with plant operation, some 20 new jobs will be created, from security staff to the plant engineer and technicians. The project developer considers this as a positive effect of the project. Employment is part of the monitoring of

		the project and can thus be documented at the verification.
• Balance of payments (sustainability)	+1	The project itself but also its role as first-of-its-kind for a sustainable sector of electricity generation in Turkey can contribute to mitigation of import dependency, which is an important topic for Turkey, as it is growing steadily and reached values of more than 70 percent of total primary energy supply in the last years[3]. Electricity generation from wind power is completely independent from any imports and thus helps to save outflow of capital.
• Technological self reliance (including project replicability, hard currency liability, skills development, institutional capacity, technology transfer)	+1	As the project developer is a Turkish company using the returns from the GS VER project to enable the realisation of the wind farm, the Turkish capabilities, competencies and self-reliance regarding the introduction of innovative technologies are strengthened. The fact that the project activity is not common practice in Turkey is comprehensively derived in section B.3. of the PDD. The project developer considers the investment into and the operation of a new technology in Turkey as a contribution to technological self reliance due to the gathered experience with the proposed project.
Sub total	***+4***	
TOTAL	**+9**	

Table 1: Sustainable development assessment matrix (the asterisk denotes indicators that are covered by the future monitoring of the project)*

Yuntdağ WPP will be the second largest wind farm in Turkey so far. It consists of 17 wind turbines Nordex N90 of the 2.5 MW output, 90m diameter and 80m hub height. The wind turbines will be connected to the wind farm substation through 34.5 kV underground cables. The voltage is raised to 154 kV and is transferred to the National Electricity System (Alosbi Transformer Station) via a 26 km long transmission line.

The entire net electricity production is expected to be 160,834 MWh per year.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Turkey (host)	İnnores Elektrik Üretim AŞ	No

İnnores Elektrik Üretim AŞ: Project developer and owner.

Republic of Turkey: Host country. Turkey has not yet ratified the Kyoto Protocol. Turkish National Focal Point to the UNFCCC is the Ministry of Environment and Forestry[4]. Regional Environmental Center

[3] See IEA (International Energy Agency): Energy Policies, Turkey 2005 Review, 2005, p. 28.

[4] UNFCCC, list of the National Focal Points http://maindb.unfccc.int/public/nfp.pl?mode=wim (accessed in August 2007)

Country Office Turkey (REC Turkey) acts as the National Focal Point for UNFCCC Article 6 – Education, Training and Public Awareness.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

Republic of Turkey

A.4.1.2. Region/State/Province etc.:

Izmir region, Aliağa province

A.4.1.3. City/Town/Community etc:

The site is located between the villages of Yuntdağ, Balaban and Koyuneli

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

Project site is located approx. 60 km north of Izmir, 1 km west from the Bababan village, 2 km northwest from Yuntdağ and 1 km southeast from Koyuneli. The site is located on two ridgelines at the elevation between 490m and 530m.

Location of the project site is presented on the Picture 1.

Picture 1: Map of the project area

The geographical coordinates (coordinate system ED50, Zone 35) of the project activity are presented in the table below.

Turbine	East	North
T01	516633	4313956
T02	516615	4313686
T03	516642	4313426
T04	516697	4313168
T05	516744	4312913
T06	516757	4312647
T07	516772	4312389
T08	516786	4312100
T09	516846	4311849
T10	516854	4311595
T11	516936	4311349
T12	517036	4311122
T13	515532	4311741
T14	515563	4311485
T15	515585	4311081
T16	515533	4310674
T17	515431	4310288

Table 2: Coordinates of the turbines

A.4.2. Size of the project:

With an electrical capacity of 42.5 MW, the project comes under the large-scale project category.

A.4.3. Category(ies) of project activity:

The 42.5 MW Wind Power Project falls in the category A.1., Renewable Energy, according to the Gold Standard VER Project Developer's Manual

A.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

Emission reductions will be calculated based on the calculated Combined Margin (for details see B.2.). With the assumed yearly electricity generation of approx. **160,834 MWh**, over the period of 7 years the project activity will generate overall approx. **797,745 tCO_2e** emission reductions. The emission reductions will be generated by substituting the energy produced from conventional sources, namely from fossil fuels. The following figures show the shares of the different fuels to the overall Turkish installed electric capacity and generation in the year 2006:

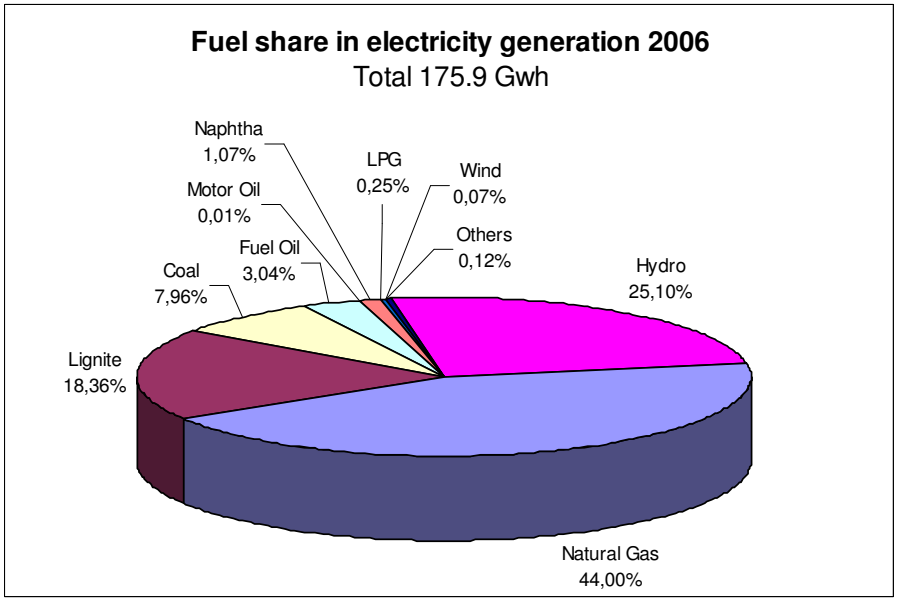


Figure 1: Fuel share in electricity generation in 2006[5]

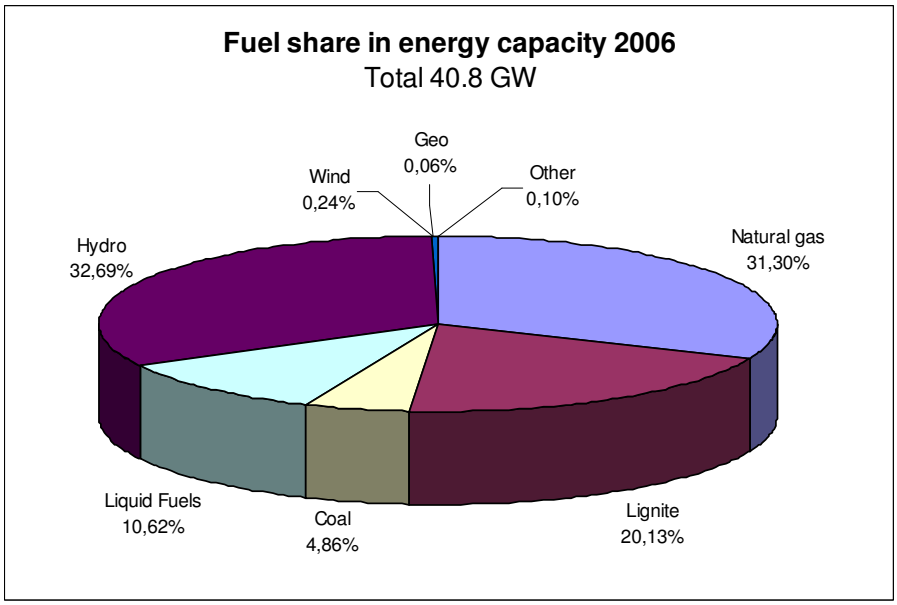


Figure 2: Fuel share in energy capacity in 2006[6]

Hydropower is the only relevant zero-emissions primary energy source at the moment in Turkey. The share of non-hydro renewables (geothermal, solar, wind, biomass) with its 162 MW capacity makes 0.14 percent of total generation. Also noteworthy is the trend in the renewables share: today's 25 percent share of renewables compares to 40 percent in 1990.[7]

[5] TÜIK http://www.tuik.gov.tr/PreHaberBultenleri.do?id=464&tb_id=3 (accessed in August 2007)

[6] Source: http://www.teias.gov.tr/yukdagitim/kuruluguc.xls (accessed in July 19th 2007)

[7] See IEA (International Energy Agency): Energy Policies, Turkey 2005 Review, 2005, p. 117

But more important for the justification of effective emission reductions by the proposed project activity is a glance at the future trend. Whereas the share of coal (principally lignite) in electricity generation is forecasted by the government to rise from 23 % in 2003 to 33.3 % in 2020, the share of non-hydro renewables is expected to increase only to 1.8 % in 2020 from the current 0.14 %.[8]

These numbers and figures show the contribution of a wind power project like Yuntdağ WPP to environmental friendly electricity generation. At the moment nine wind power plants with 131.4 MW installed capacity are operative. Against the background of expected future growth rates for power consumption of 7 to 10% p.a., the alternative to the Wind Power Plant is a capacity addition representing the above described Turkish mix of hydroelectric and fossil fuelled power plants. They are better known, less risky and financially more attractive from an investor's point of view.

One element forming the general conditions for wind power projects in Turkey is the energy efficiency law from April 2007[9], which contains an amendment to the 2005 renewable energy law regarding feed-in tariffs. The new law stipulates a purchase obligation of 10 years for a purchase price between 5 and 5.5 €cent/kWh. This tariff is much below the average remuneration in the leading wind markets and does not constitute much of an incentive for investments in little experienced wind power projects in Turkey. These regulations are considered in the investment planning of the project and do not lead to returns that let the project be profitable or attractive for capital investors and lenders.

In comparison with emissions arising from electricity generation representing the Turkish generation mix, some 797,745 tCO_2 are avoided by the wind power plant over the first seven year crediting period from 05/2008 to 04/2015. Yuntdağ WPP demonstrates a long-term potential of wind energy as a tool to efficiently reducing greenhouse gas emissions as well as to diversifying and increasing security of the local energy supply and contributing to a sustainable development.

A.4.4.1. Estimated amount of emission reductions over the crediting period:

The crediting period starts with the commissioning of the plant, exactly with the first day of documented electricity supply to the grid. The expected yearly net electricity generation is 160,834 MWh, what leads to annual emission reductions of **113,964 tCO_2e** (**797,745 tCO_2e** over the period of 7 years), as indicated in the table below. As the project activity is to start in early 2008, the estimated emission reductions from the first and last year of the crediting period sum up to the amount of the estimated yearly reductions.

Years	**Annual estimation of emission reductions [tonnes of CO_2e]**
2008 (May – Dec)	75,976
2009	113,964
2010	113,964
2011	113,964
2012	113,964
2013	113,964
2014	113,964
2015 (Jan – Apr)	37,988
Total emission reductions (tonnes of CO_2e)	**797,745**
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	113,964

Table 3: Expected annual emission reductions

[8] See IEA (International Energy Agency): Energy Policies, Turkey 2005 Review, 2005, p. 135

[9] Law No. 5627, published in the official gazette on 2 May 2007, see http://www.eie.gov.tr (accessed on 25 July 2007)

SECTION B. Application of a baseline methodology

B.1. Title and reference of the approved baseline methodology applied to the project activity:

"Consolidated baseline methodology for grid-connected electricity generation from renewable sources (ACM0002)"[10]. The above methodology is hereafter referred to as the "Baseline Methodology".
The Baseline Methodology will be used in conjunction with the approved monitoring methodology ACM0002 ("Monitoring Methodology").

B.1.1. Justification of the choice of the methodology and why it is applicable to the project activity:

The choice of methodology ACM0002, Version 6, is justified as the proposed project activity meets its applicability criteria:

- Yuntdağ WPP Project is a grid-connected renewable power generation project that adds electricity capacity from wind sources.
- The project does not involve switching from fossil fuels to renewable energy at the site of the project activity.
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid are available.

B.2. Description of how the methodology is applied in the context of the project activity:

The Baseline Methodology specifies how the baseline is described and calculated. It particularly refers to the consolidated tool for the demonstration and assessment of additionality, provided by the CDM Executive Board. In the context of the baseline determination, the project boundary and the Operating and Build Margin have to be established following the specifications set by ACM0002. In the following the derivation of the emission factor is described.

The baseline scenario is formulated in ACM0002 as follows:

> *"Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the Combined Margin (CM) calculations described below."*

This formulation exactly corresponds to the proposed project activity, as the expected electricity generation by the Yuntdağ WPP would be supplied by the Turkish generation mix in the absence of the project. This is also shown by the additionality demonstration in chapter B.3, where the different scenarios that come into question in this case are discussed.

In the following, the step-wise approach provided in ACM0002 to calculate the combined margin emission factor for Turkey is described.

[10] Revised version 6 from May 19th 2006, see http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html (accessed on July 25th 2007)

Calculation of the combined margin emission factor

STEP 1: Calculation of the Operating Margin emission factor:

ACM0002 provides four options for calculating the Operating Margin, and guidance for how to choose which option to use for a given project. For the project at hand, method "a" with the calculation of the Simple Operating Margin (Simple OM) shall be applied for the following reasons:

- ACM0002 relies on dispatch data analysis (method c) as its preferred option. However, this approach cannot be applied in this case due to a lack of hourly dispatch data available for the Turkish power grid. As a simpler approach than preferred by the methodology is chosen, great importance is attached to the conservative manner of the derivation of the Operating Margin emission factor in the project design.
- The Simple OM approach can be used where low cost/must run resources constitute less than 50 % of total grid generation in average of the five most recent years. The following table shows that this condition is fulfilled:

Share of hydroelectric production 2002 - 2006					
	2002	**2003**	**2004**	**2005**	**2006**
Gross production [GWh]	129,399.5	140,580.5	150,698.3	161,956.2	175,893.3
Hydro [GWh]	33,683.7	35,329.5	46,083.7	39,560.5	44,157.7
Share of hydro	26.03%	25.13%	30.58%	24.43%	25.10%

Table 4: Share of hydroelectric production in Turkey, 2002 - 2006[11]

The Simple Operating Margin (OM) emission factor ($EF_{OM,\ y}$) is calculated as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low operating cost and must run power plants. According to the Baseline Methodology, the typical low operating cost and must run resources include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. However the only relevant one in Turkey is hydro power. The share of the non-hydro renewables (geothermal, solar, wind, biomass) is only 0.14 percent (average 2002-2006) of total electricity generation and therefore assumed as negligible for this calculation. Nuclear energy is not generated in Turkey. There is also no indication that coal is used as must-run.

Therefore the only low cost and must run plant not included in the calculation are hydropower plants.

The following formula shall be applied:

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} * COEF_{i,j}}{\sum_{j} GEN_{j,y}} \qquad \textbf{Formula 1}$$

Where

$F_{i,j,y}$ is the amount of fuel *i* consumed by relevant power source *j* in year *y*;

[11] TEİAŞ, Development of Electricity Generation, Internet: http://www.teias.gov.tr/istatistik2005/35.xls and http://www.tuik.gov.tr/PreHaberBultenleri.do?id=464&tb_id=3 (both accessed on July 19th 2007)

j	refers to the power sources delivering electricity to the grid with the above described conditions;
$COEF_{i,j,y}$	is the CO_2 emission coefficient of fuel *i*;
$GEN_{j,y}$	is the electricity delivered to the grid by source *j.*

For the calculation of the OM the consumption data of the fuels used is taken from the TEİAŞ data base, which holds data on annual fuel consumption by sector as well as on electricity generation by sources and electricity imports. The data for the year 2006 are not fully available, therefore the calculation of the OM data from years 2003-2005 is used. All the data needed for the calculation, including the Emission Factors and Net Calorific Values (NCVs) is in available in Annex 2 (Table 17 and Table 18).

At first the overall emissions from electricity production are collected (Table 5):

CO_2-emissions from electricity production 2003-2005			
	2003	**2004**	**2005**
CO_2-Emissions [ktCO_2]	**75,489**	**76,291**	**95,468**

Table 5: CO_2-emissions by electricity production 2003-2005[12]

In Table 6 there is presented the gross electricity production data by all the relevant energy sources. Low-cost/must-run resources like hydro, wind, geothermic and biomass are not considered.

Gross electricity production by energy source 2003-2005 [GWh]			
	2003	**2004**	**2005**
Natural gas	63,536.0	62,241.8	73,444.9
Lignite	23,589.9	22,449.5	29,946.3
Coal	8,663.0	11,998.1	13,246.2
Fuel oil	8,152.7	6,689.9	5,120.7
Motor oil	4.4	7.3	2.5
Naphtha	1,036.2	939.7	326.5
LPG	2.9	33.4	33.7
Gross electricity production from relevant sources	**104,985.1**	**104,359.7**	**122,120.8**

Table 6: Gross electricity production by energy source 2003-2005[13]

As Table 6 shows gross data, but $GEN_{j,y}$ in the above described formula means electricity delivered to the grid, i.e. net generation, the following table shall help to derive net data by calculating the net/gross proportion on the basis of overall gross and net production numbers.

Relation net/gross electricity production 2003-2005			
	2003	**2004**	**2005**
Gross production [GWh]	140,580.5	150,698.3	161,956.2
Net production [GWh]	135,248.3	145,065.7	155,469.1
Relation	**96.21%**	**96.26%**	**95.99%**

Table 7: Net/gross electricity production 2003-2005[14]

[12] Calculation based on the annual consumption of fossil fuels and accordant net calorific values, for details see Annex 2

[13] TEİAŞ, see http://www.teias.gov.tr/istatistik2005/35.xls (accessed on July 19th 2007)

[14] TEİAŞ, see http://www.teias.gov.tr/istatistik2005/34.xls (accessed on July 19th 2007)

Multiplying these overall gross/net relation percentages with the fossil fuels generation amount does in fact mean an approximation. However this is a conservative approximation as the consumption of plant auxiliaries of fossil power plants is higher than for the plants that are not included in the baseline calculation. In the end this would lead to a lower net electricity generation and therefore to a higher OM emission factor and higher emission reductions.

The following table shows the resulting net data for fossil fuel generation and adds electricity imports.

Net el. production by fossil fuels and import 2003-2005 [GWh]			
	2003	**2004**	**2005**
Net electricity production from fossil fuels	101,003.0	100,459.1	117,229.3
Electricity import[15]	1,158.0	463.5	635.9
Electricity supplied to grid by relevant sources	**102,161.0**	**100,922.6**	**117,865.2**

Table 8: Electricity supplied to the grid, relevant for OM

Electricity import is added to the domestic supply in order to fulfil the Baseline Methodology requirements. Imports from connected electricity systems located in other countries are weighted with an emission factor of 0 tCO_2/MWh.

The last step is to calculate the ratio of emissions and generation:

OM emission factor 2003-2005 [tCO_2/MWh]			
	2003	**2004**	**2005**
OM emission factor	**0.739**	**0.756**	**0.810**

Table 9: OM emission factor for 2003-2005

The Baseline Methodology allows two data vintages for the calculation of the OM emission factor:

- *Ex ante*: A 3-year average, based on the most recent statistics available at the time of PDD submission
- *Ex post*: The year in which project generation occurs, if the OM emission factor is updated based on ex post monitoring

As the necessary data to show a 3-year average OM emission factor is available, the ex ante approach is chosen for the project at hand. This again is assumed to be a conservative approach, as the share of fossil fuels in the Turkish generation mix tends to rise in the future, as shown in chapter A.4.4.

The mean value of the 2003-2005 figures as shown in Table 9 shall be applied. Therefore the OM emission factor is **0.7683 tCO_2/MWh**.

[15] TEİAŞ, see http://www.teias.gov.tr/istatistik2005/34.xls (accessed on July 19th 2007)

STEP 2: Calculation of Build Margin emission factor:

According to the Baseline Methodology the Build Margin emission factor EF_{BM} is calculated as the generation-weighted average emission factor of a sample of power plants *m* for a specific year, as follows:

$$EF_{BM}[tCO_2 / MWh] = \frac{\sum_{i,m} F_{i,m} * COEF_{i,m}}{\sum GEN_m}$$ ***Formula 2***

Where

$F_{i,m}$ is the amount of fuel *i* consumed by relevant power sources *m;*

$COEF_{i,m}$ is the CO_2 emission coefficient of fuel *i*, taking into account the carbon content of the fuels used by relevant power sources *m;*

GEN_m is the electricity (MWh) delivered to the grid by source *m*.

Calculation of the Build Margin is based on the sample of plants, which consists of either:

- the five power plants that have been built most recently, or
- the most recently built power plants capacity additions to the electricity system that comprise 20% of the system generation (in MWh).

From these two options the sample group that comprises the larger annual generation shall be used.

For the project at hand, a list of recently built power plants was made available by the state-owned Turkish Electricity Transmission Company (TEIAŞ), naming their capacity, type of utility (e.g. IPP, autoproducer, BOT), fuel type and date of commissioning. The list does not contain data about the annual electricity generation or even fuel consumption, which would be necessary to calculate the Build Margin emission factor according to the above stated model. It was not possible to obtain more detailed data from official sources.

Furthermore, the characteristics of recent capacity additions pose some challenges:

- The five most recently built power plants add up to a capacity of 105.6 MW and represent approximately 0.25 percent of the overall Turkish annual generation, which in 2006 amounted to (gross production) 175.9 TWh[16], and thus by far do not reach the 20% threshold.
- Alternatively the Build Margin can be calculated by using the latest capacity additions comprising 20% of the system generation. Due to the lacking generation data for each plant in the list, it is only possible by use of an approximation. 20% of 175.9 TWh amount to 35.2 TWh. Assuming for all the plants on the list an average full load hour for each fuel type based on the generation and capacity between 2004 and 2006, the latest 161 plants would add up to 24%. The oldest plant in the list adds more then 4% to the sample group's generation and thus is fully included in the calculation.

For calculating the most recent 24% of the generating units built, the data from TEİAŞ[17] is used. The derivation of the values presented in Table 10 is contained in a separate excel file which is available for validation.

[16] Turkish Statistic Institute, http://www.tuik.gov.tr/PreHaberBultenleri.do?id=464&tb_id=3 (accessed on July 19th 2007)

[17] TEİAŞ http://www.tuik.gov.tr/PreHaberBultenleri.do?id=464&tb_id=3, http://www.teias.gov.tr/istatistik2005/35.xls, http://www.teias.gov.tr/istatistik2005/3.xls

Energy type	Average full load hours 2004-2006 [h]	03/2003 - 08/2007		BM emission factor [tCO_2/MWh]
		Capacity additions [MW]	Equivalent generation [MWh]	
Natural Gas	6,295	4,192.6	26,391,781	0.4390
Lignite	3,869	530.7	2,052,985	1.1018
Coal	6,724	1,506.0	10,125,831	0.8230
Liquid Fuels (Fuel Oil, Motor Oil, LPG, Naphtha)	1,358	306.3	415,833	0.6669
Hydro	3,338	824.5	2,752,221	0
Wind	2,435	3.6	8,645	0
Geo	5,952	8.0	47,321	0
Other	3,151	197.9	623,641	0
Total	**4,188**	**7,569.5**	**42,418,309**	**0.5295**

Table 10: Build Margin calculation

The wind Bares, Anemon, Karakurt and Mare are not included in the Build Margin calculation, as they are registered as VER projects.

In order to generate a weighted Build Margin emission factor, at first the emission factors for each energy source have to be calculated:

Fuel Specific emission factors
Fuel specific carbon content factors (tC/TJ) have been taken from the "2006 IPCC Guidelines for National Greenhouse Gas Inventories"[18].

Electrical efficiency rates: There are no power plant specific efficiency data available. Therefore average efficiency rates from Turkish fuel consumption and electricity generation statistics were calculated and rounded up in order to be conservative. These rates were checked for plausibility by comparing them with values from the European Commission's "Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques for Large Combustion Plants" (July 2006). The derivation of the data is presented in a separate Excel file, which is available for validation.

The following table shows the plant specific emission factors calculated from the carbon dioxide emission factor of the fuel and the technology specific average efficiency.

Energy source	Emission Factor [tCO_2/MWh]	Efficiency	BM emission factor [tCO_2/MWh]
Natural Gas	0.2020	46%	0.4390
Lignite	0.3636	33%	1.1018
Coal/ Anthracite	0.3539	43%	0.8230
Fuel/Motor Oil	0.2668	40%	0.6669

Table 11: Fuel specific CO_2 emission factors

[18] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Table 1.4

Equivalent electricity generation
The equivalent electricity generation $EquivGEN_{BM,j}$ for each fuel type *j* of the most recent 24% of the generating units built is calculated as follows:

$$EquivGEN_{BM,j}\ [MWh] = CAP_{add,03'03-08'07,j}\ [MW] * FLH_{av\ 2004-06,j}\ [h] \qquad \textbf{Formula 3}$$

Where:

$CAP_{add,03'03-08'07}$	are the capacity additions between March 03 and August 07
$FLH_{av\ 2004-06,j}$	are the average full load hours per fuel type *j* of the years 2004-2006

For calculations see Table 10 above.

The applied data result in a weighted Build Margin emission factor of **0.5295 tCO_2/MWh**.

STEP 3: Baseline emission factor

The baseline emission factor is the weighted average of the Operating Margin emission factor and the Build Margin emission factor. According to ACM0002 the default weight values for the wind power projects are 75% for OM and 25% for BM, which leads to following formula:

$$EF = 0.75 * EF_{OM} + 0.25 * EF_{BM} \qquad \textbf{Formula 4}$$

The resulting baseline emission factor is **0.7086 tCO_2/MWh**.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered VER project activity:

For the explanation of how and why the project activity leads to emission reductions that are additional to what would have occurred in the absence of the project activity and therefore does not represent the baseline scenario, the Baseline Methodology refers to the consolidated "Tool for the demonstration and assessment of additionality"[19], that defines a step-wise approach to be applied to the proposed project.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations.

Sub-step 1a. Alternatives to the project activity

In the absence of the project activity, the accordant amount of electricity would be delivered through the grid, which to a large extent is fed by fossil sources, leading to carbon dioxide emissions. Demand for electricity in Turkey is growing quickly, therefore additional capacities are necessary. The following figure and related data show the future trend of electricity generation, whereas generation from non-hydro renewables and especially from wind is not part of the business as usual scenario:

[19] Version 03, see http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf (accessed at July 25th 2007).

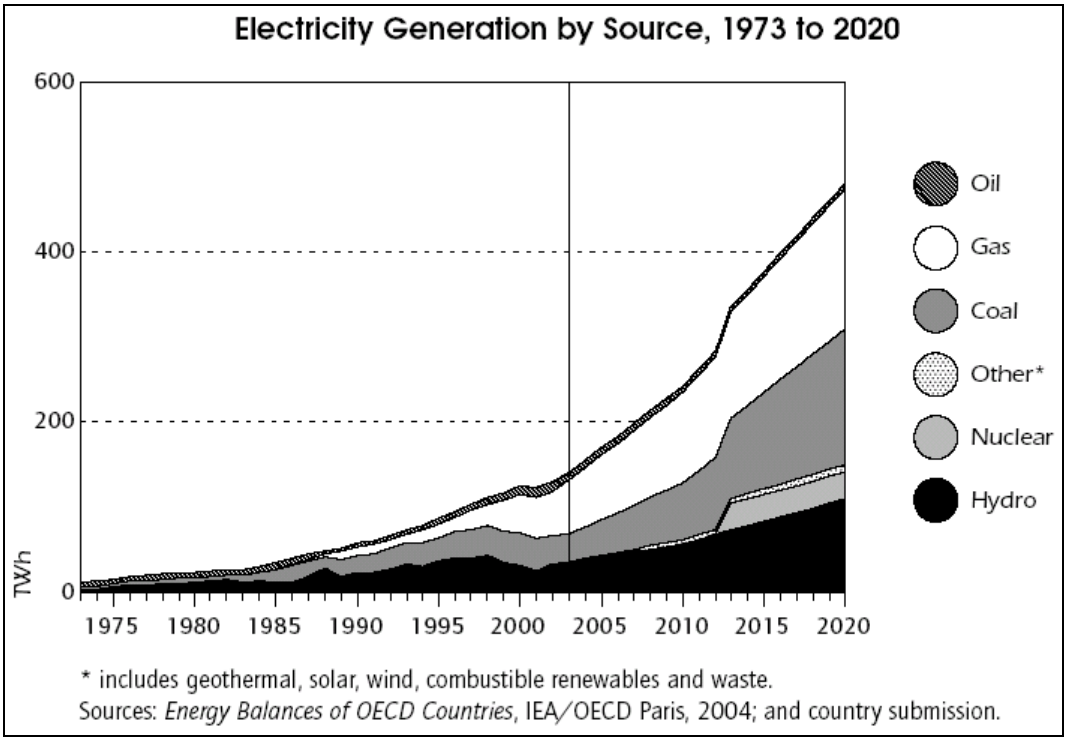


Figure 3: Electricity Generation by Source, 1973 to 2020[20]

This graph is accompanied by the following estimations regarding the development of the share of sources for electricity generation:

	2003	**2010**	**2020**
Electricity Generation [TWh gross]	140.58	242.02	481.38
Output shares (%)			
Coal	23.0	27.3	33.3
Oil	6.5	2.9	1.3
Gas	45.2	44.1	34.3
Comb. Renew. & Waste	-	-	-
Nuclear	-	-	6.6
Hydro	25.1	23.6	22.8
Geothermal	0.1	0.2	0.1
Solar/Wind/Other	0.0	2.0	1.7

Table 12: Development of Electricity Generation and Sources[21]

These data are confirmed by current plans for new lignite power plants – a part of the Turkish strategy to decrease import dependency.

Besides rehabilitation and replacement of existing power plants and reduction of transmission and distribution losses, new capacities have to be added to satisfy demand in the medium and long term. These capacity additions will be carried out amongst others by private investors, as publicly-owned generators have not been allowed to make investments in new power plants since 2001, the time of economic depression. Private investors again face some difficulties in deciding large investments in the

[20] See IEA (International Energy Agency): Energy Policies, Turkey 2005 Review, 2005, p. 134

[21] See IEA (International Energy Agency): Energy Policies, Turkey 2005 Review, 2005, Annex A, p. 171

current situation of state-defined low prices especially in the baseload segment, as they have to compete with fully depreciated state-owned power plants.[22]

Regarding the baseline scenario, which is characterised by the above described status and development of the Turkish generation mix, it is not in the hands of İnnores as project participant to influence the future mix. İnnores can only chose between investing or not investing into the proposed project and thus has no further alternatives.

DOST Enerji Üretim, the owner of the license holding company İnnores, was founded in 2006 with the intention to invest into renewable electricity projects and operate them as an independent power producer. The decision in favour or against a project investment depends on the expected revenues and risks, like for every other private investment. Investment decisions other than Yuntdağ WPP are independent from the question whether Yuntdağ is built or not. Thus, to keep a consistent and credible view that reflects the investor's decision concerning Yuntdağ WPP, the only two possible baseline scenarios are the following:

1) **Continuation of the current situation, i.e. Yuntdağ wind farm is not built**

2) **The proposed project activity undertaken without being a Gold Standard VER project**

With analysing these two alternative scenarios within the additionality test, consistency with the baseline definition of ACM0002 is assured. ACM0002 defines the baseline scenario as the amount of electricity that would be delivered to the grid by the project activity, generated by the operation of existing grid-connected power plants and by the addition of new generation sources, as reflected by the combined margin. In the following it will be shown that this baseline scenario (= scenario 1) is the most plausible scenario in this case and that the implementation of the proposed project is additional to what would occur in the absence of the proposed project.

Sub-step 1b. Consistency with mandatory laws and regulations

It is obvious that both alternatives are in compliance with all mandatory applicable legal and regulatory requirements – not building a wind farm as well as building one.

Step 2. Investment analysis

Investment analysis is not applied.

Step 3. Barrier analysis

Sub-step 3a. Barriers that would prevent the implementation of the proposed GS-VER project activity

The main barriers for renewable energy investments in Turkey are the lacking financial incentives, uncertainty about the future national policy, currency risks, lacking experience and disadvantages compared to conventional technologies with view to the regulatory framework. The carbon market turns out to be an innovative and effective element of an "enabling environment" for new renewable sources for electricity generation in Turkey. While the national policy can concentrate on the manifold aspects how to support the rapidly developing economy, funds from international credit buyers help the simultaneously fast growing electricity market to pursue a sustainable path by alleviating barriers which project developers face. The following barriers partly apply in general to all wind power projects, partly to projects in the specific regions and again partly are project specific.

System usage fee

Wind projects do especially suffer from the regulation concerning fees for the public grid system usage. The system usage fee, that has to be paid to TEİAŞ, is calculated on the basis of the installed capacity of

[22] See IEA (International Energy Agency): Energy Policies, Turkey 2005 Review, 2005, p. 135

a power plant. For conventional power plants, which use their installed capacity to some 80 to 85 percent to generate electricity, this means a much lower relative burden than for wind power plants, which use their capacity only to some 40%. Demands for calculation of system usage fee on the basis of actual output are rejected by TEİAŞ.[23] This shows the barrier for scenario 2, the investment into a wind farm that scenario 1 does not face. Quite the contrary, the system usage fee's design privileges conventional power sources, as they generally use their installed capacities to a relevantly higher degree than wind and other renewable sources.

Moreover, the height of the system usage fee is unevenly regionally distributed over Turkey. Wind farms again suffer from the fact that the system usage fee in the Turkish western, where most of the wind sites are located due to the good wind conditions, is among the highest in Turkey. This leads again to financial advantage of conventional power plants that are less dependent on site specific characteristics. Location of Yuntdağ WPP is classified as Region 1 within the TEİAŞ system tariff. The second highest usage fee is applied in this region, which is 218 times higher than the lowest usage fee of other regions (e.g. Region 7 and 10).[24]

Situation with respect to market liberalisation

Wind power can hardly profit from electricity market liberalisation. Though they have the possibility to close contracts with private electricity buyers, who would pay higher prices than the state owned electricity distributor TEİAŞ, but then face the risk that they have to supply electricity also in times where the wind farm does not produce. This means they have to buy the contractual amounts on the market, most probably for a higher price than they sell it to their customer, thus producing financial losses with every kilowatt hour that has to be delivered without the wind farm producing. As this risk is hardly calculable, wind power producers rely to the very low, but guaranteed prices TEİAŞ pays. Operators of conventional power plants can profit from liberalisation, as they can more flexibly adapt generation to actual demand.

Price cap for renewable electricity

Concerning the guaranteed feed-in tariff for renewable electricity, with Law of Utilization of Renewable Energy Resources for the purpose of energy generation, it is defined as a minimum price of 5 Eurocent per kWh for 10 years for the plants put in operation before the year of 2012. However there is also a maximum price of 5.5 Eurocent per kWh which has to be paid to the producer. This regulation does not exist in other incentive schemes for renewable electricity in Europe. Anyway, since some 50 percent of electricity generation in Turkey is by the state, any competition above the 5 Cent threshold is limited, as the state can regulate the electricity supply and with this influence the prices.

Privatisation of electricity distribution

While the ongoing privatisation activities do not bring any chances for wind power producers, they rather contain the risk of rising distribution fees. All these uncertainties have to be considered within the financial and investment planning of the project and complicate access to equity and loans for wind power investments.

High financing costs due to perceived risks in the international market

Turkish project developers face high costs when they try to obtain export credit insurance due to high perceived country risk of Turkey in the international market. With the perceived risks of an investment into the newly applied technology (Yuntdağ is still one of the first private investments into wind power) in Turkey, the costs for export credit insurance would have been prohibitive, so that DOST had to abandon it. Without export credit insurance, conditions for credit financing included additional burdens and

[23] See speech by Mr. Tolga Bilgin, chairman of Ressiad (Wind Power and Hydro Power Plants Businessmen's Association) on March 9th, 2007 in Istanbul. Internet: http://www.ressiad.org.tr/makaleler.php?ID=62 (accessed on July 2nd, 2007)

[24] See TEİAŞ Committee decision http://www.epdk.org.tr/tarife/elektrik/iletim/1029/1029.html (accessed on August 1st, 2007)

commitments for DOST. Instead of a 15 year pure project financing loan, DOST only got a loan with 10 years duration and right of recourse for the lender.

Availability of dept financing

The barriers described above contribute to the largest barrier being the low attractiveness of the project to investors and therefore the difficulties in obtaining debt funding. This was the major problem in project development due to the low IRR combined with the high risks involved with implementation of a not common project type in Turkey. Generally investment in Turkey is associated with relatively high risks – especially after the economic crisis in 2001 – which makes access to international capital markets difficult. Beside the generally high perceived country risks in Turkey, the disadvantages and risks associated with the inexperienced wind market and technology in Turkey lead to difficulties in finding a reasonable offer for debt financing. This kind of investment barrier is also getting obvious by analysing the Turkish wind power development. Despite good wind conditions, some 40 wind licenses are waiting for implementation into a project since years, most of them untouched, some of them offered for sale, some soon running out, all because of lacking financing for wind power projects. The letter from 23 January 2007 by Garanti bank confirms that the application of the carbon credit concept, in this case the international market for VERs (Voluntary Emission Reductions), positively influenced the financing decision for Yuntdağ Wind Farm.[25] The advantage of the VER generation and sale is the long term sale agreements and the quotation of the income in a hard currency, in Euro.

Sub-step 3b. The identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)

As the above presented barriers are largely specific to wind power projects, they do not – or at least less – affect the alternatives that are included in the baseline scenario of ACM0002, namely the electricity generation by existing grid-connected power plants and the addition of new – and in this case especially conventional, thus GHG emitting – generation sources.

Alleviation of the identified barriers by the GS VER income

The major problem in project development being the availability of debt financing, the identified barriers and economic and financial hurdles described above will be overcome by additional revenues from generation and selling of Gold Standard Voluntary Emission Reductions (GS-VERs).

As for corporate decisions, financial ratios are a relevant basis, the effect of GS-VER registration shall be analysed on the basis of the internal rate of return (IRR). For electricity sales, the numbers from the internal calculations of DOST/İnnores, taken from a conservative approach of the feasibility assessment and micrositing, are used. The columns show the IRR values for one and two crediting periods, respectively. This approach is still conservative, as the project proponent assumes to re-validate and continue the project for two more periods, thus for the maximum period of 21 years.

Assumptions:

- Electricity generation: 160,834 MWh p.a.
- Emission reductions: 113,964 tCO_2e p.a.
- GS-VER price of 6 Euro, alternative price for official Kyoto credits 15 Euro
- One or two crediting periods

[25] See letter by Garanti bank, January 23rd 2007

	IRR without GS-VER project	IRR with GS-VER price of 6 EUR/ton 1 crediting period (7 years)	IRR with GS-VER price of 6 EUR/ton 2 crediting periods (14 years)	IRR with CER/ERU price 15 EUR/ton 1 crediting period (7 years)	IRR with CER/ERU price 15 EUR/ton 2 crediting periods (14 years)
10th year	4.06 %	5.21 %	5.45 %	6.82 %	7.37 %
20th year	10.08 %	10.79 %	11.12 %	11.81 %	12.57 %

Table 13: Impact of GS-VER sale on IRR

The impact of integrating GS-VER sales into the project calculations is already getting evident by only considering the first 7 year crediting period. It is getting even more obvious when also the second crediting period is taken into account, assuming the same values for electricity generation and emission reductions as in the first period. For a potential investor or lender, not only the added value to the IRR is an important argument for investing into the project but also the fact, that the project developer considered all possible sources of income, thus showing a responsible and careful handling of investment projects.
In case Turkey ratifies the Kyoto Protocol and becomes a JI or CDM host country, the project developer intends to upgrade the Yuntdağ GS-VER project to be registered as a JI or CDM project activity. Appropriate provisions will be made in any Emission Reduction Purchase Agreements closed by the project developer.

Step 4. Common practice analysis

Sub-step 4a. Other activities similar to the proposed project activity

At the moment, 56 licenses for wind power plants are issued by EPDK, the "Electricity Market Regulation Agency".[26] As there is no official information available about the status of the projects, own observations have to give an impression of the proceedings on the Turkish wind market.

According to the IEA country report, four wind power plants were installed before 2006, adding up to 20.1 MW[27]. This is confirmed by information from Ressiad[28] and TEİAŞ[29], providing further details about the projects. From 2006 on, wind market activities can be observed by the increasing informal activities between the different players on conferences and fairs as well as the growing networks. Known realised projects since 2006 are Bares and Karakurt, Mare and Anemon. With this, the following wind parks are known to exist so far:

[26] See http://www.epdk.org.tr/lisans/elektrik/lisansdatabase/verilentesistipisorgula.asp (accessed on July 11th 2007)

[27] See IEA (International Energy Agency): Energy Policies, Turkey 2005 Review, 2005, p. 123

[28] Ressiad: Wind Power and Hydropower Plants Businessmen's Association, www.ressiad.org.tr

[29] Turkish Electricity Distribution Company, www.teias.gov.tr

Nr.	Plant	Operator	Model	Capacity [MW]	Region	Operation
1	Delta Plastik	Demirer Holding	Autoproducer	1.50	İzmir	Aug 1998
2	ARES	Güçbirliği Holding	BOT	7.20	İzmir	Dec 1998
3	BORES	Demirer Holding	BOT	10.20	Çanakkale	Jun 2000
4	Sunjüt	Demirer Holding	Autoproducer	1.20	İstanbul	April 2005
5	Bares	Bares Elektrik	IPP	30.00	Balıkesir	May 2006
6	Tepe	Ertürk	IPP	0.85	İstanbul	Sep 2006
7	Anemon	Anemon Elektrik	IPP	30.40	Çanakkale	Feb 2007
8	Karakurt	Deniz Elektrik	IPP	10.8	Manisa	Apr 2007
9	Mare	Enercon-Demirer	IPP	39.2	Çeşme, İzmir	Apr 2007

Table 14: Wind Power Plants in Operation

Concerning the first three plants, they were built before 2001, the year of economic crisis. Two of them are realised as BOT (Build Own Transfer) plants, that means stately owned and with guaranteed income. The other one is very small and serves to feed industry plants with electricity, thus based on a different business model than IPP (Independent Power Producer) wind power plants with the purpose to sell electricity to the grid. This description applies also to Nr. 4.

Nr. 5, 7,8 and 9 are the first real private investments into large wind power with the purpose of earning money from electricity sale (IPP – Independent Power Producer). All four are realised with the help of carbon credits, with Bares and Karakurt being validated VER projects and Anemon and Mare as Gold Standard VER projects in the validation stage.

It is more difficult to get an impression of the ongoing developments regarding wind power plants that shall soon be built. From what is known to the project developer, three more VER and GS-VER wind power projects are underway to be built and completed until early 2008, one of them being the already validated VER project 30 MW Sebenoba wind farm, built and operated by Deniz Elektrik. No developments of wind parks without carbon financing are known.

Sub-step 4b. Discussion of similar option that are occurring

As shown above, the observed activities in the Turkish wind market can either not be considered similar, as they were realised under a different environment, or do not have to be included in this analysis since they are realised as VER or GS-VER projects. For only one project (Nr. 6 from Table 14) with 0.85 MW installed capacity there is no further information on the circumstances for their implementation. Nevertheless, their size alone gives a reason for not including them into the common practice analysis, as the investment risks are far away from those for Yuntdağ. Thus, no similar options occur, showing that wind power is far from being common practice in Turkey.

Summarizing the above one can state that the commercial risks are high for this project. Without GS-VERs income, the proposed project does not represent an economically attractive investment opportunity. Taking into consideration the significant technological and investment barriers and barriers due to prevailing practice in connection with renewable energies and specifically with wind energy in Turkey, investors are unlikely to invest into the project in the absence of carbon finance.

The emissions reductions from the proposed project are therefore additional to what would have occurred in the absence of the GS-VER project activity.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity:

The project consists of the 17 wind turbines that are connected to the grid via a 26 km transmission line. The wind power project does not comprise any emission sources.

	Source	Gas	Included?	Justification/Explanation
Baseline	Generation mix of Turkish electricity grid	CO_2	Yes	ACM0002 assumption: Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.
Project Activity	Construction and operation of WPP	CO_2	No	Project emissions are negligible during construction and non-existent during operation, as a net electricity generation approach is chosen.

For the purpose of determining the build margin (BM) and operating margin (OM) emission factor, the project electricity system is defined as the overall Turkish electricity network. According to TEİAŞ, the Turkish transmission system is interconnected. There is no independent Çanakkale regional electricity system or any significant transmission constraints.

For electricity imports from neighbour countries, the emission factor of 0 tons CO_2 per MWh is applied.

B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity (ies) determining the baseline:

Date of completion: 12 Nov 2007

Name of entity determining the baseline: FutureCamp GmbH, Germany (project consultant)
Tel: +49 (89) 68 008-330
Fax: +49 (89) 68 008-333
Email: climate@future-camp.de
Contributor: İnnores Elektrik Üretim AŞ

FutureCamp is not a project participant.

SECTION C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

Construction works are expected to start in November 2007. With this, the project activity begins in November 2007.

C.1.2. Expected operational lifetime of the project activity:

The expected lifetime of the Yuntdağ WPP project is 20 years.

C.2 Choice of the crediting period and related information:

A renewable crediting period has been selected for the project.

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

The first crediting period starts with commissioning of the wind power plant expected to be in March 2008. The first day of the crediting period will be documented in the initial monitoring report, as it is the same as the first day of electricity delivery to the grid, stated by meter reading records signed by TEIAS.

C.2.1.2. Length of the first crediting period:

7 years, 0 months.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not applicable

SECTION D. Application of a monitoring methodology and plan

D.1. Name and reference of approved monitoring methodology applied to the project activity:

Approved Monitoring Methodology ACM0002 (Version 06), which is the consolidated monitoring methodology for grid-connected electricity generation from renewable sources, is applied.

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

Application of this methodology to Yuntdağ WPP is justified because:

- the approved methodology ACM0002 for baseline determination is used,
- the project activity is connected to the grid and information on its characteristics is available,
- electricity generation from the wind energy sources,
- this is not a fuel-switch project.

D.2.1. OPTION 1: Monitoring of the emissions in the project scenario and the baseline scenario

As the necessary baseline emission factors are all defined ex ante (Operating and Built Margin, see baseline description), the only information to be monitored is the amount of electricity fed into the grid by Yuntdağ WPP. This value will be monitored continuously by redundant metering devices, one of them being the main one in the Yuntdağ substation, which provides the data for the monthly invoicing to TEİAŞ.

The collected data will be kept by İnnores during the crediting period and until two years after the last issuance of VERs for the Yuntdağ WPP project activity for that crediting period.

Given a data vintage based on ex ante monitoring and selection of a renewable 7 year crediting period, the Combined Margin will be recalculated at any renewal of the crediting period using the valid baseline methodology ACM0002.

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Left blank on purpose, as the proposed project activity does not lead to any project emissions.

D.2.1.2. Data to be collected in order to monitor project performance on the most sensitive sustainable development indicators:

The Gold Standard requires to include those indicators into the monitoring plan that are either crucial for an overall positive impact on sustainable development or particularly sensitive to changes in the framework conditions and/or where the public consultation has yielded concerns of stakeholders. The project's overall positive impact on sustainable development is the fact that greenhouse gas emissions from electricity generation are reduced as well as the implementation of the environmental sound technology in Turkey. Both aspects are naturally part of the monitoring: emission reductions are monitored and can only happen when the plant is built and operating. Further particularly sensitive indicators were not identified and no concerns have been raised by stakeholders. Because of this, no requirements emerge from the Gold Standard rules to include additional indicators into the monitoring plan.

However, in order to take up and support the philosophy of the Gold Standard and as a result of the discussion during the on-site validation meeting, the following specific indicators, which seem to be suitable to represent the project's social and environmental impacts, were identified and included into the monitoring plan.

Sustainable Development Indicator	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Rationale
Local job creation		Number and type of jobs and completed trainings		m	The direct creation of new jobs is one major positive social impact of the project activity. At the time of PDD writing, the final structure and number of the staff has not yet been determined. Thus, this shall be included into the monitoring plan. Not only the project developer himself, but also his subcontractors (esp. during construction works) will resort to local people in order to avoid costs for moving or large travels. The first monitoring report shall contain a section on employment by the project developer and plant operator during the construction phase and the first year of operation. With the help of the labour contracts and job descriptions, the number and types of new jobs will be presented. In addition, training plans and certificates will be presented in order to demonstrate the creation of qualified jobs and improvement of human capacities at the local level. The following monitoring

					reports will keep at this issue by demonstrating the continued employment, further trainings and any changes of the staff.
Use of the new road		*Qualitative indicator*		e	The new road (description see section F) is the main lasting change in the direct environment of the villagers due to the project activity. During the stakeholder consultation it was repeatedly confirmed that the villagers' expectation is less traffic through the village center and a better connection to the surroundings, especially as the road will be asphalted. In order to document this positive impact, the village's officials, including the headman, shall be interviewed after one year and asked about their impression of changes in the traffic. The initial monitoring report shall contain a section an accordant section and show the results of the enquiry.
Bird collisions		*Number of bird collisions*		m	As part of the impacts of the proposed project on biodiversity, bird kills shall be observed and documented. As no continuous observation is practicable, the Muhtars (mayors) of the three nearby villages, Balaban, Yuntdag and Koyuneli, shall be asked for a statement regarding bird kills at the end of a monitoring period. It is assumed that villagers and farmers will report observed bird kills either to the Muhtar or to Innores. This might lead to the miss of singular cases of bird kills, which is deemed to be negligible.

D.2.1.3. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO2 equ.)

Project emissions are zero.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

1. GEN_y	Net electricity delivered to the grid	Electricity Meter	MWh	m	Continuously	100%	Electronic and paper	The data will be taken from the monthly meter readings, documented in the "meter reading record". The latter serves as basis for the settlement notification by TEİAŞ and the following invoicing by İnnores.

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO2 equ.)

Baseline emissions are calculated by using the following formula:

$$BE_y = GEN_y * EF$$ ***Formula 5***

Where:

BE_y	Baseline emissions [tCO_2e]
GEN_y	Annual electricity supplied by the project to the grid [MWh]
EF	Baseline emission factor [tCO_2e/MWh]
y	Refers to a given year

D.2.2. OPTION 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Not applicable

D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

Not applicable

D.2.3. Treatment of leakage in the monitoring plan

Potential leakage emissions in the context of power sector projects are emissions arising due to activities such as power plant construction, fuel handling and land inundation. However, according to the Methodology, those emission sources do not need to be taken into account.

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Not applicable

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

Not applicable

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

Emission reductions in year y (ER_y) are equal to the baseline emissions described in D.2.1.4. (BE_y): $ER_y = BE_y$

Transmission line losses are not included in the calculations as they are negligible, do also occur in the baseline scenario (construction of alternative, fossil fuelled power plants) and are not under the control of the project proponent.

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored

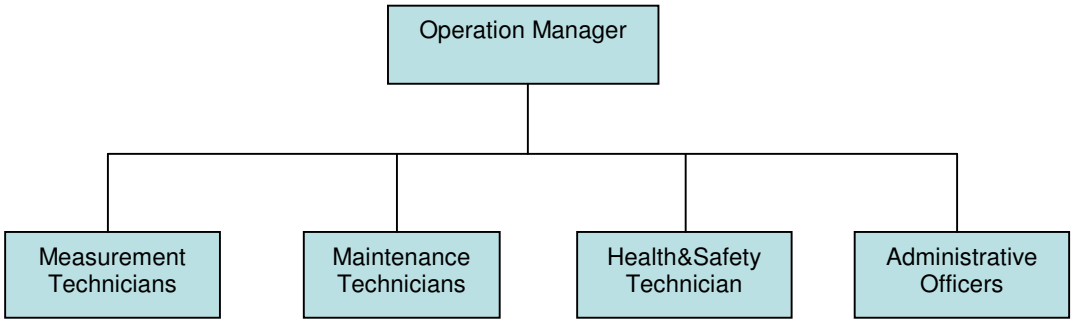
Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
Net electricity delivered to the grid (D.2.1.3.; 1. GEN_y)	Low	The Turkish Electricity Market Regulation Agency (EPDK) sets rules on the accuracy of electricity meters that are used by power plants feeding into the grid. The rules are part of the EPDK regulation 25056 from 22 March 2003. The table in Article 11 of the regulation specifies the use of electricity meters of the accuracy class 0.5S for power plants between 10 MW and 100 MW and refers to compliance with International Electrotechnical Commission's norm EN 60687. TEIAS, who's employees will monthly visit the plant for the meter readings, is in charge of ensuring the adherence to these rules. Calibration and maintenance procedures will follow the requirements. At the time of PDD writing, the exact meter model which will be used as main and redundant meter is not yet defined. At the first verification date, technical data of the meters will be provided and compliance with the rules demonstrated. The fact that two reliable best practice meters are installed in a redundant manner keeps the uncertainty level of the only parameter for baseline calculation low. High data quality of this parameter is not only in the interest of the emission reduction monitoring, but paramount for the business relation between the plant operator and the electricity buyer.

D.4. Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

As described above, the only relevant data that has to be monitored is the net electricity generation (GEN_y) per year. These data are subject to the accounting quality systems of both parties to the power purchase agreement, TEİAŞ and İnnores. With this, no additional structures or processes have to be implemented to insure the availability and high quality of the necessary data for monitoring.

At the end of each monitoring period, which is planned to generally last one year, the data from the monthly meter reading records will be added up to the yearly net electricity generation and multiplied with the combined margin emission factor with the help of an excel spreadsheet that also contains the combined margin calculation. Thus, the complete baseline approach is always transparent and traceable. For the elaboration and quality assurance of the monitoring report, FutureCamp GmbH, who already supported in the project design, is assigned.

For the operation stage, the following hierarchy is planned:



The following table contains the job descriptions and requirements as defined by the project developer for the employees search:

Job name	Job description	Graduation Level	Staff quantity	Prescribed trainings
Measurement Technician	Measuring the electricity generation through the proper methods and instruments. Data storing and reporting to Operational Manager and Grid Operator (TEIAS)	Technical high school (electricity division)	1 prs/shift (2 shifts/day)	Grid Operator's Trainings
Maintenance Technician	Making periodical and failure maintenances programmes and activities. Following and fulfilling the guarantee procedures.	Technical high school (electricity or mechanical divisions)	1 prs/shift (2 shifts/day)	Electrical Maintenance Trainings by Nordex Mechanical Maintenance Trainings by Nordex

Health & Safety Technician	Fulfilling Occupational safety and health necessities. Responding to Environmental issues. For the issues, provide the proper data flow between the company and the stakeholders. Reporting to Operational managers.	Technical high school	1 prs/shift (1shift/day)	Occupational safety and health trainings for Chamber of Mechanical Engineers. First aid trainings from Local Authority of the Ministry of Health.
Administrative Officer	Small local procurements and arrange daily transportation. Controlling and managing the safety guards activities.	High school	1 prs/shift (3 shifts/day)	Effective team work, Time management trainings from consultancy firms and associations.

Table 15: Description of jobs at the Yuntdağ wind farm

With this, nine people will be employed at the plant. At the time of PDD writing, the functions are not yet assigned to individuals. An accordant list with job descriptions and names will be provided at the first verification.

All the data needed for the calculation of emission reductions will be kept by İnnores during the crediting period and until two years after the last issuance of GS-VERs for Yuntdağ WPP.

Quality of data handling and storage is assured by the business processes between İnnores and TEIAS. The monthly meter reading documents are stored by İnnores and TEIAS, the settlement notification, which is issued by TEIAS and includes the meter reading data, is stored on a TEIAS file server and accessible for İnnores via a secured website. The meters themselves can always be read as plausibility check for verification.

Because of the data acquisition and management and quality assurance procedures that are anyway in place, no additional procedures have to be established for the monitoring plan. Dedicated emergency procedures are not provided, as there is no possibility of overstating emission reductions due to emergency cases.

D.5 Name of person/entity determining the monitoring methodology:

FutureCamp GmbH, Germany (project consultant)
Tel: +49 (89) 68 008-330
Fax: +49 (89) 68 008-333
Email: climate@future-camp.de
Contributor: İnnores Elektrik Üretim A.Ş.

FutureCamp is not a project participant.

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

There are no emissions associated with the production of electricity using wind energy.

E.2. Estimated leakage:

No leakage is identified.

E.3. The sum of E.1 and E.2 representing the project activity emissions:

The total project activity emissions are zero.

E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline: baseline:

The estimation of the anthropogenic baseline emissions is based on the expected electricity generation, which amounts to 160,834 MWh p.a. and the above calculated baseline emission factor (for formula description see D.2.1.4). The yearly average baseline emission amount to **113,964 tCO_2e p.a.** and over the period of 7 years **797,745 tCO_2 eq.**

E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity:

As project emissions and leakage emissions equal zero, only baseline emissions are relevant (BE_y). Therefore, amount of the emission reductions equals the amount of the baseline emissions.

E.6. Table providing values obtained when applying formulae above:

Year	Estimation of project activity emission reductions (ton CO_2e)	Estimation of baseline emission reduction (ton CO_2e)	Estimation of leakage (ton CO_2e)	Estimation of emission reductions (ton CO_2e)
May 2008	0	75,976	0	75,976
2009	0	113,964	0	113,964
2010	0	113,964	0	113,964
2011	0	113,964	0	113,964
2012	0	113,964	0	113,964
2013	0	113,964	0	113,964
2014	0	113,964	0	113,964
April 2015	0	37,988	0	37,988
Total	**0**	**797,745**[30]	0	**797,745**

[30] Emission reductions are calculated in Excel table, where values are considered with 9 decimal places. In the PDD at hand the presented values are rounded up, therefore the total number of emission reductions does not equal the sum of the yearly emission reductions.

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

It was confirmed by the regional environmental authority with a certificate from 12 Jan 2005 that an official Environmental Impact Assessment (EIA) is not required for the proposed project. The need for an EIA is checked by the regional authority on a project specific base and considers the local conditions. For the 26 km transmission line however, an Environmental Impact Assessment has been carried out. The authority approved its construction as no critical negative environmental impacts have been identified and all requirements are fulfilled.

The works on the infrastructure include some road extensions and constructions:

- an existing road from Yuntdag village to the plant site has to be widened by 2.5 meters on a 150 meter section
- a new 1700 meter road has to be built as bypass around the village, as the road through the village is too narrow. The local authorities and the headman of Yuntdag were involved into the planning process and chose the route

Both road construction works take place on empty and unused land without the need for tree cuttings and thus do not have any negative influence on the soil quality, while the reduction of soil is negligible due to the unfertile character of the soil. Building of the new road is welcomed by the villagers and their representatives, as it will reduce the traffic through the village not only for the time of construction works, but also permanently. At the stakeholder meeting, the villagers especially welcomed the fact that the new road will be asphalted and thus mark a real improvement of the infrastructure of the village.

All potential environmental issues were discussed in detail on the stakeholder consultation, however no objections or critical opinions were received. The evaluation of social and environmental indicators within the Sustainable Development Assessment Matrix (see section A.2.) builds on the findings and experiences of the stakeholder consultation meeting as well as on common sense regarding the wind power plant technology. This analysis confirmed that no EIA is necessary. No negative or critical indicators were identified, which means that no additional indicators have to be included into the monitoring plan. The total score of the Sustainable Development Assessment Matrix is +9.

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

There have not been identified any significant environmental impacts of the project.

SECTION G. Stakeholders' comments

G.1. Brief description how comments by local stakeholders have been invited and compiled:

The local stakeholders' comments invitation and compilation process applied was as follows:

Initial Stakeholder Consultation

The initial stakeholder meeting took place on the July 25th in a village nearby the future project site – Koyuneli.

In order to analyze the project impacts in detail including environmental, social and economical aspects, participants from the following four groups took part in the meeting:

- local people from neighbouring villages
- local and national representatives of various NGOs
- university deputies
- authorities of the related ministries

Additionally representatives of the REC Turkey (Yunus Arıkan) and of the Turkish Focal Point (Mustafa Şahin) were invited but could not attend. Altogether 25 official invitations were send including a short explanation of the Gold Standard proceedings and a brief description of the Yuntdağ WPP project. At the end the stakeholders were called in order to confirm the participation in the meeting. In order to prove that the wide range of stakeholders were invited, on enquiry the courier mail receipts will be made available.

Local people were invited a week before the meeting by announcements in the local and national newspapers and via public notes, amongst others in the village central coffee house (Figure 4), which locally is the most frequently visited tavern.

Figure 4: Announcement in the window of the village central coffee house

The meeting itself took place in the above mentioned coffee house. Altogether 57 participants attended the meeting, among them the following officials:

- 1 observer from the Ministry of Environment and Forestry (representative of the National Focal Point)
- 3 deputies from the İzmir division of Ministry of Agriculture
- 1 deputy of İzmir division of Ministry of Health
- Mayor of the Koyuneli Village
- Mayor of the İsmailli village

At the beginning the non-technical PDD was distributed to all participants along with the meeting agenda and the attendance list.

The first speaker Mr. Doğrusoy, who is the general manager of İnnores, presented the project idea including its characteristics such as generation of clean energy and contribution to the sustainable development in Turkey. Mr. Doğrusoy also shared his belief that this project will be a good example for other companies developing wind power projects.

Afterwards a comprehensive presentation was made, which comprehended the following information:

- details regarding project developer
- technology description of the implemented project
- estimated volumes of emission reductions
- size of revenues from GS-VERs sale
- characteristics of Gold Standard
- project features, which differentiate Yuntdağ WPP from other wind parks in Turkey

Environmental and social aspects influencing the project were analysed using the Gold Standard Checklist (defined in the Gold Standard VER Manual for Project Developers[31], Appendix E). Results are summarised in the Sustainable Development Assesment Matrix in Annex 3.

Main Stakeholder Consultation

For the main stakeholder consultation process, the following documents were made publicly available:

- The original and complete PDD (English language)
- A non-technical summary of the PDD (Turkish language)

The English version of the non-technical summary as well as the report on the initial stakeholder consultation were available on enquiry.

The PDD was made available

- on the Gold Standard website from 10 August on.
- on the Website of the DOE (SGS) from 10 August 2007 on.

The PDD and the Turkish non-technical summary were made available

- on the website of the project “Promoting Climate Change Policies in Turkey” of REC Turkey and the Turkish ministry of environment and forestry from 22 August 2007 on,
- as hardcopy at the central coffeehouse in Koyuneli village from 21 August to 22 October 2007.

Stakeholders comments were actively invited by

- posting an email on the internationally diffused and well-known ‘Climate-L’ news and announcement list by IISD reporting services[32] in an email from 22 August 2007,

[31] CDM Gold Standard http://www.cdmgoldstandard.org/uploads/file/GS-VER_Proj_Dev_manual_final%20.pdf (accessed on August 1st 2007)

- sending letters to the list of "official stakeholders" who have already been identified and invited for the initial stakeholder consultation meeting,
- displaying announcements at the central coffeehouse at Koyuneli village and
- announcing the invitation for comments in the newspaper on 27 August 2007,

all referring to the above listed opportunities to read the PDD and the non-technical summary and to give comments over the different channels. The list of addressees of the invitation letter includes observers from different official authorities, NGOs and the Ministry of Environment and REC Turkey, who represent the Turkish Focal Point according to UNFCCC article 6.

With the last activities initiated on 22 August (publication of PDD on the Turkish Climate Change website and the posting of the Climate-L announcement), the two month period required by the Gold Standard rules for the main stakeholder consultation ended on 22 October 2007.

G.2. Summary of the comments received:

Initial Stakeholder Consultation

The overall feedback to the organized consultation, and what follows to the project, was very positive.

The questions asked during the meeting were related to direct project benefits the for the villagers, amongst others the employment possibilities. Mr. Doğrusoy specified in detail the new positions which will be created and stressed the importance of the additional source of electricity, from which all the inhabitants will profit.
Villagers also asked about the possible negative effects on health in terms of e.g. radiation comparable with the cell phone radiation. Health impacts of wind park were in detail explained and it was assured that no radiation will be generated.

Figure 5: General Manager of İnnores, Mr. Doğrusoy answering the stakeholder questions

[32] See http://www.iisd.ca/email/climate-L.htm (accessed in October 2007)

There have not been raised any critical comments nor objections for the project implementation.
Positive feedback was received in regard to the additional employment possibilities for the local people.

Main Stakeholder Consultation

One comment from the ministry of environment and forestry was received concerning two formal aspects in the PDD formulation.

G.3. Report on how due account was taken of any comments received:

Initial Stakeholder Consultation

All the comments, as well as questions and answers were written down during the meeting, which was finally signed by the mayor of Koyuneli and the general manager of İnnores. The document "Questions, answers and proposals for project", which was prepared during the meeting in Turkish is available also in English version as a separate appendix to the PDD at hand.

The Gold Standard checklist was completed by the organizers of the meeting during the discussion. All received comments regarding each point included in the checklist were written down. After the list was completed, mayor of Koyuneli and the general manager of İnnores signed the prepared document. Similarly to the above mentioned documented comments, the checklist is also available in English as a separate appendix to the PDD at hand.

Main Stakeholder Consultation

Adjustments have been carried out.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	İnnores Elektrik Üretim A.Ş.
Street/P.O.Box:	Bayar Cad. Gülbahar Sok. No: 14, Kozyatagi
Building:	
City:	Istanbul
State/Region:	
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URL:	www.dostenerji.com
Represented by:	Ruhi Dogusoy
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

BASELINE INFORMATION

DATA BASIS NEEDED FOR CALCULATION OF THE COMBINED MARGIN EMISSION FACTOR

Energy type	2006			2005		
	Installed capacity [MW]	Electricity gener. [MWh]	Full load hours [h]	Installed capacity [MW]	Electricity gener. [MWh]	Full load hours [h]
Natural Gas	12,792	77,386,900	6,050	10,976	73,444,900	6,691
Lignite	8,227	32,302,800	3,927	7,131	29,946,300	4,200
Coal	1,986	14,004,200	7,051	2,002	13,246,200	6,616
Liquid Fuels (Fuel Oil, Motor Oil, LPG, Naphtha)	4,343	7,697,700	1,773	5,758	5,482,500	952
Hydro	13,363	44,157,700	3,304	12,906	39,560,500	3,065
Wind	98	129,400	1,318	20	59,000	2,935
Geo	23	123,008	5,348	15	94,400	6,293
Other	41	91,592	2,218	35	122,400	3,467
Total	**40,873**	**175,893,300**	**4,303**	**38,843**	**161,956,200**	**4,169**

2004				03/2003 - 08/2007		
Installed capacity [MW]	Electricity gener. [MWh]	Full load hours [h]	Average full load hours 2004-2006 [h]	Capacity addition [MW]	Equivalent generation of capac. addition [MWh]	**BM emission factor [tCO2/MWh]**
10,131	62,241,800	6,144	6,295	4,192.6	26,391,781	0.439
6,451	2,449,500	3,480	3,869	530,7	2,052,985	1.102
1,845	11,998,100	6,503	6,724	1,506	10,125,831	0.823
5,690	7,670,300	1,348	1,358	306.3	415,883	0.667
12,645	46,083,700	3,644	3,338	824.5	2,752,221	0.000
19	57,700	3,053	2,435	3.6	8,645	0.000
15	93,200	6,213	5,952	8.0	47,321	0.000
28	104,000	3,768	3,151	197.9	623,641	0.000
36,824	**150,698,300**	**4,092**	**4,188**	**7,569.5**	**42,418,309**	**0.5295**

Table 16: Calculation of Build Margin (BM)[33]

[33] Basis for calculation from TEİAŞ http://www.tuik.gov.tr/PreHaberBultenleri.do?id=464&tb_id=3, http://www.teias.gov.tr/yukdagitim/kuruluguc.xls, http://www.teias.gov.tr/istatistik2005/3.xls and http://www.teias.gov.tr/istatistik2005/35.xls

			2003	2004	2005
EÜAŞ AND AFFILIATED PARTNERSHIPS AND P. Ps. INCLUDED IN THE PRIVATIZATION SCOPE&PROGRAMME	Hard Coal		1,420,846	1,209,020	1,589,140
	Lignite		30,106,638	28,703,772	42,763,044
	TOTAL		**31,527,484**	**29,912,792**	**44,352,184**
	Fuel Oil	Main Fuel	213,518	173,591	212,263
		Auxiliary Fuel	104,052	72,933	155,014
		TOTAL	**317,570**	**246,524**	**367,277**
	Diesel Oil	Main Fuel	0	1,035	32
		Auxiliary Fuel	11,909	26,081	27,755
		TOTAL	**11,909**	**27,116**	**27,787**
	TOTAL		**329,479**	**273,640**	**395,064**
	Natural Gas		2,431,825	1,473,102	2,149,958
MOBIL POWER PLANTS	Fuel Oil		516,425	275,222	188,579
	Diesel Oil		0	0	0
	TOTAL		**516,425**	**275,222**	**188,579**
PRODUCTION COMP.	Imported Coal		1,668,036	2,767,660	2,982,782
	Fuel Oil		35,836	116,484	190,208
	Naphta				1,619
	Natural Gas		**6,792,327**	**7,791,886**	**10,548,955**
	Diesel Oil		49	26	155
AUTOPRODUCERS	Hard Coal		120,182	118,583	113,088
	Imported Coal		496,622	469,450	574,048
	Lignite		931,721	927,249	1,110,346
	TOTAL		**1,548,525**	**1,515,282**	**1,797,482**
	Fuel Oil		1,988,351	1,760,408	1,254,894
	Diesel Oil		1,503	1,510	500
	LPG		759	12,673	12,908
	Naphta		264,371	208,749	82,862
	TOTAL		**2,254,984**	**1,983,340**	**1,351,164**
	Natural gas		3,366,795	4,060,733	3,057,851
TOOR	Lignite Main Fuel		4,517,669	4,145,639	4,445,753
	Fuel Oil Auxiliary Fuel		6,210	4,700	4,941
	Diesel Oil Auxiliary Fuel		662	489	
Turkey	Hard Coal		1,541,028	1,327,603	1,702,228
	Imported Coal		2,164,658	3,237,110	3,556,830
	Lignite		35,556,028	33,776,660	48,319,143
	TOTAL		**39,261,714**	**38,341,373**	**53,578,201**
	Fuel Oil		2,864,392	2,403,338	2,005,899
	Diesel Oil		14,123	29,141	28,442
	LPG		759	12,673	12,908
	Naphta		264,371	208,749	84,481
	TOTAL		**3,143,645**	**2,653,901**	**2,131,730**
	Natural Gas		**12,590,947**	**13,325,721**	**15,756,764**

Table 17 Annual fuel consumption in power plants in Turkey (2003-2005)[34]

[34] TEİAŞ, see http://www.teias.gov.tr/istatistik2005/46.xls (accessed on July 20th 2007)

	2003	2004	2005	OX factor	Emission factor (tC/TJ)	NCV (TJ/kt)[35]
Hard Coal	4,348,209	3,746,003	4,803,056	0.98	26.8	29.30
Imported Coal	5,672,182	8,482,391	9,320,172	0.98	26.8	27.21
Lignite	33.958.314	32,258,902	46,147,917	0.98	27.6	9.63
Total	**43,978,705**	**44,487,296**	**60,271,145**			
Fuel Oil	6,351,856	5,329,458	4,448,128	0.99	15.2	40.19
Diesel Oil	44,872	92,587	90,366	0.99	20.2	43.33
Lpg	2,242	37,434	38,128	0.99	17.2	47.31
Naphta	863,892	682,135	276,061	0.99	20.0	45.01
Total	**7,262,862**	**6,141,614**	**4,852,683**			
Natural Gas Total	**24,247,303**	**25,662,310**	**30,343,947**	0.995	15.3	34.50
TOTAL	**75,488,869**	**76,291,221**	**95,467,775**			

Table 18 Calculated CO_2 emissions (2003-2005)

[35] 2006 Guidelines of IPCC National Inventory http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

RECENT POWER PLANTS: CAPACITY AND FUEL TYPE

Name of Power Plant	Capacity in MW	Fuel Type	Date of Operation
Adana Atik Su Aritma Tesisi	0,80	Biogas	09.06.2006
Karen Gr I-II	24,3	Fuel-oil	14.06.2003
Anadolu Efes Bira Gr-I	3,8	Fuel-oil	05.09.2003
Akbaşlar (isolated)	4,0	Fuel-oil	13.09.2003
Gül Enerji Gr-II	12,5	Fuel-oil	03.06.2004
Karkey-II 3+3 DGM	54,3	Fuel-oil	12.11.2004
Karkey (Silopi-4) Gr-IV	6,15	Fuel-oil	30.06.2005
Karkey (Silopi-4) Gr-V	6,75	Fuel-oil	23.12.2005
ORTA DOĞU RULMAN POLATLI SANTRALI	7,36	Fuel-oil	21.08.2006
SAMUR HALILARI SANAYİ VE TİC. A.Ş	7,36	Fuel-oil	29.08.2006
Kırka	8,20	Fuel-oil	28.09.2006
SÜPER FİLM AMBALAJ SANAYİ ve TİCARET A.Ş.	25,32	Fuel-oil	26.11.2006
MARDİN ENERJİ SANTRALİ	33,00	Fuel-oil	06.04.2007
İDİL-2 ENERJİ SANTRALİ	24,00	Fuel-oil	06.04.2007
SİİRT ENERJİ SANTRALİ	24,00	Fuel-oil	06.04.2007
Menderes Elektrik Gr-I	7,95	Geothermal	10.05.2006
Hacılar Gr I-II	13,3	Hydro (run of river)	14.06.2003
Pamuk HEPP Gr I-II-III	23,3	Hydro (run of river)	20.10.2003
Mercan Gr I-II-III	19,1	Hydro (run of river)	25.12.2003
Ere (Bir Kapılı HES) Grup-I	48,5	Hydro (run of river)	11.03.2004
Elta Elk (Dodurga) Gr I-II-III-IV	4,1	Hydro (run of river)	26.04.2004
İskur Tekstil (Süleymanlı) Gr I-II	4,6	Hydro (run of river)	28.04.2004
Bereket Enerji (Feslek Hes) Gr 1-2	9,5	Hydro (run of river)	05.08.2004
Tektuğ (Kargılık) Gr I-II	23,90	Hydro (run of river)	24.04.2005
İçtaş Enerji (Yukarı Mercan) Gr I-II	14,20	Hydro (run of river)	21.05.2005
Bereket Enerji (Dalaman) Gr XIII-XIV-XV	7,50	Hydro (run of river)	15.07.2005
ŞANLIURFA GR I-II	51,80	Hydro (run of river)	01.03.2006
BEREKET ENERJİ GÖKYAR HES 3 GRUP	11,62	Hydro (run of river)	05.05.2006
MOLU EN. Zamantı Bahçelik GR I-II	4,22	Hydro (run of river)	31.05.2006
SU ENERJİ (Balıkesir) GR I-II	4,60	Hydro (run of river)	27.06.2006
BEREKET ENERJİ (Mentaş Reg) GR I-II	26,60	Hydro (run of river)	31.07.2006
BAHÇELİK HES	4,17	Hydro (run of river)	01.08.2006
Basaran Hidroelektrik Santrali	0,60	Hydro (run of river)	11.08.2006
KAREL PAMUKOVA SANTRALİ	9,30	Hydro (run of river)	11.08.2006
EKİN (Başaran Hes) (Nazilli)	0,60	Hydro (run of river)	11.08.2006
Kızıldüz HES	16,00	Hydro (run of river)	13.09.2006
Şahmallar HES	14,00	Hydro (run of river)	13.09.2006
Kalealtı HES	15,00	Hydro (run of river)	20.11.2006
Kürtün Gr-I	42,5	Hydro (with Dam)	26.09.2003
Batman Gr I-III	128,0	Hydro (with Dam)	14.11.2003
Batman Gr II-IV	70,0	Hydro (with Dam)	09.12.2003
Kürtün Gr-II	42,5	Hydro (with Dam)	18.12.2003
Muratlı Gr I-II	115,00	Hydro (with Dam)	02.06.2005
Yamula Gr I-II	100,00	Hydro (with Dam)	30.07.2005

Çolakoğlu (Capacity Addition)	45,0	Imported Coal	05.05.2004
İÇDAŞ ÇELİK GR-I	135,00	Imported Coal	30.11.2005
K. MARAŞ	6,00	Imported Coal	08.12.2005
İskenderun (İsken) Gr I-II	1.320,0	Imported Coal	23.11.2003
Elbistan-B Gr I	360,00	Lignite	15.02.2005
Çan Gr II	160,00	Lignite	15.03.2005
Boraks	10,66	Lignite	28.09.2006
Eti Bor (Borik Asit) Gr I-II	10,4	LPG	29.08.2003
İzmir Gr I-II-III-IV-V-VI	1.590,7	N.Gas	28.03.2003
Özakım	7,0	N. Gas	19.06.2003
Baydemirler Gr II-III	2,1	N. Gas	11.07.2003
Tübaş	1,4	N. Gas	11.07.2003
Sönmez Flament Gr-I	4,1	N. Gas	30.10.2003
Bahariye Mensucat (Isolated)	1,0	N. Gas	01.01.2004
Ankara D.G. (Baymina) Gr I-II-III	798,0	N. Gas	08.01.2004
Atateks 2 GM	5,6	N. Gas	20.02.2004
Tanrıverdi 4 GM	4,7	N. Gas	24.03.2004
Tekboy Tekstil 1 GM	2,2	N. Gas	18.05.2004
Kombassan Kağıt Gıda ve Teks	5,5	N. Gas	09.06.2004
Ayen Ostim Enerji Üretim	31,1	N. Gas	11.06.2004
Bis Enerji 2 GT	73,0	N. Gas	16.06.2004
Şahinler Enerji 1 GM	3,2	N. Gas	29.06.2004
Besler Gr-2, BT (5,2+7,5)	12,7	N. Gas	07.07.2004
Çelik Enerji Ür. Şti. 2 GM	2,4	N. Gas	09.07.2004
Kombassan Kağıt Matbaa Gıda	5,5	N. Gas	24.09.2004
Habaş Aliağa Gr I-II	89,2	N. Gas	08.10.2004
Standart Profil 3 GM	6,7	N. Gas	22.10.2004
Altınmarka Gıda Gr I-II-III	3,6	N. Gas	17.12.2004
Metem Enerji (Peliklik) Gr I-II-III	11,7	N. Gas	29.01.2005
Metem Enerji (Hacışıramat) Gr I-II	7,8	N. Gas	29.01.2005
Mercedes Benz Turk Gr I-II-III-IV	8,3	N. Gas	04.02.2005
Baydemirler Gr IV-V-VI	6,2	N. Gas	04.02.2005
Entek Elk. Koç Uni. Gr I-II	2,3	N. Gas	07.02.2005
Bis Enerji Gr VII	43,70	N. Gas	18.03.2005
Karege Gr IV-V	18,10	N. Gas	07.04.2005
Ak Enerji (K.paşa) Gr I-II	87,20	N. Gas	30.04.2005
Nuh Enerji-2 Gr I	47,00	N. Gas	24.05.2005
Yongapan (Kast.Entg) Gr-II	5,20	N. Gas	25.05.2005
Tezcan Galvaniz Gr I-II	3,50	N. Gas	27.05.2005
Hayat Kağıt Gr-I	7,53	N. Gas	27.05.2005
Habaş Aliağa Gr-III	44,62	N. Gas	02.06.2005
Akbaşlar Gr-II (isolated)	9,00	N. Gas	24.06.2005
Zeynep Giyim San. Gr-I	1,17	N. Gas	07.07.2005
Çebi Enerji GT	43,37	N. Gas	23.08.2005
Can Enerji Gr-I	4,00	N. Gas	25.08.2005
EVYAP GR I-II	5,12	N. Gas	27.08.2005
HABAŞ ALİAĞA GR-IV	44,62	N. Gas	21.09.2005
AYKA TEKSTİL GR-I	5,50	N. Gas	24.09.2005

ALTEK ALARKO GR I-II	60,10	N. Gas	14.10.2005
MOSB GR I-II-III-IV-V-VI-VII	84,83	N. Gas	11.11.2005
GRANİSER GRANİT GR-I	5,50	N. Gas	14.11.2005
ZORLU ENERJİ YALOVA GR I-II	15,93	N. Gas	26.11.2005
KÜÇÜKÇALIK TEKSTİL GR I-II-III-IV	8,00	N. Gas	27.11.2005
KORUMA KLOR GR I-II-III	9,60	N. Gas	03.12.2005
BOSEN GR-III	51,02	N. Gas	30.12.2005
EKOTEN TEKSTİL GR-I	1,93	N. Gas	16.02.2006
ERAK GİYİM GR-I	1,37	N. Gas	22.02.2006
AYDIN ÖRME GR-I	7,52	N. Gas	25.02.2006
MARMARA ELEKTRİK (Çorlu) GR-I	8,73	N. Gas	13.04.2006
MARMARA PAMUK (Çorlu) GR-I	8,73	N. Gas	13.04.2006
ENTEK (Köseköy) GR-IV	47,62	N. Gas	14.04.2006
ELSE TEKSTİL (Çorlu) GR I-II	3,16	N. Gas	15.04.2006
SÖNMEZ ELEKTRİK (Çorlu) GR I-II	17,46	N. Gas	03.05.2006
KASTAMONU ENTEGRE (Balıkesir) GR-I	7,52	N. Gas	24.05.2006
BOZ ENERJİ GR-I	8,73	N. Gas	09.06.2006
AMYLUM NİŞASTA (ADANA)	14,25	N. Gas	09.06.2006
ŞIK MAKAS (Çorlu) GR-I	1,58	N. Gas	22.06.2006
ANTALYA ENERJİ GR I-II-III-IV	34,92	N. Gas	29.06.2006
HAYAT TEM. VE SAĞLIK GR I-II	15,04	N. Gas	30.06.2006
EKOLOJİK EN. (Kemerburgaz) GR-I	0,98	N. Gas	31.07.2006
MAKSİ ENERJİ ELEKTRİK ÜRETİM OTOPRODÜKTÖR GRUBU SAN. VE TİC.A.Ş	7,70	N. Gas	01.08.2006
ECZACIBAŞI-BAXTER	1,00	N. Gas	01.08.2006
ÇELİK ENERJİ ÜRETİM KOCAELİ SANTRALI	2,33	N. Gas	01.08.2006
AYDIN ÖRME AKYAZI SANTRALI	7,52	N. Gas	01.08.2006
EROĞLU GİYİM (Çorlu) GR-I	1,17	N. Gas	01.08.2006
Mersin Kojenerasyon Santralı	126,10	N. Gas	28.08.2006
YILDIZ ENTEGRE KOJENERASYON SANTRALİ	6,18	N. Gas	21.09.2006
Cerkezkoy Enerji Elektrik Uretimi A.S	53,97	N. Gas	27.09.2006
BURGAZ ELEKTRİK ÜRETİM A.Ş.	6,91	N. Gas	29.12.2006
BİRLİK MENSUCAT	7,20	N. Gas	01.01.2007
KİLSAN OTOPRODÜKTÖR TESİSİ	3,20	N. Gas	19.03.2007
T Enerji Üretim A.Ş.	1,58	N. Gas	19.04.2007
YILDIZ MDF GE LM 2500 GAS TURBINE	28,54	N. Gas	30.04.2007
Zorlu Enerji (Sincan) Gr-I	39,7	N. Gas + Diesel-oil	31.05.2003
Zorlu Enerji (Sincan) Gr-II BT	10,6	N. Gas + Diesel-oil	18.07.2003
KARKEY KARADENİZ ELEKTRİK ÜRETİM A.Ş	98,40	N. Gas + Diesel-oil	18.09.2006
TÜPRAŞ - İzmit Rafinerisi	85,00	N. Gas + Fuel-oil	04.08.2006
T.Ş.F.A.Ş. KAZIM TAŞKENT ESKİŞEHİR ŞEKER FABRİKASI	15,72	N. Gas + Fuel-oil	04.09.2006
Karege Gr I-II-III (Arges)	34,0	N. Gas + Fuel-oil	30.07.2003
AKMAYA SAN. VE TİC. A.Ş.	6,91	N. Gas + Fuel-oil	29.12.2006
Yurtbay Gr I-II	7,8	N. Gas + LPG	16.05.2003
Pakmaya (Köseköy) Gr II-III	2,1	N. Gas + LPG	02.07.2003
Pakmaya (Düzce) Gr II-III	2,1	N. Gas + LPG	02.07.2003
İSKO Dokuma İşletmeleri San. ve Tic. A.Ş.	27,50	N. Gas + LPG	01.08.2007
Enerji-SA (Mersin) Gr GT	41,7	N. Gas + Naphtha	05.10.2003
Ak-En (Batı Çim) Gr BT	14,5	N. Gas + Naphtha	26.10.2003

Enerji-SA (Çanakkale) Gr BT	21,6	N. Gas + Naphtha	01.11.2003
Enerji-SA (Mersin) Gr BT	21,6	N. Gas + Naphtha	22.11.2003
Entek Gr-IV	31,1	N. Gas + Naphtha	12.02.2004
AKÇA ENERJİ GR-III	8,73	N. Gas + Naphtha	14.12.2005
Ak-En (Uşak) Gr III	5,1	Naphtha	26.10.2003
Enerji-SA (Adana) 1 BT	49,8	Naphtha	23.06.2004
Alkim Alkali Kim. Gr I-II (Dazkırı)	3,4	Solid + Liquid	03.05.2003
Ayen Ostim Enerji Üretim (BT)	9,9	Steam	01.10.2004
Modern Enerji (NG+LPG) Gr-II	7,68	Steam	13.06.2005
Modern Enerji (NG) Gr-III	8,38	Steam	14.06.2005
ZORLU ENERJİ KAYSERİ GR-IV	38,63	Steam	26.10.2005
AK ENERJİ (K.paşa) GR-III	40,00	Steam	09.11.2005
HABAŞ ALİAĞA GR-V	23,00	Steam	24.11.2005
ALTEK ALARKO GR-III	21,89	Steam	23.02.2006
NUH ENERJİ-2 GR-II	26,08	Steam	02.03.2006
EKOLOJİK ENERJİ HASDAL	5,65	Waste	03.11.2006
Eti Mad.(Ban. Asit) Gr-I	11,50	Waste Heat	15.07.2005
ITC-KA ENERJİ ÜRETİM SAN. VE TİC.AŞ.	1,00	Waste Heat	16.11.2006
Sunjüt (WEPP) Gr I-II	1.20	Wind	22.04.2005
BARES II	(VER Project) 30.00	Wind	20.04.2006
ALİZE ENERJİ ÇEŞME SANTRALI	1.50	Wind	01.08.2006
TEPERES	0.85	Wind	26.09.2006
KARAKURT WF	(VER Project) 10.8	Wind	20.04.2007
ANEMON ENERJI ELEKTRIKÜRETIM A.Ş.	(VER Project) 30.40	Wind	01.02.2007
MARE	(VER Project) 39.20	Wind	01.04.2007

Table 19: Recent power plants

DATA SOURCES OF ALL THE PARAMETERS USED IN THE PDD AT HAND

Data / Parameter:	**Gross electricity production**
Data unit:	MWh
Description:	Electricity supplied to the grid by relevant sources (2003-2005)
Source of data used:	Turkish Electricity Transmission Company (TEIAŞ), Annual Development of Turkey's Gross Electricity Generation of Primary Energy Resources (1940-2005) http://www.teias.gov.tr/istatistik2005/35.xls
Value applied:	Table 6
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Any comment:	

Data / Parameter:	**Net electricity production**
Data unit:	MWh
Description:	Net electricity fed into the grid. Used for the calculation of the net/gross relation
Source of data used:	Turkish Electricity Transmission Company (TEIAŞ), Annual Development of Electricity Generation- Consumption and Losses in Turkey (1984-2005), http://www.teias.gov.tr/istatistik2005/34.xls
Value applied:	Table 7
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Any comment:	

Data / Parameter:	**CO_2 emissions**
Data unit:	tCO_2
Description:	CO_2 emissions generated due to electricity production (2003-2005)
Source of data used:	Fuel consumption data: Turkish Electricity Transmission Company (TEIAŞ), see http://www.teias.gov.tr/istatistik2005/46.xls Emission Factors and Net Calorific Values (NCVs): Revised 2006 IPCC Guidelines: Volume 2: Energy
Value applied:	Table 5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Annual CO_2 emissions are calculated based on the consumption data from all the power plants in Turkey, based on data from TEIAŞ, the national electricity transmission company, where the country specific emission factors and net calorific values are taken from the official IPCC Guidelines for National Greenhouse Gas Inventories.
Any comment:	

Data / Parameter:	**List of BM power plants with capacity**
Data unit:	Name of a power plant, MW, fuel type, date of operation
Description:	List of the power plants build between 03/2003 and 08/2007 along with their capacities, fuel type and the date of operation;
Source of data used:	Turkish Electricity Transmission Company (TEIAŞ) http://www.teias.gov.tr/
Value applied:	Table 19
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey. The list of power plants is not completely publicly available, but was provided for the purpose of determining the build margin.
Any comment:	

Data / Parameter:	**Full load hours per energy source**
Data unit:	h
Description:	Amount of the full load hours regarding the different plant types (2004-2006)
Source of data used:	Turkish Electricity Transmission Company (TEIAŞ) http://www.teias.gov.tr/istatistik2005/3.xls, http://www.tuik.gov.tr/PreHaberBultenleri.do?id=464&tb_id=3, http://www.teias.gov.tr/yukdagitim/kuruluguc.xls and http://www.teias.gov.tr/istatistik2005/35.xls
Value applied:	Table 10, Table 16
Justification of the choice of data or description of measurement methods and procedures actually applied :	TEIAŞ is the national electricity transmission company, which makes available the official data of all power plants in Turkey.
Any comment:	The data was calculated from the installed capacity [MW] and the amount of the generated electricity [MWh] from the different plant types.

Data / Parameter:	**Technology specific emission factor of the 20%-plants**
Data unit:	tCO_2/MWh
Description:	Calculated specific emission factors based on the carbon emission factor data and the electrical efficiency data for all relevant energy sources (natural gas, lignite, coal/anthracite, fuel/motor oil).
Source of data used:	1. TEIAS: http://www.teias.gov.tr/istatistik2005/47.xls 2. TEIAS: http://www.teias.gov.tr/istatistik2005/35.xls 3. "2006 IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy (carbon emission factor) 4. European Commission Report (July 2006): Integrated Pollution Prevention and Control (IPPC) - Best Available Techniques for Large Combustion Plants (electrical efficiency for lignite, coal/anthracite, fuel/motor oil)
Value applied:	Table 11
Justification of the choice of data or description of measurement methods and procedures actually applied :	There are not available power plant specific efficiency data for Turkey. Therefore the conservative data from the IPCC European Commission Report and German Federal Environmental Agency was used.
Any comment:	

Annex 3

MONITORING PLAN

1. The Monitoring Plan

This Monitoring Plan (MP), describes how the performance of the proposed Yuntdağ WPP Project will be monitored and verified in terms of its greenhouse gas emission reductions (ERs) and conformance with all relevant Clean Development Mechanism criteria.

The MP builds on the baseline scenario identified in the main text of the Project Design Document (PDD) of the proposed project and is fully consistent with it.

The MP is based on the approved methodology ACM0002, "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources" (Version 6). The MP will be used by the Project Entity, İnnores, and possibly by appointed consultants.
The MP's instructions should be followed to successfully measure and track the project impacts and prepare for the periodic audit and verification process that will have to be undertaken to certify the achieved GS-VERs.

Specifically, the MP provides the requirements and instructions for:
- Establishing and maintaining the appropriate monitoring system, including spreadsheets for the calculation of GS-VERs;
- Implementing the necessary measurement and management operations;
- Preparing for the requirements of independent, third party verification and audits.

The project owner can update and adjust the MP to meet operational requirements, provided the Verifier approves these modifications during the process of initial or periodic verification.

2. Calculating Emission Reductions

The emission reductions from the project result from the electricity which is generated from the Yuntdağ WPP. This electricity will displace power generated by other sources of power and fed into the national Turkish grid. The only data to be monitored is the net electricity production of the wind farm.

3. Operational and Monitoring Obligations

The overall responsibility for monitoring and reporting issues is with İnnores. This includes:
- data collection in electronic and paper form
- the data correctness is assured, as the monthly electricity data are separately stored at İnnores and TEİAŞ
- monitoring, measurements and reporting
- records handling
- dealing with possible monitoring data adjustments and uncertainties
- review of reported results/data
- review of project performance
- internal audits of GHG project compliance with operational requirements as applicable

All of the data needed for the calculation of emission reductions will be kept by İnnores during the crediting period and until two years after the last issuance of GS-VER for Yuntdağ WPP project activity.

Details of the Monitoring Plan are described under section D.