CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

>>Grid Connected Electricity Generation in Paz-Ashdod Refinery
PDD Version 2 (25th of September 2007)

A.2. Description of the project activity:

>>
Purpose:

a) New construction of **45** MW electric generation capacity by using a state of the art natural gas turbine system. About 129 000 MWh/year electric power will be used for own consumption of the refinery that are currently purchased from the national grid that is using mostly oil and coal power stations**.** 231 000 MWh/year surplus electric energy will be inserted into the public grid and will replace there the power production mix that is dominated by oil and coal.

b) Supply of process heat to the refinery that is currently produced in boilers with natural gas and refinery gas. As the Methodology AM0029 does not provide the possibility to claim the emission reduction from utilisation of waste heat for process heat, the emission reduction claim of this PDD is very conservative as considerable amounts of natural gas consumption will be avoided that is equal to over 80 000t CO2 per year. However the potential savings from using the waste heat replacing natural gas is taken into consideration for proving the financial additionally of the project.

There is no national regulation or standard that would require the installation of cogeneration systems. The existing power supply and process heat generation system fully complies with all existing regulations as the current active boiler system was recently switched from heavy fuel oil to natural gas.
No emission reductions form switching from fuel oil to natural gas will be claimed.

Greenhouse gas reduction:

a) Power production with modern natural gas turbine system would impact developments in the build margin of the Israel grid and will be considerable less carbon intensive as the existing power mix .
b) Replacement of natural gas and refinery gas used for process heat by waste heat form power production (no emission reductions claimed) over 80 000t CO_2 per year.

Contribution to sustainable development:

By introduction of large scale combined heat and power for industrial plants, ORL will become a one of the forerunners for the whole industry in Israel that currently predominantly used grid electric energy and consumes natural gas, heavy fuel oil or coal for process heat.
Coal is the available and cost effective alternative fuel to natural gas. Even having a special coal loading terminal in the vicinity of the plant, ORL opted for the most environmental friendly fuel available.
Natural gas is currently not a popular fuel for power generation in Israel due to the fact that it was introduced as a fuel only since **2005** and is currently available only in the area of the cities of Ashdod and Ashkelon. Receiving credit for reduction of emissions by the usage of natural gas for power production would provide a strong incentive to speed up the introduction of natural gas at a larger scale in Israel.

A.3. Project participants:

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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)
Israel (host)	Private entity "PAZ Ashdod Oil Refineries Ltd. (ORL)"	yes
Israel	Madei Taas Ltd, private entity	yes

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

>>Israel

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

>> South of the sea shore

A.4.1.3. City/Town/Community etc:

>> Ashdod,   The Neft street number 1

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

>> The project is located is the south sea sore of Israel at the municipality of the city of Ashdod, at the Neft street number 1 Ashdod, (31^0 50' east longitude and 34^0 40' northern latitude)

Project location

Project Position.

This is the industrial area of Ashdod. North east is ORL.
The coal terminal is the black area in the middle of the picture.
The satellite image shows clearly, that electric energy form coal is ready available for the internal processes of ORL as well as coal would be a possible fuel for thermal purposes, too.
There are no residential buildings in the area.
The plant construction will have also no effect on wildlife.

A.4.2. Category(ies) of project activity:

>>
Sectoral Category 1, Energy Industries (non-renewable energy)

A.4.3. Technology to be employed by the project activity:

>>
Production of electric energy and process heat with natural gas that is delivered from nearby offshore wells.
The technology of efficient production of electricity with natural gas is still a novelty in Israel.
All technical know-how and core components have to be imported.
The project will surely stimulate other large power and heat consumers in Israel to engage in power production by Natural Gas and in this way will reduce the consumption of coal and heavy fuel oil for power production in Israel.
Currently coal and heavy fuel oil are the dominant fuels for power production in Israel. (See Annex 3)
The concept of usage of waste heat for supply of process heat is also not common practise in Israel and can stimulate many other industrial activities to increase the efficiency of fossil fuel consumption.
The electric efficiency of the turbine will be around 35%, while the waste heat will be utilised. Due to the usage of natural gas the carbon intensity of the electricity production will be well below the national average – only this CO2 emission reductions are claimed. Savings of natural gas consumption due to replacement of conventional boiler capacity are used to calculate the IRR of the investment, but are not used to calculate emission reductions.
Seize and prominence of the project can help to jump start the usage of these efficient technologies in the near future on the territory of Israel.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

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Years	**Annual estimation of emission reductions in tonnes of CO_2 e**
2008	no forecast possible of project start in 2008
2009	94667
2010	94667
2011	94667
2012	94667
2013	94667
2014	94667
2015	94667
2016	94667
2017	94667
2018	94667
Total estimated reductions (tonnes of CO_2 e)	946670 depending on amount of CER produced during 2008
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO_2 e)	102587

Please note:
The indicated emission reduction is from power production only.
The emission reduction from usage of waste heat for process purposes of about 80 000t CO_2 is not claimed.

A.4.5. Public funding of the project activity:

>>
No Public Funding
Only private equity and commercial loans

SECTION B. Application of a baseline and monitoring methodology

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

>>
Approved baseline methodology AM0029 Version 02
"Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas"

And approved monitoring methodology AM0029 "Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel"

ACM0002.ver 07 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

Tool for the Demonstration of Assessment of Additionality version 02.

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

Applicability:

- The project activity is the construction and operation of a new natural gas fired grid-connected electricity generation plant. Natural gas is the primary fuel of at least 99% of consumption.
- The geographical/ physical boundaries of the baseline grid can be clearly identified as the national public grid of Israel. The grid in Israel is self sufficient and there are no power imports (see Annex3)
- Information for estimating baseline emissions is publicly available in Israel. (Israel Electric Company, Environmental Report for 2005, Pages number 11, 13. http://www.israel-electric.co.il/Static/WorkFolder/ComEnv/Environmental%202005%20WEB%20FULL%20VERSION.pdf
- Natural gas is sufficiently available in the region or country, future natural gas based power capacity additions, comparable in size to the project activity, are not constrained by the use of natural gas in the project activity (see Annex 3). The refinery is already consuming natural gas for process heat generation that will be replaced by the project.
  The exploration of natural gas in Israel is currently facing a considerable expansion of available capacity. The project activity will not prevent any other similar project from receiving sufficient natural gas.

B.3. Description of the sources and gases included in the project boundary
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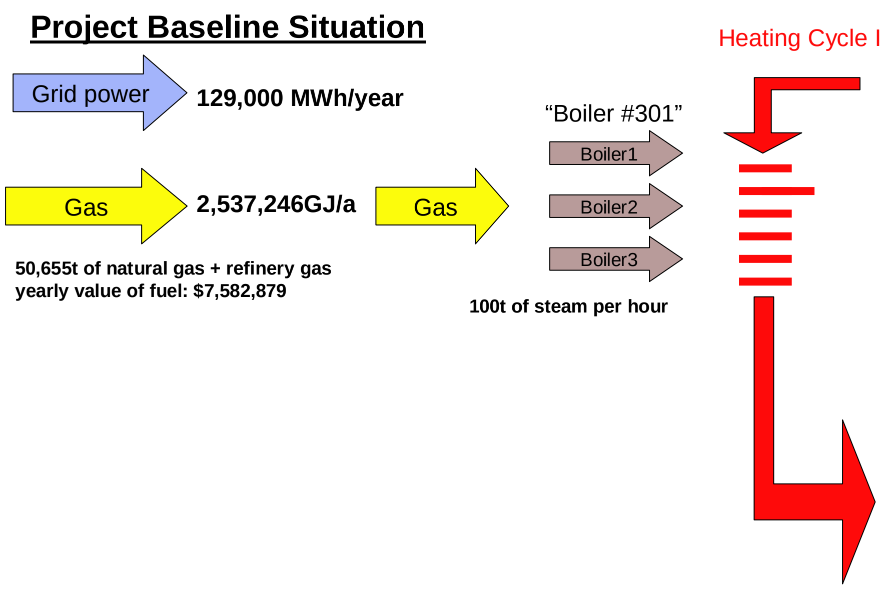
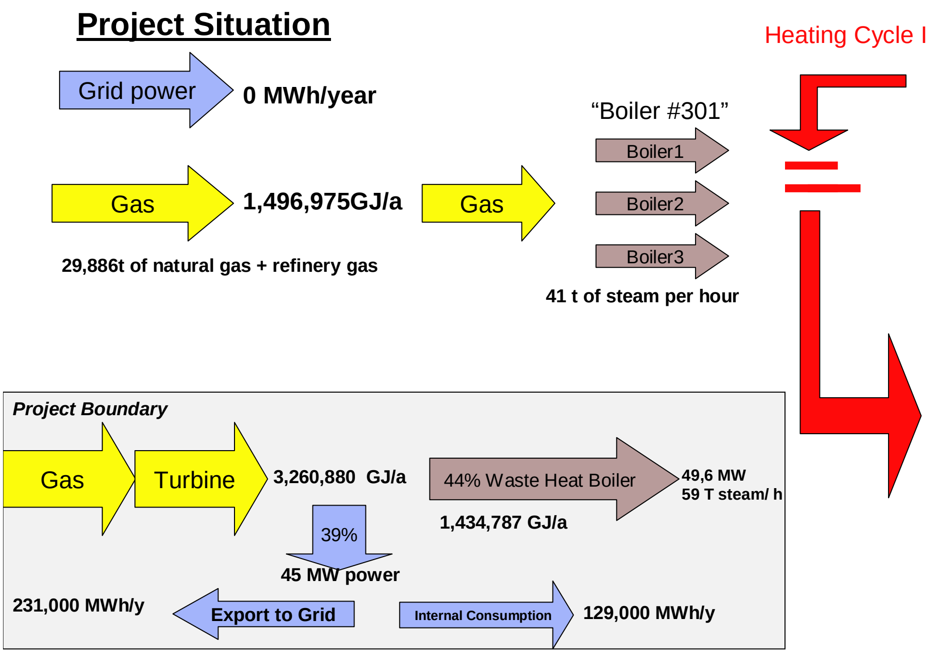
Table: Overview of emissions sources included in or excluded from the project boundary

	Source	Gas	Included	Justification/ Explanation
Baseline	Emissions from grid power production	CO_2	Yes	Main emission source
		CH_4	No	Excluded for simplification. This is conservative as emissions from natural gas extraction and transport are extremely conservatively assessed as leakage.
		N_2O	No	Excluded for simplification. This is conservative.
Project Activity	Natural gas use as primary fuel for the turbine	CO_2	Yes	CO2 emissions from combustion. Main emission source
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification

The project boundary has been defined:
1. All physical facilities constructed/ erected on account of the project activity, including power plant, and fuel transportation facilities, metering points.
2. All physical facilities and geographical areas of relevance to the project activity that are influenced by the project activity, including power plants connected to the regional grid defined here for preparing information on CO_2 intensity of the grid.





Outside boundary:
a) Potential leakage from natural gas extraction and transport
Other usage of natural gas in the refinery exempt for the project activity of power production with a new turbine system.

B.4.	**Description of how the baseline scenario is identified and description of the identified baseline scenario:**

According to AM0029 the following steps have to be undertaken:

a) Identification of the plausible baseline scenarios:

a) Project activity implemented without CDM
Possible baseline scenario. (See B5 for explanation of Additionality)

b) Power generation using natural gas but other technology
Unlikely because power generation of this scale is not common practise using piston engines. This would cause much higher investment as the usage of gas-turbines. Also the utilisation of waste heat would involve additional investments in comparison with construction of a turbine system .
The construction of boilers for steam production, steam turbine, steam engines is not state-of-the -art any more for utilisation of natural gas..
Fuel cell technology is not available in this seize and extraordinary expensive.
Therefore the power production with a turbine system is the logical technology option, especially under the aspect that the waste heat can be used to replace the existing boiler capacities.
Therefore other technologies are not taken into consideration as baseline options.

c) Power generation using other energy resources
To comply with environmental concerns, the usage of heavy fuel oil was terminated for process heat production just in 2005Alternative energy like solar would involve enormous investments

(and large scale of land that is not availably to ORL) and do not provide the security of energy supply the operation of the refining plant demands. Therefore back up facilities that would be likely be natural gas-turbines that would run in hot standby would be necessary anyhow. Therefore calculation of IRR for this alternatives would never reveal any economic feasible results.
There are no commercial nuclear reactors in Israel and this is not usual to use nuclear power for combined heat and power at industrial sites near dense populated areas.

d) *There are not geothermal sources in Israel*
Other technologies are therefore not taken into consideration as baseline options.

e) Import of electricity form the grid
<u>Possible baseline scenario</u>*. This is common practise until now. The overwhelming majority of industrial facilities in Israel is using grid power supply.*

2. Identification of the economically most attractive baseline scenario.

a) Project activity implemented without CDM
A detailed calculation including confidential data is available for the certifier.
The calculation results in an IRR of 2.75 % that is clearly not sufficient also taking into consideration the involved risks especially from changing in fuel and electricity prices and also inflation rate. All this factors can have immense effect on the profitability of the project and are subject to sudden changes given the exposed political situation in Israel.
The IRR as calculated for the project activity is also necessary to be seen in relation to the average common IRR of the fuel processing Industry in Israel. Processing of fuel is highly profitable due to high oil prices.
Included in the calculation were savings from preventing purchase of grid power, income form sales of excess power to the grid, savings form preventing usage of natural gas for process heat generation.
b) Power generation using natural gas but other technology
does not apply as gas turbines are known in the industry as the most cost efficient solution.
c) Power generation using other energy resources
does not apply, as usage of fuel oil and coal would be cheaper but involve higher emissions and are no alternative due to environmental concerns.
d) Import of electricity form the grid
This scenario does not involve any investments and is therefore clearly the most attractive

Description of the baseline scenario d:
The refinery would continue purchasing in the future 129,000 MWh/year electric power from the public grid of Israel. The CO_2 intensity of the grid would not be changed due to investment of the project operator.
In addition the necessary process heat in the refinery would be produced by combustion of natural gas and waste-refinery-gas at the existing boilers that were retrofitted for the usage of natural gas only in 2005. The technical life expectancy of the equipment currently in usage is above the project period of 10 years. As no emission reductions are claimed for replacement of natural gas by waste heat from the power production. This additional emission reductions are not further discussed or claimed.
For having a comprehensive overview on the future market situation, ORL employed a specialist for the forecast of electricity prices within the next 10 years. This forecast results were used in the IRR calculation in Annex 3.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of Additionality): >>

General description of GHG reduction:
The operation of the intended new gas-turbine power station would positively influence the CO_2 intensity of the grid-power in Israel. The waste heat replaces currently used natural gas for process heat generation. Due to high volume investment and fuel cost the project is economically not an attractive investment. Other barriers make the project also unlikely in case the IRR would be higher.
The Additionality Analysis will show that the business as usual is the most likely cause of action and the project case will need additional resources of income to become an attractive investment.

Step 0. Preliminary screening based on the starting date of the project activity
Evidence that the incentive form the CDM was seriously considered in the decision to proceed with the project activity.

Private entity "Oil Refineries Ltd. (ORL)" made following steps to assure that the project will receive CDM status before it will make the final investment decision:

1) ORL order a CDM implementation study from the company Eco traders (www.ecotraders.com) report issue on December 2005
2) Tender for consulting services : 15.1. 2006
3) Contract with "Maidai Taas" at the 2.4.2006 for the design of the PDD.
4) Conducting a public hearing to receive official stakeholder comments at the 4 September 2006
5) Contracting of SGS as validator in October 2006
6) Site visit of SGS at 28th of November 2006

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

Sub-step 1a. Define alternatives to the project activity:

a) Project activity implemented without CDM
b) Power generation using natural gas but other technology
does not apply
c) Power generation using other energy resources
does not apply
d) Import of electricity form the grid (current situation)
Usage of natural gas for generation of process heat

Sub-step 1b. Enforcement of applicable laws and regulations:

Alternative a) and d) are in full compliance with national regulatory requirements.
The refinery has already introduced natural gas as a fuel for its process heat generation.
It is perfectly legal to go on with the existing practise of electricity purchase from the grid and own production of process heat with natural gas and refinery waste gas.
Since January 2005 the sales of electricity of private producers to the grid or other customers is possible as a part of the privatisation efforts of the Israeli government in the power sector.

Step 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method
The operation of the plant will create three revenue streams:
- Income from internal electricity consumption (preventing purchasing from national grid of Israel)
- Income from sales of electric energy to the grid
- Reduced demand for natural gas for process heat production

Therefore it is necessary to apply an analysis of the financial indicator for the proposed project activity. However as the "Alternative- d) current situation does not need any additional investments, the IRR of the project activity without income from the CDM is compared with the commercial lending rate applicable in Israel.

Sub-step 2b. – Option III. Apply benchmark analysis

The IRR of the planned investment is calculated in regard to:

- Income from internal electricity consumption (preventing purchasing from national grid of Israel)
- Income from sales of electric energy to the grid/other end-users
- Reduced demand for natural gas for process heat production
- Capital expenses
- Cost for service, maintenance, personnel and overheads
- Cost for fuel

The benchmark is the commercial lending rate applicable in Israel + risk premium for the project activity.

Sub-step 2c. Calculation and comparison of financial indicators (only applicable to options II and III):
See detailed calculation in the Annex 3 (this information is confidential. To be use only for DOE)
The calculation Results in a value of IRR of 2.75 %.
The commercial lending rate of the Bank of Israel in early 2005 was 11.5%.[1] The project is thus clearly less attractive than the benchmark even when not taken any risk premium into consideration.

Sub-step 2d. Sensitivity analysis (only applicable to options II and III):

Variations:	Resulting IRR	Comment
Project activity without income form CER	IRR 2.86 %	Not sufficient commercially attractive
Increase of cost for natural gas by 10% . This is very relevant as the actual gas contract prices in Israel are for 3.7-4 $/MBTU.	IRR -1.2%	The IRR is turning negative
Inflation discount rate 0%	IRR 4,2%	The IRR is still lower than the lending rate.

[1] See Bank of Israel (2005): Main economic data, Lending rate exceptional credit, March 2005, http://www.bankisrael.gov.il/deptdata/mehkar/indic/eng_a6.htm

Inflation discount rate of 4%	IRR 0.2%	Not sufficient commercially attractive
Reduce interest on capital from 6,5% to 5%	IRR 4,36	The IRR is still lower than the lending rate.
Increase internal consumption (deu to increase in production facilities iv ORL) to 20 MW and decrease power export to 24 MW	IRR 3,51	The IRR is still lower than the lending rate.

Step 3: Barrier Analysis

The investment analysis already clearly shows that the project is additional.

b) Additional barriers to the realisation of the project are following:

- The refinery depends on an uninterrupted supply of process heat. This cannot be taken for granted by using a complex system as gas turbines that have to be shutoff for maintenance and service as well in case of malfunction. The original boilers have to possess the original capacity to be able to supply sufficient thermal energy in case the turbine is shut of.

- The production of electricity is not the core business of the refinery. The management has no experience in the operation of electric generators and marketing of electricity.

- The technology of “Gas Turbine-Combined Heat and Power” for industrial purposes is relatively new in Israel. There is not sufficient know how in the country for the construction and operation of this systems. All components and expertise has to be imported. Service for maintenance and spare part supply has to build up. There is no experienced personnel for the operation of this systems available in Israel. Usage of services from foreign companies would increase cost and add additional commercial risk.

- The market of electricity is dominated by the Israel Electric Company (IEC). The operators of new generation facilities have to compete with a company that has 60 years of experience in electric power production and marketing.

B) There are no barriers that would prevent the existing practise to go on:

- The current practise is legal and not restricted by any law in Israel
- The existing facilities for connection to the grid as well as for generation of process heat have a technical life expectancy of over 10 years. The boilers were recently refurnished for usage of natural gas and therefore would comply with any existing or upcoming environmental regulations.
- The supply of electric power complies with all demands of the refining plant.

Attached files in the Annex 3:

- Diagram of the percentage of different power generation resources in Israel (IEA 2002)

- Volume of electric energy produced and consumed (CIA fact book)

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

The project scenario, alternative
a) is prevented due to insufficient IRR without the possibility to sell CER. In addition it faces several institutional barriers that have to be overcome by increasing the financial attractiveness of the project.

c) and c) are technically not feasible alternatives or will involve extreme high investments.

The above barriers would not prevent the alternative d) that is the current practise of purchase of all electric power from the grid.

Step 4. Common Practice Analysis

The dominant fuel for power production in Israel is coal, followed by fuel oil. (See graph in Annex 3). Natural gas as a fuel for industry has no long history in Israel,The only other large scale project for industrial cogeneration "American Israel Paper Mill (AIPM) Natural Gas Cogeneration" was applying for CDM status.
The capacity of Natural Gas cogeneration is currently less than 5% of the power production in Israel.
The project is one of the first projects of it's kind in Israel.
There is no regulation or enforcement of the use of this technology for the refinery in Ashdod.

All private industrial facilities in Israel would be confronted with similar barriers for the introduction of Natural Gas cogeneration or power production.

Step 5: Impact of CDM Registration

CER revenues until 2012 will increase IRR to a level that will make the project economically feasible (see Table below). However the operator hopes to realise a CER price of above $ US 15 to sufficiently compensate for all project risks. At the time of the PDD development the price for futures for EU-Allowances was fluctuating between € 15 and 22.
The additional income from CER will be in EURO or US$; in this way it will reduce the inflation and exchange rate risk for the import of the foreign made equipment.

Table 1: Overall Revenues in USD

	2009	2010	2011	2012	2013[1]
Electricity sales&savings	23,466,865	23,052,263	22,688,886	22,266,435	20,875,059
Cost-of maintenance and fuel	12,042,148	11,273,652	12,279,456	10,811,100	10,630,384
Cost of capital	6,545,723	6,172,356	5,809,643	5,457,331	5,115,174
CER volume	94667	102,587	102,587	102,587	102,587
Income form CER sale at 10 USD/CER	946,670	946,670	946,670	946,670	946,670
CER sale at 20 USD/CER	1,809,340	1,809,340	1,809,340	1,809,340	1,809,340

[1] Sale during true up-period for Annex B first commitment period assumed

CER income is not subject to 1,7% inflation in this calculation.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Baseline Data:
The data for the CO_2 intensity of the public grid in Israel are supplied by an official source. (See Annex 3.)

Baseline Emissions:
Baseline emissions are calculated by multiplying the electricity generated in the project plant ($EG_{PJ,y}$) with a baseline CO_2 emission factor ($EF_{BL,CO2,y}$),

$$BE_y = EG_{PJ,y} \cdot EF_{BL,CO2,y}$$

Calculation of Project emissions

The project activity is on-site combustion of natural gas to generate electricity. The CO_2 emissions from electricity generation (PE_y) are calculated as follows:

$$PE_y = \sum_f FC_{f,y} * COEF_{f,y}$$

Where:

$FC_{f,y}$: is the total volume of natural gas or other fuel 'f' combusted in the project plant or other startup fuel (m3 or similar) in year(s) 'y'

$COEF_{f,y}$: is the CO_2 emission coefficient (tCO_2/m_3 or similar) in year(s) for each fuel and is obtained as:

$$\mathbf{COEF_{f,y} = \Sigma NCV_y * EF_{CO2f,f,y} * OXID_f}$$

Where:

$NCV_{f,y}$: is the net calorific value (energy content) per volume unit of natural gas in year 'y' (GJ/m_3) as determined from the fuel supplier, wherever possible, otherwise from local or national data;

$EF_{CO_2,f,y}$: is the CO_2 emission factor per unit of energy of natural gas in year 'y' (tCO_2/GJ) as determined from the fuel supplier, wherever possible, otherwise from local or national data;

$OXID_f$: is the oxidation factor of natural gas

Calculation of Leakage:

Leakage emissions in the baseline:
The percentage of Natural gas within the Israeli power production (See Annex 3) can be currently neglected. It is also conservative not to perform a calculation of the potential CH_4 emissions in the baseline.

Leakage emissions in the project activity:
For the leakage emission calculation of the project activity instead is used the default value as stated in the methodology[2] without any deductions- this is conservative.

Calculation of Emission Reductions

To calculate the emission reductions the project participant shall apply the following equation:

Ery = Bey – Pey – Ley

Where:

Ery : emissions reductions in year y (t CO_2e)
Bey : emissions in the baseline scenario in year y (t CO_2e)
Pey : emissions in the project scenario in year y (t CO_2e)
Ley : leakage in year y (t CO_2e)

[2] Where such data is not available, project participants should use the default values provided in Table 2 (see Annex 3).
Note that the emission factor for fugitive upstream emissions for natural gas (*EFNG,upstream,CH4*) should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the Table 2 (See Annex 3). Where default values from this table are used, the natural gas emission factors for the location of the project activity should be used. The US/Canada values may be used in cases where it can be shown that the relevant system element (gas production and/or processing/transmission/ distribution) is predominantly of recent vintage and built and operated to international standards.

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	$EF_{CO2,f,y}$
Data unit:	t CO_2/GJ
Description:	Emission factor for fuel ‘f’
Source of data used:	IPCC
Value applied:	56,1 t CO_2/ TJ
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default value
Any comment:	

Data / Parameter:	$OXID_f$
Data unit:	Factor
Description:	Oxidation factor
Source of data used:	IPCC
Value applied:	0,995 for gaseous fuel
Justification of the choice of data or description of measurement methods and procedures actually applied :	Actual IPCC default value
Any comment:	

Data / Parameter:	**CH_4 Global Warming Potential**
Data unit:	Factor
Description:	GHG effect of CH_4
Source of data used:	IPCC
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	Standard value in UNFCCC
Any comment:	

Data / Parameter:	$EF_{NG, upstream, CH4}$
Data unit:	tCH_4 /PJ
Description:	Potential fugitive emissions of methane from production and transport of natural gas
Source of data used:	Table 2. default emission factors AM0029
Value applied:	160 (USA and Canada)
Justification of the choice	No official value available in Israel

of data or description of measurement methods and procedures actually applied :	
Any comment:	This value is a very conservative value, given that the network is build only a view years ago with latest available technology and the proximity of the project site to the gas field.

Data / Parameter:	$EF_{BL,CO2,y}$
Data unit:	tCO_2 / MWh
Description:	Grid power CO_2 intensity
Source of data used:	The calculation is based on the annual report of the Israeli grid
Value applied:	783 g CO_2/KWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official and public information
Any comment:	This is the official value yearly purplish by Israel Electric company

B.6.3 Ex-ante calculation of emission reductions:

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Baseline Emissions:

$$BE_y = EG_{PJ,y} \cdot EF_{BL,CO2,y}$$

BEy = 360 000MWh/y * 0,783 t CO_2 /MWh = **281 880 t CO_2**

EFBL,CO_2,y 783 g CO_2/KWh

Emissions from Project Activity:

$$PE_y = \sum_f FC_{f,y} * COEF_{f,y}$$

PEy = 3,260,880 GJ /a * 55,9 t CO_2/TJ = **182 283 t CO_2**

FCf,y : 3,260,880 GJ/a

$$\mathbf{COEF_{f,y} = \Sigma NCV_y * EF_{CO2,f,y} * OXID_f}$$

COEFf,y	55,9 t CO_2/TJ
NCVf y :	37MJoule/m3 = 0,037 GJ/m3
EFCO2,f,y	56,1 t CO_2 /TJ
OXIDf :	0,995

Calculation of Leakage) Natural gas production and transport CH4 emissions:

$LE_{CH4,y}$ = 3,260,880 GJ /a * 160 t CO_2 per TJ[3] * 21= 4930t CO_2 equivalent

EFBL,upstream,CH4 : Does not apply as there was nearly no natural gas electric energy production before the project activity

GWP_{CH4} 21 (IPCC)

SUM of Leakage : 4930t CO_2

Calculation of Emission Reductions

To calculate the emission reductions the project participant shall apply the following equation:

ERy = BEy – PEy – LEy

ERy = **281 880** t CO_2 **- 182 283** t CO_2– 4930 t CO_2e = 94667 t CO_2

Where:

ERy : emissions reductions in year y (t CO_2e)

BEy : **289 800** t CO_2

PEy : **182 283** t CO_2 (t CO_2e)

LEy : 4930t (t CO_2e)

[3] See Annex 3 for reference of the default value

B.6.4 Summary of the ex-ante estimation of emission reductions:

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	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
2008	No forecast[4]	No forecast	No forecast	No forecast
2009	182 283	281 880	4930	94667
2010	182 283	281 880	4930	94667
2011	182 283	281 880	4930	94667
2012	182 283	281 880	4930	94667
2013	182 283	281 880	4930	94667
2014	182 283	281 880	4930	94667
2015	182 283	281 880	4930	94667
2016	182 283	281 880	4930	94667
2017	182 283	281 880	4930	94667
2018	182 283	281 880	4930t	94667
Total (tonnes of CO_2 e)	1822830	2 818 800	49300	946670

The calculation is based on 783g/kWh operation margin (as supplied by Israeli grid)
The real emission reduction are in the magnitude of 157 000 t CO_2 /a

[4] As it is not clear when the construction can be finished in 2008, 2018 is taken as a full year for upfront calculation

B.7 Application of the monitoring methodology and description of the monitoring plan:
Approved monitoring methodology AM0029
Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel.

The methodology is applicable under the same conditions as the associated baseline methodology.

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)	
Data / Parameter:	EFBL,CO_2,y
Data unit:	CO_2
Description:	CO_2 Intensity of the Israel Grid
Source of data to be used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	783 g CO_2/KWh
Description of measurement methods and procedures to be applied:	This value will be supplied by the Israeli Grid
QA/QC procedures to be applied:	Official value
Any comment:	This is the only and most reliable data source

Data / Parameter:	**FCf,y**
Data unit:	m3 or TJ
Description:	Annual fuel(s) consumption in project activity.
Source of data to be used:	Volume meter for natural gas input at the power station. Invoice of the fuel supplier for cross checking.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	3 257 584 GJ
Description of measurement methods and procedures to be applied:	Data from industrial standard gas meter in the main supplying natural gas to the turbine. Data from billing information of the gas utility for cross checking.
QA/QC procedures to be applied:	Natural gas supply metering to the project will be subject to regular (in accordance with stipulation of the meter supplier) maintenance and testing to ensure accuracy. The readings of the overall gas consumption of the refinery will be double checked by the gas supply company. The gas consumption is permanently electronically supervised in the refinery's control centre.

Any comment:	There are other consumers of natural gas at Ashdod refinery. The utility does not directly supply fuel to the turbine. Therefore the direct fuel consumption has to be measured by an internal meter. Details of data storage will be known at time of initial verification

combined margin

Data / Parameter:	**NCVy**
Data unit:	
Description:	Net Calorific Value(s) of the fuel used in the project activity.
Source of data to be used:	Gas grid
Value of data applied for the purpose of calculating expected emission reductions in section B.5	37MJoule/m^3
Description of measurement methods and procedures to be applied:	Official data. Supplied together with the billing information from the natural gas utility.
QA/QC procedures to be applied:	No additional QA/QC procedures may need to be planned.
Any comment:	This is the only and most reliable data source

Data / Parameter:	**EG**
Data unit:	MWh /y
Description:	MWh power produced by the project per year
Source of data to be used:	Own power meter at the project generator
Value of data applied for the purpose of calculating expected emission reductions in section B.5	360 000 MWh/y
Description of measurement methods and procedures to be applied:	Internal electricity meter. Electronically documented.
QA/QC procedures to be applied:	The generator power output is permanently electronically supervised in the refinery’s control centre
Any comment:	Details of data storage will be known at time of initial verification

B.7.2 Description of the monitoring plan:

>>
The project manager of the cogeneration plant is responsible for the collection of the relevant data:

- natural gas consumption of the cogeneration plant
- overall natural gas consumption of the refinery
- electricity production of the cogeneration plant
- export of electricity to the grid
- electricity production for internal use in the refinery
- thermal energy production for internal use in the refinery

In addition the plant manager has to collect following data on regular base:
- billing data for electricity consumption and feed in of the refinery
- billing data for natural gas consumption of the refinery
- latest official data for Net Calorific Value of natural gas purchased
- annual published data on CO_2 intensity of electricity production in Israel

All metering data is recorded on the gas meters as well as the electricity meters for energy production and feed-in to the grid.
Additional information will be recorded by the electronic guidance system of the plant.
However no detailed information exists how this electronic system will look like, as no final investment decision has been taken before the validation of the project by the DOE.
The billing data is cross checked with the original data of the meters for electricity and gas.
The meters for electricity feed-in and natural gas consumption are official meters of the electricity and gas network in Israel and therefore the data is highly reliable.

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>
25-September 2007, Mr.Eli Matz

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:

>> December 2008

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

>>
At least 10 years

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

C.2.1. Renewable crediting period

No

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

>> does not apply

C.2.1.2. Length of the first crediting period:

>>does not apply

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
December 2008

C.2.2.2. Length:

>>10 years, 0 month

SECTION D. Environmental impacts

>>
Air:
Emissions from the combustion of natural gas, mainly CO_2 and H_2O. Some emissions of NO_X, but within the limits of the relevant regulations in Israel for NO_X emissions.

Land:
The plant will be built in an already established industrial area.

Water:
No impact.

Biodiversity:
No impact.

Cultural Heritage:
No impact as the site is already used as an industrial area.

Social:
Creation of local employment.
Possible layoffs at conventional power stations in future could be possible but are outside the responsibility of the project operator.

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

>>
Air:
The plant will work in compliance with all relevant laws in Israel for the regulation of emissions.
The overall effect of the plant operation will be positive, as the prevailing power stations using fuel oil and coal would emit more SO_2 and dust as the clean burning natural gas turbine.

Water:
Not affected

Ground:
The project site is an established refining plant area. No additional land is used for this project.

Noise:
The project is situated in an industrial area with no residential estates nearby.

Biodiversity:
Not affected

D.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:

>>does not apply

SECTION E. Stakeholders' comments

>>
A public hearing concerning CDM for Oil refinery Ashdod was organised at the 4th of September 2006 at the Oil refinery , Ashdod

Participants:
Mr Oshri Ohayon – Paz Ashdod Refinery, Environmental Engineer
Mr Ido Rosoliyo : Paz Ashdod Refinery, Plant manager
Eli Matz – General Manager of Madei Taas Ltd.

Public audience:

NAME		ID Number	Address
1.	Oshri Ohayon	6963726	Ashdod, Har chermon 6/6 A
2.	Ruti Volanski	26985044	Ashdod, Livyatan 4
3.	Jacob Nechushtai	6534325	Ashdod, Tel Chai 11/26
4.	Dorel Moskowitz	015383581	Ashdod, Shaar Ha-Arayot 4
5.	Menashe Petel	46383030	Ashdod, Jabotinski 4
6.	Baruch Hershkowitz	068918721	Ashdod, He iyar 4/2
7.	Irena Rozin	319196566	Ashdod, Avraham Ofer 17/10
8.	Vadim Sprinz	306594409	Ashdod, Shlomo Ha-Melech 46/13
9.	Jacob Swieydrov	302566933	Ashdod, Kochav Ha-Shachar 3
10.	Chaim Steiner	16469603	Ashdod, Har Mezada 68
11.	Yosi Zinger	053345716	Nir Banim

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

>>

Invitation by local and national print media:

BAZAN בזן

הזמנה לכנס

בעניין ישום פרוטוקול קיוטו
בבית הזיקוק אשדוד
(צמצום פליטת גזי חממה
מבית הזיקוק לאטמוספירה)
בית זקוק אשדוד מזמין את הציבור לכנס בנושא
ישום פרוטוקול קיוטו.
במהלך הכנס יינתן הסבר על השיטות והתוכניות
ליישום הפרוטוקול.
לציבור תינתן אפשרות לשאלות והבהרות.
הכנס יתקיים במרכז המבקרים
בבית הזיקוק אשדוד
בתאריך 4.9.06 בין השעות 15:00 - 14:00

הציבור מוזמן

130 | 25.8.2006 | כל הדרום

Local Newspaper in “Kol Hadarom” (voice of the south “voice of the South” Ashdod 25th of August 2006

BAZAN בזן

הזמנה לכנס

בעניין ישום פרוטוקול קיוטו
בבית הזיקוק אשדוד
(צמצום פליטת גזי חממה
מבית הזיקוק לאטמוספירה)
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הכנס יתקיים במרכז המבקרים
בבית הזיקוק אשדוד
בתאריך 4.9.06 בין השעות 15:00 - 14:00

הציבור מוזמן

מעריב | יום ג', ח' באלול תשס"ו, 29.8.2006

National newspaper “Maariv” 29th of August 2006-09-28

E.2. Summary of the comments received:

>>

1. Question by participant no. 2:
How much is the needed investment.
Answer by Osheri Ohayon
The total investment in the plant is about Mio$ 40.

2. Question by participant no. 6:
It it really a reduction in the Co2 emissions. What is the expected income from trading with CO2?
Answer by Eli Matz

Obviously YES, by burning Natural gas there is a certain amount of CO2 emitted to the atmosphere. this amount is considerably lower then of burning coal.

3. Question by participant no. 10:
Is the electricity produced from the methane be enough for Paz Ashdod Refinery ?
Answer by Eli Matz:
Yes , power plant is designed to fully supply the consumption of ORL Ashdod and additional sales to the grid.

4. Question by participant no. 9:
Will the power be distributed through the main grid or parallel wires should be installed to distribute the electricity?
Answer by Eli Matz:
No parallel cabling should be installed. All power would be delivered through the main grid.

5. Question by participant no. 8:
Who will finance the project?
Answer by Osheri Ohayon:
The Project will be financed by banks and about 20-30% by our internal sources with the income from the CER's sales.

7. Question by participant no. 1:
Who is actually paid for the CER's?
Answer by Eli Matz:
The countries (and the companies in those countries) that sign and committed to the implementation of Kyoto protocol purchasing the CER's

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

>>
There was no opposition to the planned project activity.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Madei Taas Ltd
Street/P.O.Box:	21 Hamelach st. Park Afek
Building:	
City:	Rosh Aayn
State/Region:	
Postfix/ZIP:	48091
Country:	Israel
Telephone:	+9723 3 9027174
FAX:	+972 3 5423722
E-Mail:	elimatz@madeitaas.co.il
URL:	www.madeitaas.co.il
Represented by:	
Title:	
Salutation:	Mr.
Last Name:	Matz
Middle Name:	
First Name:	Eli
Department:	General manager
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

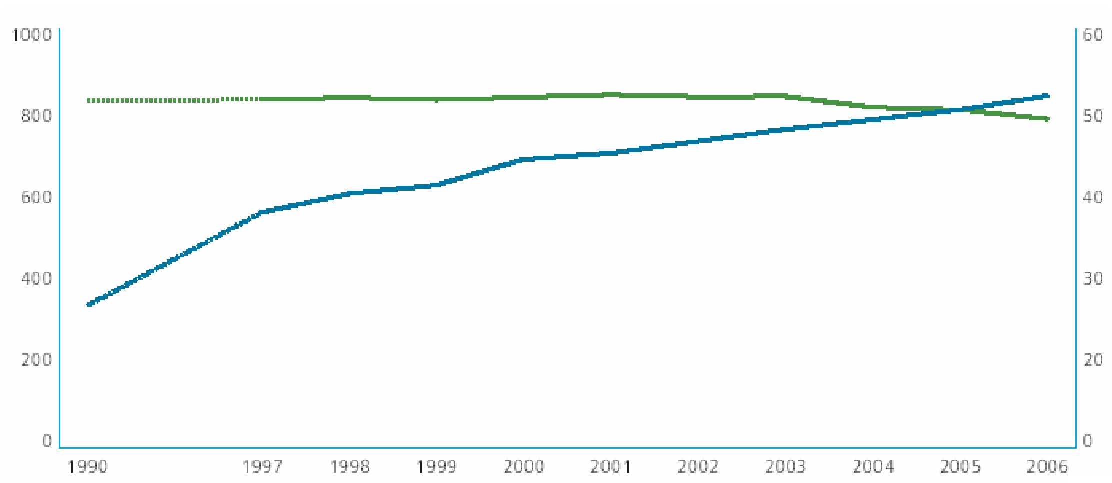
Does not apply, as there is no public funding involved.

Annex 3

BASELINE INFORMATION

Annex 3.1 Baseline Information concerning CO_2 intensity of the grid:
According to the Israel Electric Company (Annual Report 2006), the average grid emissions factor is 783 g CO_2/kWh.

Specific CO_2 Emission from IEC power Plans



	1990	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Specific Emission (gram per kwh)	826	830	834	829	835	841	836	837	811	805	783
Electricity production MMkwh	20.3	33.6	36.3	37.5	41.2	42.1	43.8	45.5	46.9	48.3	50.3

Source: Israel Electric environmental report for 2006 :
http://www.israel-electric.co.il/Static/WorkFolder/Environmet/2006%20Environmental%20Report-WEB%20VERSION.pdf

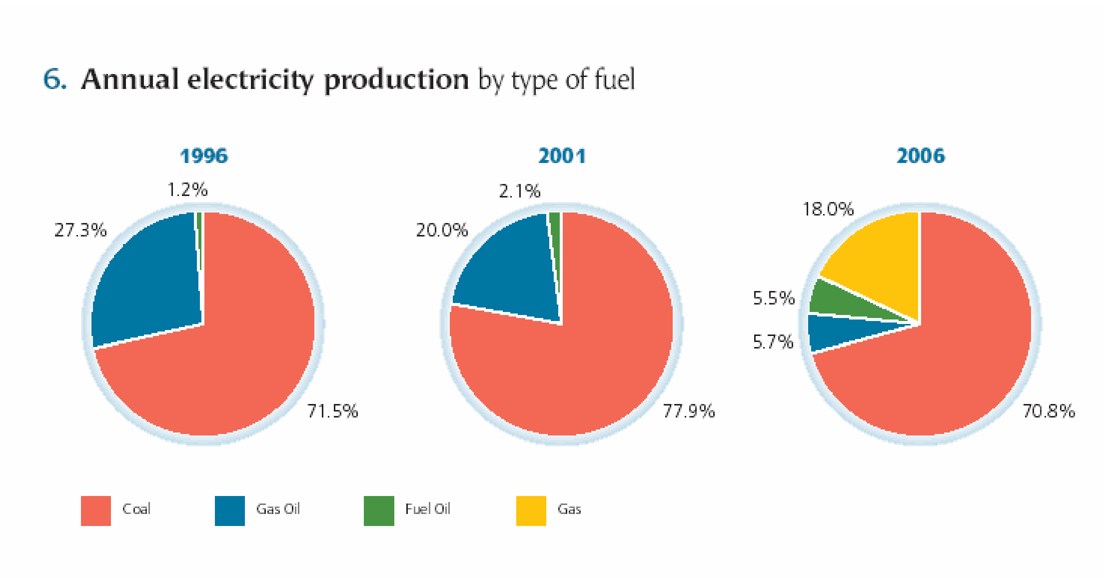
In the last line of this table the CO_2 intensity of the electricity production in Israel is stated for the years 1999-2006. Please note that electricity production from natural gas is noted only in the last recent years. The **CO2 emission factor** for 2006 is stated in the last line, left corner.

Volume of produced electric energy:

As per Israel electric statistic report page 8 , Table 5 ,"Electricity production by power plants" , the total 2006 Electricity production was : **50,238 Million kWh**

FOOLWING ARE SELECTED DATA AS OF END OF DECEMBER, 2006:

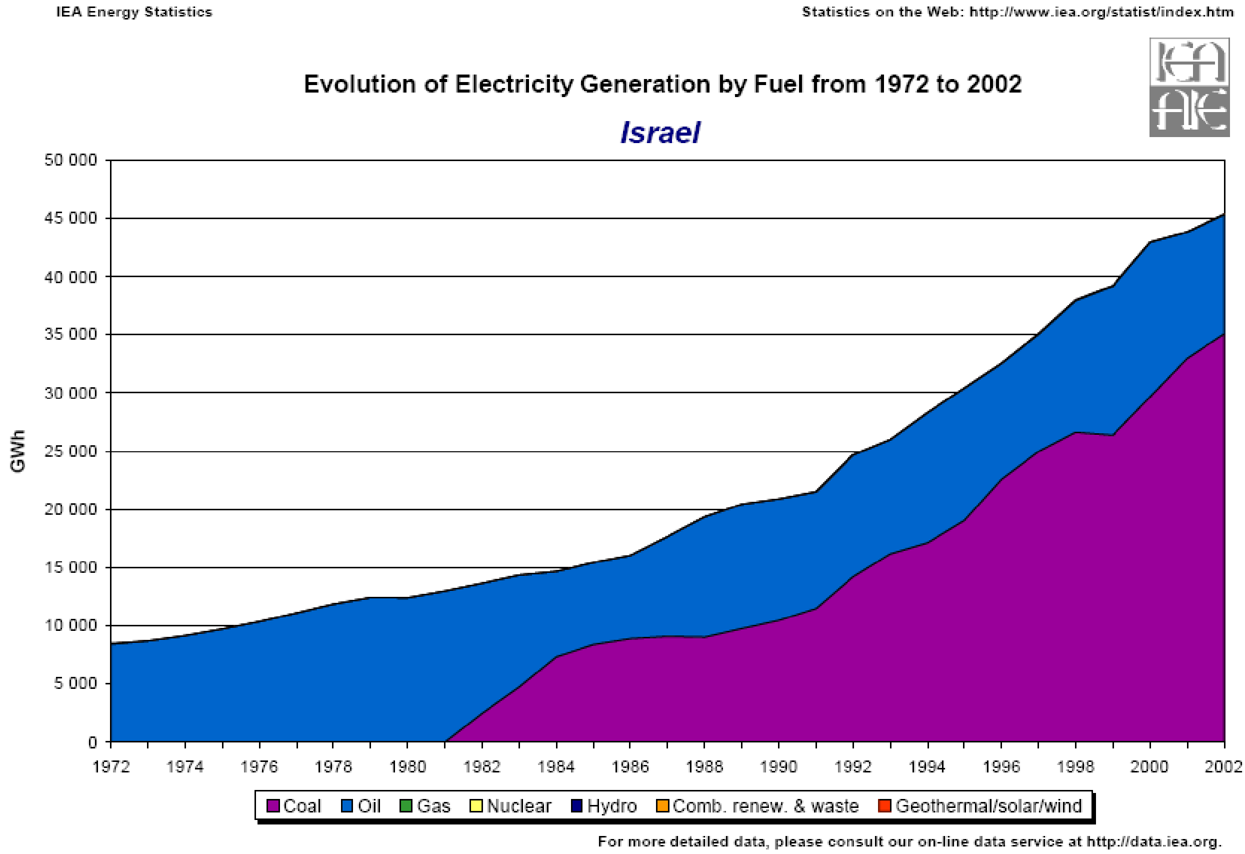
GENERATING SYSTEM	Installed Capacity	10,899 MW
	Peak Demand	9,450 MW
	Electricity Generated	50,235 (Million KWH)
ELECTRICITY CONSUMPTION	Total consumption	46,175 (Million KWH)
	Average consumption growth (1997-2006)	4.9%
	Total revenues	17,590 Million N.I.S.
		4,163 Million U.S.D
	Average electricity price	38.98 Agorot/KWh
		9.2 Cents
	Total consumers	2.4 Million
FUEL CONSUMPTION (Thousand Tons)	Fuel oil	665
	Coal	12,519
	Gas oil	628
	Natural Gas	1,530
MANPOWER	Permanent employees	9,782
	Temporary employees	2,894



Annual electricity production by fuel. Source: IEC Statistical report for 2006

Source : Israel Electric report for 2006
http://www.israel-electric.co.il/Static/WorkFolder/IRR/2006%20Stat%20ENG.pdf

Annex 3.2 Baseline Information concerning Build Margin



Annex 3.3: Electricity production in Israel, Imports and Exports

Electricity - production: 44.24 billion kWh (2003)

Electricity - consumption: 39.67 billion kWh (2003)

Electricity - exports: 1.47 billion kWh (2003)

Electricity - imports: 0 kWh (2003)

Source:
https://www.cia.gov/cia/publications/factbook/geos/is.html#Econ
22nd August 2006

Annex 3.4: Availability of Natural Gas

Natural gas - production:	200 million cu m (2003 est.)
Natural gas - consumption:	200 million cu m (2003 est.)
Natural gas - exports:	0 cu m (2001 est.)
Natural gas - imports:	0 cu m (2001 est.)
Natural gas - proved reserves:	38.94 billion cu m (1 January 2002)

Source:
https://www.cia.gov/cia/publications/factbook/geos/is.html#Econ
22nd August 2006

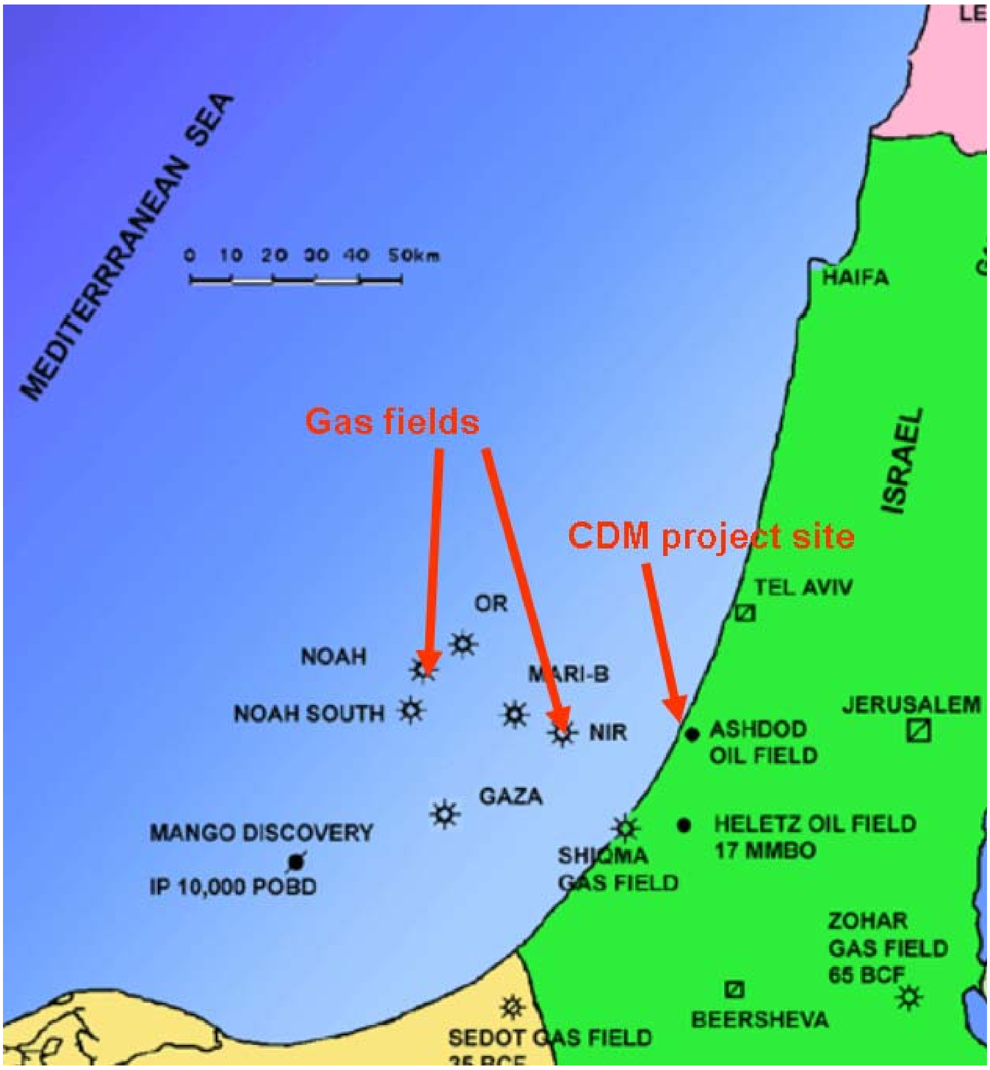
Annex 3.4 Calculation of IRR

This information is confidential information and made available for the DOE.
See separate confidential excel sheet.

The calculation of IRR is based on following numbers:

The calculation of the IRR on the investment of	**US $ 42,550,000**
Using interest on capital - per year	**6,5%**
Assuming internal savings and additional revenue - per year	**US $ 23,466,865**
Fuel and service cost – per year	**US $ 12,042,984**
Annual power production - MWh electric power	**360 000**
Inflation rate of	**1,7%**
CO2 Intensity of the grid - g/kWh	**783**

Annex 3.5 Leakage from natural gas production and transport



Source: **www.zionoil.com/industry/exploration.html**
The gas resources of Israel are extremely close to the planned project activity in Ashdod.

The development of these resources was mainly in the last 4-6 years. Therefore the latest technology available was used as well as the distance for transport is only about 30-100 km.

To use the most favourable default factors would even be very conservative.
In absence of official statistics therefore the operator opts to use the default IPCC value from USA/Canada (see table below excerpt from the methodology) of total 160 tCH_4 per PJ of natural gas = 0,001512t CO2 per GJ.
Given the planned consumption of 3,260,880 GJ of natural gas per year within the project for electricity production, 4930t CO_2 equivalent are a very conservative assumption for leakage.
As the project will replace existing natural gas consumption by at least 2538 000 GJ that are currently burned for process heat. This direct and indirect emissions will be replaced by waste heat and in this way the theoretical volume of leakage further reduced. As the boilers are outside the project boundary it is not

possible to include this positive GHG reduction effect and it is mentioned only to provide prove of the conservativeness of the reduction claim.

Table 2. Default emission factors for fugitive CH_4 upstream emissions

Activity	Unit	Default emission factor	Reference for the underlying emission factor range in Volume 3 of the *1996 Revised IPCC Guidelines*
Coal			
Underground mining	t CH4 / kt coal	13.4	Equations 1 and 4, p. 1.105 and 1.110
Surface mining	t CH4 / kt coal	0.8	Equations 2 and 4, p.1.108 and 1.110
Oil			
Production	t CH4 / PJ	2.5	Tables 1-60 to 1-64, p. 1.129 - 1.131
Transport, refining and storage	t CH4 / PJ	1.6	Tables 1-60 to 1-64, p. 1.129 - 1.131
Total	t CH4 / PJ	4.1	
Natural gas			
USA and Canada			
Production	t CH4 / PJ	72	Table 1-60, p. 1.129
Processing, transport and distribution	t CH4 / PJ	88	Table 1-60, p. 1.129
Total	t CH4 / PJ	160	
Eastern Europe and former USSR			
Production	t CH4 / PJ	393	Table 1-61, p. 1.129
Processing, transport and distribution	t CH4 / PJ	528	Table 1-61, p. 1.129
Total	t CH4 / PJ	921	
Western Europe			
Production	t CH4 / PJ	21	Table 1-62, p. 1.130
Processing, transport and distribution	t CH4 / PJ	85	Table 1-62, p. 1.130
Total	t CH4 / PJ	105	
Other oil exporting countries / Rest of world			
Production	t CH4 / PJ	68	Table 1-63 and 1-64, p. 1.130 and 1.131
Processing, transport and distribution	t CH4 / PJ	228	Table 1-63 and 1-64, p. 1.130 and 1.131
Total	t CH4 / PJ	296	

Note: The emission factors in this table have been derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range.

Annex 4

MONITORING INFORMATION

The project will be monitored according to the methodology.

Overall responsibility for monitoring and carrying out the monitoring following this monitoring plan lies with:
Paz Ashdod Refinery is responsible to collect all data from production facilities at the plant. Madei Taas is responsible for reporting of the project activity.

1. Training
Training work will be perform in future due time.

2. Installation of the gas turbine
Installation will perform in late 2008. Certificates for correct installation will issue by the gas turbine manufacturer and by the main project supervisor. Certificates will be available for the verification process.

3. Calibration
The metering equipment will be calibrated and checked annually (1 time a year) for accuracy so that the metering equipment shall have sufficient accuracy as per manufacturer specifications .

4. Monitored data
Monitored data will be continually read and saves at the central DCS system. A data backup procedures in the refinery computers is made daily. One time a month, a data printout will be made and sign by the responsible person at the refinery.

5. Quality control
Yearly the net generation data will be approved by Madei Taas before it is accepted and stored.
This audit will check compliance with operational procedures in this monitoring plan and Section B of the PDD. If improvements are proposed these will be reported to the DOE and only undertaken after approval from the DOE.

6. Data management system
Physical document such as paper-based maps, diagrams will be collated in a central place, together with this monitoring plan. In And all data including calibration records is kept until 2 years after the end of the total crediting period of the CDM project.

7. Emergency sitiations : all data savesd and backup permanently at the data colection system (DCS)., so by any loss of data it can be retrivee from data backup. If any loss of comunucation betwing the fild meters a manual reading will be made from the meters scren. The reading data will be set of special pre-preperd Manual Reading Report.

8. Reporting
All reporting of the Data will be provided to the DOE as required

9. Verification
Madei Taas will facilitate the verification through providing the DOE with all required necessary information at any stage.

d in order to monitor emissions, and how this data will be archived, related to project category I.D "Grid connected renewable electricity generation":

Data variable	Source of data	Data unit	Measured (m) calculated (c) estimated (e)	Recording frequency	Proportion of data to be monitored	How will data be archived? (electronic/ paper)	Comment
MWh power produced by the project (gas turbine) per year	Electricity meters locate on the power output cables of the turbine alternator	MWh	Measured	Continuous electronic recording in the centeral computer	100%	Continuously electronically archiving. One a month paper printout archiving	
CO_2 Intensity of the srael Grid	Israel Electric Company (IEC)	t CO_2 / KWh	calculated	Fixed for crediting period	n.a.	paper	This value wi by the Israeli
Fuel consumption in project activity (gas urbine).	Natural gas meters located in the pipe entering to the gas turbine	m^3/hour	Measured	Continuous electronic recording and saved	100%	Continuously electronically archiving. One a month paper archiving	
Net Calorific Value of the fuel used in he project activity.	Official data. Supplied together with the billing information from the natural gas utility.	MJ/m^3	Measured	Official data. Supplied together with the billing information from the natural gas utility.	n.a.	paper	