CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

Optimisation of Clinker use and energy conservation through technical improvement in the Ramla Cement Plant in Israel

October, 2004

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Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

Optimisation of Clinker use and energy conservation through technical improvement in the Ramla Cement Plant in Israel.

A.2. Description of the project activity:

The optimisation of clinker use and energy conservation (hereafter, the Project) developed by Nesher Cement Enterprises (hereafter referred to as the Project Developer) is an industrial process development and energy efficiency project in Ramla, Israel, hereafter referred to as the "Host Country")

Nesher Israel Cement Enterprises LTD. is Israel's sole producer of cement. Nesher supplies cement to the Israeli market and most of the needs of the neighbouring Palestinian Authority. Nesher's flagship plant in Ramla near Tel Aviv is one of the world's largest factories in terms of production capacity and utilizes the most advanced technologies. One of Nesher's such initiatives is the use of large deposits of coal ashes produced by the Israel Electric Corporation's power stations as a clay or clinker substitute in the cement manufacturing process. As a result of these activities Nesher received the Millennium Business Award for Environmental Achievement from the United Nations Environment Program and International Chamber of Commerce.

The purpose of the CDM project activity is to introduce to the Israeli cement industry a new state of the art grinding technology. Nesher Cement Enterprises intend to install a vertical mill, the first of it's kind in Israel which implements the new grinding technology. The vertical mill, which grinds together the different raw materials to produce cement, is capable of grinding clinker to finer particles. This innovative grinding technology enables to lower the percentage of clinker in cements, due to the increase of the fineness of the grinding while maintaining the level of strength in the cement produced.

In the clinker manufacturing process green house gases are emitted directly (in the calcification process and due to fuel consumption). Once the percentage of clinker in the cement shall be lowered, less clinker shall be produced per ton of cement and therefore less GHG's emitted per ton of cement manufactured. By enabling a maximum utilization of the clinker potential, the vertical mill conserves the use of raw materials and natural resources and contributes to sustainable development.

Another feature of the vertical mill is its reduction in energy consumption. Compared to the existing Ball mills in use at all Nesher Plants, the vertical mill is expected to consume 15 KWh less per ton of cement grinded. Electricity conservation contributes to sustainable development and reduces the adverse environmental impacts of fossil fuel generated electricity.

The project is helping the Host Country fulfil its goals of promoting sustainable development. Specifically, the project:

- Provides employment opportunities in the area where the project is located;

- Involves training Nesher's personnel to acquire knowledge and skills necessary for the operation of the new technology;
- Uses clean and efficient technologies, and conserves natural resources, thus the project will be meeting the Sustainable Development Criteria of Israel.
- The Project is the first CDM project to be initiated in the Host Country and the second CDM project in the Middle East. It will serves as an important capacity building experience and shall pave the way for other CDM initiatives.
- Optimises the use of natural resources since fewer raw materials to produce the same amount of cement will be required.

A.3. Project participants:

- Project developer and Sponsor: Nesher Cement Enterprises LTD.
- Carbon Advisor: Ecotraders.
- Annex 1 Participant and Carbon Advisor: EcoSecurities Ltd
- Designated National Authority: MOE- Israeli Ministry of Environment.

Further contact information of project participants is provided in Annex 1.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

Israel (the "Host Country")

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

Central Region.

A.4.1.3. City/Town/Community etc:

The cement plant is located 1 km from the town of Ramla.

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

The Nesher Ramla cement plant is located 1 km from the town of Ramla to the East. The plant facilities cover an area of over 550,000 square meters. The plant consists of large warehouses, kilns, grinders, laboratories and mixing facilities.

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

Sectoral Category 4, Manufacturing Industries.

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

The mill type is LM 56.3+3 made by Loesche Gmbh Germany. The performance warranties supplied by the Loesche company are the following:

For cement type: CEM II 42.5N AV:
220 T/H.
4100 Cm^2/g
SP. Power cons. 31.5 KWh/t

For cement type: CEM II 42.5N B-LL:
278 T/H
4200 Cm^2/g
SP. Power cons. 23.6. KWh/t

The material components are elevated by belt conveyor from storage to three new mill pre bins for the Loesche mill. Clinker, gypsum and Limestone are discharged from the bins to a belt weigh feeder and from there are fed to the mill. The feed material is directed to the center of the grinding table. The rotation of the table and the centrifugal force move the material under three master rollers. The comminution is achieved by shear and compressive forces. The comminute material is thrown upward by gas steam into rotary classifier. Ready cement is fed to silos and coarse unready cement is fed back to the mill.

A.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed CDM 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:

In recent years Nesher cement enterprises has focused on reducing clinker particle size. Clinker ground into finer particles allows a reduction in the percentage of clinker in cements while maintaining the cements strength. Any reduction in the use of clinker reduces emissions of GHG's. Main GHG emissions from the clinker production process come from the calcification process during which limestone is heated in kilns to produce clinker; due to the burning of fossil fuels used to heat up the kilns; and, the use of electricity from the grid in various steps of the clinker production process.

Due to previous investments in special particle size monitoring systems a reduction in clinker has been achieved. However, using the current grinding technology used in Nesher plants no further reduction in clinker percentage is possible without lowering the strength of the cement.

Nesher has undertaken substantial investments for the purpose of introducing a new state of the art grinding technology to the cement industry in Israel. The vertical grinding technology enables grinding clinker particles to a finer grind and allowing less clinker to be added to the cement while maintaining the cement's strength. The vertical technology has been in use in the Nesher plants in the raw material grinding process (pre- clinker production). The project activity introduces the vertical technology for use in the cement manufacturing process (post- clinker production). Due to technological advancements, the vertical technology applications have widened, and the mill is capable of grinding the coarse cement to a finer grind. The current grinding technology in use in the Nesher plants is the ball mill grinder.

The grinding process used in ball mills is based on impact and attrition, whereas that used at a vertical mill is based on the use of sufficiently high pressure to create breakage of the particles, until the required particle size is obtained. The vertical mill shall enable the following reduction in clinker percentage:

Cement Types	Ball Mill	Vertical Mill
42.5 N A-V	82.5%	78%-80%
42.5 N A-LL	75%	60%-65%

Another advantage of the vertical mill is that it conserves energy. Power consumption of a vertical mill, for the same type of cement is 15 kWh lower than that of a ball mill. The vertical mill is an environmentally sound technology that conserves the use of energy, raw materials and natural resources.

All these are anthropogenic emissions which are quantifiable and comprise an emission factor of CO_2 emitted per ton of clinker produced. The project activity proposes to reduce the use of clinker in the cement manufacturing process in Israel.
A reduction in the use of clinker shall result in a reduction of GHG emissions. Where as the emissions factor per ton of clinker shall remain constant, less clinker shall be used per ton of cement and therefore less GHG's emitted per ton of cement.

Nesher Cement enterprises have a business licence where rigorous emission standards set by the Israeli Ministry of Environment are specified for the Nesher plants. These emission standards include SOx, NOx and particle matter but do not include any requirement or standard regarding GHG's.
There is no national Israeli standard for emissions of GHG's.
There are no sectoral requirements of any kind regarding GHG's.
There are no sectoral or national requirements to conserve energy.

Taking into account the lack of legislation and national policies regarding reduction of GHG's, the emission of GHG's would not have occurred in the absence of the project activity.

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

Over the 10 years crediting period, the total emission reductions has been estimated to be about 2,142 ktCO_2. The emission reductions from the technology improvement component are estimated at 1,857 ktCO_2. As for the total emission reductions from the electricity component, these are estimated to be around 285 ktCO_2. Refer to section E for further details on the quantification of GHG emission reductions associated with the technology improvement component of the proposed project activity. For specific details on the quantification of GHG emission reductions associated with the electricity component a suitable methodology will have to be identified and adopted.

A.4.5. Public funding of the project activity:

The project will not receive any public funding from Parties included in Annex I of the UNFCCC.

SECTION B. Application of a baseline methodology

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

NMB00XX "Baseline methodology for technological improvements in industry".

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

Given that the project activity is an improvement in an industrial process resulting in lower GHG emissions per unit output, the methodology is applicable.

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

The methodology is applied using historical process data. The defaults used for the calculation of calorific values for fuel types and fuel oxidization, came from the IPCC GHG Gas Inventory Reference Manual (IPCC 1996).

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 CDM project activity:

The determination of project scenario additionality is done using the CDM consolidated tool for demonstration of additionality, which follows the following steps:

Step 0. Preliminary screening of projects started after 1 January 2000 and prior to 31 December 2005

The project is only expected to start operation after registration with the UNFCCC. In any case, as it will be demonstrated in the following steps, CDM revenue has been considered from the early stages of development of the project, and it is an integral part of the financial package of the project.

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

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

Alternative 1: The proposed CDM project activity: installation of a new vertical mill resulting in reductions in the use of clinker for the production of cement.

Alternative 2: Continuation of the current situation: use of ball mills to grind cement, using more clinker for the production of cement.

Sub-step 1b. Compliance with applicable laws and regulations:

All the alternatives comply with the laws and regulatory requirements for energy generation in the project location.

Step 2. Investment Analysis

Sub-step 2a: Determine appropriate analysis method

According to the methodology for determination of additionality, if the alternative to the CDM project activity does not include investments of comparable scale to the project, then Option III must be used.

This will be applied for this project.

Sub-step 2b: Option III - Application of benchmark analysis

The likelihood of development of this project, as opposed to the continuation of use of existing ball mills (i.e., its baseline) will be determined by comparing its IRR with the benchmark of interest rates available to a local investor, i.e., those provided by Mutual funds or by stocks in the Host Country. Mutual Funds investing in goverment bonds have given between 14.54% and 16.95% in 2003, while some Tel Aviv Stock Market equity funds offered even higher returns.

Sub-step 2c: Comparison of financial indicators

The Table below shows the financial analysis for the project activity. As shown, the project IRR (without carbon) is 11.94%, lower than the interest rates provided by local banks or government bonds in the Host Country.

Table: Financial results of the project (Alternative 1) with and without carbon finance. NPV uses a 9% discount rate. (in Shekel NIS)

	with carbon	**without C**
Net Present Value ($)	22,227,000	10,464,000
IRR	16.60%	11.94%
Discount rate	9%	

Summary of results of project analysis. Details made available to validators.

Sub-step 2d: Sensitivity analysis

A sensitivity analysis was conducted by altering the following parameters:

- Increase in project revenue (savings in clinker, electricity and other materials needed for cement production);
- Reduction in project capital (CAPEX) and running costs (Operational and Maintenance costs).

Those parameters were selected as being the most likely to fluctuate over time. Financial analyses were performed altering each of these parameters by 10 %, and assessing what the impact on the project IRR would be (see Table below). As it can be seen, the project IRR remains lower than its alternative even in the case where these parameters change in favour of the project.

Scenario	IRR (%)	NPV ($)
Original	*11.94*	10,464,000
Increase in project revenue	13.44	16,211,000
Reduction in project costs	*12.55*	12,724,000

Note: NPV uses 9% discount rate.

Step 4. Impact of CDM registration

As shown in Step 2 above, the project is unlikely to move forward without the additional financial support of the CDM. If the developer was able to sell emission reduction credits from the project activity at an assumed price of U$ 7.00 dollars per tonne of CO_2e, the additional revenue generated by carbon sales would be sufficient to make the project go ahead.

Step 5. Common Practice Analysis

To date there has been no development of such industrial improvements in Israel. This is the first vertical mill of its kind in the country.

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 boundary, for the purpose of establishing the baseline scenario, defines where possible alternative scenarios to the proposed project are likely to be found. For investment projects applying the proposed methodology the physical site(s) of the business-as-usual activities and of the proposed project activity typically define the boundary.

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:

The baseline study was concluded in October 2004. The entities determining the baseline and participating in the project as the Carbon Advisors are EcoTraders, Israel and EcoSecurities Ltd., UK, listed in Annex 1 of this document.

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:

September 2005

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

20 years

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

C.2.1. Renewable crediting period

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

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C.2.1.2. Length of the first crediting period:

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C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

1/1/2006

C.2.2.2. Length:

10 years

SECTION D. Application of a monitoring methodology and plan

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

NMM00XX "Methodology for technological improvements in industry"

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

The chosen methodology is to be used in conjunction with baseline methodology NMB00XX. The proposed project activity meets all the applicability requirements.

D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario

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	Data variable	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
1	Production level of a given product (QP)	tonnes	m	continuously	100%	Electronic and paper	In the case of cement production this is the amount of cement produced per year.
2	Emissions factor for the product in the project scenario (EF_p)	tCO_2/t product	c	at the beginning of each crediting period	100%	Electronic and paper	The exact EF for the project needs to be determined at the beginning of each crediting period, using project specific parameters, as follows:
3	CaO in Clinker project	%	m	at the beginning of each crediting period	100%	Electronic and paper	
4	Fuel Requirement in project	TJ	m	at the beginning of each crediting period	100%	Electronic and paper	
5	Fuel EF	tCO_2/TJ	c	at the beginning of each crediting period		Electronic and paper	From IPCC
6	% clinker in cement, project	tClinker/tcement	c	at the beginning of each crediting period		Electronic and paper	This will need to be done for different types of cement

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

The formula to calculate project emissions is:

$$E_p = (QP_p * EF_p) + (QFp * EFFp)$$

Where:

E_p: Emissions in project scenario (tonnes CO_2e)

QP_p: Amount of cement produced in project scenario (tonnes). By definition, this is the same as in the baseline.

QFp: Amount of fuel used in project scenario (volume or energy unit).

EFFp: IPCC emission factor for fuel used in project scenario (tCO_2/ volume or energy unit).

EF_p: Emissions Factor in the project scenario (tonnes CO_2e/tonnes of cement).

EF_p will be calculated as:

EFp = CEF clinker x % Clinker in cement in project

Where:

CEF clinker = Chemical emissions + Heat emissions

Chemical emissions = % CaO in clinker x 0.785 (tCO2/t CaO produced)

Heat emissions = Fuel used (TJ) x Fuel EF (as per IPCC)

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	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
7	*Production level of product (QP)*	*Project developer*	*tonnes*	*m*	*continuously*	*100%*	*electronic and paper*	Given that QP is the same in baseline and project scenarios, it is measured in the project scenario and applied in both formulas.
8	*Emissions factor for the product in the baseline scenario (EF_b)*	*Developer and IPCC, calculated as follows:*	tCO_2e/ t of cement	*m*	At the beginning of each crediting period	*100%*	*electronic and paper*	The exact EF for the project needs to be determined at the beginning of each crediting period, using project specific parameters, as follows:
9	*CaO in Clinker, baseline*	*Developer*	tCO_2e/ t of clinker	*m*	At the beginning of each crediting period	*100%*	*electronic and paper*	
10	*Fuel Requirement in baseline*	*Developer*	tCO_2e/ t of clinker	*m*	At the beginning of each crediting period	*100%*	*electronic and paper*	
11	*Fuel EF*	*IPCC*	tCO_2e/ t of clinker	*m*	At the beginning of each crediting period	*100%*	*electronic and paper*	
12	% clinker in cement, baseline	Developer	T Clinker/t cement	*m*	At the beginning of each crediting period	*100%*	*electronic and paper*	
13	*Investment return rates*	To be indicated by the project	%	M	At the beginning of each crediting	100%	*electronic and paper*	Value used for baseline and additionality definition

		proponent and checked by DOE			period			
14	*Fuel consumption by the project*	Developer	tons	m	continuosly	100%	*electronic and paper*	
15	*Fuel EF in project*	*IPCC*	tCO_2e/ton fuel	*m*	At the beginning of each crediting period	*100%*	*electronic and paper*	

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

$$E_b = (QP_b * EF_b) + (QF_b * EFF_b)$$

Where:

E_b: Emissions in the baseline scenario (tonnes CO_2e)

QP_b: Amount of cement produced in the baseline scenario (tonnes). QP_b is by definition be the same as in the project.

EF_b: Emissions Factor of the baseline scenario (tonnes CO_2e/tonnes cement).

QF_b: Amount of fuel used in baseline scenario (volume or energy unit).

EFF_b: IPCC emission factor for fuel used in baseline scenario (tCO_2/ volume or energy unit).

Where

EF_b will be calculated as:

$$EF_b = \text{CEF clinker x \% Clinker in cement in baseline}$$

Where:

CEF clinker = Chemical emissions + Heat emissions

Chemical emissions = % CaO in clinker x 0.785 (tCO_2/t CaO produced)

Heat emissions = Fuel used (TJ) x Fuel EF (as per IPCC)

D.2.3. Treatment of leakage in the monitoring plan

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	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
14	*Baseline Electricity Use (D_b)*	*On site metering*	*MWh*	*m*	*continuously*	*100%*	*Electronic and Paper*	
15	*Project Electricity Use (D_p)*	*On site metering*	*MWh*	*m*	*continuously*	*100%*	*Electronic and Paper*	
16	*Grid CEF*	*IPCC*	*TCO_2/ MWh*	*c*	*At beginning of crediting period*	*100%*	*Electronic and Paper*	

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

No leakage has been identified

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.)

$$\mathbf{ER = E_b - E_p - L}$$

Where:

ER: Emission Reduction (tonnes CO_2e)

E_b: Emissions in the baseline scenario (tonnes CO_2e)

E_p: Emissions in the project scenario (tonnes CO_2e)

L : Leakage (tonnes CO_2e)

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.
1. EG_y	*Low*	*This data will be directly used for calculation of emission reductions. These data is the one most accurately measure, as this is measured both by the operator as well as by the grid company that will acquire the electricity generated by the project. To guarantee QC/QA, it will be double checked by receipts of electricity sales.*
All others	*Low*	*Default data (for emission factors) and grid statistics data will be used. All the sources where data where obtained are cited and come from reputable sources.*

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

The project will be monitored by Ramle's Environmental Affairs Manager.

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

The baseline study was concluded in October 2004. The entities determining the baseline and participating in the project as Carbon Advisors are EcoTraders, Israel, and EcoSecurities Ltd., UK, listed in Annex 1 of this document.

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

$$E_p = (QP_p * EF_p) + (QFp * EFFp)$$

Where:

E_p: Emissions in project scenario (tonnes CO_2e)

QP_p: Amount of cement produced in project scenario (tonnes). By definition, this is the same as in the baseline.

QFp: Amount of fuel used in project scenario (volume or energy unit).

EFFp: IPCC emission factor for fuel used in project scenario (tCO_2/ volume or energy unit).

EF_p: Emissions Factor in the project scenario (tonnes CO_2e/tonnes of cement).

EF_p will be calculated as:

EFp = CEF clinker * % Clinker in cement in project

Where:

CEF clinker = Chemical emissions + Heat emissions

Chemical emissions = % CaO in clinker x 0.785 (tCO_2/t CaO produced)

Heat emissions = Fuel used (TJ) x Fuel EF (as per IPCC)

Applying the formulas above:

CaO content in clinker (%)	0.646
Emissions from CaO production (tCO_2)	0.785
EF clinker (chemical component) tCO_2/t Clinker	0.50711
Plus heat emissions:	
Heat emissions per tonne of clinker (tCO_2)	0.284
CEF clinker (tCO_2/t clinker)	**0.842**

Calculation of EFp:

	t clinker / t cement	Emissions (clinker use), tCO_2/t cement	Production of each type of cement (%)	Average CEFs (t CO_2/t cement)
Cement ALL (vertical mill)	0.6	0.505	47%	0.588
Cement AV (vertical mill)	0.785	0.661	53%	

Calculation of project emissions per year:

Clinker used (1000 t)		2,618
Average fuel used per year (tons of naphta)		742
Cement production Ball mill (1000 t)	47%	1,538
Cement production Vertical mill (1000 t)	53%	1,901
Total cement production (1000 t)		**3,439**
Emissions Ball mill (1000 t CO2)		1,062
Emissions Vertical mill (1000 t CO2)		1,118
Average Emissions Fuel Consumption vertical mill (1000 t CO2)		2.4
Total emissions (1000 t CO2)		**2,180**

It has to be noted that the proposed project activity also leads to emissions due to electricity consumption in the cement manufacturing process. For specific details on the quantification of GHG emission reductions associated with the electricity component a suitable methodology will have to be identified and adopted.

E.2. Estimated leakage:

No source of leakage has been identified.

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

The project activity emissions are 2,183,000 tCO_2 /year.

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

$$E_b = (QP_b * EF_b) + (QF_b * EFF_b)$$

Where:

E_b: Emissions in the baseline scenario (tonnes CO_2e)

QP_b: Amount of cement produced in the baseline scenario (tonnes). QP_b is by definition be the same as in the project.

EF_b: Emissions Factor of the baseline scenario (tonnes CO_2e/tonnes cement).

QF_b: Amount of fuel used in baseline scenario (volume or energy unit).

EFF_b: IPCC emission factor for fuel used in baseline scenario (tCO_2/ volume or energy unit).

Where

EF_b will be calculated as:

$$EF_b = \text{CEF clinker} * \% \text{ Clinker in cement in baseline}$$

In the baseline scenario, there is no fuel consumption and therefore the second argument of the formula above is zero. Given that the EF of clinker in the baseline scenario is the same as in the project, the next step is to calculate EF_b, as follows:

Scenario	t clinker / t cement	Emissions (clinker use), tCO2/t cement	Production level (%)	Average CEFs (t CO2/t cement)
Cement ALL (ball mill)	0.78	0.657	34%	0.690
Cement C AV (ball mill)	0.84	0.708	66%	

Calculation of baseline emission per year:

Clinker used (1000 t)		2,744
Cement production Ball mill (1000 t)	100%	3,430
Cement production Vertical mill (1000 t)	0%	0
Total cement production (1000 t)		**3,430**
Emissions Ball mill (1000 t CO2)		2,368
Emissions Vertical mill (1000 t CO2)		0
Total emissions (1000 t CO2)		**2,368**

It has to be noted that the proposed project activity also leads to emissions due to electricity consumption in the cement manufacturing process. For specific details on the quantification of GHG emission reductions associated with the electricity component a suitable methodology will have to be identified and adopted.

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

ER = 2,368,000 - 2,183,000 = 186,000 t CO_2 per year.

Over the 10 years crediting period, the total emission reductions will be 1,857,000 tCO_2.

It has to be noted that the proposed project activity also leads to emission reductions due to reduced electricity consumption in the cement manufacturing process. For specific details on the quantification of GHG emission reductions associated with the electricity component a suitable methodology will have to be identified and adopted. However, this has been estimated to be around 28,515 tCO_2/year. This has been estimated as follows: Electricity reduction in project scenario (MWh) * CEF grid (tCO_2/MWh). The electricity consumption reduction in project scenario has been calculated by the project proponent, and the CEF from the grid comes from the National Electricity Authority for Israel (Annual Report 2003), according to the table below:

	Average electricity used / t cement (MWh)	CEF grid (tCO_2/MWh)	Electricity emissions (tCO_2/t cement)
Vertical mill	0.024	0.837	0.020088
Ball mill	0.039		0.032643

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

Emission reduction projection Nesher project

Amount cement /tClinker ball mill (average 2 types)	1.25
Amount cement /tClinker vertical mill (average 2 types)	1.37
CEF clinker Ramla (t CO2/t clinker)	0.84
CEF cement ball mill (tCO2 / t cement)	0.69
CEF cement vertical mill (tCO2 / t cement)	0.59
CEF fuel used in vertical mill (tCO2/ton naphta)	3.30

		1	2	3	4	5	6	7	8	9	10	
		2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
BASELINE CASE												
Clinker used (1000 t)		2,744	2,744	2,744	2,744	2,744	2,744	2,744	2,744	2,744	2,744	27,440
Cement production Ball mill (1000 t)	100%	3,430	3,430	3,430	3,430	3,430	3,430	3,430	3,430	3,430	3,430	34,300
Cement production Vertical mill (1000 t)	0%	0	0	0	0	0	0	0	0	0	0	0
Total cement production (1000 t)		**3,430**	**3,430**	**3,430**	**3,430**	**3,430**	**3,430**	**3,430**	**3,430**	**3,430**	**3,430**	**34,300**
Emissions Ball mill (1000 t CO2)		2,368	2,368	2,368	2,368	2,368	2,368	2,368	2,368	2,368	2,368	23,683
Emissions Vertical mill (1000 t CO2)		0	0	0	0	0	0	0	0	0	0	0
Total emissions (1000 t CO2)		**2,368**	**2,368**	**2,368**	**2,368**	**2,368**	**2,368**	**2,368**	**2,368**	**2,368**	**2,368**	**23,683**
PROJECT												
Clinker used (1000 t)		2,618	2,618	2,618	2,618	2,618	2,618	2,618	2,618	2,618	2,618	26,185
Fuel used - Naphta (t)		717	728	735	741	746	703	760	763	765	767	742.50
Cement production Ball mill (1000 t)	47%	1,538	1,538	1,538	1,538	1,538	1,538	1,538	1,538	1,538	1,538	15,383
Cement production Vertical mill (1000 t)	53%	1,901	1,901	1,901	1,901	1,901	1,901	1,901	1,901	1,901	1,901	19,011
Total cement production (1000 t)		**3,439**	**3,439**	**3,439**	**3,439**	**3,439**	**3,439**	**3,439**	**3,439**	**3,439**	**3,439**	**34,394**
Emissions Ball mill (1000 t CO2)		1,062	1,062	1,062	1,062	1,062	1,062	1,062	1,062	1,062	1,062	10,622
Emissions Vertical mill (1000 t CO2)		1,118	1,118	1,118	1,118	1,118	1,118	1,118	1,118	1,118	1,118	11,180
Emissions from fuel consumption (1000 tCO2)		2.367	2.403	2.426	2.446	2.462	2.320	2.509	2.518	2.525	2.532	25
Total emissions (1000 t CO2)		**2,183**	**2,183**	**2,183**	**2,183**	**2,183**	**2,182**	**2,183**	**2,183**	**2,183**	**2,183**	**21,826**
Gross emissions reductions (1000 tCO2)		**186**	**186**	**186**	**186**	**186**	**186**	**186**	**186**	**186**	**186**	**1,857**
Leakage (1000 tCO2)		0	0	0	0	0	0	0	0	0	0	0
Net emissions reductions (1000 tCO2)		**186**	**186**	**186**	**186**	**186**	**186**	**186**	**186**	**186**	**186**	**1,857**

SECTION F. Environmental impacts

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

To be completed.

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:

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SECTION G. Stakeholders' comments

To be completed.

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

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G.2. Summary of the comments received:

>>

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

>>

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Host country DNA

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

This project will not receive any public funding.

Annex 3

BASELINE INFORMATION

All data shown in relevant sections

Annex 4

MONITORING PLAN

All data shown in part D

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