CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

Dead Sea Bromine Ltd. Periclase Site Fuel-Switch
Version 01
October 2007

A.2. Description of the small-scale project activity:

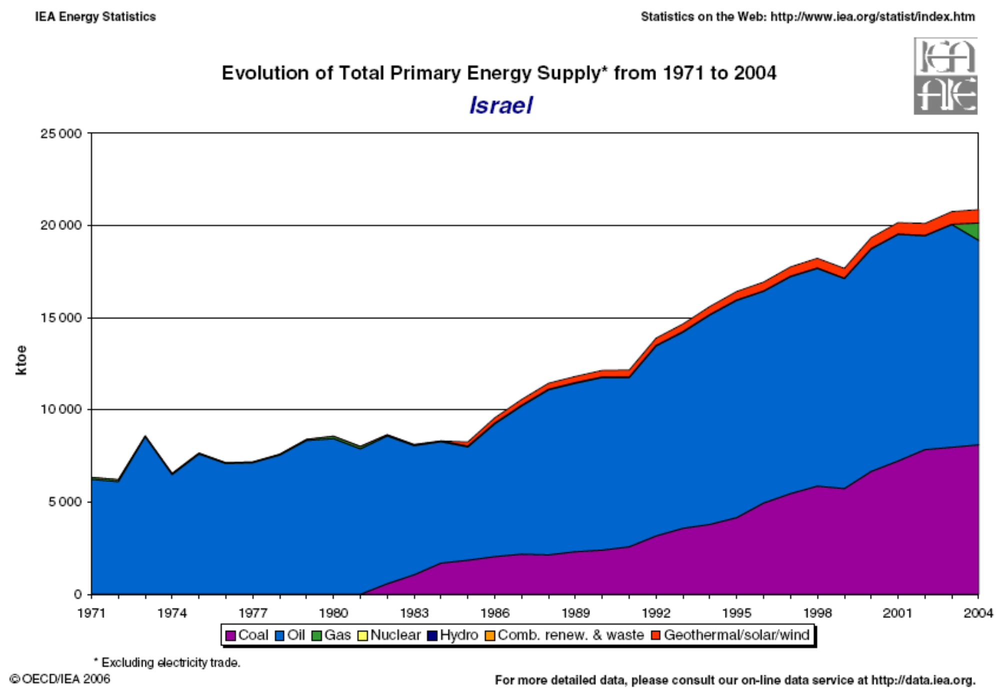
The Dead Sea Bromine Periclase plant, part of the Dead Sea Bromine Group, was established at Mishor Rotem in 1973. The Periclase plant produces a wide range of magnesium oxide (MgO), magnesium hydroxide ($Mg(OH)_2$) and magnesium carbonate products for use in the food and pharmaceutical industries, transformer steel and for specialty applications, such as rubber, adhesives and cosmetics. Magnesium oxide is used for production of high purity magnesium compounds. The calcined MgO grades are widely used in applications such as high quality fertilizer production, pH control in chemical production processes, paper and pulp production, production of magnesium salts, animals feed, and many other applications.

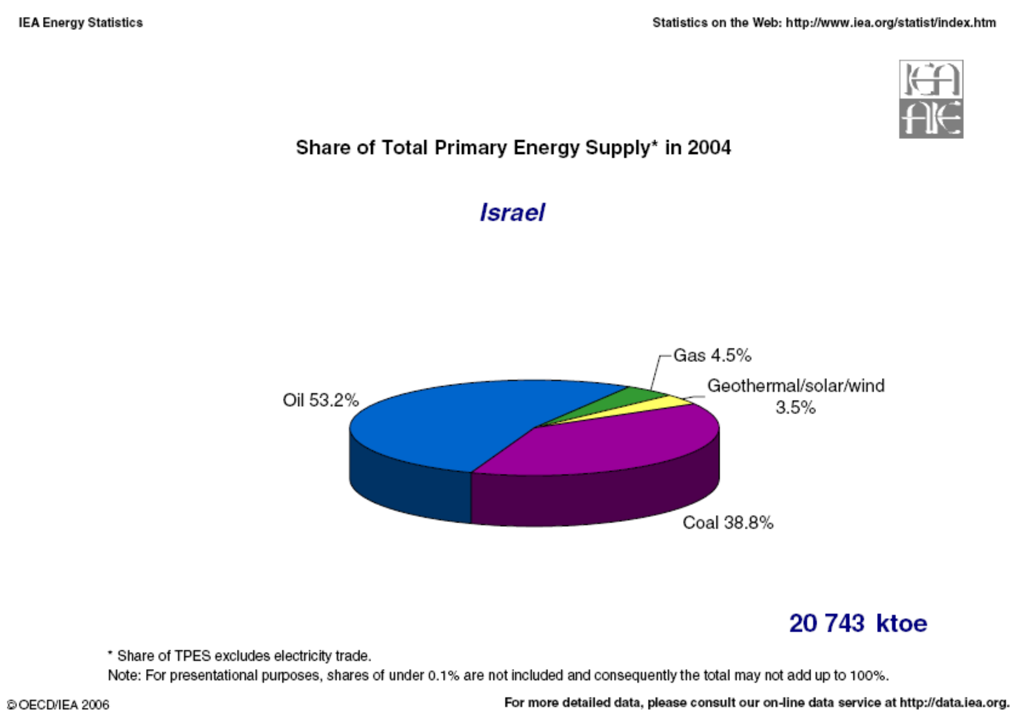
The plant has ISO certification, certification from the Israeli Ministry of Health and compliance with FDA.standards.

In the past, the Periclase plant operated its reactors and furnaces using naphtha, heavy fuel oil (HFO), and the driers on a small amount of natural gas. The project activity will replace the fossil fuels that are used to fire the reactors, furnaces and driers at the Periclase plant with natural gas. To do so, the plant must retrofit all of its equipment to operate on natural gas, including the driers. Although the driers already operate using natural gas, the equipment must be upgraded to meet the new standards. The switch to natural gas will reduce the greenhouse gas emissions produced by the plant and by the Host Country. In addition, natural gas produces fewer air pollutants than HFO, such as SO_2, which will also improve the region's air quality.

Natural gas is not commonly used by industry in Israel for any type of energy generation. Israeli industry tends to use petroleum oils for energy generation; the International Energy Agency estimated that in 2004, oil made up 53% of Israel's primary energy supply.[1]

[1] Diagram taken from the International Energy Agency (IEA), http://www.iea.org/Textbase/stats/pdf_graphs/ILTPES.pdf and http://www.iea.org/textbase/stats/pdf_graphs/ILTPESPI.pdf. According to the International Energy Agency TPEC is calculated as indigenous energy products plus imports, less energy exports.





The government of Israel is committed to sustainable objectives and the project activity fulfils the following sustainability objectives:

Environmental

- The project will address climate change by reducing the amount of greenhouse gases (GHG) emissions generated from Periclase's production processes.

- The project will enable the plant to continue operation but with fewer air pollutant emissions, such as NOx, SOx and particulate matter, than it would in pre-project production.

Social

- Due to the use of a lower-carbon fuel such as natural gas, the project shall also achieve a reduction in harmful air pollutants such as SO_x, NO_x and particulate matter, which will produce health benefits.

Economic

- The project provides essential capacity building for Israeli industry because this project is among the first examples in Israel of private sector industry switching from petroleum oils to natural gas.

A.3. Project participants:

Name of Party involved (*). ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicates if the Party involved wishes to be considered as project participant (Yes/No)
Israel (Host Country)	Dead Sea Bromine Ltd. Periclase Site. Project Developer.	No
	EcoTraders Ltd. CDM project manager and consultant	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

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A.4.1.1. Host Party(ies):

Israel

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

N/a

A.4.1.3. City/Town/Community etc:

Mishor Rotem

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

The project activity is located at the Dead Sea Bromine Periclase factory at Mishor Rotem in the south of Israel. Mishor Rotem is located approximately 15 km from the town of Dimona (population 34,000) and 22 km from the town of Arad (population 28,000).

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

The project falls into Type III – Other project activities, and category B – Switching fossil fuels. The methodology III.B being used for the project is Version 12 (EB35).

The Dead Sea Bromine Periclase Site Fuel Switch is not part of a programme of activities as defined in Annex 15 of the decisions made at EB28.[2]

The Dead Sea Bromine Periclase Site Fuel Switch project will switch the fuel the plant uses in its reactors, furnaces and driers ovens from naphtha, HFO and diesel to natural gas. The project will switch the equipment in the plant to operate on natural gas. The installation of new equipment includes replacing the existing natural gas technology, which does not meet the new natural gas standards. The project therefore falls into Sectoral Scope 1: Energy industries (renewable - / non-renewable sources).

Under Methodology III.B emission reductions must not exceed 60,000 tCO_2e annually. As shown below in sections A.4.3 and B.6 emission reductions from the fuel-switch project will be below this annual.

[2] A programme of activities (PoA) was defined as a voluntary coordinated action by a private or public entity which coordinates and implements any policy/measure or stated goal (i.e. incentive schemes and voluntary programmes), which leads to GHG emission reductions or increase net greenhouse gas removals by sinks that are additional to any that would occur in the absence of the PoA.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

Year	Annual estimation of emission reductions in tonnes of CO2e
2008	25,778
2009	25,778
2010	25,778
2011	25,778
2012	25,778
2013	25,778
2014	25,778
2015	25,778
2016	25,778
2017	25,778
Total estimate reductions (tonnes of CO2e)	257,780
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	25,778

A.4.4. Public funding of the small-scale project activity:

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

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

Appendix C, paragraph 2 of the Simplified Modalities and Procedures for Small-Scale CDM project activities states:

"A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure;
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point."

The project activity is being developed by Dead Sea Bromine Ltd at its Periclase plant. Dead Sea Bromine Ltd. confirms that it has not registered any small scale CDM activity in the past or applied for registration another small scale CDM project activity within 1km of the respective project boundary of the proposed project, in the same project category and technology/measure.

SECTION B. Application of a baseline and monitoring methodology

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

The project activity will use the approved baseline and monitoring methodology "III.B. Switching fossil fuels" (Version 12).

B.2 Justification of the choice of the project category:

The proposed project will replace heavy fuel oil with natural gas. Methodology III.B, "Switching fossil fuels" was chosen for two reasons:

1. The primary activity in this project is a fuel-switch.
   The methodology applies to projects that are switching their fossil fuel consumption to a different fossil fuel.

2. Primary plant output to be used as a variable.
   The methodology requires that the facility's output be monitored. This methodology allows for industrial output to be used for the output variable. This makes this particular methodology appropriate for industrial facilities whose primary output is not energy, such as the Periclase plant, where the primary outputs are different magnesium compounds.[3]

B.2.1 The small scale methodology III.B states that the baseline methodology is applicable to the following cases:

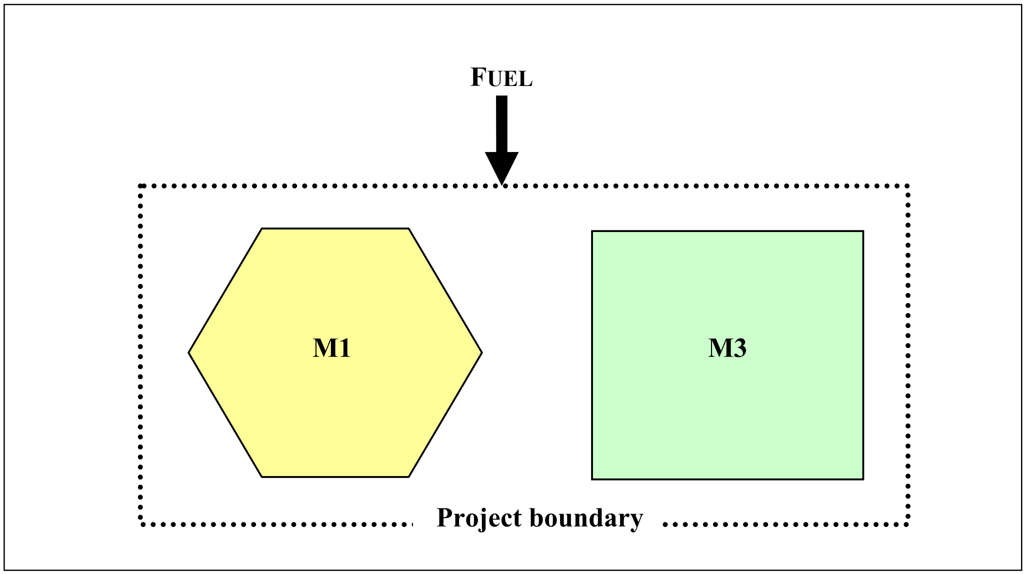
Applicability Clause	**Applicability of the clause to the small scale project activity**
"This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications."	✓ The project is switching from the fossil fuels used in the existing plant's reactors, furnaces and driers to natural gas, a less carbon-intensive fossil fuel.
"If the project activity primarily aims at reducing emissions through fuel switching, it falls into this category. If fuel switching is part of a project activity focused primarily on energy efficiency, the project activity falls into category II.D or II.E."	✓ The project is not expected to affect the efficiencies of the reactors or furnaces. Therefore, the project may use methodology III.B.
"Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO2 equivalent annually."	✓ The project's emissions reductions will be less than 60,000 tCO_2e per year.

B.3. Description of the project boundary:

Methodology III.B states that "the project boundary encompasses the physical, geographical site where the fuel combustion affected by the fuel-switching measure occurs."

[3] Other projects that make use of methodology III.B designate their main production output, which is not energy output, as the output variable. E.g. *the Quimvale and Gas Natural Fuel Switch Project*, registered in March 2007, uses calcium carbonate as its output variable.

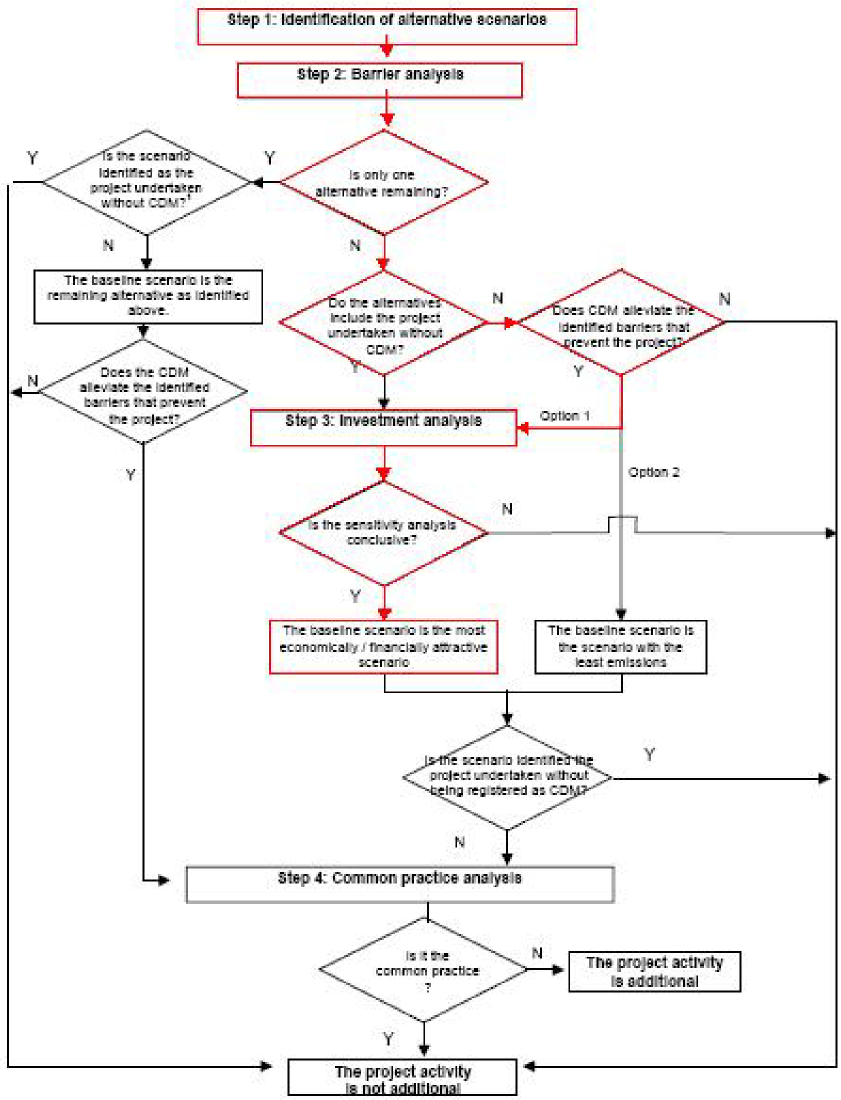
The fuel combustion at the Periclase plant occurs in facilities M1 and M3, where the reactors, furnaces and driers are situated. Therefore, facilities M1 and M3 are included in the project boundary.



B.4. Description of baseline and its development:

Methodology III.B does not specify how to choose the baseline scenario. Therefore, the baseline scenario will be selected using the procedure described in the "Combined tool to identify the baseline scenario and demonstrate additionality". Only the first steps in the tool will be used, in order to choose the baseline scenario. The steps in the Tool used to determine additionality will not be used for this project. Instead, in keeping with the requirements of the small-scale CDM PDD, barriers will be determined according to the options provided in attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

The chart below illustrates the steps conducted to determine the appropriate baseline scenario for this project:



Step 1. Identification of alternative scenarios

Step 1a. Define alternative scenarios to the proposed CDM project

Alternatives:
1) Continuation of current practice – fossil fuel mix (primarily naphtha and HFO, also small amounts of diesel and natural gas)
2) Fuel switch – natural gas, without the CDM component
3) Fuel switch – natural gas, with CDM
4) Fuel switch to 100% naphtha

Alternatives (1) through (4) all provide comparable energy output and would allow the plant to continue production at the same level of quality. Although the plant will lose production time and potentially need to lower its level of output because of the introduction of natural gas to the entire plant, the plant could maintain the same level of production if it were to enlarge its combustion chambers. For the barriers that this presents, please see below.

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

At present there are no environmental standards or regulations in Israel relating to GHGs that restrict the use of naphtha or HFO use at the plant. Israel has ambient air quality standards in place relating to SO_x, NO_x and particulate matter (PM). In addition, each industrial plant must maintain a business license, which contains the environmental standards to which the plant must adhere. The Periclase plant meets the common air quality standards of the Host Country and the specific air quality standards as detailed in the plant's business license.

All alternatives meet applicable laws and regulations.

Step 2. Barrier analysis
Sub-step 2a: Identify barriers that would prevent the implementation of alternative scenarios:

Technological Barriers
The Periclase plant faces a technological problem in implementing the project. Natural gas requires a larger combustion chamber than does either naphtha or HFO, because natural gas needs more oxygen than either naphtha or HFO to generate the energy needed for the plant's production. It has not yet been decided how to meet this technological problem. One option is to enlarge the combustion chambers, by demolishing a part of them and rebuilding them with a larger volume; this approach would require the Periclase plant to shut down production for a few months, which will impose a significant financial burden on the company.

If it is decided not to enlarge the combustion chamber because of the lost production time, the only other option available may be to reduce the plant's production levels. In the existing combustion chambers, natural gas will be able to produce less energy than the fuels currently used naphtha or HFO. Therefore, production levels may fall due to the project because the amount of energy that will be produced will be lower.

Scenarios (2) and (3) face technological barriers.

Other Barriers – Uncertainty of fuel supply
The Periclase plant has invested time and capital in expanding its natural gas infrastructure to include the entire plant. These investments were made prior to the closure on a contract with a natural gas supplier. Negotiations are ongoing with Eastern Mediterranean Gas (EMG), an Egyptian natural gas supplier, and as of October 2007, no contract has been closed.

EMG is, at present, the only likely gas supplier from which Periclase can purchase natural gas. Although the Israeli and Egyptian governments are in negotiations, there has been opposition in Egypt to a deal with Israel to supply natural gas.[4] The other two suppliers in the region, Yam Tetis and British Gas, are not realistic sources of supply at the moment. Yam Tetis controls a small natural gas reserve off the coast of Ashkelon but has already contracted most of the reserves to the Israel Electric Company and other companies; British Gas, located off the coast of Gaza, has not yet developed its infrastructure and it is estimated that gas will

[4] "Egypt Faces Opposition Criticism Over Reported Israeli Gas Deal" Agence France Presse, May, 2004. http://findarticles.com/p/articles/mi_kmafp/is_200405/ai_kepm475192. Accessed July 15, 2007.
"Petrojet starts construction of Egypt-Israel gas pipeline in March" *The Daily Star*, February 14, 2007. http://www.dailystaregypt.com/printerfriendly.aspx?ArticleID=5591 Accessed on July 15, 2007.

not be available until 2011, at the earliest.[5] Additionally, conflict between Israeli government and the Palestinian government in Gaza make it unlikely that a deal will be brokered unless significant political changes in the region occur.[6] It is also not realistic for Periclase to rely on its current supply of natural gas from Neve Zohar; the supply is dwindling and does not provide enough gas at the required pressure for the plant. Though the plant uses a small supply of natural gas to operate its driers in the past, this supply is too small to operate any other equipment. Furthermore, this natural gas supply is dwindling and currently, the supply and the gas pressure is too uncertain to continue operations. If it were not for the CDM project activity the Periclase plant would have had to retrofit its driers to operate either on naphtha or HFO.

If the gas supply from EMG fails, the Periclase plant will be forced to return to using naphtha. Switching back to naphtha will require the plant to stop production for two weeks so that it can restore the naphtha fuel system to the plant. In such a case, the Periclase plant will face losses from the cessation of production and will lose some of its investment in the project activity, because natural gas infrastructure installed in the plant will not be used to the extent expected when the investment was made. The uncertainty regarding the availability of natural gas makes it harder to justify the lost time and revenue that will result if the plant may return to naphtha.

Scenarios (2) and (3) face a barrier due to uncertainty about the fuel supply.

Sub-step 2b. Eliminate alternatives that are prevented by identified barriers:
Alternatives:

1) Continuation of current practice – fossil fuel mix (primarily naphtha and HFO)
2) ~~Fuel switch – natural gas, without the CDM component~~
3) ~~Fuel switch – natural gas, with CDM~~
4) Fuel switch to 100% naphtha

<u>Impact of CDM Revenues</u>
The financial support from the CDM will help alleviate the barriers described above. The Periclase plant will face production losses from the switch to natural gas, either from the need to stop production to expand the combustion chambers or from lower production levels because the combustion chamber will not be enlarged. CDM revenue will offset these losses.

The Periclase plant also faces uncertainty regarding its new natural gas fuel supply. If the natural gas supply fails, the Periclase plant will return to using naphtha, but the switch back to naphtha will require production to stop for two weeks while the system is switched. Furthermore, should the natural gas supply fail, the Periclase plant will lose the investment it made in the fuel switch project. CDM revenue will support the Periclase plant in the face of fuel supply uncertainty.

Step 3. Financial Analysis

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5 "Agreement to Purchase Natural Gas from British Gas – Within 2 Months", by Avi Bar-Eli. The Marker, May 13, 2007. http://www.themarker.com/tmc/article.jhtml?log=tag&ElementId=skira20070513_858610. Accessed July 15, 2007.

6 "The Conflict in Palestine and its Repercussions on Gaza Gas Export to Israel" by Walid Khadduri. Al Hayat, July 2, 2007. http://english.daralhayat.com/business/07-2007/Article-20070702-868d3d59-c0a8-10ed-0082-a494eba38cc2/story.html. Accessed July 15, 2007.

A financial analysis was conducted for the two remaining alternatives, scenarios (1) and (4). HFO comprises 37% and naphtha the remaining 63% of energy generation (according to the average energy generation from 2004 to 2006[7]).

The Ministry of Infrastructure regulates fuel prices and makes these prices publicly available through the Central Bureau of Statistics.[8] The prices shown in the comparison below are the official prices for HFO and naphtha for 2005 and 2006.

Year	Month	Refinery price of HFO - NIS per tonne	Refinery price of HFO - $ / tonne	Refinery price of naphtha - NIS per tonne	Refinery price of naphtha - $ / tonne
2005	I	752.3	171.81	1,633.80	373.12
	II	845.4	193.44	1,769.90	404.98
	III	905.4	209.15	1,892.30	437.12
	IV	1,055.70	241.50	2,111.00	482.90
	V	1,136.70	259.89	2,048.90	468.46
	VI	1,059.40	236.21	1,818.50	405.47
	VII	1,246.50	273.33	2,044.90	448.39
	VIII	1,210.10	268.36	2,135.50	473.58
	IX	1,294.20	285.17	2,465.70	543.30
	X	1,493.30	322.84	2,655.00	573.99
	XI	1,428.00	303.84	2,495.60	531.00
	XII	1,271.20	275.65	2,158.80	468.11
2006	I	1,312.30	284.12	2,262.50	489.85
	II	1,553.50	330.31	2,551.90	542.59
	III	1,558.30	332.32	2,477.40	528.33
	IV	1,501.40	327.84	2,494.80	544.75
	V	1,523.90	340.61	2,779.70	621.30
	VI	1,512.80	338.26	2,713.30	606.69
	VII	1,428.30	322.21	2,809.10	633.71
	VIII	1,528.30	348.98	2,779.90	634.78
	IX	1,415.50	325.19	2,650.60	608.94
	X	1,142.20	267.31	2,149.40	503.03
	XI	1,165.50	270.99	2,186.20	508.31
	XII	1,125.10	267.78	2,193.50	522.06

7 Naphtha accounts for 56% of averaged energy generation. However, naphtha prices are publicly available from the Central Bureau of Statistics and the price of natural gas from Neve Zohar is not. Furthermore, the amount of diesel used by the factory is negligible. Therefore, it was decided that for the selection of the baseline scenario, it would be assumed that 63% of energy generation would come from naphtha. This is conservative, because naphtha is more expensive than HFO and by raising the cost of the factory's current practice, it may end up being a more expensive option than 100% naphtha in a sensitivity analysis.

[8] Fuel price data in New Israeli Shekels (NIS) was taken from the Central Bureau of Statistics energy database. The data is available online in Hebrew. http://www1.cbs.gov.il/energy, for petroleum products under "Data, Graphs and International Comparisons". Prices from the oil refineries (Bazan) is the source of this data.

Exchange rates to calculate USD from NIS is taken from the Bank of Israel. 2005 data: http://www.bankisrael.gov.il/deptdata/mth/average/averg05e.htm; 2006 data: http://www.bankisrael.gov.il/deptdata/mth/average/averg06e.htm.

AVERAGE	**1,269.39**	**283.21**	**2,303.26**	**514.78**

The analysis of the prices listed in the chart above clearly indicates that there is an enormous difference between the price of HFO and naphtha. To confirm that most financially attractive scenario is current practice, i.e. the continued use of HFO and naphtha, a sensitivity analysis was conducted.

Using fuel consumption data provided by the plant, the average amount of energy (TJ) used over three years (2004-2006) was determined. Based on the amount of TJ used, the amount of HFO and naphtha (alternative #1) or 100% naphtha (alternative #4) that would have been required to generate this amount of energy was using the net calorific value (NCV) provided by the IPCC in its 2006 Guidelines for National Greenhouse Gas Inventories.[9] The prices of HFO and naphtha, averaged from 2005 and 2006 data, were taken from the table above.

Using data of fuel consumption provided by the Periclase plant, it was determined that the following costs are faced by each of the alternative baseline scenarios:

Alternative 1	Continuation of current practice:	$14,654,824
Alternative 4	100% naphtha	$16,996,638

Alternative 1, the continuation of current practice, financially is the most attractive scenario.

Sensitivity analysis #1 – Price of HFO increases by 10%

Alternative 1	Continuation of current practice:	Price of HFO +10%	$15,015,002
Alternative 4	100% naphtha	No change in price of naphtha	$16,996,638

Sensitivity analysis #2 – Price of naphtha decreases by 10%

Alternative 1	Continuation of current practice:	Price of naphtha -10%	$13,549,519
Alternative 4	100% naphtha	Price of naphtha -10%	$15,296,974

In each case presented in the sensitivity analysis, current practice (alternative 1) remains the most financially attractive scenario. Therefore, the baseline scenario for the project is current practice (use of a mix of fossil fuels).

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 small-scale CDM project activity:

To determine the project's additionality, the SSC-PDD requires that the project activity be assessed using the options listed in Attachment A to appendix B of the Simplified Modalities and Procedures for Small-scale CDM Projects. Attachment A to Appendix B requires that

[9] IPCC 2006. Vol.2, Ch.1, pg.1.18-1.19. Values given as TJ/Gg, but calculated here according to TJ/t (1Gg=1000tonnes).

barriers to the project activity be demonstrated by showing that if the project had not been undertaken and an alternative to the project had occurred, emissions would have been higher.

The baseline scenario is the current practice at the Periclase plant, i.e. a mix of fossil fuels. Therefore, it is not the project activity undertaken without CDM.

In order to fully understand the difficulties the Dead Sea Bromine Periclase Site Fuel Switch project faces, it is necessary to give some background on the Israeli energy sector. Energy in Israel is generated primarily from petroleum oils and coal. Up until now, natural gas has not been readily available to meet industrial energy needs.

Since the mid-1980s, the Israeli government has intended to introduce natural gas to the industrial sector. In 1995, the government established the Natural Gas Authority to promote the development of a natural gas infrastructure in Israel. The national plan for the installation of a natural gas pipeline (National Plan 37) was completed in 1999. The plan was to be implemented immediately upon its finalization, although actual implementation encountered a number of unforeseen obstacles, which delayed the introduction of natural gas to Israel:

1. The government published a tender with the intention that a single private body to construct maintain and operate the pipeline. After the tender failed in 2003, the government realized that only a governmental body could undertake a project of this magnitude. Israel Natural Gas Lines Ltd (INGL) was established to construct the natural gas pipeline and received a license to do so in 2004.

2. Construction of the pipeline began in 2004[10] but the pipeline project was delayed for a number of reasons. No natural gas transportation system has ever been constructed in Israel, which means that there was a lack of skilled and properly trained personnel to implement the project. Construction was delayed as well because it was difficult for the INGL to acquire the necessary building permits to construct the pipeline because local authorities, such as the Fire Authority and municipalities, were sensitive to the risks posed by a natural gas pipeline.

3. To date, only a minor part of the natural gas pipeline as planned has been installed, delaying further the arrival of natural gas to Israel. The yellow highlights on the map below illustrate the part of the natural gas pipeline that has been laid down. As of October 2007, certain sections of the coastal north-south pipeline have been completed; even so, the infrastructure is still lacking to actually deliver the natural gas in the existing pipeline.

4. To date, the pipeline to the Periclase plant has not been completed. The constant delay in the supply of natural gas has caused endless difficulties for industries wishing to plan ahead and include natural gas in their fuel mix.

5. No pipeline is yet available from the EMG gas fields, from El Arish and Israel has no influence or impact upon its construction. Until the El Arish-Ashkelon pipeline is completed, there is no gas supply for the Periclase plant.

[10] Survey of the Natural Gas Sector in Israel. Conducted by Ma'a lot (the Israeli Company for Ranking Bonds). Accessed July 10, 2007. http://www.maalot.co.il/content.asp?PageId=229.

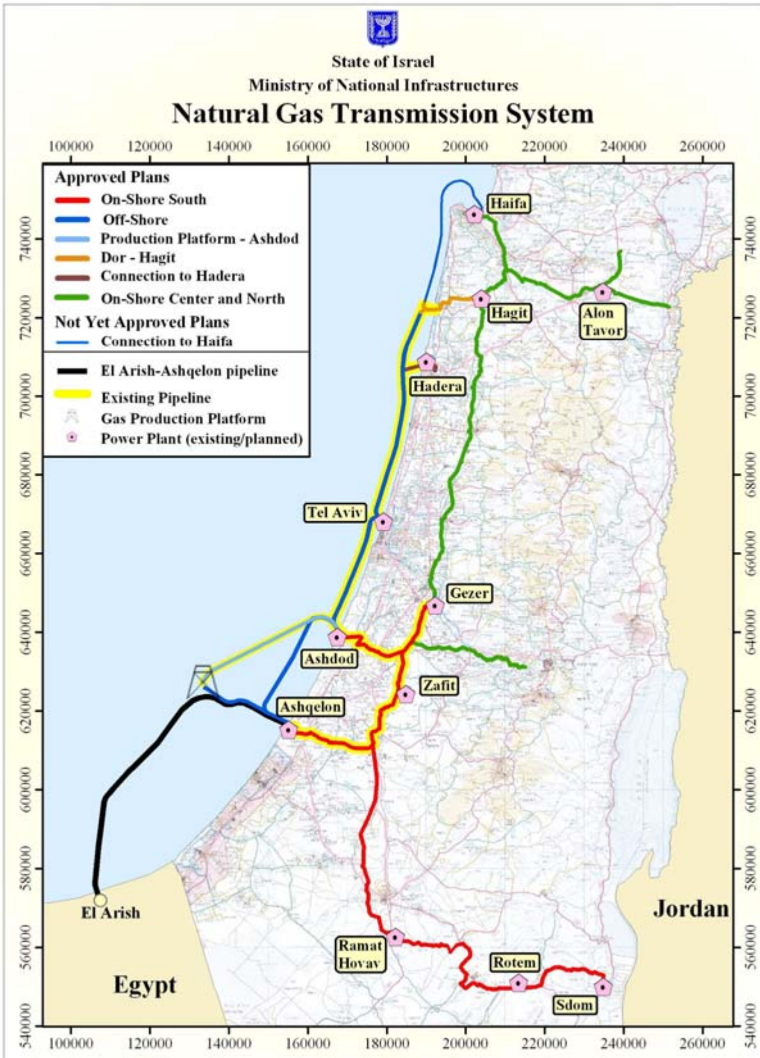

Figure 1: Natural Gas Pipeline in Israel, October 2007[11]

Barriers to the Project
Were the Periclase plant to continue operating on its current fuel mix (primarily naphtha and HFO) the plant would not face the barriers described below and emissions would be higher as shown below:

(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

The Periclase plant faces a technological barrier in implementing the project. Natural gas requires a larger combustion chamber than does either naphtha or HFO, because natural gas

[11] Ministry of National Infrastructure. http://www.mni.gov.il/mni/en-US/Energy/NaturalGas/NGTransportation.htm. Accessed on October 16, 2007.

needs more oxygen than either naphtha or HFO to generate the energy needed for the plant's production. It has not yet been decided how to meet this technological problem. One option is to enlarge the combustion chambers by rebuilding them with a larger volume; this approach would require the Periclase plant to shut down production for a few months, which would impose significant losses on the company. If it is decided not to enlarge the combustion chamber because of the lost production time, the only other option available may be to reduce the plant's production levels. In the existing combustion chambers, natural gas will be able to produce energy for less output than can naphtha or HFO. This would mean that the plant could not continue at current production levels when the entire plant operates on natural gas. Therefore, the project activity will lead to a loss of production at some level.

Should the Periclase plant continue its current practice of using naphtha and HFO for the majority of its fuel mix, the plant would not face technological barriers regarding its fuel use. This situation would lead to higher emissions than the project activity

Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
This project is one of the first of its kind to be implemented in Israel in the private sector. There are only two other private users of natural gas in Israel, the Ashdod Refineries, which although privatized in August 2006, began using natural gas in November 2005 when it was still a government-owned company. The only private company in Israel that initiated a switch to natural gas while under private ownership is the American Israel Paper Mills, which has been developed as a CDM project.

To appreciate the pioneering characteristics of this project it is necessary to understand how Israel's industrial sector generates energy. Israeli industry relies mainly on petroleum oils (heavy-fuel oil, diesel and naphtha) to generate heat and steam (see list in Annex 5). Up until now, natural gas has not been widely available for use in the energy and industrial sectors. The Periclase plant is a case in point; it has used some natural gas over the years, but the supply was too small to meet the plant's entire demand for fuel. Furthermore, the supply has dwindled to such an extent that the pressure of the available natural gas is too low and uncertain, and in the absence of the project activity, the Periclase plant would have to switch its driers to operate on HFO or naphtha.

In the absence of the project activity, the Periclase plant would have continued to use naphtha and HFO, and would likely have had to replace the natural gas used in the driers with naphtha or HFO. The baseline scenario of primarily naphtha and HFO has higher CO_2 emissions than natural gas. HFO and naphtha are common, standard fuels used in Israeli industry and the Periclase plant would not have faced any barriers if it had continued to use these fuels.

Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

<u>Other Barriers – Uncertainty: Fuel Availability</u>
The Periclase plant faces uncertainty regarding the availability of the natural gas it has purchased, which can affect the company's production schedule and economic viability.

1. The natural gas offshore transportation pipeline is to be constructed from El Arish in the northern Sinai to Ashkelon in southern Israel.

There gas pipeline in El Arish may have associated security risks. The fact that the El Arish pipeline will supply gas to Israel may make it a security target, given the political tensions in the region. If the natural gas delivery system is damaged and gas is not available for a period of time from EMG, the Periclase plant will not have the option of other gas supplies with which to supplement its natural gas demand. Most of the Yam Tetis gas supply has been secured by the IEC and other companies through contracts. The British Gas supply will not be available until 2011, at the earliest.[12] Additionally, conflict between Israeli government and the Palestinian government in Gaza make it unlikely that a deal with be brokered unless there are significant political changes. The Periclase plant is investing a great deal of capital in a natural gas fuel switch, but the natural gas supply is less reliable than the current fuels used at the plant, naphtha and HFO. If the supply of natural gas fails, the plant will may be forced to return to naphtha, which would entail lost work and production hours from returning the ovens to operating on naphtha.

2. Gas contracts signed are take-or-pay contracts, which mean that the consumer and the supplier are locked into contract for a specific amount of time. This creates two disadvantages for the Periclase plant compared to the current fuel consumption. In the event that the Periclase plant opts not to use the gas, for whatever reason, it must still pay EMG for the majority of the contracted amount. More traditional fuels, like HFO, allow the company flexibility in creating its fuel mix and ordering what is needed as it is needed.

Had the plant not decided to go ahead with the project, it would have continued to use naphtha and HFO, which are always available, can be ordered as needed and stored on-site and require no commitment to any one supplier. The continued use of naphtha and HFO instead of the project activity would have led to higher emissions.

Summary of barriers to the project activity:

Barrier	CDM Project Activity	Naphtha & HFO (Baseline Scenario)
Technological	• Need to enlarge the combustion chambers, which will require cessation of production for a few months, or will need to reduce production output to match the amount of energy natural gas can supply using the existing combustion chambers.	• No cessation of production. • No reduction in output.
	Barrier to the implementation of the project.	*No barrier to the baseline scenario.*
Prevailing Practice	• Among the first projects of this kind in the Host Country • Majority of the industry in the Host Country uses petroleum oils to generate heat and steam.	• Commonly used fuels in Israel • The majority of the plant's fuel supply, HFO and naphtha, can be managed in an on-site supply inventory and orders for deliveries can be placed as needed
	Barrier to the implementation of the project.	*No barrier to the baseline scenario.*
Uncertainty – Fuel Availability	• Fuel to be delivered by transportation system from a different country • Political tensions in the region may put the delivery of fuel at risk. • Contract one supplier to deliver natural gas – if another supplier is needed, will need to negotiate another contract.	• HFO and naphtha can be ordered from any one of a number of companies and is available in an unlimited supply, meaning no loss of production. • Should one fuel supplier company not be able to provide HFO and/or

[12] "Natural Gas Agreement with British Gas in Two Months", by Avi Bar-Eli. *The Marker Online,* May 13, 2007. http://finance.walla.co.il/?w=//1105962/@@/item/printer. Accessed August 23, 2007.

	• If gas supply fails or is delayed, Periclase will need to reinstall naphtha burners, which will mean loss of investment and loss of production hours.	naphtha, orders can be placed with a different fuel supplier.
	Barrier to the implementation of the project.	*No barrier to the baseline scenario.*

Continuing to use naphtha and HFO would not have required the time and effort that the Periclase plant has invested in the project and the barriers that it has faced and may face in the future:

- Facing reduction in production or cessation of production for a number of months because the existing combustion chambers are not large enough to maintain current production on natural gas (technological barrier);
- Being one of the first private companies in Israel to develop plans to switch its entire facility to natural gas (prevailing practice barrier);
- Dealing with risk in natural gas supply and availability (uncertainty barrier);
- Being limited to one supply of gas, which, if the supply fails, would necessitate returning to naphtha, which would result in lost production during the retrofit;
- Being limited to one gas supplier, in the event that a new contract must be negotiated due to supply problems, and problems with other suppliers in the region (uncertainty barrier);

Therefore, the project is additional because the baseline scenario, the continued use of HFO would not have faced the above barriers and would have led to higher emissions.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The approved small-scale methodology "III.B. Switching fossil fuels" demands the following in terms of emission reduction (ER) calculations:

Project Emissions:

"Project activity emissions consist of those emissions related with the use of fossil fuel after the fuel switch."

No equations are contained in the approved methodology and, therefore, project emissions shall be calculated according to the equation below, which was developed to meet the methodology's instructions.

$$PE_y = PE_{NG,y} + PE_{i,y} \qquad (1)$$

Where:

Parameter	Description	Unit
$PE_{,y}$	Project Emissions in year y.	tCO_2
PE_{NG}	Project Emissions from natural gas use in year y.	tCO_2
$PE_{i,y}$	Project Emissions from non-natural gas fossil fuel use in year y.	tCO_2

Equation for project emissions from natural gas use:

$$PE_{NG,y} = FC_{PJ,NG} \times CF_{MMBTU \rightarrow TJ} * EF_{NG} \qquad (1a)$$

Where:

Parameter	Description	Unit
$FC_{PJ,NG}$	Fuel consumption in project scenario of natural gas	MMBTU
$CF_{MMBTU \rightarrow TJ}$	Conversion factor to calculate the number of TJ per MMBTU	TJ/MMBTU
EF_{NG}	Emission factor of natural gas considering both the net calorific value and oxidation factor. (IPCC 2006)	tCO_2/TJ

Equation for project emissions from other fossil fuel use:

$$PE_{i,y} = \sum FC_{PJ,i,y} \times NCV_i * EF_i \qquad (1b)$$

Where:

Parameter	Description	Unit
$FC_{PJ,i,y}$	Fuel consumption in project scenario of fuel *i* in year y	tonnes
NCV_i	Net calorific value of fuel *i*	TJ/tonne
EF_i	Emission factor of fuel *i* considering both the oxidation factor. (IPCC 2006)	tCO_2/TJ

In this manner, each tonne of CO_2 emitted to the atmosphere in the project due to the consumption of fossil fuels is accounted for.

Fuel consumption of natural gas in project scenario will be measured according to the procedures described in the following section of the PDD. The estimations given in section B.6.3 for the ex-ante calculations are derived from internal demand projections of the plant. For simplicity, the ex-ante calculation also assumes that only natural gas will be used throughout the project activity.

The ex ante calculation of PE_y bases the parameter $FC_{i,}$ on the amount of energy required to produce the forecasted production schedule of the Periclase plant for the years 2009-2017. Actual fuel consumption throughout the project activity will be monitored by flow meters, as described in section B.7.1.

Baseline Emissions:

Therefore, baseline emissions shall be calculated as follows:

$$BEy = BE_{per\ unit\ output,BL} * P_{output,PJ}$$

Eq. 2a

Where:

Parameter	Description	Unit
BEy	Baseline emissions in year y.	tCO_2/yr
$BE_{per\ unit\ output,BL}$	Emission in the baseline per unit of output	tCO_2/tonne output
$P_{output,\ PJ,y}$	Output in project scenario in year y.	Tonne

$$BE_{per\ unit\ output} = \sum \left(\frac{FC_{BL,i} * NCV_i * EF_i}{P_{output,BL}} \right)$$

Eq. 2b

Where:

Parameter	Description	Unit

$P_{output, BL}$	Output in baseline scenario averaged over the 3 years prior to project development.	Tonne
$FC_{BL,i,}$	Fuel consumption of fuel *i* in baseline scenario averaged over the 3 years prior to project development.	Tonne
NCV_i	Net calorific value of fuel *i*	TJ/tonne
EF_i	Emission Factor fuel *i* (IPCC)	tCO_2/tonne

Baseline emissions are calculated in two steps. The carbon emissions per unit of output are calculated (tCO_2/m), as in Eq. 2b. The result of this calculation is use to calculate total baseline emissions, as shown in Eq. 2a.

By multiplying the actual baseline emissions, which are calculated as the sum of the petroleum fuels multiplied by their respective emission factors, with a "production factor" that divides the project's output with the baseline's output, baseline emissions are calculated dynamically and account for changes in production. The amount of fuels *i* used to calculate the baseline emissions are based on the average fuel consumption by the plant for the years 2004-2006. All data used in the calculation of the baseline are found in Annex 3.

Leakage:
No leakage calculation is required.

Emission Reduction:
$ER_y = BE_y – PE_y$

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

Data / Parameter:	EF_{NG}
Data unit:	tCO_2/TJ NG
Description:	Emission Coefficient of natural gas considering both the net calorific value and oxidation factor.
Source of data used:	IPCC 2006
Value applied:	56.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	As the methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	$CF_{MMBTU \rightarrow TJ}$
Data unit:	TJ/MMBTU
Description:	Conversion factor to calculate the number of TJ per MMBTU
Source of data used:	http://www.onlineconversion.com
Value applied:	0.00105506
Justification of the choice of data or description of measurement methods	Recognized conversion factor.

and procedures actually applied :	
Any comment:	

Data / Parameter:	$FC_{BSL,HFO}$
Data unit:	Ton
Description:	Fuel consumption of HFO in baseline scenario.
Source of data used:	Industrial Facility.
Value applied:	This data is a proprietary information that will be displayed to the DOE
Justification of the choice of data or description of measurement methods and procedures actually applied :	Three years of data (2004-2006) were used to determine average fuel consumption. Fuel purchase receipts are the most accurate way to measure fuel purchases because the refinery, which must deliver exactly what the client orders, weighs the fuel prior to delivery. Quantity of fuel delivered is entered into the plant's computerized data management system.
Any comment:	All data will be stored for the duration of the project activity + 2 years.

Data / Parameter:	NCV_{HFO}
Data unit:	TJ/t HFO
Description:	Net calorific value for HFO.
Source of data used:	IPCC 2006
Value applied:	0.0404
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	EF_{HFO}
Data unit:	tCO_2/TJ HFO
Description:	Emission Factor for HFO.
Source of data used:	IPCC 2006
Value applied:	77.367
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	$FC_{BSL,naphtha}$
Data unit:	Tonne
Description:	Fuel consumption of HFO in baseline scenario.
Source of data used:	Industrial Facility.
Value applied:	This data is a proprietary information that will be displayed to the DOE
Justification of the	Three years of data (2004-2006) were used to determine average fuel

choice of data or description of measurement methods and procedures actually applied :	consumption. Fuel purchase receipts are the most accurate way to measure fuel purchases because the refinery, which must deliver exactly what the client orders, weighs the fuel prior to delivery. Quantity of fuel delivered is entered into the plant's computerized data management system.
Any comment:	All data will be archived for the duration of the project activity plus two additional years.

Data / Parameter:	$NCV_{naphtha}$
Data unit:	TJ/t naphtha
Description:	Net calorific value for naphtha.
Source of data used:	IPCC 2006
Value applied:	0.0445
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	$EF_{naphtha}$
Data unit:	tCO_2/TJ naphtha
Description:	Emission Factor for naphtha.
Source of data used:	IPCC 2006
Value applied:	73.333
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	$FC_{BSL,natural\ gas}$
Data unit:	Tonne
Description:	Fuel consumption of natural gas in baseline scenario.
Source of data used:	Industrial Facility.
Value applied:	This data is a proprietary information that will be displayed to the DOE
Justification of the choice of data or description of measurement methods and procedures actually applied :	Three years of data (2004-2006) were used to determine average fuel consumption. Fuel purchase receipts are the most accurate way to measure fuel purchases because the natural gas fuel supplier reads the gas meter and bills the plant based on the reading. The quantity of natural gas is entered into the plant's computerized data management system. The amount of natural gas listed in the purchase receipts is in m^3. A density of 0.8 kg/m^3 for natural gas was used, which is 0.0008 tonnes/ m^3, to calculate the value in tonnes. [13]

[13] Density of natural gas taken from http://www.engineeringtoolbox.com/gas-density-d_158.html. The density is given as 0.7-0.9 kg/m^3 and therefore, the average of these, 0.8, was chosen.

Any comment:	All data will be archived for the duration of the project activity plus two additional years.

Data / Parameter:	NCV_{NG}
Data unit:	TJ/t NG
Description:	Net calorific value for natural gas
Source of data used:	IPCC 2006
Value applied:	0.048
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	EF_{NG}
Data unit:	tCO_2/TJ NG
Description:	Emission Factor for natural gas.
Source of data used:	IPCC 2006
Value applied:	56.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	$FC_{BSL,diesel}$
Data unit:	Tonnes
Description:	Fuel consumption of diesel in baseline scenario.
Source of data used:	Industrial Facility.
Value applied:	This data is a proprietary information that will be displayed to the DOE
Justification of the choice of data or description of measurement methods and procedures actually applied :	Three years of data (2004-2006) were used to determine average fuel consumption. Fuel purchase receipts are the most accurate way to measure fuel purchases because the refinery, which must deliver exactly what the client orders, weighs the fuel prior to delivery. Quantity of fuel delivered is entered into the plant's computerized data management system. Diesel receipts list the amount of diesel purchased in litres. Using an average density for diesel of 0.84 g/ml (= metric tonnes/m^3), which is the same as 0.00084 tonnes/litre, the amount of diesel consumed in tonnes was calculated. [14]
Any comment:	All data will be archived for the duration of the project activity plus two additional years.

Data / Parameter:	NCV_{diesel}

[14] Diesel density value taken from http://bioenergy.ornl.gov/papers/misc/energy_conv.html

Data unit:	TJ/t diesel
Description:	Net calorific value for diesel
Source of data used:	IPCC 2006
Value applied:	0.043
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	EF_{diesel}
Data unit:	tCO_2/TJ diesel
Description:	Emission Factor for diesel.
Source of data used:	IPCC 2006
Value applied:	74.067
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology states: "IPCC default values for emission coefficients may be used."
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	$P_{output,BL}$
Data unit:	Tonne
Description:	Tonnes of output produced in the baseline scenario in year y.
Source of data used:	Industrial Facility
Value applied:	29,702 30,717
Justification of the choice of data or description of measurement methods and procedures actually applied:	Three years of data (2004-2006) were used to determine average production. Production output data for the plant was taken from the plant's data management system.
Any comment:	All data will be archived for the duration of the project activity plus two additional years.

B.6.3 Ex-ante calculation of emission reductions:

Baseline Emissions

Baseline emissions were calculated according to the equations given in Section B6.1.

$BEy = BE_{per\ unit\ output,BL} * P_{output,PJ}$

For the *ex ante* calculations it has been assumed that output in the project activity ($P_{output,PJ}$) will equal the output in the baseline scenario, which has been averaged from three years of data.

$P_{output,\ PJ}$	30,717	tonnes
$BE_{per\ unit\ output}$	3.52	tCO_2/tonne output
BEy	108,204	**tCO_2/yr**

The calculation of the baseline emissions per unit of output ($BE_{per\ unit\ output}$) is calculated as shown below

$$BE_{per\ unit\ output} = \sum \left(\frac{FC_{BL,i} * NCV_i * EF_i}{P_{output,BL}} \right)$$

- Fuel consumption (FC) for each type of fuel in the baseline scenario is the average fuel consumption of each type of fuel for three years (2004-2006).
- Production output in the baseline scenario ($P_{output,BL}$) is the averaged production output over three years (2004-2006).
- The emission factor for each type of fuel (EF) was calculated using data provided by the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

$BE_{per\ unit\ output}$ =	3.52	**tCO_2/tonne**

Project Emissions
Project emissions will include emissions from the combustion of natural gas. They may also include emissions from the combustion of another type of fossil fuel. Therefore, project emission will be calculated as follows:

$PE_y = PE_{NG,y} + PE_{i,y}$

Equation 1 - Project Emissions (annual)		
$PE_y = PE_{NG,y} + PE_{i,y}$		
$PE_{NG,y}$=	82,426	tCO2/y
$PE_{i,y}$=	0	tCO2/y
PEy=	82,426	tCO2/y

<u>Equation for project emissions from natural gas use:</u>

$PE_{NG,y} = \sum FC_{PJ,NG} \times CF_{MMBTU \rightarrow TJ} * EF_{NG}$

- Fuel consumption (FC) in the project activity was estimated by taking the average amount of energy required in the baseline scenario (i.e. the amount of TJs used of each fuel) and calculating how many MMBTUs of natural gas would be required to generate this amount of energy.
- The conversion factor (CF) from MMBTU of natural gas to TJ is a constant.
- The emission factor for natural gas (EF) was taken from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Equation 1a - Project Emissions from natural gas		
$PE_{NG,y}$ =	$\sum FC_{PJ,NG} \times CF_{MMBTU \to TJ} * EF_{NG}$	
$FC_{PJ,NG}$ =	1,392,591.34	MMBTU/y
$CF_{MMBTU->TJ}$	0.001055056	TJ/MMBTU
EF_{NG} =	56.10	tCO2/TJ
$PE_{NG,y}$=	82,425.59	**tCO2/y**

Equation for project emissions from other fossil fuel use:

$PE_{i,y} = \sum FC_{PJ,i,y} \times NCV_i * EF_i$

- It is assumed that no fossil fuel other than natural gas will be consumed in the project activity.
- The emission factor for each fuel (EF) was taken from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Equation 1b - Project Emissions from non-natural gas fossil fuel		
$PE_{i,y} = \sum FC_{PJ,i,y} \times NCV_i * EF_i$		
$FC_{PJ,HFO,y}$ =	0.00	t/y
NCV_{HFO}	0.0404	TJ/t
EF_{HFO} =	77.37	tCO2/TJ
$FC_{PJ,naphtha,y}$ =	0.00	t/y
NCV_{HFO}	0.0445	TJ/t
EF_{HFO} =	73.33	tCO2/TJ
$FC_{PJ,diesel,y}$ =	0.00	t/y
NCV_{diesel}	0.0430	TJ/t
EF_{diesel} =	74.07	tCO2/TJ
$PE_{i,y}$=	0.00	**tCO2/y**

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

Year	Estimation of project activity emissions (tCO2e)	Estimation of baseline emissions (tCO2e)	Estimation of Leakage (tCO2e)	Estimation of overall emission reductions (tCO2e)
2008	82,426	108,204	0	25,778
2009	82,426	108,204	0	25,778
2010	82,426	108,204	0	25,778
2011	82,426	108,204	0	25,778
2012	82,426	108,204	0	25,778
2013	82,426	108,204	0	25,778
2014	82,426	108,204	0	25,778

2015	82,426	108,204	0	25,778
2016	82,426	108,204	0	25,778
2017	82,426	108,204	0	25,778
Total Emission Reductions over the Crediting Period (tCO_2e)				257,780

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	$FC_{PJ,NG}$
Data unit:	MMBTU
Description:	Fuel consumption of Natural Gas in project scenario, year y.
Source of data to be used:	Industrial Facility
Value of data	<table><tr><th></th><th>MMBTU</th></tr><tr><td>**2008**</td><td>1,392,591</td></tr><tr><td>**2009**</td><td>1,392,591</td></tr><tr><td>**2010**</td><td>1,392,591</td></tr><tr><td>**2011**</td><td>1,392,591</td></tr><tr><td>**2012**</td><td>1,392,591</td></tr><tr><td>**2013**</td><td>1,392,591</td></tr><tr><td>**2014**</td><td>1,392,591</td></tr><tr><td>**2015**</td><td>1,392,591</td></tr><tr><td>**2016**</td><td>1,392,591</td></tr><tr><td>**2017**</td><td>1,392,591</td></tr></table>
Description of measurement methods and procedures to be applied:	The amount of natural gas consumption will be taken from purchase receipts, which will be received by RAN from INGL.
QA/QC procedures to be applied:	The natural gas consumed will be measured by flow meter(s) that will measure the gas flow. All flow meters will be subject to calibrations and on going maintenance operations as dictated by law in the Natural Gas purchase agreement moderated by the Ministry of Infrastructure. The natural gas lines have a system of two pipelines running to the PRMS, in order to insure availability in case of a problem with one of the pipes. A Turbine meter and an Ultrasonic meter are installed on each pipeline in order to verify and cross-check their readings.
Any comment:	All data will be archived for the duration of the project activity plus two additional years.

Data / Parameter:	$FC_{PJ,i,y}$
Data unit:	tonne
Description:	Fuel consumption of non-natural gas fossil fuels in project scenario, year y.
Source of data to be used:	Industrial Facility
Value of data	

	<table><tr><th></th><th>tonnes</th></tr><tr><td>2008</td><td>0</td></tr><tr><td>2009</td><td>0</td></tr><tr><td>2010</td><td>0</td></tr><tr><td>2011</td><td>0</td></tr><tr><td>2012</td><td>0</td></tr><tr><td>2013</td><td>0</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>0</td></tr><tr><td>2016</td><td>0</td></tr><tr><td>2017</td><td>0</td></tr></table>
Description of measurement methods and procedures to be applied:	Fuel purchase receipts are the most accurate way to measure fuel purchases because the refinery, which must deliver exactly what the client orders, weighs the fuel prior to delivery and bills the plant based on the amount of fuel that is weighed and delivered.
QA/QC procedures to be applied:	Each fuel delivery truck that arrives at the plant must provide a delivery certificate from the refinery, which contains the amount of fuel in the delivery as weighed by the refinery. The plant weighs the delivery truck; if there is greater than a 1% difference between the amount of fuel in the delivery certificate and the result of the weighing at the plant, the plant does not accept the delivery. The fuel delivery truck is weighed upon leaving the plant to ensure that all the fuel was indeed delivered. Scales will be calibrated according to internal plant procedures.
Any comment:	All data will be archived for the duration of the project activity plus two additional years.

Data / Parameter:	$P_{output,PJ}$
Data unit:	tonne
Description:	Output during the project activity
Source of data to be used:	Industrial Facility
Value of data	<table><tr><th></th><th>tonnes</th></tr><tr><td>2008</td><td>30,717</td></tr><tr><td>2009</td><td>30,717</td></tr><tr><td>2010</td><td>30,717</td></tr><tr><td>2011</td><td>30,717</td></tr><tr><td>2012</td><td>30,717</td></tr><tr><td>2013</td><td>30,717</td></tr><tr><td>2014</td><td>30,717</td></tr><tr><td>2015</td><td>30,717</td></tr><tr><td>2016</td><td>30,717</td></tr><tr><td>2017</td><td>30,717</td></tr></table>
Description of measurement methods and procedures to be applied:	Output will be weighed during the packaging process. All data will be entered into the computerized data management system.
QA/QC procedures to be applied:	Scales are calibrated according to internal plant procedures.
Any comment:	All data will be archived for the duration of the project activity plus two additional years.

B.7.2 Description of the monitoring plan:

Monitoring of parameters required to determine emission reductions (parameters listed above in section B.7.1) will be undertaken by the authorised individuals on-site. The project's monitoring plan will follow international standards and will include (but is not limited to) data monitoring, regular equipment maintenance and calibrations, data verification and troubleshooting measures.

The monitoring procedures for the project activity set the credibility by which the project's performance and GHG-reductions are measured. The monitoring procedures include developing data collection methods and means of data analysis to determine GHG reductions. Equally important are the operating procedures developed to ensure the proper operation of the project activity.

The monitoring demands in methodology III.B are:

"Monitoring shall involve:
(a) Monitoring of the fuel use and output for an appropriate period (e.g., a few years, but records of fuel use may be used) prior to the fuel switch being implemented - e.g. coal use and heat output by a district heating plant, liquid fuel oil use and electricity generated by a generating unit (records of fuel used and output can be used *in lieu* of actual monitoring);
(b) Monitoring fuel use and output after the fuel switch has been implemented - e.g. gas use and heat output by a district heating plant, gas use and electricity generated by a generating unit."

The methodology specifies the parameters needed to be monitored. These are <u>fuel consumption</u> and <u>product output</u> for both baseline and project scenarios.

<u>Fuel Consumption: Natural Gas</u>

1. The natural gas supply will be measured by one or more flow meters, which are installed on the natural gas pipe at the entrance to the plant. All components of the gas monitoring system (gas meters, gas chromatograph, etc) will be subject to calibrations and ongoing maintenance operations as dictated by law in the Natural Gas Purchase Agreement determined by the Ministry of Infrastructure.
2. All maintenance procedures for the gas system are dictated by law in the Natural Gas Purchase Agreement and will be undertaken by INGL. INGL must report its operation and maintenance procedures, including calibration, to the Periclase plant to ensure that all procedures are carried out according to the agreement.
3. Natural gas consumption is received monthly by the Periclase plant in the form of an invoice (purchase receipt) from INGL. Once a month, this data will be aggregated with the other CDM parameters into a CDM report by the CDM project manager, who will review the data and apply Q&A procedures to ensure data integrity. This data will be stored electronically and in hard copy at the plant for the duration of the project activity, plus two years.
4. Project emissions calculations will be based on the natural gas purchase receipts received by the Periclase plant.

<u>Fuel Consumption: HFO, Diesel and Naphtha</u>

For the baseline and project emissions calculations, fuel consumption is based on the fuel purchase receipts that the plant receives from the fuel supplier. The monitoring plan refers to fuel consumption being derived from the fuel purchase receipts for calculating baseline and project emissions due to the following reasons:

1. Purchase receipts contain amount of fuel weighed by the fuel supplier, which is accurate to two decimal points.
2. The plant consumes all the fuel it purchases over a period of time. The plant assumes that all fuel purchased is consumed.

The plant's quality assurance policy requires that the fuel deliveries are weighed upon entrance to and exit from the plant, to ensure that the amount of fuel delivered corresponds to the amount stated in the fuel delivery certificate. The delivery certificate contains the amount and type of fuel that is included in the delivery. Scales are calibrated according to the plant's internal procedures.

Product Output

Plant output is measured in the packing room, where sacks are filled automatically up to the desired weight. Each sack's weight is checked on a separate scale to ensure quality control. The data of the amount of product packed in each packing room is entered into the plant's computerized data management system. The scales are calibrated according to the plant's internal procedures.

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

Application of the baseline and monitoring methodology was completed by EcoTraders on September 25, 2007.

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:

>> March 1, 2008

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:

>>

C.2.1.2. Length of the first crediting period:

>>

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>> June 1, 2008

C.2.2.2. Length:

>> Ten years.

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

The Dead Sea Bromine Periclase Site Fuel-Switch project was not required to conduct an environmental impacts analysis report. However, the project will have obvious environmental and health benefits. The project's intended elimination of carbon-intensive fossil fuels (HFO, naphtha and diesel) will improve air quality and reduce emissions of SO_2, NOx and particulate matter. Furthermore, the fossil fuels that the plant has historically used are delivered to the plant by truck, while the natural gas is delivered via a pipeline. The fuel switch will reduce the number of trucks on the highways in Israel, which will improve air quality and reduce traffic congestion.

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:

The project's environmental impacts are not considered significant and no environmental impact assessment was required.

SECTION E. Stakeholders' comments

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

A stakeholders' meeting was held on 3 September, 2007, in the town of Hura. Hura is a Bedouin town located about an hour's drive from the plant. The meeting was co-ordinated between the plant and a local NGO, Sustainable Negev and invitations were sent to NGOs, other plant's in the area and local residents. Representatives from Negev towns, Israeli NGOs and other stakeholders, such as employees of neighbouring factories, attended.

The meeting consisted of two presentations after each of which the meeting's participants asked questions about the project and offered comments. The first presentation was made by EcoTraders and provided stakeholders with information on the climate change, the Kyoto Protocol and the CDM process and a description of the project activity and its contribution to reducing greenhouse gas emissions. EcoTraders also provided an information sheet about the Kyoto Protocol and the project activity. Stakeholders were invited to send questions and comments to EcoTraders via a website specially developed for the project activity (the URL was given on the information sheet). The website remained open for 60 days.

A presentation was also given by the Periclase plant, which included more details about the project itself.

The following individuals attended the stakeholders' meeting:

Bilha Givon – Sustainable Negev
Muhammad Al-Nabari – Manager of the Sanitation Division, Hura
Fahima El Atuna– Resident, Hura

Talar El Atuna – Resident, Hura
Farkhan Abu Riash – Resident, Hura
Asher Goldstein – Machteshim (chemical company)
Yitzchak Barntziuk – Machteshim
Arie Cohen – Resident, Be'er Sheva
Yakov Wolfson – Sustainable Negev
Eli Levi - Resident, Omer
Renana Yassur
Riki Yisraelovitch - Resident, Be'er Sheva
Jan Wolfson – Bromine Community Forum
Avi Dlomi – Resident, Be'er Sheva
Fuad Diab – Rotem Amfert Negev
Shlomo Glidai – Rotem Amfert Negev
Atzmon Amitai – Bromine Compounds
Faisal El Atuna – Resident, Hura
Orit Nevo – Resident, Be'er Sheva

Please note that Be'er Sheva, Omer and Hura are towns located near the Ramat Hovav industrial zone.

Stakeholders' meeting for the Dead Sea Bromine Periclase Fuel Switch Project. September 3, 2007, Hura, Israel.

E.2. Summary of the comments received:

Q1: Is the trade in emission reductions between financial institutions or different countries?

Q2: If Germany has committed to reducing its greenhouse gas emissions by 5%, is it permitted to reduce further?

Q3: How certain is it that a project will receive revenues from the Clean Development Mechanism?

Q4: It is possible for small factories to develop CDM projects?

Q5: Must the whole CDM process be completed before the project begins?

Q6: Does CDM include all GHGs?

Q7: Will the new demand for natural gas raise the price of natural gas and cause the price of HFO to fall?

Q8: What happens if the gas supplier stops supplying gas?

Q9: What is the role of IEC?

Q10: By which standard will the NG project at the Periclase plant operate? Doesn't natural gas pose safety risks?

Q11: What are the safety and environmental impacts of damage to a pipe?

Q12: How does the UN monitor and do quality control of projects like these?

C1: It seems to me that we are taking a risk in relying on Egypt for our energy needs.

C2: There have been a lot of articles in the press that natural gas isn't a dependable source of energy.

C3: Maybe the partnership with Egypt in natural gas will help the peace process.

C4: It is an historical event that the plant will operate on natural gas.

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

A1: Trade in emission reductions may take place between financial institutions or between different countries, depending on how a developed country with an emission reduction target has chosen to meet its target. A country can decide to require industry to account for 100% of the reductions, or the government can take upon itself a portion of the responsibility to meet the target.

A2: A country with an emission reduction target must meet its target. If installations, or the government, choose to undertake reductions beyond this target it is permitted.

A3: A project will be receive CDM revenue if it properly monitors its activities and follows the requirements of the CDM.

A4: Small factories certainly can develop CDM projects. Even kibbutzim can develop CDM projects to reduce their emissions, such as from animal manure.

A5: No. The CDM process can be undertaken in parallel with the development of a project. However, each CDM project must show that if it were not for the financial assistance provided by the sale of emission reductions, which is the benefit of CDM, the project would not have occurred.

A6: The Kyoto Protocol includes a large number of GHGs, including methane, N_2O, SF_6 and others. Our project will only reduce CO_2 because that is the main GHG that results from fuel combustion.

A7: Energy prices are connected, but natural gas prices are set in contracts for the long term, while HFO, diesel and naphtha prices fluctuate because orders for these fuels are made on an as-need basis.

A8: Some sort of guarantee on the part of the supplier will be built into the contract. It is true that there is uncertainty about the fuel supply when using natural gas, which is one of the problems with natural gas. HFO, diesel and naphtha are more reliable fuels because one orders them as needed and they are delivered.

A9: The project needs an adviser for the planning process. The Periclase plant has hired the IEC to act as its planner. IEC is the largest engineering company in Israel and has a lot of experience.

A10: There are two global standards for natural gas operations, the British and the Dutch. The project will operate according to the Dutch standard. Additionality, the Natural Gas Authority will oversee natural gas use Israel and provide permits for the project. The Gas Authority's tests are very stringent.

A11: There are no safety or environment problems expected because the gas dissipates in the air. However, if there is a spark in the area where the pipe is damaged, the gas will combust which could cause environmental and safety problems. The pipe will be located 80-100 cm below the ground to prevent damage to it. Furthermore, there are control centers located every few kilometres along the length of the pipe, and as soon as a control centre recognizes a fall in pressure in the pipe, due to a leak or other problem, the control center shuts down the gas flow.

A12: Each CDM project is audited prior to registration with the UN to ensure that the project meets all the CDM requirements. For project emission reductions to be approved by the UN, all monitored data and project procedures are audited. Only after a successful auditing will the project receive emission reductions. The UN authorizes certain third-party companies to carry out these project audits.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from an Annex I Party provided for this project.

Annex 3

BASELINE INFORMATION

	2004	**2005**	**2006**	***Annual Average***	***Monthly Average***	**Source:**
All Production (Tonne/yr)	29,447	31,871	30,832	30,717	**2,560**	*Plant measurements. Stored in plant computer system*

Fuel Type	**tC/TJ**	**Oxid. fact (%)**	**tCO2e/TJ**	**TJ/t fuel**	**tCO2e/t**	**Source**
Naphtha	20.0	1	73.333	0.0445	3.26333	IPCC 2006
Residual (heavy) fuel oil (HFO)	21.1	1	77.367	0.0404	3.12561	IPCC 2006
Natural gas	15.3	1	56.100	0.048	2.69280	IPCC 2006
Diesel	20.2	1	74.067	0.04300	3.18487	IPCC 2006
	IPCC 2006 Vol. 2, Ch.1 1.23-1.24		Calculated according to formula given in Vol.2, Ch.1 p.1.23-1.24	IPCC 2006. Vol.2, Ch.1, pg.1.18-1.19. Values given as TJ/Gg. I calculated according to TJ/t (1Gg=1000tonnes)	Calculated using the data given in the IPCC 2006 Report for tCO_2/TJ and TJ/t fuel.	

Annex 4

MONITORING INFORMATION

Details regarding CDM Monitoring System Procedures can be found in the Monitoring Manual.

Procedure Name	Objective	Scope
Staff Training	Staff training includes steps to ensure that staff receives proper training for plant operations and procedures related to the CDM project.	• Plant operations • Safety procedures
Data quality control and troubleshooting.	To cross-check data and records prior to storage to ensure accuracy of data.	• Fuel use data • Production data
Equipment calibration	The intervals and steps by which equipment is calibrated.	• Scales

The CDM project is currently under development. CDM O& M procedures will be developed as part of this process.