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 Magnesium (DSM) Fuel-Switch Project
Version 01
October 2007

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

Dead Sea Magnesium (DSM) is located at Sdom at the southwest of the Dead Sea. The Dead Sea has a high concentration of magnesium which is the source for the production of the magnesium metal. The DSM plant was completed in 1996. The production of magnesium is based on the electrolytic decomposition of carnallite ($KCl.MgCl_2.6H_2O$). DSM's technologies draw on proven process know-how adapted by DSM scientists and engineers.

The state-of-the-art DSM plant at Sdom produces the magnesium metal and magnesium alloys.

The DSM plant has historically used heavy fuel oil (HFO) and liquefied petroleum gas (LPG) to provide the energy needed for its drying ovens and its foundry. The drying ovens dry the carnallite, which is the raw material used for magnesium production, while the foundry is where the magnesium is cast. The proposed project activity ("the project") will switch the HFO and LPG to natural gas, with the possibility of diesel and LPG being used as a backup fuel for times when the natural gas supply is not available.

The switch to natural gas will reduce the greenhouse gas emissions produced by the factory 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, as shown in Annex 5 to this document.

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 DSM's operations.
- The project will enable the factory 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 benefit the health of employees and nearby towns.

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:

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Name of Host Party involved	Private and/or public entity(ies) project participants	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Israel (Host Country)	Dead Sea Magnesium Private entity. CDM project owner.	No
	EcoTraders Ltd. Private entity. CDM project consultant.	No

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

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

>> Israel.

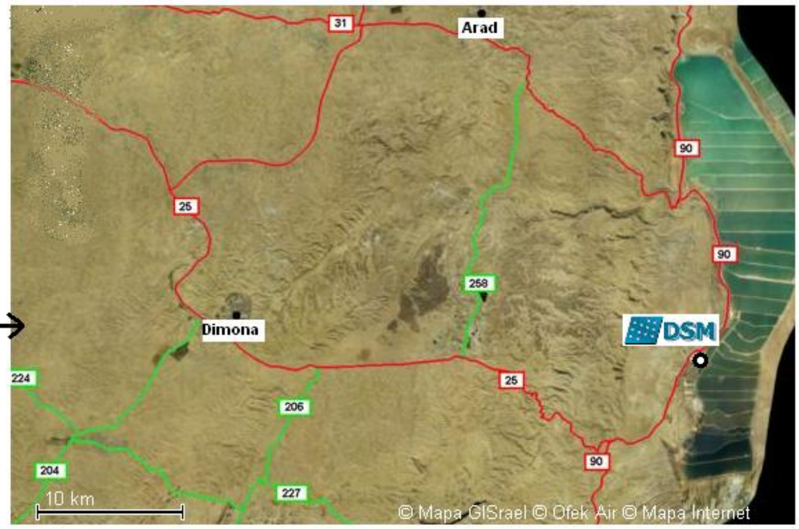
A.4.1.2. Region/State/Province etc.:

>> Dead Sea Region.

A.4.1.3. City/Town/Community etc:

>>Sdom

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 Sdom on the southern part of the Dead Sea. The factory is located approximately 31 km from the town of Dimona (population 34,000) and 28 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 DSM Fuel Switch is not part of a programme of activities as defined in Annex 15 of the decisions made at EB28.[1]

The DSM Fuel Switch project will switch the fuel the factory uses in its driers ovens from HFO, LPG and diesel to natural gas. The project will retrofit the drying ovens in the factory to operate on natural gas. 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 cap.

[1] 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	21,323
2009	21,323
2010	21,323
2011	21,323
2012	21,323
2013	21,323
2014	21,323
2015	21,323
2016	21,323
2017	21,323
Total estimate reductions (tonnes of CO2e)	213,230
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	21,323

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 DSM, which 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 and LPG 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 (HFO and LPG to natural gas).
   The methodology applies to projects that are switching their fossil fuel consumption to a different fuel source.

2. Primary factory 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 DSM factory, where the primary outputs are magnesium and magnesium alloys.[2]

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

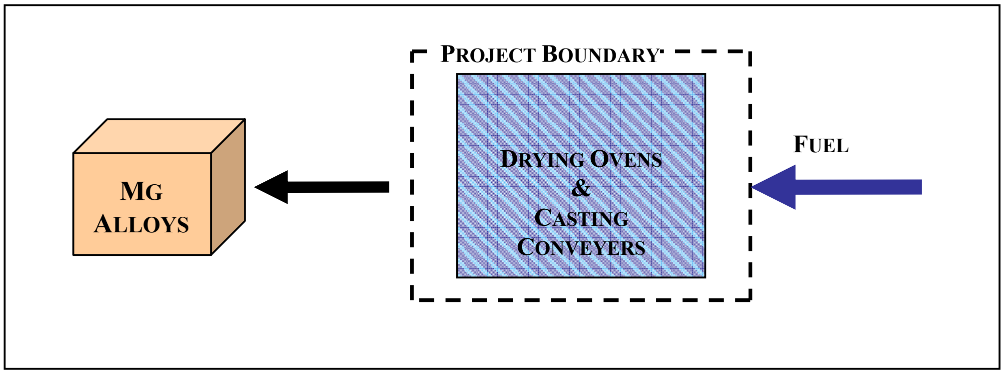
Applicability Clause	**Applicability of the clause to the small scale project activity**
"This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications."	✓ The project is switching from the fossil fuels used in the existing factory's drying ovens 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 drying ovens. 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:

[2] 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.

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

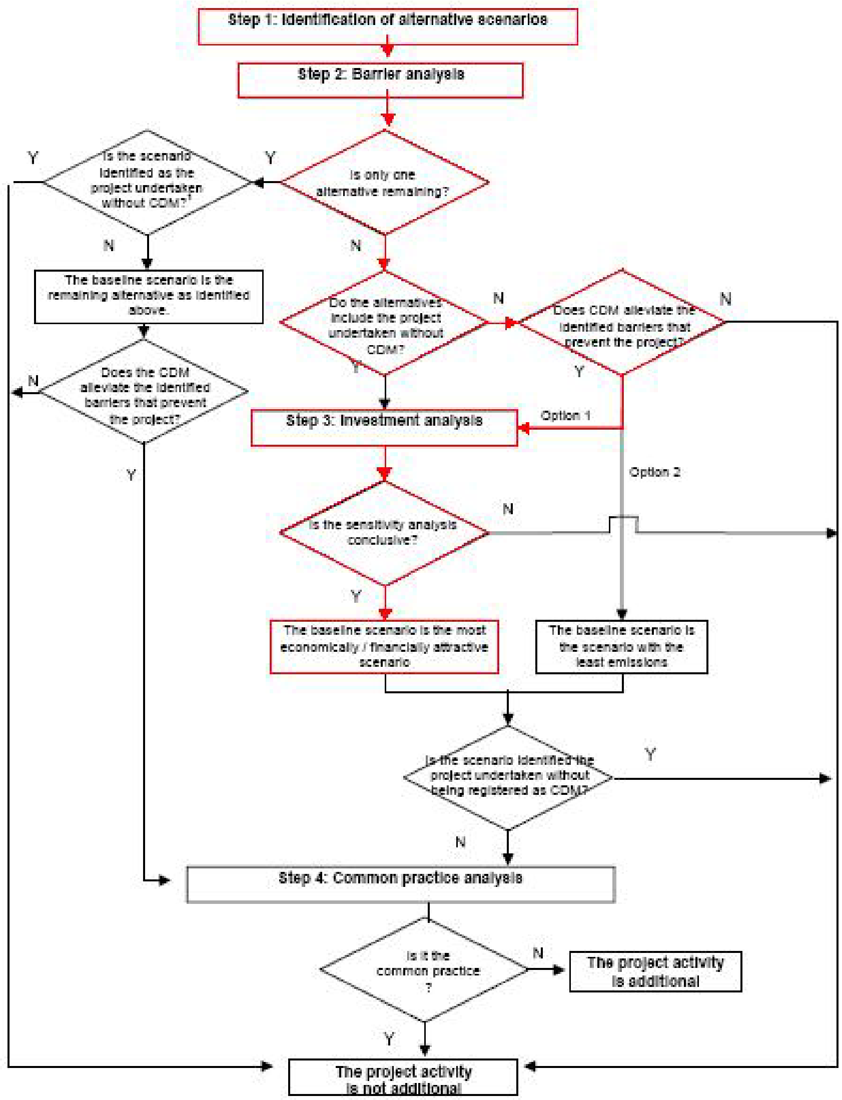
The physical, geographical site where the fuel combustion affected by the fuel-switching measure occurs in the drying ovens that are used by the DSM plant to dry carnallite, the raw material used in its magnesium production; and in the casting conveyors, where the magnesium is casted in the plant's foundry..



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 – using HFO and LPG
2) Fuel switch – natural gas, without the CDM component
3) Fuel switch – natural gas, with CDM
4) Fuel switch to diesel

Alternatives (1) through (4) all provide comparable energy output and would allow the factory to continue production at the same level of quality.

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 continuation of HFO use at the factory. 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 DSM plant meets the common environmental standards and the specific air quality standards as detailed in the factory's business license. Therefore, each of the alternatives above adheres to laws and regulations of the Host Country.

Step 2. Barrier analysis

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

Technological Barriers

Because natural gas is a relatively new fuel in Israel and few facilities have experience in using it, the DSM plant does not have the knowledge base for working with natural gas, such as operation and maintenance of equipment and troubleshooting procedures. The factory had to invest in an extensive training program for all employees who are involved in production, operation and maintenance and will work with the natural gas. The training program includes theoretical and practical training with an in-class course, field training and an exam that each employee must pass. The DSM plant had to hire outside experts to develop and implement the training program. The Israel Electric Company, the largest company of engineers in Israel, was contracted to carry out the training of the plant's engineers. Welders on the factory's maintenance staff required special training to work with natural gas, because their work is hazardous with natural gas. There is no qualified company in Israel to provide this training and a company from an Annex I country was contracted to provide this training.

The DSM plant was required to invest capital and manpower hours to train its employees how to use the new technology – natural gas – and to seek Annex I country expertise to transfer technological knowledge to the Host Country. Without the specialized training, the plant would not have trained personnel to implement the natural gas fuel switch CDM project or to maintain the equipment and ensure continued levels of productions. It is clear that the project activity faces a technological barrier in the lack of trained personnel to implement and maintain the project activity.

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

Other Barriers – Uncertainty of fuel supply

The DSM plant must invest time and capital in training its staff and in the installation of the natural gas infrastructure in the plant. These investments have been made prior to the closure on a contract with a natural gas supplier. Negotiations are ongoing with the natural gas supplier and as of October 2007, no contract has been closed.

Presently, there is only one likely natural gas supplier – Eastern Mediterranean Gas (EMG), whose natural gas is from Egypt. Although the Israeli and Egyptian governments are in negotiations, there has been opposition in Egypt to a deal with Israel to supply natural gas.[3] The other two suppliers in the

[3] "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.
"Acting for Lebanon." *Al-Ahram Weekly*, August 10-16, 2006. http://weekly.ahram.org.eg/2006/807/re52.htm. Accessed October 1, 2007.

region, Yam Tetis and British Gas, are not realistic sources of supply. Yam Tetis controls a small natural gas supply 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 not be available until 2011, at the earliest.[4] 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.[5]

If EMG is unable to supply the contracted amount of gas in the long term, DSM must either find a new source of natural gas, which will entail negotiations and a new contract with another natural gas supplier, or it will return to a more carbon-intensive fuel. A new contract will provide natural gas at market prices, which will increase DSM's fuel purchase costs; or, DSM can return to using HFO in its ovens and accept the loss of investment in the project.

DSM expects to purchase gas from EMG in a "take-or-pay" contract, which means that it will be locked into a contract with one natural gas supplier, which specifies the amount of fuel to be purchased and the length of time of the contract. This creates a disadvantage for DSM compared to the current HFO consumption. In the event that DSM opts not to use the gas, for whatever reason, it must still pay the natural gas supplier for the majority of the contracted amount of natural gas. Petroleum fuels, like HFO, allow the company flexibility in creating its fuel mix and placing fuel orders consistent with current fuel demand.

Alternatives (2) and (3) face technological and uncertainty barriers.

1) Continuation of current practice – using HFO and LPG
2) ~~Fuel switch – natural gas, without the CDM component~~
3) ~~Fuel switch – natural gas, with CDM~~
4) Fuel switch to diesel

Impact of CDM Revenues

DSM sees CDM revenue as a reliable source of income that will alleviate a portion of the risk the company faces in the realization of the project: investment of capital in training prior to certainty about gas delivery; and fuel supply risks that in the future. The CDM revenue supports the DSM plant in the face of the barriers that the plant must overcome to successfully implement the project activity.

Step 3. Financial Analysis

The Tool requires that if there is more than one option remaining for the baseline scenario selection that a financial analysis be conducted to determine which option is the most economically attractive. A financial analysis was conducted for the two remaining alternatives, scenarios (1) and (4). The analysis below will compare the costs of HFO and LPG with diesel.[6]

"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.

[4] "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.

[5] "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.

[6] 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://216.239.59.104/search?q=cache:l-

The cost of HFO per tonne, LPG per tonne and diesel per kilolitre (1000 litres) was taken from historical data available from the Central Bureau of Statistics. Using a density for diesel of 0.84 tonnes/kilolitre[7], the price per tonne of diesel was calculated, as shown in this table:

Year	Month	Refinery price of HFO - NIS /ton	Refinery price of HFO - $/ton	Refinery price of diesel - NIS/ton	Refinery price of diesel - $/ton	Refinery price of LPG - NIS/tonne	Refinery price of LPG - $/tonne
2005	I	752.3	171.81	1,793.57	409.61	1,895.50	432.89
	II	845.4	193.44	1,914.76	438.13	1,690.40	386.79
	III	905.4	209.15	2,048.93	473.30	1,829.80	422.68
	IV	1,055.70	241.50	2,220.95	508.05	1,887.50	431.77
	V	1,136.70	259.89	2,143.21	490.02	1,688.10	385.97
	VI	1,059.40	236.21	2,038.69	454.57	1,495.60	333.47
	VII	1,246.50	273.33	2,450.24	537.27	1,503.50	329.68
	VIII	1,210.10	268.36	2,399.05	532.02	1,581.30	350.68
	IX	1,294.20	285.17	2,726.43	600.75	1,774.30	390.95
	X	1,493.30	322.84	2,862.98	618.95	2,460.70	531.99
	XI	1,428.00	303.84	2,716.90	578.09	2,723.50	579.49
	XII	1,271.20	275.65	2,419.88	524.73	2,508.40	543.92
2006	I	1,312.30	284.12	2,448.93	530.21	2,482.90	537.56
	II	1,553.50	330.31	2,716.31	577.54	2,762.00	587.26
	III	1,558.30	332.32	2,595.83	553.59	2,815.60	600.46
	IV	1,501.40	327.84	2,756.07	601.80	2,196.10	479.53
	V	1,523.90	340.61	2,954.40	660.35	1,950.00	435.85
	VI	1,512.80	338.26	2,907.02	650.01	2,108.90	471.55
	VII	1,428.30	322.21	2,914.64	657.52	2,371.80	535.06
	VIII	1,528.30	348.98	2,837.50	647.93	2,416.70	551.85
	IX	1,415.50	325.19	2,943.45	676.22	2,475.90	568.81
	X	1,142.20	267.31	2,396.90	560.96	2,326.10	544.38
	XI	1,165.50	270.99	2,409.40	573.45	2,164.00	503.15
	XII	1,125.10	267.78	2,430.00	545.27	2,186.50	520.40
Average		**1,269.39**	**283.21**	**2,501.92**	**558.35**	**2137.30**	**477.34**

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, 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.

[7] "Bioenergy conversion factors." Petro-diesel density (average) = 0.84 g/ml (=metric tonnes/m^3). http://bioenergy.ornl.gov/papers/misc/energy_conv.html.

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

Using HFO and LPG consumption data provided by the DSM plant factory and the prices for HFO, LPG and diesel, averaged from 2005 and 2006 (presented in the table above), it was determined that the following costs are faced by each of the alternative baseline scenarios. The amount of diesel that would have been required by the DSM plant was calculated using the net calorific value (NCV) provided by the IPCC in its 2006 Guidelines for National Greenhouse Gas Inventories.[8]

Alternative 1	Continuation of current practice: HFO and LPG	$7,117,664
Alternative 4	100% diesel	$13,118,865

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: HFO and LPG	Prices of HFO and LPG +10%	$7,829,431
Alternative 4	100% diesel	No change in diesel price	$13,118,865

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

Alternative 1	Continuation of current practice: HFO and LPG	No change in HFO and LPG prices	$7,117,664
Alternative 4	100% diesel	Price of diesel -10%	$11,806,978

In each case presented in the sensitivity analysis, current practice (HFO and LPG) remains the most attractive scenario.

The investment analysis of the combined tool requires that the baseline scenario that is selected be the most financially attractive option. Therefore, scenario (4) is eliminated.

1) Continuation of current practice – using HFO and LPG
2) ~~Fuel switch – natural gas, without the CDM component~~
3) ~~Fuel switch – natural gas, with CDM~~
4) ~~Fuel switch to diesel~~

The financial analysis clearly indicates that the baseline scenario is Scenario (1), the continuation of current practice.

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:

[8] 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).

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 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 DSM plant, i.e. the use of HFO and LPG. The baseline scenario is not the project activity undertaken without CDM.

In order to fully understand the difficulties the DSM 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.

The Israeli government has intended to introduce natural gas to the industrial sector since the mid-1980s. In 1995, the government established the Natural Gas Authority to promote the development of 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[9] 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 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 September 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 DSM 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 DSM plant.

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[9] 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.

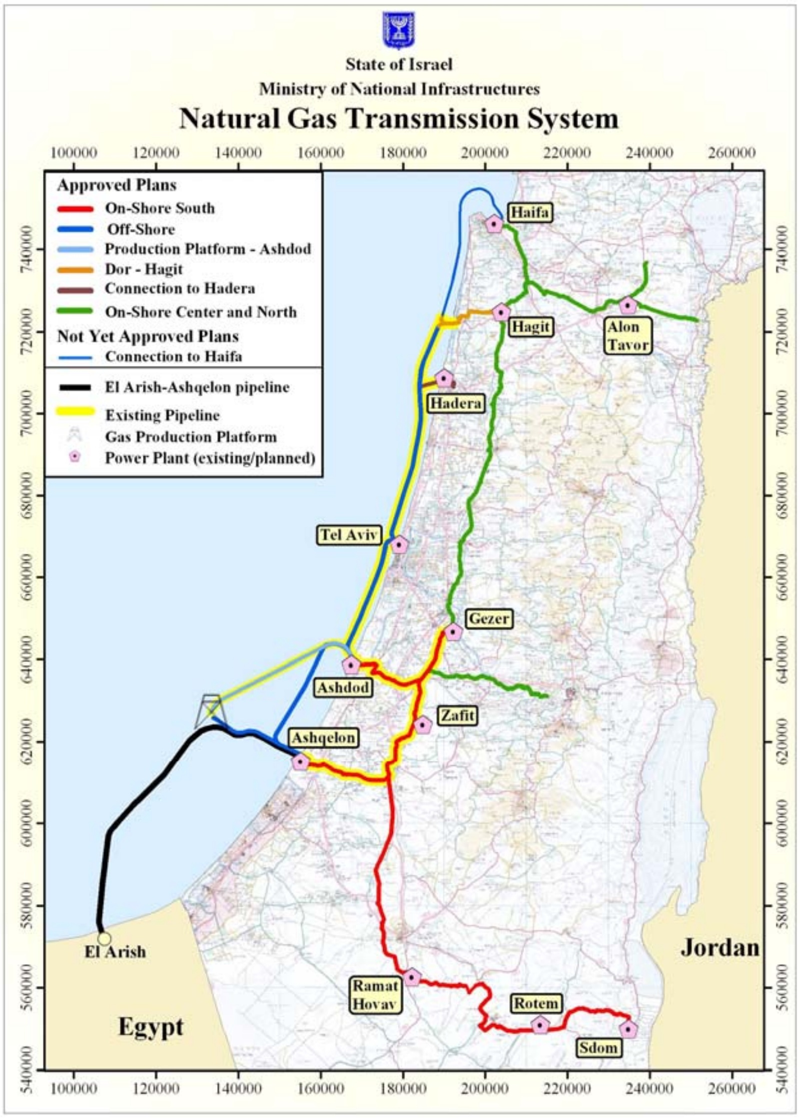

Figure 1: Natural Gas Pipeline in Israel, October 2007[10]

Barriers to the Project

Were the DSM plant to continue operating using HFO the plant would not face the barriers described below and its emissions would be higher.

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[10] Ministry of National Infrastructure. http://www.mni.gov.il/mni/en-US/Energy/NaturalGas/NGTransportation.htm. Accessed October 17, 2007.

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, and the American Israel Paper Mills factory, 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 Annex 5). Up until now, natural gas has not been available for use in the energy and industrial sectors. In the absence of the project activity, the DSM plant would have continued to use HFO and LPG, which emit higher levels of CO_2 than natural gas. HFO and LPG are common, standard fuels in Israeli industry and DSM would have not faced any barriers if it had continued to use these fuels. As was stated in Section B.4, the DSM plant meets its environmental obligations while using HFO and LPG.

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.

Because natural gas is a relatively new fuel in Israel and few facilities have experience in using it, the DSM plant does not have the knowledge base for working with natural gas, such as operation and maintenance of equipment and troubleshooting problems. The factory had to invest in an extensive training program for all employees who are involved in production, operation and maintenance and will work with the natural gas. The training program involves theoretical and practical training and includes an in-class course and field training with a practical exam that each employee must pass. The DSM plant had to hire outside experts to develop and implement the training program. The Israel Electric Company, the largest company of engineers in Israel, was contracted to carry out the training of the plant's engineers. Welders on the factory's maintenance staff required special training to work with natural gas, because their work is hazardous with natural gas. There is no qualified company in Israel to provide this training and a company from an Annex I country was contracted to provide this training.

The DSM plant was required to invest capital and manpower hours to train its employees how to use the new technology – natural gas – and to seek Annex I country expertise to transfer technological knowledge to the Host Country. Without the specialized training, there would not be trained personnel to implement the natural gas fuel switch CDM project or to maintain the equipment and ensure continued levels of productions. It is clear that the project activity faces a technological barrier in the lack of trained personnel to implement and maintain the project activity.

Were DSM not to implement the fuel-switch project, it would have continued to use HFO and LPG. There are numerous employees at the DSM plant who have the expertise to work with HFO and LPG. No special training or contracting of services for training would have been required by DSM if it were not implementing a new technology; emissions, however, would have been higher.

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>

DSM faces uncertainty regarding the availability of the natural gas it has purchased, which can affect the company's production schedule and economic viability.

1. DSM has had to invest in natural gas delivery infrastructure, safety equipment and training for its employees in anticipation of natural gas being available in 2008 from El Arish. 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, DSM 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.[11] 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 DSM 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 petroleum fuels used at DSM. If the supply of natural gas fails, the factory will may be forced to return to HFO or to use diesel, which would entail lost investment in the project activity.

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 a disadvantage for DSM compared to the current HFO consumption. In the event that DSM opts not to use the gas, for whatever reason, it must still pay the gas supplier 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 DSM not chosen to implement a fuel switch project it would have continued to use HFO and LPG, which is always available, can be ordered as needed and stored on-site and requires no commitment to any one supplier. The continued use of HFO and LPG instead of the project activity would have led to higher emissions.

Summary of barriers to the project activity:

Barrier	DSM Fuel Switch (Project Activity)	HFO and LPG (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. • Special training needed for employees to ensure safe operations on natural gas.	• Commonly used fuels in Israel • Knowledge exists of how to use HFO and LPG in ovens • Factory only must manage its HFO and LPG supply inventories and place orders for deliveries as needed • Factory needs no special knowledge or trained personnel to ensure that HFO and LPG supply is available
	Barrier to the implementation of the project.	*No barrier to the baseline scenario.*
Technological Barrier	• Special training needed for the factory to operate on natural gas.	• No special training would be needed to continue operations on HFO and LPG

[11] "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.

	• Annex I expertise had to be contracted to provide certification for operation with natural gas.	because the knowledge is available in-house.
	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. • If gas supply fails or is delayed, DSM may need to switch back to HFO burners, which will mean loss of investment.	• HFO and LPG 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 LPG, orders can be placed with a different fuel supplier. HFO and LPG are fuels that can be stored on-site and their inventories managed.
	Barrier to the implementation of the project.	*No barrier to the baseline scenario.*

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

- Being one of the first private companies in Israel to develop plans to switch to natural gas (prevailing practice barrier);
- Lack of trained personnel that required special training and contracting expertise from Annex I countries (technological barrier);
- Dealing with risk in natural gas supply and availability from one supplier in a region with political tensions (uncertainty barrier);
- Being limited to one supply of gas, which, if the supply fails, would necessitate returning to petroleum fuels, which would result in the loss of the investment in the project.
- 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 and LPG would not have faced the above barriers and would have led to higher emissions. Therefore, the project activity is additional.

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.

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

Where:

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

Equation for project emissions from natural gas use:

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

Where:

Parameter	Description	Unit
$FC_{PJ,NG}$	Fuel consumption in project scenario of natural gas	MMBTU/yr
$CF_{MMBTU \rightarrow TJ}$	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:

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

Where:

Parameter	Description	Unit
$FC_{PJ,i,y}$	Fuel consumption in project scenario of fuel *i* in year y	Tonnes/yr
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 ton 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 for production at DSM during the lifetime of the project activity. It is assumed, for *ex ante* calculation purposes that production will equal the average production of 2004-2006. Actual fuel consumption and production levels 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:

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

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/ton output
$P_{output,\ PJ,y}$	Output in project scenario in year y.	Ton/yr

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

Eq. 2b

Where:

Parameter	Description	Unit
$P_{output,\ BL}$	Output in baseline scenario averaged over the 3 years prior to project development.	Tonne
$FC_{BSL,HFO}$	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/t), 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 factory for the years 2004-2006. For the *ex ante* calculations it is assumed that production during the project activity will equal DSM's average production from 2004-2006. Actual production will be monitored, as described below. 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 and procedures actually applied :	Recognized conversion factor.
Any comment:	

Data / Parameter:	$FC_{BL,HFO}$
Data unit:	tonne
Description:	Fuel consumption of HFO in baseline scenario.
Source of data used:	Industrial Facility.
Value applied:	24,726
Justification of the choice of data or description of measurement methods and procedures actually 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. Quantity of fuel delivered is entered into the factory's computerized data management system.
Any comment:	All data will be stored for the duration of the project activity + 2 years.

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	The methodology states: "IPCC default values for emission coefficients may be used."

measurement methods and procedures actually applied :	
Any comment:	IPCC default emission factor values will be determined at the start of the crediting period.

Data / Parameter:	NCV_{HFO}
Data unit:	TJ/tonne
Description:	Net calorific value of 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 :	IPCC values are accurate and frequently used for CDM calculations.
Any comment:	

Data / Parameter:	$FC_{BL,LPG}$
Data unit:	tonne
Description:	Fuel consumption of LPG in baseline scenario.
Source of data used:	Industrial Facility.
Value applied:	241
Justification of the choice of data or description of measurement methods and procedures actually 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. Quantity of fuel delivered is entered into the factory's computerized data management system.
Any comment:	All data will be stored for the duration of the project activity + 2 years.

Data / Parameter:	EF_{LPG}
Data unit:	tCO_2/TJ LPG
Description:	Emission Factor for LPG.
Source of data used:	IPCC 2006
Value applied:	63.07
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:	NCV_{LPG}

Data unit:	TJ/tonne
Description:	Net calorific value of LPG
Source of data used:	IPCC 2006
Value applied:	0.047
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC values are accurate and frequently used for CDM calculations.
Any comment:	

Data / Parameter:	$P_{output,BL,y}$
Data unit:	Tonne
Description:	Tons of output produced in the baseline scenario in year y.
Source of data used:	Industrial Facility
Value applied:	26,939
Justification of the choice of data or description of measurement methods and procedures actually applied:	Production output data for the factory was taken from the factory'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 (2004-2006).

Equation 2a – Baseline Emissions		
$P_{output,\ PJ}$	26,939	tonnes
$BE_{per\ unit\ output}$	2.9	tCO_2/tonne output
BEy	**78,002**	**tCO_2/yr**

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

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

- Fuel consumption (FC) for the fuel in the baseline scenario (HFO) is the average fuel consumption for three years (2004-2006).
- During the years used for calculation of the baseline (2004-2006) HFO, LPG was used for the drying ovens and the foundry, respectively. Diesel has been used only for back up purposes and constitutes only a small quantity of fuel. For the sake of conservativeness, therefore, diesel was not included in the calculation of baseline emissions. This provides a conservative baseline because the portion of the baseline emissions generated by the diesel is not being counted. This lowers the level of baseline emissions, which means that emission reductions due to the project activity will be lower. Therefore, the baseline calculation uses only HFO and LPG and not diesel consumption.
- 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.

Equation 2a – Baseline Emission per unit of output		
$P_{output,BL}$	26,939	tonnes
$FC_{BL,HFO}$ =	24,732.84	tonnes
NCV_{HFO}	0.040	TJ/tonne
EF_{HFO} =	77.37	tCO_2/TJ
$FC_{BL,LPG}$ =	240.68	tonnes
NCV_{LPG} =	0.047	TJ/tonne
EF_{LPG} =	63.07	tCO2/TJ
$BE_{\text{per unit output}}$ =	2.9	tCO2/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)		
$PE_y = PE_{NG,y} + PE_{i,y}$		
$PE_{NG,y}$=	56,679	tCO2/y
$PE_{i,y}$=	0	tCO2/y
PEy=	56,679	tCO2/y

Equation for project emissions from natural gas use:

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

- 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		
$PE_{NG,y} = \sum FC_{PJ,NG} \times CF_{MMBTU \to TJ} * EF_{NG}$		
$FC_{PJ,NG} =$	957,597	MMBTU/y
$CF_{MMBTU->TJ}$	0.00105506	TJ/MMBTU
$EF_{NG} =$	56.10	tCO2/TJ
$PE_{NG,y}$=	56,679	**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
$FC_{LPG,avg} =$	241	ton
$NCV_{LPG} =$	0.047	TJ/t
$EF_{LPG} =$	63.07	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 (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of Leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2008	56,679	78,002	0	21,323
2009	56,679	78,002	0	21,323
2010	56,679	78,002	0	21,323
2011	56,679	78,002	0	21,323
2012	56,679	78,002	0	21,323
2013	56,679	78,002	0	21,323
2014	56,679	78,002	0	21,323
2015	56,679	78,002	0	21,323
2016	56,679	78,002	0	21,323
2017	56,679	78,002	0	21,323
Total Emission Reductions over the Crediting Period (tCO_2e)				213,230

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>957,597</td></tr><tr><td>**2009**</td><td>957,597</td></tr><tr><td>**2010**</td><td>957,597</td></tr><tr><td>**2011**</td><td>957,597</td></tr><tr><td>**2012**</td><td>957,597</td></tr><tr><td>**2013**</td><td>957,597</td></tr><tr><td>**2014**</td><td>957,597</td></tr><tr><td>**2015**</td><td>957,597</td></tr><tr><td>**2016**</td><td>957,597</td></tr><tr><td>**2017**</td><td>957,597</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 for which the Ministry of Infrastructure is responsible.

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:	**HFO** The source of data for fuel consumption is the fuel purchase receipts received from the fuel supplier.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 factory based on the amount of fuel that is weighed and delivered. **LPG** The source of data for fuel consumption is the fuel purchase receipts received from the fuel supplier.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 factory based on the amount of fuel that is weighed and delivered. **Diesel** Diesel use will be measured by fuel purchase receipts or by a measurement gauge on the fuel tank.
QA/QC procedures to be applied:	Each fuel delivery truck that arrives at the factory must provide a delivery certificate from the refinery, which contains the amount of fuel in the delivery as weighed by the refinery. The factory 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 factory, the factory does not accept the delivery. The fuel delivery truck is weighed upon leaving the factory to ensure that all the fuel was indeed delivered. The scale and measurement gauge are maintained according internal factory 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:	tonnes
Description:	Production output during the project activity
Source of data to be used:	Industrial facility
Value of data	see table below
Description of measurement methods and procedures to be applied:	Output is weighed on a scale designed for this purpose. Weight measurements are stored in the computerized data management system.
QA/QC procedures to be applied:	Scales are calibrated according to the manufacturer's requirements.
Any comment:	

	tonnes
2008	26,939
2009	26,939
2010	26,939
2011	26,939
2012	26,939
2013	26,939
2014	26,939
2015	26,939
2016	26,939
2017	26,939

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 fuel consumption and product output for both baseline and project scenarios.

Fuel Consumption: Natural Gas

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 factory. 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. They gas monitoring system is owned and operated by INGL.
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 DSM factory to ensure that all procedures are carried out according to the agreement.
3. Natural gas consumption data is received monthly by the plant in the form of an invoice 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 power plant for the duration of the project activity, plus two years. Natural gas consumption for project emission calculations will be taken from the natural gas purchase receipts.

Fuel Consumption: HFO

For the baseline and project emissions calculations, fuel consumption is based on the fuel purchase receipts that the factory 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 factory consumes all the fuel it purchases over a period of time. The factory assumes that all fuel purchased is consumed.

The factory's quality assurance policy requires that the fuel deliveries are weighed upon entrance to and exit from the factory, 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.

Fuel Consumption: LPG

For the baseline and project emissions calculations, fuel consumption is based on the fuel purchase receipts that the factory 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 factory consumes all the fuel it purchases over a period of time. The factory assumes that all fuel purchased is consumed.

Fuel Consumption: Diesel

Data on diesel use will be taken either from purchase receipts (like HFO) or from a measurement gauge located at the factory.

Product Output

The plant's magnesium output is weighed on scales that have been calibrated to ensure accuracy. Each weighing measurement is entered into the DSM's computerized data management system.

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

The 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:

10 years

SECTION D. Environmental impacts

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

The DSM 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 HFO, a carbon-intensive fossil fuel will improve air quality and reduce emissions of SO_2, NOx and particulate matter. Furthermore, the fossil fuels that the factory has historically used are delivered to the factory 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. The "Regulations for Planning and Building (Environmental Impact Assessment) 2003" published by the Ministry for Environmental Protection on its website[12] lists the situations (p.2) require the submission of an EIA:

- Power plant
- Airport
- Sea port
- Marina
- Refinery
- Landfill/treat site for hazardous waste
- Draining areas of the sea

A fuel switch, which includes installation and upgrading of infrastructure, is not included in this list and therefore, there is no requirement by the Host Country for an EIA to be conducted.

SECTION E. Stakeholders' comments

>>

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

A meeting for stakeholders was held on August 22, 2007 at Sdom. Over twenty people participated in the meeting.

A presentation was made at the meeting to explain the problem of global warming, and the solution presented by the Kyoto Protocol, the CDM and carbon market. Details about the project activity were provided and information sheets about these topics were handed out to all participants.

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[12] Document only available in Hebrew. http://www.sviva.gov.il/Enviroment/Static/Binaries/law/klali37_1.pdf. Accessed October 2, 2007.

Stakeholders were given the opportunity to ask questions about the CDM and the project activity and they received responses during the meeting. They were also invited to send any additional comments or questions about the project via a website that was designed specifically for the purpose of stakeholders' comments. The website remained open for 60 days following the stakeholders' meeting.

Figure 2: Stakeholders' Comments Meeting

A list of participants in the meeting can be found in Annex 6 to this document.

E.2. Summary of the comments received:

Q1: What is the meaning of tCO_2e? What does the "e" represent?

Q2: Are the emission reductions purchased by industrialized countries? Do they have financial value?

Q3: Is the carbon market international? Can agricultural communities in Israel also participate in CDM and carbon trading?

Q4: If an agricultural community were to stop using methyl bromide could the CDM be implemented?

Q5: Where will the natural gas come from?

Q6: When will the project actually be implemented?

Q7: Is there a government subsidy for the project?

Q8: What happens if there is a problem with natural gas? Will there be a back up fuel?

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

A1: TCO_2e means "tonnes of carbon dioxide equivalent". There are many greenhouse gases aside from carbon dioxide, and each one contributes to global warming at a different level. CO_2 has a global warming potential, i.e., contributes to global warming, of 1. Other gases, such as methane, contribute more to global warming than CO_2. Per tonne, methane contributes twenty-one times more to global warming than CO_2, so its global warming potential is 21 tCO_2e.

A2: Emission reductions, once they have been audited by a third party approved by the United Nations Framework Convention on Climate Change Secretariat, are sold on the carbon market to private or public entities.

A3: The carbon market operates internationally, although only countries with emission reduction targets, which are industrialized countries, purchase credits. Agricultural communities in Israel can participate in projects that may be appropriate for them, such as composting wastes. For a more complete list of potential projects, please visit the EcoTraders' website.

A4: Methyl bromide is a chemical used in agriculture; it damages the ozone layer and does not contribute to climate change. The Montreal Protocol addresses chemicals that damage the ozone layer, which is a different problem than climate change and requires the phase-out of methyl bromide. The phase out of methyl bromide will not produce emission reductions under the CDM.

A5: There are three possible sources of natural gas for Israel. The first, Yam Tetis, is located off the coast of Ashkelon. The reserves at Yam Tetis are small and have been already contracted by the Israel Electric Company. The second, British Gas is located off the coast of Gaza. There is no infrastructure in place at the moment and gas from this source will only be available in 2011, at the earliest. The third, Eastern Mediterranean Gas or EMG, is gas from Egypt. Once the gas transportation system from Egypt has been built this gas should be available in 2008. It is most probable that DSM will purchase gas from Egypt.

A6: Gas should be available by mid-2008. The DSM plant will be ready to implement the project by June 2008, if all goes according to plan, including completion of the gas transportation system.

A7: The project is entirely financed by the DSM. There are no government subsidies.

A8: The DSM plant is having a system installed that can operate on natural gas or diesel. In the event that the natural gas supply fails, the plant will use diesel.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Change contact details to mine.

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding from an Annex I Party to the UNFCCC is available for this project.

Annex 3

BASELINE INFORMATION

	2004	2005	2006	*Annual Average*	*Monthly Average*	Source:
Historic Heavy Fuel Oil Demand (HFO) (T/year)	26,832	25,323	22,024	**24,726**	**2,061**	*Purchase receipts*
Historic Heavy Fuel Oil Demand (HFO) (TJ/year)	1,084	1,023	890	**998.94**	**83.24**	*Calculated using IPCC data of TJ/tonne HFO*
Historic LPG (T/year)	273	192	257	**241**	**20**	*Purchase receipts*
Historic LPG (TJ/year)	13	9	12	**11.38**	**0.95**	*Calculated using IPCC data of TJ/tonne HFO*
All Magnesium Production (Ton/yr)	28,382	27,853	24,581	**26,939**	**2,245**	*Factory measurements. Stored in factory computer system*

Fuel Type	tC/TJ	Oxid. Factor (%)	tCO2e/TJ	TJ/t fuel	tCO2e/t	Source
Residual (heavy) fuel oil (HFO)	21.1	1	77.367	0.0404	3.12561	IPCC 2006
LPG	17.2	1	63.067	0.0473	2.98305	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

Procedure Name	Objective	Scope
Staff Training	Staff training includes steps to ensure that staff receives proper training for factory operations and procedures related to the CDM project.	• Factory 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

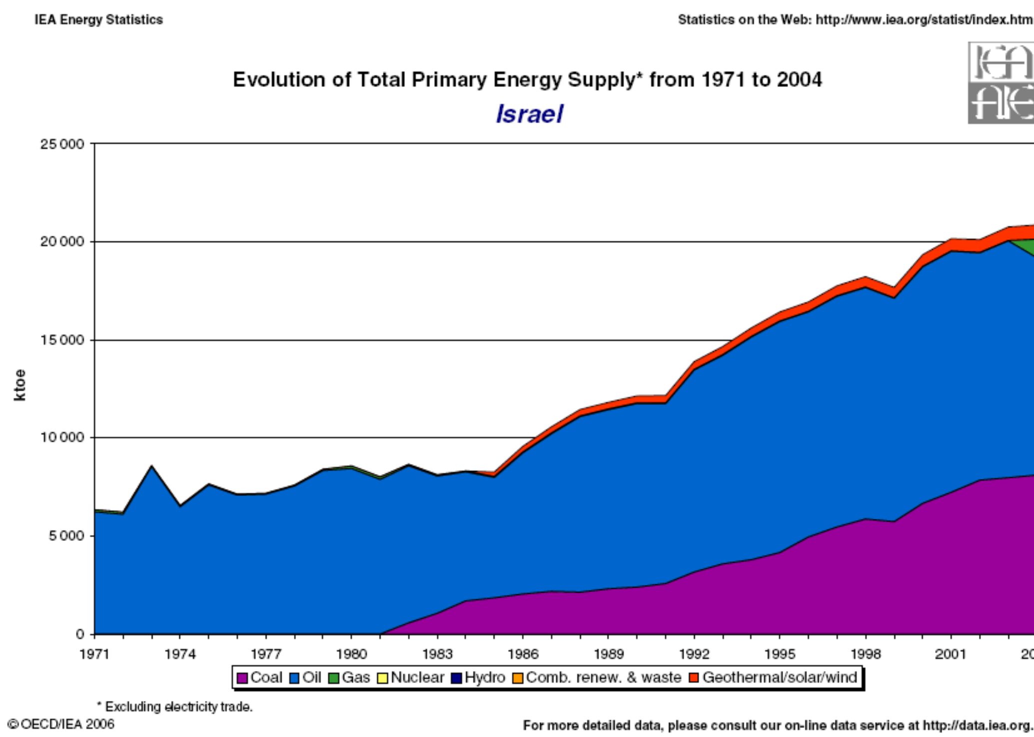
The CDM project is currently under development. CDM O&M procedures will be developed once the CDM project is operational.

Annex 5

Fuels Used for Total Primary Energy Supply (TPES) in Israel

Diagram taken from the International Energy Agency (IEA). According to the International Energy Agency TPES is calculated as indigenous energy products plus imports, less energy exports.

The following diagrams illustrate that the majority of energy in Israel is generated from coal and oil products.



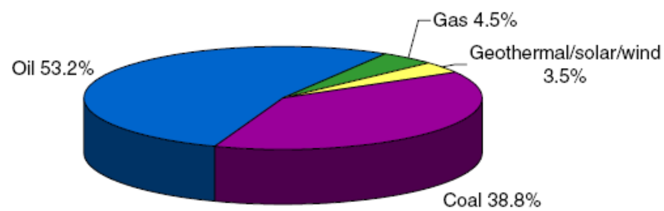
http://www.iea.org/Textbase/stats/pdf_graphs/ILTPES.pdf

IEA Energy Statistics

Statistics on the Web: http://www.iea.org/statist/index.htm

Share of Total Primary Energy Supply* in 2004

Israel



20 743 ktoe

* Share of TPES excludes electricity trade.

Note: For presentational purposes, shares of under 0.1% are not included and consequently the total may not add up to 100%.

For more detailed data, please consult our on-line data service at http://data.iea.org.

http://www.iea.org/textbase/stats/pdf_graphs/ILTPESPI.pdf

Annex 6

Participants in the Meeting for Stakeholders

Bezalel Vardimon	DSW
Shimon Zisk	Sustainable Negev
Gabi Weiss	DSW
Bilha Givon	Sustainable Negev
Nissan Avni	Resident, Ein Tamar
Gideon Cohen	DSM
Noam Goldstein	DSW
Zadok Zamir	DSW
Orli Muli	Environmental branch, DSW
Ayala Avrahami-Guver	Environmental office for the Eastern Negev
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Gal Manil	Resident, Kibbutz Ein Gedi
Shachal Gindi	Friends of the Earth
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Esti Barak	Resident, Naot Hakikar
Raz Avni	Resident, Ein Tamar
Aza Ravid	Resident, Ein Tamar
Iris Ben David	Resident, Ein Tamar
Asher Luzon	Resident, Naot Hakikar
Ami Zeicho	Resident, Naot Hakikar
Menachem Zin	DSW
Moshe Kleiman	DSW

Note: Naot Hakikar, Ein Tamar, Kibbutz Ein Gedi are all settlements in the Dead Sea region.