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

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**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.<br>• 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 Works Ltd. Small Scale Fuel Switch Project
Version 01
December 16, 2007

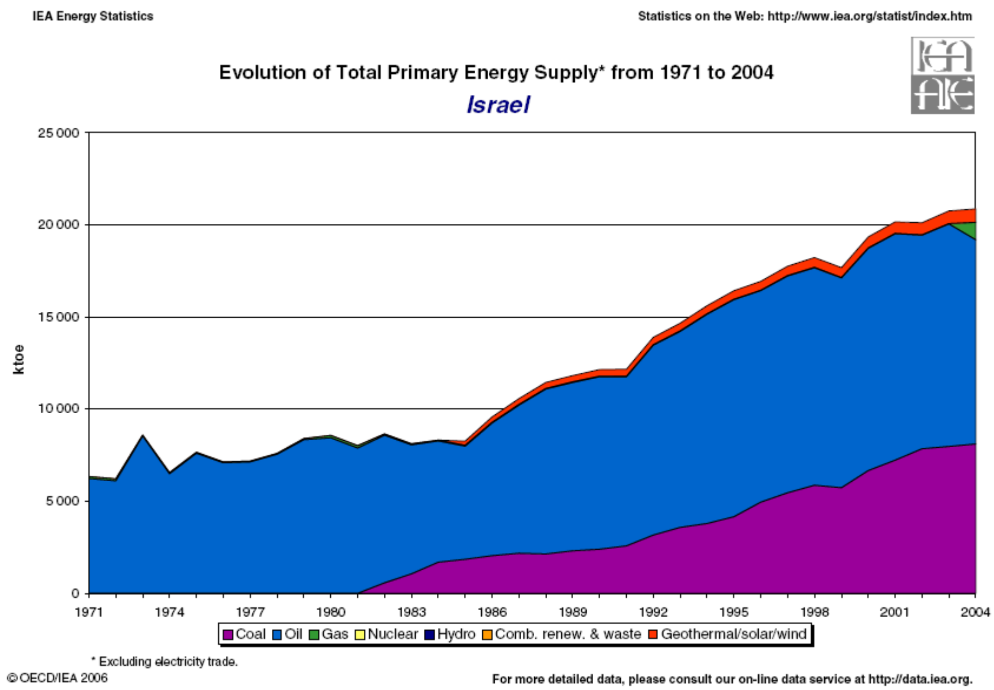
### A.2. Description of the small-scale project activity:

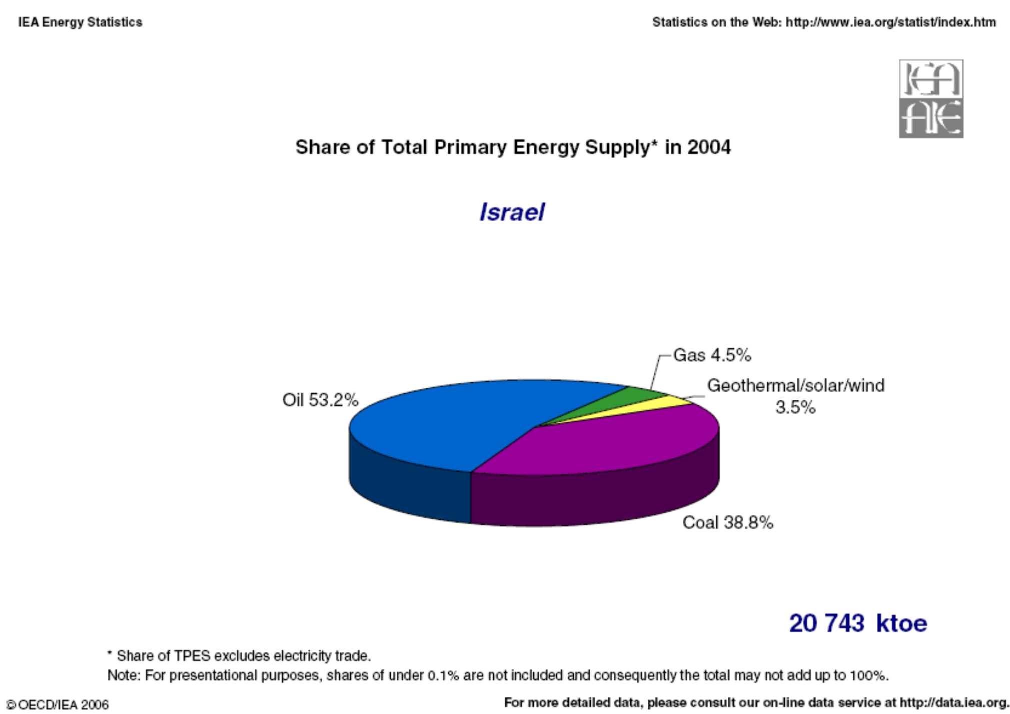
Dead Sea Works Ltd. (DSW) is one of the world's leading manufacturers of chemicals and produces potash from the Dead Sea. DSW was established as a government company in 1952 and was privatized in 2000. DSW operate in over 60 countries and won a number of industry awards, such as "Beautiful Industry Award" – an award that is given for aesthetic and clean plant, the "Quality of the Environment Award" etc. DSW employs around 600 employees, most of them from places near by such as Dimona, Arad, Tamar and Be'er Sheva.

As part of its production processes, DSW must dry, crystallize and granulate its product, which is accomplished using different drying dryers. The dryers have historically consumed two types of fossil fuel: heavy fuel oil (HFO) and diesel. The DSW plant has decided to undertake a CDM project to reduce its greenhouse gas (GHG) emissions. The project activity will switch the HFO and diesel used for the dryers to natural gas with the possibility of diesel and HFO being used as a backup fuel for times when the natural gas supply is not available. The fuel switch will not only reduce GHG emissions that contribute to climate change but will also reduce other types of air emissions.

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 estimates that in 2004, oil made up 53% of Israel's primary energy supply.[1]

[1] Diagrams 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 development and the DSW small-scale fuel switch project achieves the following sustainability objectives:

*Environmental*

- The project will address climate change by reducing the amount of greenhouse gases (GHG) emissions generated from DSW's production processes.
- The project reduces the plant's air pollution emissions, such as NOx, SOx and particulate matter.
- The project reduces the number of trucks that must deliver fuel to the Dead Sea area. The reduction in the number of trucks will reduce air emissions caused by transportation.

*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 local residents.
- The project reduces the number of trucks that must deliver fuel to the Dead Sea area. The reduction in the number of trucks will improve air quality and reduce traffic congestion in the area.

*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 Works Ltd. Private entity. Project Developer. | No |
| | EcoTraders Ltd. Private entity. 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:**

>> Israel.

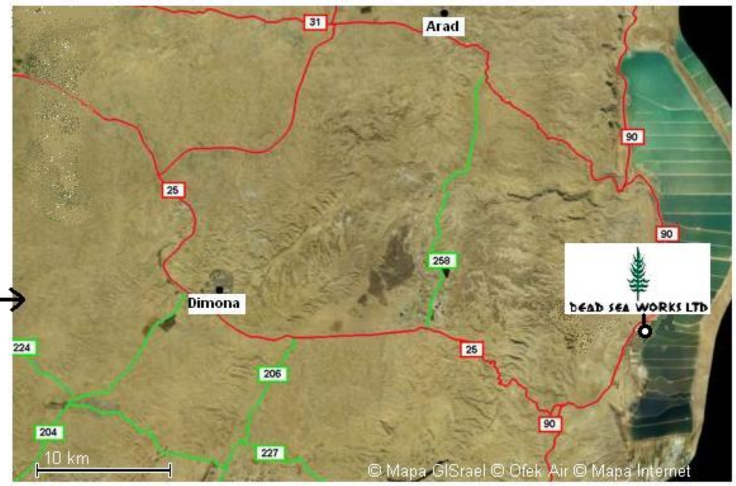
**A.4.1.2. Region/State/Province etc.:**

>> 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 at the UTM co-ordinates 31$^{o}$01N, 35$^{o}$22E. The plant is located approximately 42 km from the town of Dimona (population 34,000) and 40 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 DSW Fuel Switch is not part of a programme of activities as defined in Annex 15 of the decisions made at EB28. 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 programs), 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. There is no entity involved in the project, public or private, that is co-ordinating a policy, measure or stated goal, such as an incentive scheme that leads to GHG emission reductions.

The DSW Fuel Switch project will switch the fuel the plant uses in its dryers from HFO and diesel to natural gas. The project will retrofit the dryers 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.

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

| Year | Annual estimation of emission reductions in tonnes of CO2e |
|---|---|
| 2008 | 28,492 |
| 2009 | 28,492 |
| 2010 | 28,492 |
| 2011 | 28,492 |
| 2012 | 28,492 |
| 2013 | 28,492 |
| 2014 | 28,492 |
| 2015 | 28,492 |
| 2016 | 28,492 |
| 2017 | 28,492 |
| Total estimate reductions (tonnes of CO2e) | 284,920 |
| Total number of crediting years | 10 |
| Annual average over the crediting period of estimated reductions (tonnes of CO2e) | 28,492 |

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

The project will not receive any public funding or official development assistance 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 DSW, 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 or a greater distance 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 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 HFO and diesel with natural gas. Methodology III.B, version 12, "Switching fossil fuels" was chosen for two reasons:

1. The primary activity in this project is a fuel-switch (HFO and diesel to natural gas).
   The methodology applies to projects that are switching their fossil fuel consumption to a different 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 DSW plant, where the output is potash products.[2]

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

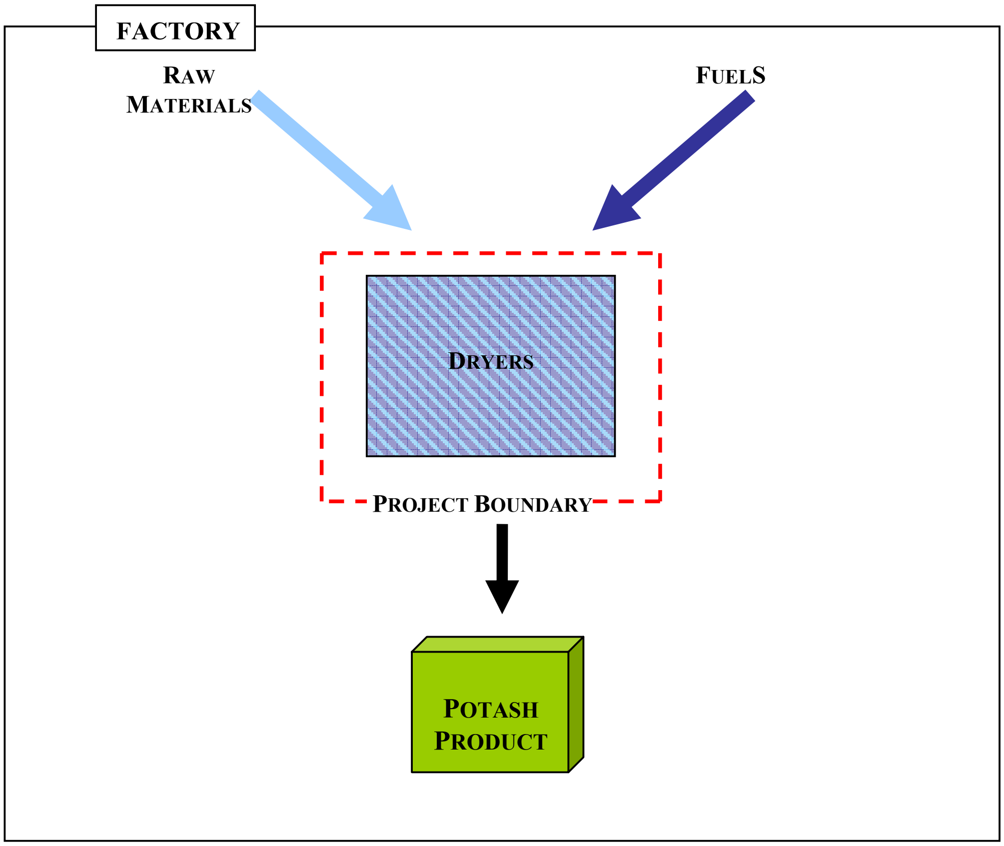
| **Applicability Clause** | **Applicability of the clause to the small scale project activity** |
|---|---|
| "This category comprises fossil fuel switching in existing industrial, residential, commercial, institutional or electricity generation applications." | ✓ The project is switching from the fossil fuels used in the existing plant's dryers 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 dryers' efficiencies. 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 28,492 $tCO_2e$ per year, which is less than the 60,000 $tCO_2e$ per year limit of the methodology. |

### 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."

[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.

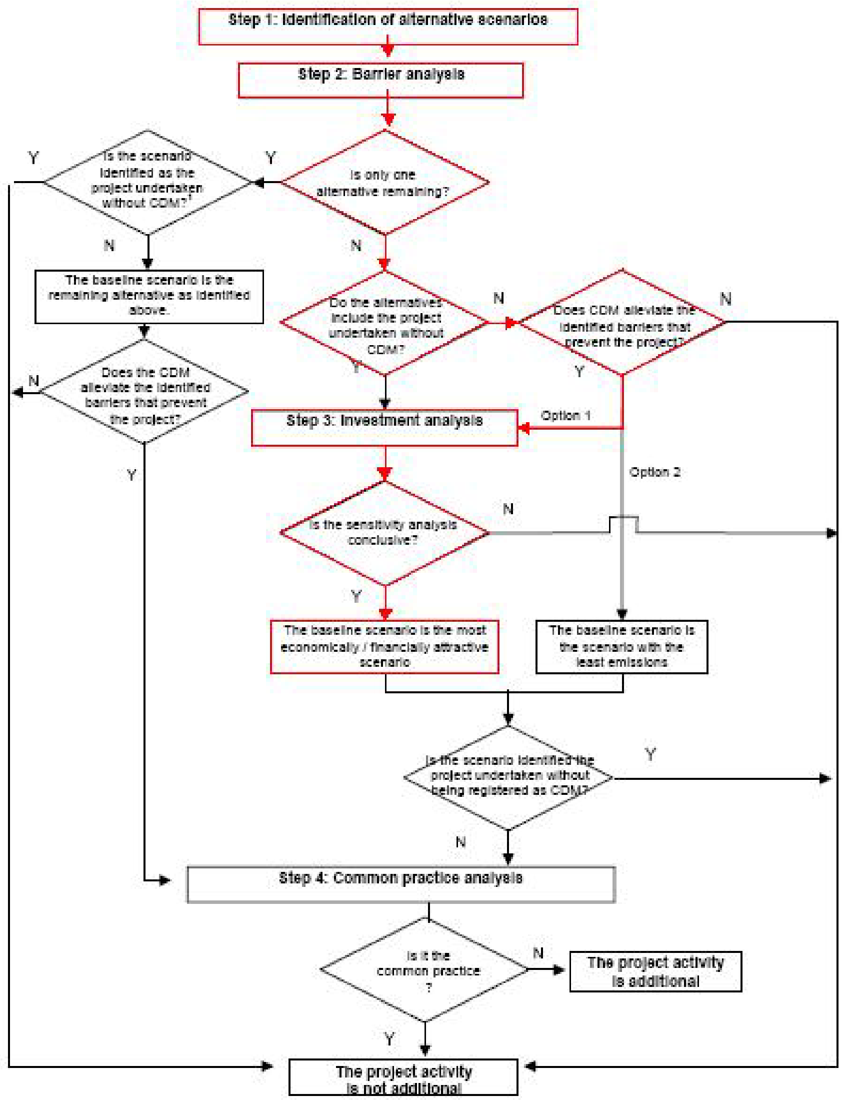
The physical, geographical site where the fuel combustion affected by the fuel-switching measure occurs is in the dryers that are used by the DSW plant in its production process.




| **B.4**. **Description of baseline and its development:** |
|---|

Methodology III.B, version 12 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 steps 1-3 in the tool will be used 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 – HFO and diesel
2) Use of HFO and diesel with sack filter technology.
3) Fuel switch – natural gas, without the CDM component
4) Fuel switch – natural gas, with CDM
5) Fuel switch to 100% diesel

Alternatives (1) through (5) all provide comparable energy output and would allow the plant 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 and diesel consumption at the plant or require a switch to natural gas. Israel, however, does have ambient air quality standards in place relating to $SO_x$, $NO_x$ and particulate matter (PM). Each industrial facility must maintain a business license that includes environmental standards specified for the plant. Under its current operations the DSW plant meets its required air emissions' standards for $SO_2$ and $NO_x$ but not for PM. Alternative (1) does not meet applicable laws and regulations, although alternatives (2) through (5) do.

Alternatives:

1) ~~Continuation of current practice – using HFO and diesel~~
2) Use of HFO and diesel with sack filter technology
3) Fuel switch – natural gas, without the CDM component
4) Fuel switch – natural gas, with CDM
5) Fuel switch to 100% diesel

**Step 2. Barrier analysis**

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

Technological Barriers

1. Lack of Trained Personnel

Because natural gas is a relatively new fuel in Israel and few facilities have experience in using it, the DSW 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. Total training for all the plant's employees who work in production, operations and maintenance requires the equivalent of 1067 days of training (e.g. a training course for the plant's engineers is 5 days long and the plant has twenty-two engineers that must complete this training, for a total of 110 days of training). The DSW 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. In addition, welders at facilities using natural gas require special training and certification. The DSW plant is required to hire specially trained welders who have this certification, in addition to the training that must be completed for its current employees.

2. Lack of Host Country Expertise

In addition to training its employees, the plant has had to contract Annex I country companies to provide the expertise and oversight for the implementation of the project. Wega, a German company, was hired to approve the plant's engineering plans. Bureau Veritas, from Belgium, was hired to perform third-party inspection of all the project equipment. Without this Annex I expertise, the project would not be implemented because there is no local expertise to ensure safe and reliable implementation of the project.

Summary of external companies hired by the plant to implement the fuel-switch project:

| Company Name | Country | Responsibility |
|---|---|---|

| | | |
|---|---|---|
| Wega | Germany | Consultant for plant on its engineering plan (inspection and approval prior to submission to the Natural Gas Authority) |
| BV - Bureau Veritas | Belgium | Third party inspection of all parts of the project equipment |
| Israel Electric Company | Israel | Planning and training of plant's engineers |
| Shalhevet | Israel | Training for all employees at the plant |

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 production.

The DSW plant was required to invest capital and manpower hours to train its employees on 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 from local and Annex I companies, 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. The plant also had to contract Annex I expertise to review and verify its plans and equipment. It is clear that the project activity faces technological barriers in the lack of trained personnel to implement and maintain the project activity and in the necessity to contract a company from an Annex I country for the expertise to verify its plans and equipment.

Scenarios (3) and (4) face technological barriers.

Other Barriers – Uncertainty of fuel supply

The DSW plant decided to implement the project during the second half of 2005. Since then significant investments of time and capital took place. A growing commitment to the project and external obligations where taken in the planning stage prior to closing a contract with a natural gas supplier.

In deciding to implement the project, the plant was faced with three potential and problematic fuel suppliers. The first, Yam Tetis, controls a small natural gas supply off the coast of Ashkelon, but has contracted most of the reserves to the Israel Electric Company and other companies. Yam Tetis therefore cannot be counted on to meet the plant's long-term demand for natural gas[3].

The second natural gas supplier in the region, British Gas, is located of the coast of the Gaza Strip. British Gas, however, 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 the Israeli government and Hamas, the political

[3] To further substantiate this point, only after three years of prolonged negotiations with the different natural gas suppliers, DSW signed on March 25th 2008, an agreement with Yam Tethys partners to supply a limited amount of gas, due to the field's quantity constraints and subject to certain conditions, to be fulfilled.

[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.

entity currently in control of Gaza, makes British Gas unlikely to be a reliable supplier of gas to the Israeli market unless significant political changes in the region occur.[5]

The third supplier, Eastern Mediterranean Gas (EMG), controls a natural gas supply located in Egypt. Although the Israeli and Egyptian governments have negotiated a natural gas agreement, there has been and continues to be opposition in Egypt to a natural gas supply contract with Israel.[6]

In addition to the selection of a natural gas supplier, DSW faced additional issues in terms of supply uncertainty when deciding to implement the project. DSW expects to purchase gas 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, making fuel a fixed cost. This creates a disadvantage for DSW compared to the current HFO and diesel consumption, where fuel consumption is a variable cost and the plant can adjust its fuel consumption according to its production needs. In the event that DSW 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. DSW's financial commitment to the natural gas supplier may place the plant in a difficult position if its market share and production fall in the future. Petroleum fuels, like HFO, allow the company flexibility in creating its fuel mix and placing fuel orders consistent with current fuel demand.

It is also unclear whether the supplier will be able to meet DSW's demand for natural gas. According to recent newspaper reports[7], updated forecasts show that Israel's new natural gas delivery system – both domestically and from Egypt - does not have enough capacity to meet expected demand, due to the fact that both underwater and overland pipes are too narrow. This is further evidence of Israel's inexperience in dealing with natural gas. The limited capacity, coupled with the Israel Electric Company's intention to significantly increase its natural gas consumption, could disrupt the gas supply to private industrial users such as DSW. In addition, the section running between Ashkelon and Kiryat Gat has been deemed to be particularly problematic. This is crucial for DSW, as it is through this section that gas will be delivered to Sdom.

Should the supplier be unable to provide the contracted amount of gas in the short term, DSW must return to using HFO and diesel to operate its dryers. Should the supplier be unable to provide the contracted amount of gas in the long term and DSW wishes to continue to use natural gas, it must find a new source of natural gas and enter negotiations with another natural gas supplier, which presents additional

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[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] "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.
"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.

[7] "The natural gas pipeline between Egypt and Israel is too narrow; the cost of its expansion – half a billion dollars" *TheMarker,* March 24, 2008.
http://career.themarker.com/tmc/article.jhtml?ElementId=skira20080323_93321&log=true

uncertainty. As explained above, there are a limited number of possible natural gas suppliers to the DSW plant, which may make it difficult to find a different natural gas supplier. Furthermore, a new natural gas contract will supply the gas at the current market price, which will likely be higher than the price secured at an earlier date, thus increasing DSW's fuel purchase costs. Alternatively, DSW would have the option of reverting back to using HFO and diesel in its dryers and accept the loss of investment in the project.

Alternatives (3) and (4) face technological and uncertainty barriers.

1) ~~Continuation of current practice – using HFO and diesel~~
2) Use of HFO and diesel with sack filter technology
3) ~~Fuel switch – natural gas, without the CDM component~~
4) ~~Fuel switch – natural gas, with CDM~~
5) Fuel switch to 100% diesel

<u>Impact of CDM Revenues</u>
DSW views CDM revenue as a sound and stable source of income, which will alleviate a portion of the risk the company faces in the realization of the project: investment of capital in training and quality assurance prior to certainty regarding gas delivery and fuel supply risks in the future. The CDM revenues provide support to the DSW plant in the face of the numerous risks that the introduction of natural gas poses, and were taken into account when deciding to implement the project.

The DSW plant is also relying on the CDM "brand" to demonstrate to its customers, many of whom are located in Annex I countries that it is conscious of its impact on the environment and is committed to environmental business practices.

**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 the two scenarios to the DSW plant and determine the most financially attractive scenario.

The costs of HFO per tonne and diesel per kilolitre (1000 litres) were taken from historical data available from the Central Bureau of Statistics.[8] Using a density for diesel of 0.84 tonnes/kilolitre[9], the price per tonne of diesel was calculated, as shown in this table:

| Year | Month | Refinery price of | Refinery price of | Refinery price of | Refinery price of |
|---|---|---|---|---|---|

[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 and English. http://www.cbs.gov.il/reader/new_energy/new_enr_nach_eng_new_huz.html 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.

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

| | | HFO NIS/tonne | HFO USD/tonne | diesel NIS/tonne | diesel USD/tonne |
|---|---|---|---|---|---|
| **2005** | I | 752.3 | 171.81 | 1,793.57 | 409.61 |
| | II | 845.4 | 193.44 | 1,914.76 | 438.13 |
| | III | 905.4 | 209.15 | 2,048.93 | 473.30 |
| | IV | 1,055.70 | 241.50 | 2,220.95 | 508.05 |
| | V | 1,136.70 | 259.89 | 2,143.21 | 490.02 |
| | VI | 1,059.40 | 236.21 | 2,038.69 | 454.57 |
| | VII | 1,246.50 | 273.33 | 2,450.24 | 537.27 |
| | VIII | 1,210.10 | 268.36 | 2,399.05 | 532.02 |
| | IX | 1,294.20 | 285.17 | 2,726.43 | 600.75 |
| | X | 1,493.30 | 322.84 | 2,862.98 | 618.95 |
| | XI | 1,428.00 | 303.84 | 2,716.90 | 578.09 |
| | XII | 1,271.20 | 275.65 | 2,419.88 | 524.73 |
| **2006** | I | 1,312.30 | 284.12 | 2,448.93 | 530.21 |
| | II | 1,553.50 | 330.31 | 2,716.31 | 577.54 |
| | III | 1,558.30 | 332.32 | 2,595.83 | 553.59 |
| | IV | 1,501.40 | 327.84 | 2,756.07 | 601.80 |
| | V | 1,523.90 | 340.61 | 2,954.40 | 660.35 |
| | VI | 1,512.80 | 338.26 | 2,907.02 | 650.01 |
| | VII | 1,428.30 | 322.21 | 2,914.64 | 657.52 |
| | VIII | 1,528.30 | 348.98 | 2,837.50 | 647.93 |
| | IX | 1,415.50 | 325.19 | 2,943.45 | 676.22 |
| | X | 1,142.20 | 267.31 | 2,396.90 | 560.96 |
| | XI | 1,165.50 | 270.99 | 2,409.40 | 573.45 |
| | XII | 1,125.10 | 267.78 | 2,430.00 | 545.27 |
| **Average** | | **1,269.39 NIS/t HFO** | **283.21 USD/t HFO** | **2,501.92 NIS/t diesel** | **558.35USD/t diesel** |

The analysis of the prices in the table above clearly indicates that diesel is more than twice the price of HFO.

Using data of HFO and diesel consumption provided by the DSW plant, it was determined that the following costs are faced by each of the alternative baseline scenarios. The prices for diesel and HFO, averaged from 2005 and 2006 data, were used. Alternative 2 uses averaged annual fuel consumption data from 2004-2006 for HFO and diesel to determine the cost of alternative 2 (HFO and diesel with scrubbers). Alternative 5 uses on the amount of diesel that would have been needed by the plant to meet its energy needs based on the average annual energy consumption from 2004-2006. The amount of diesel that would have been required by the DSW plant was calculated using the net calorific value (NCV) provided by the IPCC in its 2006 Guidelines for National Greenhouse Gas Inventories.[10]

To confirm that the most financially attractive scenario is current practice with the sack filter technology, i.e. the continued use of HFO and diesel, a sensitivity analysis was conducted.

[10] 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).

| | | |
|---|---|---|
| **Scenario 2** | HFO and diesel with sack filter technology: Annual average HFO and diesel consumption | $12,504,714 |
| **Scenario 5** | Hypothetical average annual fuel consumption, 100% diesel | $14,020,157 |

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

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

| | | | |
|---|---|---|---|
| **Scenario 2** | HFO and diesel with sack filter technology: Annual average HFO and diesel consumption | Price of HFO +10%, No change in diesel price | 13,205,779$ |
| **Scenario 5** | Hypothetical average annual fuel consumption, 100% diesel | No change in diesel price | $14,020,157 |

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

| | | | |
|---|---|---|---|
| **Scenario 2** | HFO and diesel with sack filter technology: Annual average HFO and diesel consumption | No change in HFO price, Price of diesel -10% | 11,982,658$ |
| **Scenario 5** | Hypothetical average annual fuel consumption, 100% diesel | Price of diesel -10% | $12,618,142 |

In each case presented in the sensitivity analysis, current practice (HFO and diesel) 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 (5) is eliminated.

1) ~~Continuation of current practice – using HFO and diesel~~
2) Use of HFO and diesel with sack filter technology
3) ~~Fuel switch – natural gas, without the CDM component~~
4) ~~Fuel switch – natural gas, with CDM~~
5) ~~Fuel switch to 100% diesel~~

The financial analysis clearly indicates that the baseline scenario is Alternative (2), the use of HFO and diesel with new sack filter technology.

**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 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 with sack filter technology at the DSW plant, i.e. the use of HFO and diesel. The baseline scenario is not the project activity undertaken without CDM.

In order to fully understand the difficulties the DSW 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 would construct maintain and operate the pipeline. After the tender failed in 2003, the government decided 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. [11]

2. Construction of the pipeline began in 2003 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. To date, the pipeline to the DSW 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.

4. The pipeline from the EMG gas fields, from El Arish, is not ready yet for industrial usage, and DSW has no influence or impact upon its construction.

[11] Ministry of National Infrastructure. http://www.mni.gov.il/mni/en-US/Energy/NaturalGas.

Zion Oil & Gas. Industry Updates – July through December 2002. http://www.zionoil.com/industry/updates/12-2002update.html.

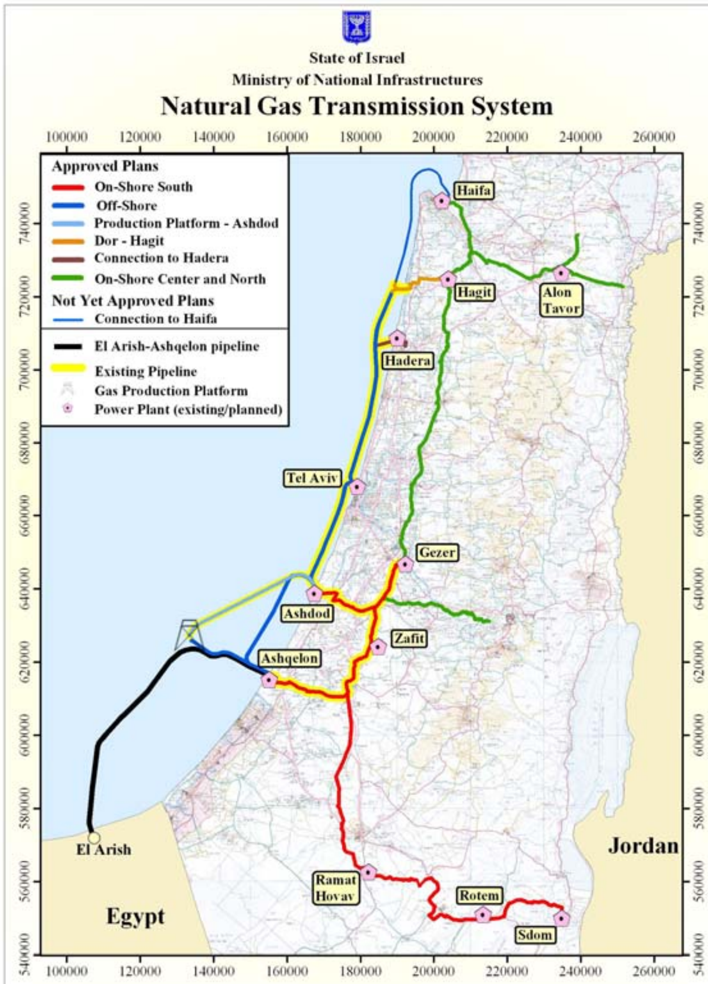


**Figure 1: Natural Gas Pipeline in Israel, October 2007**[12]

**Barriers to the Project**
Were the DSW plant to continue operating using HFO and diesel the plant would not face the barriers described below and its emissions would be higher.

*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

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

August 2006, began using natural gas in November 2005 when it was still a government-owned company, and the American Israel Paper Mills plant, 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.[13] 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 DSW plant would have continued to use HFO and diesel, which emit higher levels of $CO_2$ than natural gas. HFO and diesel are commonly used by Israeli industry and DSW would have not faced any barriers if it had continued to use these fuels. Had DSW continued to operate according to the baseline scenario instead of the CDM project the plant's GHG emissions would have been higher.

*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.*

Technological Barriers
1. Lack of Trained Personnel
Because natural gas is a relatively new fuel in Israel and few facilities have experience in using it, the DSW plant does not have the knowledge base for working with natural gas, such as operation and maintenance of equipment and troubleshooting problems that arise from the use of natural gas. To ensure the project's success the plant had to invest in an extensive training program for all of its employees, from administrative staff to the plant's employees who are involved in production, operation and maintenance and who will work with the natural gas. The training program involves theoretical and practical training and includes an in-class course and field training, with an exam that each employee must pass. Total training for all the plant's employees who work in production, operations and maintenance requires the equivalent of 1067 days of training (e.g. a training course for the plant's engineers is 5 days long and the plant has 22 engineers that must complete this training, for a total of 110 days of training). The DSW 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. In addition, welders at facilities using natural gas require special training and certification. The DSW plant is required to hire specially trained welders who have this certification, in addition to the training that must be completed for its current employees.

2. Lack of Host Country Expertise
The Israel Natural Gas Authority requires that a third party that is unrelated to the natural gas consumer or to the natural gas delivery system be contracted to supply third party inspection for the engineering plans and equipment to be used. In addition, it is highly recommended that an advisor from Annex1 will be contracted prior to the third party inspection to review the plans. Because natural gas is a relatively new fuel in Israel and few facilities have experience in using it, the country does not contain a knowledge base of developing natural gas delivery and usage systems or skilled and properly trained labor to operate and maintain facilities operating on natural gas. DSW has had to contract an Annex I engineering firm, B&V, to assess all of its equipment and construction at the plant to ensure that all components meet the standard for natural gas systems set by the Host Country.

[13] See page 4 of the PDD.

The DSW plant was required to invest capital and manpower hours to train its employees on how to use the new technology – natural gas – and to seek Annex I country expertise to transfer technological knowledge to the Host Country.
The plant has had to contract Annex I country companies to provide the expertise and oversight for the implementation of the project. Wega, a German company, was hired to approve the plant's engineering plans. Bureau Veritas, from Belgium, was hired to perform third-party inspection of all the project equipment. Without this Annex I expertise, the project would not be implemented because there is no local expertise to ensure safe and reliable implementation of the project.

Summary of external companies hired by the plant to implement the fuel-switch project:

| Company Name | Country | Responsibility |
|---|---|---|
| Wega | Germany | Consultant for plant on its engineering plan (inspection and approval prior to submission to the Natural Gas Authority) |
| BV - Bureau Veritas | Belgium | Third party inspection of all parts of project equipment |
| Israel Electric Company | Israel | Planning and training of the plant's engineers |
| Shalhevet | Israel | Training for all employees at the plant |

Without the specialized training from local and Annex I companies, 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 production. The plant was required to invest capital and manpower hours to train its employees how to use the new technology – natural gas and had to contract a company from an Annex I expertise to review and verify its plans and equipment. . It is clear that the project activity faces a technological barrier in the lack of trained personnel to implement and maintain the project activity and in the necessity to contract a company from an Annex I country for the expertise to verify its plans and equipments.

Without the investment in training needed for the project it is unlikely that the lack of skilled personnel in the Host Country and at the factory would have been significantly alleviated in the next five to ten years.

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

Other Barriers – Uncertainty: Fuel Availability

DSW faces uncertainty regarding the availability of the natural gas it will purchase, which can affect the company's production schedule and economic viability.

1. DSW has had to invest time and capital in natural gas delivery infrastructure, safety equipment and training for its employees, prior to the closer of a contract with a natural gas supplier.

In deciding to implement the project, the plant was faced with three potential and problematic fuel suppliers. The first, Yam Tetis, controls a small natural gas supply off the coast of Ashkelon, but has contracted most of the reserves to the Israel Electric Company and other companies. Yam Tetis therefore cannot be counted on to meet the plant's long-term demand for natural gas.[14]

The second natural gas supplier in the region, British Gas, is located of the coast of the Gaza Strip. The British Gas supply, however, will not be available until 2011, at the earliest.[15] Additionally, conflict between Israeli government and Hamas, the political entity currently in control of the Gaza Strip makes it unlikely that a deal would be brokered unless there are significant political changes[16].

The third natural gas supplier, Eastern Mediterranean Gas (EMG), controls a natural gas supply in Egypt. Although the Israeli and Egyptian governments have negotiated a natural gas agreement, the agreement has faced and continues to face opposition in Egypt.[17] The gas pipeline in El Arish may also 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.

The DSW 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 DSW.

2. DSW expects to purchase gas 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, making fuel a fixed cost. This creates a disadvantage for DSW compared to the current HFO and diesel consumption, where fuel consumption is a variable cost and the plant can adjust its fuel consumption according to its production needs. In the event that DSW 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. DSW's financial commitment to the natural gas supplier may place the plant in a difficult position if its market share and production fall in the future.

Petroleum fuels, like HFO, allow the company flexibility in creating its fuel mix and placing fuel orders consistent with current fuel demand.

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[14] To further substantiate this point, only after three years of prolonged negotiations, on March 25th 2008, was a contract signed with Yam Tetis for a limited amount of gas due to the field's quantity constraints.

[15] "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.

[16] "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.

[17] "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.
"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.

3. It is unclear whether the supplier will be able to meet DSW's demand for natural gas. According to recent newspaper reports[18], updated forecasts show that the natural gas delivery system does not have enough capacity to meet expected demand, due to the fact that both underwater and overland pipes are too narrow. The limited capacity, coupled with the Israel Electric Corporation's intention to significantly increase its natural gas consumption, could disrupt the gas supply to private industrial users such as DSW. In addition, the section running between Ashkelon and Kiryat Gat has been deemed to be particularly problematic. This is crucial for DSW, as it is through this section that gas will be delivered to Sdom.

If the supplier is unable to supply the contracted amount of gas in the short term, DSW must return to using HFO and diesel to operate its dryers. If the supplier is unable to supply the contracted amount of gas in the long term and DSW wishes to continue to use natural gas, it must find a new source of natural gas and enter negotiations with another natural gas supplier, which presents additional uncertainty. As explained above, there are a limited number of possible natural gas suppliers to the DSW plant, which may make it difficult to find a different natural gas supplier. Furthermore, a new natural gas contract will supply the gas at the current market price, which will likely be higher than the price secured at an earlier date, thus increasing DSW's fuel purchase costs. Alternatively, DSW would have the option of reverting back to using HFO and diesel in its dryers and accept the loss of investment in the project.

Had DSW not chosen to implement a fuel switch project it would have continued to use HFO and diesel, 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 diesel instead of the project activity would have led to higher emissions.

**Summary of barriers to the project activity:**

| Barrier | DSW Fuel Switch (Project Activity) | HFO and diesel (Baseline Scenario) |
|---|---|---|
| **Prevailing Practice** | • Among the first projects of this kind in the Host Country<br>• Majority of the industry in the Host Country uses petroleum oils to generate heat and steam. | • Commonly used fuels in Israel<br>• Knowledge exists of how to use HFO and diesel in dryers<br>• Plant only must manage its HFO and diesel supply inventories and place orders for deliveries as needed |
| | *Barrier to the implementation of the project.* | *No barrier to the baseline scenario.* |
| **Technological Barrier** | • Special training needed for the plant to operate on natural gas.<br>• Annex I expertise had to be contracted to provide certification for the plan, the equipment and operation with natural gas. | • No special training would be needed to continue operations on HFO and diesel because the knowledge is available in-house. |
| | *Barrier to the implementation of the project.* | *No barrier to the baseline scenario.* |
| **Uncertainty – Fuel Availability** | • Fuel may need to be delivered by transportation system from a different country<br>• Political tensions in the region may put the | • HFO and diesel can be ordered from any one of a number of companies and is available in an unlimited supply, meaning no loss of production. |

[18] "The natural gas pipeline between Egypt and Israel is too narrow; the cost of its expansion – half a billion dollars" *TheMarker,* March 24, 2008.
http://career.themarker.com/tmc/article.jhtml?ElementId=skira20080323_93321&log=true

| | | |
|---|---|---|
| | delivery of fuel at risk.<br>• Contract one supplier to deliver natural gas – if another supplier is needed, will need to negotiate another contract. In addition there is a very limited number of suppliers.<br>• Natural gas contract makes fuel a fixed cost and the plant will be unable to reduce its outlay for fuel if production falls.<br>• Natural gas delivery system does not have enough capacity to meet expected demand, | • Should one fuel supplier company not be able to provide HFO and/or diesel, orders can be placed with a different fuel supplier. HFO and diesel are fuels that can be stored on-site and their inventories managed.<br>• HFO and diesel are purchased on an as-need basis, which can be adjusted according to production levels. |
| | *Barrier to the implementation of the project.* | *No barrier to the baseline scenario.* |

The continued use of HFO and diesel would not have required the time and effort that DSW 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 limited suppliers in a region with political tensions (uncertainty barrier);
- Limited options in terms of alternative suppliers will be problematic in the event that a new contract must be negotiated (uncertainty barrier);
- Being locked into a contract that requires payment even if the natural gas is not used.

Under the baseline scenario, the continued use of HFO and diesel, the DSW plant would not have faced the above barriers and would have produced higher GHG emissions. Therefore, the project activity is additional.

## B.6. Emission reductions:

### B.6.1. Explanation of methodological choices:

No equations are provided by the approved methodology and, therefore, project and baseline emissions and emission reductions shall be calculated according to the equations below, which were developed to meet the methodology's instructions.

The approved small-scale methodology "III.B. version 12 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." (The Formulas for calculating project emission caused by the usage of natural gas were taken from the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” option B)

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

Where:

| Parameter | Description | Unit |
|---|---|---|
| $PE_{,y}$ | Project Emissions in time period y. | $tCO_2/y$ |
| $PE_{NG,y}$ | Project Emissions from natural gas use in time period y. | $tCO_2/y$ |

| | | |
|---|---|---|
| $PE_{i,,y}$ | Project Emissions from non-natural gas fossil fuel use in time period y. | $tCO_2/y$ |

Equation for project emissions from natural gas use:

$PE_{NG,y} = FC_{NG,y} * COEF_{NG}$ (1a)

Where:

| Parameter | Description | Unit |
|---|---|---|
| $FC_{NG,y}$ | The total volume of natural gas in time period y | m3/y |
| $COEF_{NG,}$ | The $CO_2$ emission coefficient ($tCO_2/m_3$) in time period y | tCO2/m3 |

$COEF_{NG} = NCV_{NG,y} * EF_{CO2,NG,y}$

Where:

| Parameter | Description | Unit |
|---|---|---|
| $NCV_{NG,y}$ | The net calorific value (energy content) per volume unit of natural gas in time period 'y' ($TJ/m_3$), | $TJ/m_3$ |
| $EF_{CO2,NG,y}$ | the $CO_2$ emission factor per unit of energy of natural gas in time period 'y' ($tCO_2/TJ$) | $tCO_2/TJ$ |

Equation for project emissions from non-natural gas 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 time period y | Tonnes/y |
| $NCV_i$ | Net calorific value of fossil fuel *i* | TJ/tonne |
| $EF_i$ | Emission factor of fossil fuel *i*, which includes 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 in the project 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. The ex-ante calculation assumes that only natural gas will be used during the project activity's crediting period.

The ex ante calculation of $PE_y$ bases the parameter $FC_{i,}$ on the amount of energy required for production at DSW during the project activity's crediting period. It is assumed, for *ex ante* calculation purposes that production will equal the average production level of 2004-2006. Actual fuel consumption and production levels throughout the project activity will be monitored as described in section B.7.1.

**Baseline Emissions:**

Baseline emissions shall be calculated as follows:

$BEy = BE_{per\ unit\ output,BL} * P_{output,PJ,y}$ (2a)

Where:

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

$$BE_{per\ unit\ output} = \frac{\sum (FC_{BL,i} * NCV_i * EF_i)}{P_{output,BL}}$$ (2b)

Where:

| Parameter | Description | Unit |
|---|---|---|
| $P_{output,\ BL}$ | Output in baseline scenario averaged over the 3 years prior to project development. | Tonne |
| $FC_{BSLi}$ | Fuel consumption of fossil fuel *i* in baseline scenario averaged over the 3 years prior to project development. | Tonne |
| $NCV_i$ | Net calorific value of fossil fuel *i* | TJ/tonne |
| $EF_i$ | Emission Factor fossil 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 used to calculate total baseline emissions, as shown in Eq. 2a.

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. For the *ex ante* calculations it is assumed that production during the project activity will equal DSW'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 by the methodology.

**Emission Reduction:**

$ER_y = BE_y – PE_y$ (3)

Where:

| Parameter | Description | Unit |
|---|---|---|
| $ER_y$ | Emission reductions in time period y | $tCO_2/y$ |
| $BE_y$ | Baseline emissions in time period y | $tCO_2/y$ |
| $PE_y$ | Project emissions in time period y | $tCO_2/y$ |

| 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:** | $FC_{BL,HFO}$ |
| 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 choice of data or description of measurement methods and procedures actually applied : | Fuel consumption data used to determine baseline emissions was taken from the plant's data management system. Flow meters monitor HFO consumption and this data is sent to the data management system. Three years of fuel consumption data were averaged.<br>QA/QC - 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 and can be compared to the measurements made at the plant's entrance. This amount is compared to the sum of the flow meters from the plant and the DSW power plant. |
| Any comment: | All data will be archived for the duration of the project's crediting period plus two additional 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. Emission Coefficient of Heavy Fuel Oil considering both the net calorific value and oxidation factor. |
| 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:** | $FC_{BL,diesel}$ |
|---|---|
| Data unit: | Tonne |
| 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 : | Fuel consumption data used to determine baseline emissions was taken from the plant's data management system. Flow meters monitor diesel consumption and this data is sent to the data management system. Three years of fuel consumption data were averaged.<br>QA/QC - 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 and can be compared to the measurements made at the plant's entrance. This amount is compared to the sum of the flow meters from the plant and the DSW power plant. |
| Any comment: | All data will be archived for the duration of the project's crediting period plus two additional years. |

| **Data / Parameter:** | $NCV_{diesel}$ |
|---|---|
| Data unit: | TJ/t diesel |
| Description: | Net calorific value for diesel. |
| Source of data used: | IPCC 2006 |
| Value applied: | 0.0430 |
| 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 potash products produced in the 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: | Production output for the calculation of baseline emissions was taken from the plant's data management system Three years of output data was averaged to determine the plant's average annual output.<br>QA/QC – A certified surveyor measures the inventory and production quantities are retrofitted accordingly. |
| Any comment: | All data will be archived for the duration of the project's crediting period plus two additional years. |

### B.6.3 Ex-ante calculation of emission reductions:

**Project Emissions:**

Project emissions were calculated with the following assumptions:

- Fuel consumption (FC) in the project activity was estimated by taking the average amount of energy required in the baseline scenario (i.e. the total amount of TJs used according to the fuel consumption in the baseline) and assuming that the same amount of TJ from natural gas would be required.
- It is assumed that only NG will be used in the project activity. All fuel consumption will be monitored as specified below in section B.7.1
- It is assumed that the same amount of natural gas will be consumed each year, in keeping with the average amount of energy required in the baseline scenario.

Equation 1: Project Emissions

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

| | | |
|---|---|---|
| $PE_{NG,y}$= | 78,659.30 | tCO2/y |
| $PE_{i,y}$= | 0.00 | tCO2/y |
| **PEy=** | 78,659.30 | **tCO2/year** |

Equation 1a: Project Emissions from natural gas

$PE_{NG,y}$ = $\sum FC_{PJ,NG} \times NCV_{NG} * EF_{NG}$

| | | |
|---|---|---|
| $PE_{NG,y}$= | 78,659.30 | tCO2/y |

Equation 1b: Project Emissions from other fossil fuels

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

| | | |
|---|---|---|
| $FC_{PJ,HFO,y}$ = | 0 | t/y |
| $NCV_{HFO}$ | 0.0404 | TJ/t |
| $EF_{HFO}$ = | 77.37 | tCO2/TJ |
| $FC_{PJ,diesel,y}$ = | 0 - | t/y |
| $NCV_{diesel}$ | 0.0430 | TJ/t |
| $EF_{diesel}$ = | 74.07 | tCO2/TJ |
| **$PE_{i,y}$=** | 0.00 | **$tCO_2$** |

**Baseline Emissions:**

Baseline emissions were calculated with the following assumptions:

- Baseline fuel consumptions ($FC_{BL,HFO}$ and $FC_{BL,diesel}$) were determined by averaging historical fuel consumption for each fuel from 2004-2006. The amount of fuel in TJ was calculated using the net calorific value (provided by the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*) to determine the amount of TJ contained by the fuel consumed.
- Baseline output ($P_{output,BL,i}$) was determined by averaging historical production output from 2004-2006 from the plant.
- For the purpose of the ex ante emission reduction calculation, it is assumed that future production will be the same as current production levels in the baseline ($P_{output,PJ,y} = P_{output,BL,i}$). Actual output will be monitored according to the plant's internal procedures.
- The emission factor used for HFO ($EF_{HFO}$), 77.37 $tCO_2$/TJ, and for diesel ($EF_{diesel}$), 74.067 $tCO_2$/TJ, were taken from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

Equation 2a: Baseline emissions

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

| | | |
|---|---|---|
| $BE_{per\ unit\ output}$ | 29.447 | $tCO_2$/tonne output |
| **BEy** | 107,151.04 | **$tCO_2$** |

Equation 2b: Baseline emissions per unit of output

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

| | | |
|---|---|---|
| **$BE_{\text{per unit output}}$** | 29.447 | **$tCO_2$/tonne output** |

### 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 | **78,659** | 107,151 | 0 | 28,492 |
| 2009 | **78,659** | 107,151 | 0 | 28,492 |
| 2010 | **78,659** | 107,151 | 0 | 28,492 |
| 2011 | **78,659** | 107,151 | 0 | 28,492 |
| 2012 | **78,659** | 107,151 | 0 | 28,492 |
| 2013 | **78,659** | 107,151 | 0 | 28,492 |
| 2014 | **78,659** | 107,151 | 0 | 28,492 |
| 2015 | **78,659** | 107,151 | 0 | 28,492 |
| 2016 | **78,659** | 107,151 | 0 | 28,492 |
| 2017 | **78,659** | 107,151 | 0 | 28,492 |
| **Total (tCO2e)** | **786,590** | 1,071,510 | 0 | 284,920 |

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

#### B.7.1 Data and parameters monitored:

| **Data / Parameter:** | $FC_{PJ,NG,y}$ |
|---|---|
| Data unit: | $m^3/y$ |
| Description: | Consumption of natural gas in the project |
| Source of data to be used: | Industrial facility , computerized data management system |
| Value of data | This data is a proprietary information that will be displayed to the DOE |
| Description of measurement methods and procedures to be applied: | The natural gas consumption of the driers will be measured by one or more flow meters located in the DSW plant. |
| 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 |
| Any comment: | All data will be archived for the duration of the project's crediting period plus two additional years. |

| | |
|---|---|
| **Data / Parameter:** | $FC_{PJ,i,y}$ |
| Data unit: | Tonnes |
| Description: | Fuel consumption of non-natural gas fossil fuels during the project |
| Source of data to be used: | Industrial facility, computerized data management system |
| Value of data | 0 |
| Description of measurement methods and procedures to be applied: | **HFO**<br>HFO consumption data is monitored by flow meters. The data from the flow meters is sent to the plant's computerized data management system.<br>**Diesel**<br>Diesel consumption data is monitored by flow meters The data from the flow meters is sent to the plant's computerized data management system. |
| QA/QC procedures to be applied: | The data for emission reduction calculations is taken from fuel consumption readings that are taken from the flow meter . These readings are compared to ensure that the data used for emission reduction calculations is accurate.<br>In addition, the purchase receipts are compared to the flow meters |
| Any comment: | All data will be archived for the duration of the project's crediting period plus two additional years. |

| | |
|---|---|
| **Data / Parameter:** | $P_{output,PJ,y}$ |
| Data unit: | Tonnes |
| Description: | Production output during the project |
| Source of data to be used: | Industrial facility |
| Value of data | This data is a proprietary information that will be displayed to the DOE |
| Description of measurement methods and procedures to be applied: | Output is weighed on scales, located on the belt conveyors at the plant. The output data is sent directly to the plant's computerized data management system. In addition the data is adjusted according to surveyor measurements as per the plant internal procedures. |
| QA/QC procedures to be applied: | Scales are calibrated according to the plant's internal requirements.<br>In addition, every quarter a certified surveyor measures the inventory and production quantities are retrofitted accordingly. |
| Any comment: | All data will be archived for the duration of the project's crediting period plus two additional years. |

| | |
|---|---|
| **Data / Parameter:** | $NCV_{NG,y}$ |
| Data unit: | $TJ/m^3$ |
| Description: | Average net calorific value per volume unit of natural gas |
| Source of data to be used: | Monitored using a gas chromatograph by the fuel supplier and sent to the plant via daily reports. If data is not available, IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories will be used. |
| Value of data applied for the purpose of calculating expected | Due to the preliminary stage of the project, meaning that the plant isn't operating on NG yet, the NG infrastructure isn't ready and no contract has been signed yet with a NG supplier, the NCV of the gas isn't known yet. Project Emissions where |

| | |
|---|---|
| emission reductions in section B.5 | estimated by assuming that the same amount of energy (TJ) required by the plant in the baseline scenario will be required during the project scenario and multiplying this quantity by the emission factor of NG (TCO2/TJ).<br>It is estimated by the plant's engineers that the NCV will be close to: 0.03238 MMBTU/M3 or 0.000034 TJ/M3. |
| Description of measurement methods and procedures to be applied: | The NCV is measured in British Thermal Units (BTU). The value in BTU will be converted to joules using the value 1,055.0559 J/BTU, as given by http://www.onlineconversion.com.<br>The reading of the gas chromatograph will be continuous and readings will be recorded at least fortnightly. |
| QA/QC procedures to be applied: | The gas chromatograph will be maintained and calibrated by INGL according to the Israeli law as dictated by the Ministry of National Infrastructure in the NG purchase agreement. |
| Any comment: | All data will be stored electronically for the duration of the crediting period 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, 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 requirements of methodology III.B are:

(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 consumption of the driers will be measured by flow meters located in the factory.
2. Natural gas consumption data will be stored in the factory's computerized data management system.
3. Project emissions calculations will be based on the natural gas meters in the plant
4. QA/QC –NG in the DSW plant will be consumed by two consumers. The industrial dryers, which constitute the scope of this project activity and a power plant which is outside the scope of this project activity (and no emission reductions will be claimed for this segment through this project). The total amount of NG supplied to the plant's dryers and to the power plant, as

measured by the flow meters, will be compared to the purchase receipts. All maintenance procedures for the gas delivery system are dictated by law in the Natural Gas Purchase Agreement and will be undertaken by Israel Natural Gas Lines (INGL). INGL must report its operation and maintenance procedures, including calibration, to the DSW plant to ensure that all procedures are carried out according to the agreement. Natural gas consumption is received monthly by the DSW plant in the form of an invoice (purchase receipt) from INGL.

5. 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.

**Fuel Consumption: HFO and Diesel**

1. For the baseline and project emissions calculations, fuel consumption is taken from the plant's computerized data management system.
2. The data management system stores the amount of fuel read by flow meters
3. 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 and can be compared to the measurements made at the plant's entrance. This amount is compared to the sum of the flow meters from the industrial plant and the DSW power plant..

**Product Output**

1. Plant output is measured by weighing the products on the belt conveyors. The scales' readings are sent to the computerized factory management system.
2. The scales are calibrated according to the plant's internal procedures.
3. QA/QC - A certified surveyor measures the inventory and production quantities are retrofitted accordingly.

**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 December 1, 2007. Contact information of the responsible entity, a project participant, is available in Annex 1.

All relevant data and information presented in the PDD pertains to the period in which the baseline study was conducted.

## 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:

01/06/2008

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

20 years, 0 months.

**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:**

01/09/2008

**C.2.2.2. Length:**

10 years, 0 months.

## 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 DSW Fuel-Switch project was not required to conduct an environmental impacts analysis report. The "Regulations for Planning and Building (Environmental Impact Assessment) 2003" published by the Ministry for Environmental Protection on its website[19] 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.

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.

[19]. http://www.sviva.gov.il/Enviroment/Static/Binaries/law/klali37_1.pdf. Accessed October 2, 2007.

## 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. The stakeholders, who represent different interest groups in the area, are a group that meet regularly at stakeholders' meetings held by the NGO Sustainable Negev in conjunction with the DSW plant to discuss various issues. Invitations for this stakeholders' meeting were sent by post. Over twenty people participated in the meeting:

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

Please note that Naot Hakikar, Ein Tamar, Kibbutz Ein Gedi are all villages in the Dead Sea region.

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 the carbon market. Details about the project activity were provided and an information sheet containing information about these topics was handed out to all participants.

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**

**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 $tCO_2$ equivalent.

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 but 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 GHG emission reductions and no project can be developed 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 and other firms. 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 DSW will purchase gas from Egypt.

A6: Gas should be available by mid-2008. The DSW 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 DSW. There are no government subsidies.

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

## Annex 1

### CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

| | |
|---|---|
| Organization: | EcoTraders Ltd. |
| Street/P.O.Box: | 4 Berkowitz St. |
| Building: | Sadia Gaon 24, 9th Floor |
| City: | Tel Aviv |
| State/Region: | |
| Postfix/ZIP: | 67135 |
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| FAX: | +972-3-5616-225 |
| E-Mail: | |
| URL: | http://www.ecotraders-global.com |
| Represented by: | |
| Title: | Ms. |
| Salutation: | |
| Last Name: | Dishon |
| Middle Name: | |
| First Name: | Adi |
| Department: | |
| Mobile: | +972-52-380-5549 |
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| Direct tel: | +972-3-777-82987 |
| Personal E-Mail: | dishon@ecotraders-global.com |

| | |
|---|---|
| Organization: | Dead Sea Works Ltd. |
| Street/P.O.Box: | 1 Kreutzer st/ POB 75 |
| Building: | Potash House |
| City: | Beer Sheba |
| State/Region: | |
| Postfix/ZIP: | 84100 |
| Country: | |
| Telephone: | 00972- 52-4709222 |
| FAX: | |
| E-Mail: | Farkash@DSW.CO.IL |
| URL: | |
| Represented by: | |
| Title: | Mr. |
| Salutation: | |
| Last Name: | Farkash |
| Middle Name: | |
| First Name: | Arie |
| Department: | |
| Mobile: | 00972- 52-4709222 |

| | |
|---|---|
| Direct FAX: | |
| Direct tel: | |
| Personal E-Mail: | |

**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

| 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 |
| 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 (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 plant operations and procedures related to the CDM project. | • Plant operations<br>• Safety procedures |
| Data quality control and troubleshooting. | To cross-check data and records prior to storage to ensure accuracy of data. | • Fuel use data<br>• 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.