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:

Title of the project activity: "Fuel oil to Natural Gas switching at Tecnológica de Alimentos S.A. (TASA) Callao Sur plant".

Version of document: 01
Date of document: June 19, 2007

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

Tecnológica de Alimentos S.A. (TASA) began activities around 2002 and currently is considered one of the major producers in the country of fish oil and fish meal. Its main raw material consists of two fish species called *anchoveta* and *anchoveta blanca* (*Engraulis ringens* and *Anchoa nasus*). The purpose of this project activity is to switch from Residual Oil – R6 to Natural Gas – NG in the boilers and dryers of the Callao Sur plant, in the Callao province, department of Lima, Peru.

The project is aimed principally to reduce Greenhouse Gases GHG emissions produced by the fish cooking and drying processes. These processes use R6 in two (2) types of combustion equipment, five (5) boilers and two (2) dryers. Therefore, some components of aforementioned equipment have to be replaced and adapted to use and burn natural gas[1].

- Three (3) CLEAVER – BROOKS boilers, nominal power 800 BHP, and a burning rate of 230 gallons per hour each. The conversion involves the replacement of the burner by a dual burner combustion kit.
- One (1) KEEWANEE boiler, nominal power 670 BHP, and a burning rate of 230 gallons per hour. The conversion involves the replacement of the burner by a dual burner combustion kit.
- One (1) JOHN THOMPSON boiler, nominal power 870 BHP, and a burning rate of 250 gallons per hour. The conversion involves the replacement of the burner by a dual burner combustion kit.
- Two (2) RAY dryers with burners model 10, with 320 gallons per hour of burning rate each.

The proposed project activity also includes the installation of a pressure reduction natural gas station at the plant and natural gas meters to monitor consumption. Additionally, it is necessary to build an internal gas pipeline in order to transport and connect equipment with the reduction station and main distribution line of the natural gas vendor.

The availability of natural gas for industrial use, in Lima, Peru, is recent. Moreover, the use of residual oil (R500 or R6) is well known as a common practice in Peru, and it does not have restrictions on its use in industries[2].

During the second quarter of 2005, the current TASA Callao Sur plant belonged to Pesca Perú and it was leased by Grupo Sindicato Pesquero del Perú S.A. (SIPESA). The plant restarted operations in July of the

[1] See reference "Equipments Callao Sur.pdf"

[2] Please refer to Supreme Decrees 030-1998 and 045-2005, which define, set norms, and rules the hydrocarbon fuel commerce (supply chain) in Peru.

same year after several years of stoppage. Later in the year 2006, TASA acquired SIPESA and Pesca Perú as well. In January 2007, after a successful merger process TASA and SIPESA became one single company.

When TASA acquired the Callao Sur plant, the company started works to reactivate the plant and the operation began enhancing year by year its quotient between fish meal production and fuel consumption, see table 4 (page 11).

The project activity contributes to sustainable development through these benefits:

- The use of NG instead of R6, reduces the emission of major air pollutants, like particulate matter, sulfur oxides and nitrogen oxides, since natural gas chemically has less carbon. Also, it reduces the emissions of GHG, thus contributing to climate change mitigation.
- Lower levels of air pollutants mentioned before promotes enhanced air quality in the surrounding area[3].
- Adopting the use of natural gas is a leading step to promote the industrial change needed in the fish meal and fish oil processing industry and in the industrial area in order to enhance the air quality in surrounding areas.

A.3. Project participants:

Table 1. Parties involved in the project activity

Name of Party involved (*) ((host) indicates a host Party)	**Private and/or public entity(ies) project participants (*) (as applicable)**	**Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)**
Peru (host)	Tecnológica de Alimentos S.A. TASA	No

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

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

A.4.1.1. Host Party (ies):

Peru

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

Constitutional Province of Callao.

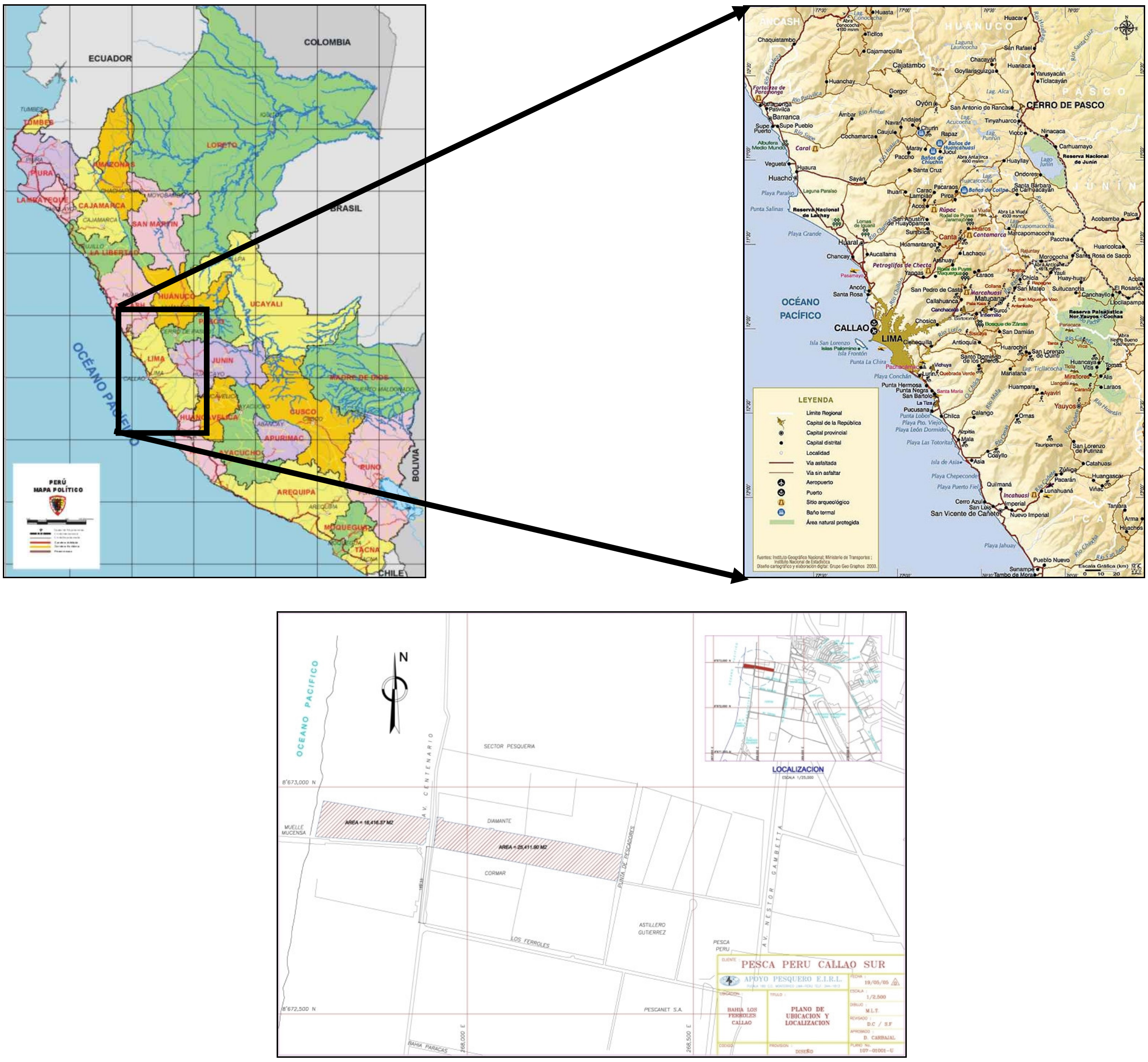
A.4.1.3. City/Town/Community etc:

[3] Please refer to Supreme Decree 009-2003, where it is shown how the national alarm levels are set in terms of these air pollutants, and CONAM´s annual air quality programs, where it is shown the way in which a standard for air quality according to industrial sector is determined.

Callao

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

Project activity is located at:
Tecnológica de Alimentos S.A. TASA Planta Callao Sur
Av. Prolongación Centenario 1954 Zona industrial Los Ferroles
Callao
Peru



Drawing 1. Location of TASA Callao Sur plant

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

The project activity is of type (iii) "other project activities" and is also of category (K) "Switching fossil fuels". The technology is one for fossil fuel switching in existing industrial applications and involves conditioning combustion equipment and installing a natural gas distribution line with a control station. Fuel switching changes efficiency either way as well but this project activity is not focused primarily on energy efficiency. Measures are limited to those that result in emission reductions of less than or equal to 60 ktCO_2 equivalent annually.

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

Table 2 describes the estimated amount of emissions reduction based on the forecasted natural gas consumption, which is dependent of the number of fishing days allowed each year. The crediting period is 10 years, starting from project registration date in 2008 and finishing one day before that registration date in 2018. The registration date is estimated around January 2008.

Table 2. Estimated emission reductions

Years	Estimation of annual emission reductions in tonnes of CO_2 e
Year 1	2,041.0
Year 2	2,041.0
Year 3	2,041.0
Year 4	2,041.0
Year 5	2,041.0
Year 6	2,041.0
Year 7	2,041.0
Year 8	2,041.0
Year 9	2,041.0
Year 10	2,041.0
Total estimated reductions (tonnes of CO_2 e)	20,410
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tCO_2 e)	2,041.0

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

There is no public funding involved in the project activity.

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

This project activity is not a component of a large scale project activity because according to Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities "Determining the occurrence of debundling", there is no other project activity registered or applicant to registration with the same project participants, neither in the same project category or technology / measure, nor registered within the previous 2 years, or whose project boundary is within 1 km of the project boundary of the proposed small scale project activity at the closest point.

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:

This project activity applies the version 10 of the AMS-III. B. "Switching fossil fuels" methodology. This version of the methodology which is in scope 1 is valid since December 23 of 2006.

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

Project category for this project activity is type III and category K. This means this is a project activity of small scale type that both reduces anthropogenic emissions of GHG and reduces less than sixty (60) kilotonnes of carbon dioxide equivalent annually, as is estimated in Section E of this document. This project activity is neither aimed at energy efficiency nor electricity generation and thus it does not belong to any categories of type I "Renewable energy projects" or type II "Energy efficiency improvements projects".

B.3. Description of the project boundary:

The project boundary of this project activity is the physical, geographical site where the fuel combustion affected by the fuel switching measure occurs. This means the project boundary is established by the physical perimeter of TASA Callao Sur plant. Its land area is 40,000 square meters approx. It is geographically located at coordinates 12°00´19" S and 77°07´56" W and it is surrounded by Pesquera Diamante at the north, by Pesquera CORMAR at the south, by a machinery workshop, and a small crop land at the west and by a container storage yard at the east.

B.4. Description of baseline and its development:

The annual biomass available to the fishing industry is set each year by PRODUCE[4] and IMARPE[5] through ministerial resolutions[6]. Considering hydro biologic resources in jurisdictional water are part of Peru's national patrimony and fishing industry is a matter of national interest, this limit is set on areas, time and quantity of fish available to fishing in order to assure a rational exploitation of this natural resource. According to annual studies of *anchoveta* life cycle, the quantity of biomass available is estimated and IMARPE then recommends the quota of biomass for fishing. Using this recommendation, PRODUCE sets areas and the starting date of fishing season. Within the period open by fishing season to all the different actors (fishing fleets owned by processing plants or particular fleet services and fish processing plants) compete to gather a part of this biomass. With each boat, the amount of fish collected is controlled and monitored by PRODUCE. When they are close to complete the biomass quota allowed in the particular season, PRODUCE finishes the permission for boats to sail estimating the covering of remaining part of biomass quota with the last boat capacity departure. There are times when fishing is forbidden on specific zones to protect young *anchoveta* population according to monitoring results of PRODUCE.

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[4] Ministerio de la Producción (PRODUCE) is the Production Ministry in Perú. For more information see http://www.produce.gob.pe

[5] Instituto del Mar del Peru (IMARPE) is the Peruvian Oceanographic Institution. For more information see http://www.imarpe.gob.pe

[6] As an example, see RESOLUCIÓN MINISTERIAL No. 095-2007-PRODUCE, No. 099-2007-PRODUCE, No. 115-2007-PRODUCE, No. 124-2007-PRODUCE, No. 149-2007-PRODUCE, and No. 154-2007-PRODUCE.

The emission baseline for this project activity, defined by the methodology, is the emissions of the TASA Callao Sur plant as if it were using residual oil R6 in the processes, expressed as kilograms of gas emissions [$kgCO_2e$]. Therefore, the emission baseline will depend on the production of the plant each year, the associated consumption of NG and the hypothetical consumption of R6 needed to process the same production.

Default values for emission coefficients were used for stationary combustion of R6 and NG in manufactory industries, as stated in Table 3 (this section, page 8).

The annual project emissions in tCO_2e, are calculated according to the equation 1 for direct emissions E_y from stationary combustion of fossil fuel.

Equation 1. Annual direct emissions from stationary combustion of fossil fuels

$$E_y = \sum_i Q\_F_{i,y} \cdot \left(EF\_F_i\_CO_2 + EF\_F_i\_CH_4 \cdot GWP\_CH_4 + EF\_F_i\_N_2O \cdot GWP\_N_2O\right)$$

Where:

$Q\_F_{i,y}$ is the quantity of fossil fuel used by each element process *i* in the scenario for each year *y* of the crediting period. It is measured in [TJ].

$EF\_F_i\_CO_2$ is the IPCC default CO_2 emission factor per unit of fossil fuel associated with fuel stationary combustion. It is measured in [tCO_2/TJ]. For CO_2, it includes the carbon oxidation factor, assumed to be 1 for stationary combustion Tier 1 approach.

$EF\_F_i\_CH_4$ is the IPCC default CH_4 emission factor per unit of fossil fuel associated with fuel stationary combustion. It is measured in [tCH_4/TJ].

GWP_CH_4 is the global warming potential of methane set by the IPCC. It is stated in [tCO_2/tCH_4].

$EF\_F_i\_N_2O$ is the IPCC default N_2O emission factor per unit of fossil fuel associated with fuel stationary combustion. It is measured in [tN_2O/TJ].

GWP_N_2O is the global warming potential of nitrous oxide set by the IPCC. It is stated in [tCO_2/tN_2O].

Table 3. Default data used to estimate GHG emissions

Data	Value	Source
Carbon dioxide default emission factor for fuel oil R6 (*$EF\_R6\_CO_2$*)	77,400 $kgCO_2/TJ$	IPCC, 2006 Guidelines, Volume 2, Table 2.3 "Emission factor for stationary combustion in manufacturing industries and construction"

Data	Value	Source
Methane default emission factor for fuel oil R6 (*EF_R6_CH4*)	3 $kgCH_4/TJ$	IPCC, 2006 Guidelines, Volume 2, Table 2.3 “Emission factor for stationary combustion in manufacturing industries and construction”
Nitrous oxide default emission factor for fuel oil R6 (*EF_R6_N2O*)	0.6 kgN_2O/TJ	IPCC, 2006 Guidelines, Volume 2, Table 2.3 “Emission factor for stationary combustion in manufacturing industries and construction”
Carbon dioxide default emission factor for Natural Gas (*EF_NG_CO2*)	56,100 $kgCO_2/TJ$	IPCC, 2006 Guidelines, Volume 2, Table 2.3 “Emission factor for stationary combustion in manufacturing industries and construction”
Methane default emission factor for Natural Gas (*EF_NG_CH4*)	1 $kgCH_4/TJ$	IPCC, 2006 Guidelines, Volume 2, Table 2.3 “Emission factor for stationary combustion in manufacturing industries and construction”
Nitrous oxide default emission factor for Natural Gas (*EF_NG_N2O*)	0.1 kgN_2O/TJ	IPCC, 2006 Guidelines, Volume 2, Table 2.3 “Emission factor for stationary combustion in manufacturing industries and construction”
Global warming potential of methane (*GWP_CH4*)	21 tCO_2/tCH_4	IPCC, 1995, “The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report, page 22.”
Global warming potential of nitrous oxide (*GWP_N2O*)	310 tN_2O/tCH_4	IPCC, 1995, “The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report, page 22.”
Calorific power of fuel oil R6 (*CP_R6*)[7]	0.15065 GJ/gal	Repsol YPF, local vendor of R6 for TASA. This value is in the range of lower heating values shown on GHG Protocol Stationary Combustion Tool, version 4 updated.

[7] This value is external and is provided by Repsol YPF Perú.

Data	Value	Source
Calorific power of natural gas (*CP_NG*)[8]	0.0404746 GJ/sm^3	Cálidda, local vendor of NG for TASA. This value is in the range of lower heating values shown on GHG Protocol Stationary Combustion Tool, version 4 updated.

Thus, in the context of this project activity, the annual baseline emissions BE_y, in tCO_2e, are calculated according to the equation 1 (this section, page 7) for direct emissions E_y from stationary combustion of fossil fuel, in this case, R6 and become equation 2.

Equation 2. Annual baseline emissions from stationary combustion of R6

$$BE = Q\_FO \cdot \left(EF\_FO\_CO_2 + EF\_FO\_CH_4 \cdot GWP\_CH_4 + EF\_FO\_N_2O \cdot GWP\_N_2O \right)$$

Where:

Q_FO is the quantity of fuel oil (R6) used by the plant in the baseline scenario for each year of the crediting period. It is measured in [TJ]. *Q_FO* is estimated from the historical efficiency of the boiler and dryers when using R6, and from the efficiency and consumption of NG *Q_NG* each year measured in the crediting period.

In order to ensure that the needed amount of energy is the same on both project and baseline scenarios, *Q_FO* is obtained from the following equation.

Equation 3. Quantity of fuel oil in terms of natural gas consumption and efficiencies

$$Q\_FO = Q\_NG \cdot \frac{\eta\_NG}{\eta\_FO}$$

This equation is necessary to obtain Q_FO which is a baseline scenario variable that cannot be measured directly.

η_FO and *η_NG* are the efficiencies of fuel oil and natural gas, respectively. The efficiencies are calculated as the quotient of fish meal produced, in [tonnes], per fossil fuel consumed, in [TJ]. The result is in [t/TJ].

[8] This value is external and is provided by Cálidda Perú. In this case is the value for December 2006. Cubic meters at standard conditions (Pressure of 101.325 kilopascals and temperature of 298,15 Kelvin).

Equation 4. Efficiencies of fossil fuels in context of the project activity

$$\eta\_FO = \frac{Q\_FF}{Q\_FO}$$

$$\eta\_NG = \frac{Q\_FF}{Q\_NG}$$

Where:

Q_FF is in [tonnes], *Q_FO* and *Q_NG* are in [TJ] and represent the quantities of fuel oil and natural gas consumed. *η_FO* is determined once, before fuel switching, and *η_NG* is determined once at the early stage of implementation of the project activity.

EF_FO_CO2 is the IPCC default CO_2 emission factor per unit of fuel oil associated with fuel stationary combustion. It is measured in [tCO_2/TJ]. In the case of this project activity, the only fuel oil used in the baseline scenario is R6 and the emission factor will be considered constant over the crediting period. See table 3 (this section, page 8).

$EF\_FO\_CH_4$ is the IPCC default CH_4 emission factor per unit of fuel oil associated with fuel stationary combustion. It is measured in [tCH_4/TJ]. See table 3 (this section, page 8).

$EF\_FO\_N_2O$ is the IPCC default N_2O emission factor per unit of fuel oil associated with fuel stationary combustion. It is measured in [tN_2O/TJ]. See table 3 (this section, page 8).

After all, baseline emissions become:

Equation 5. Annual baseline emissions based on natural gas consumption and efficiencies

$$BE = Q\_NG \cdot \frac{\eta\_NG}{\eta\_FO} \cdot (77.4 + 0.003 \cdot 21 + 0.0006 \cdot 310) = 77.41 \cdot \frac{\eta\_NG}{\eta\_FO} \cdot Q\_NG \text{ [tCO}_2\text{]}$$

For an approach to baseline risks please see annex 3.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

Anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of this registered small scale CDM project activity. Following is the demonstration that this project activity would not have occurred anyway due to at least one of the following barriers, according to attachment A and B of the simplified modalities and procedures for small scale CDM project activities:

(a) **Investment and financial barrier: a financially more viable alternative to the project activity would have led to higher emissions;** the scenario in the absence of this project activity would be to continue operating using R6 because does not requires investment.

A NPV analysis was conducted between two scenarios of cash flow. It was included a baseline and a project activity scenario with the implementation of CDM procedures (revenue of CER's were left out intentionally). It can be observed that the scenario with better NPV, although both of them are negative, is the baseline scenario. Taking into account the effect of CDM (structure, register, validation, verification, certification and no CER incomes) in the project activity cash flow lowers the NPV.

A NPV analysis (two scenarios) was used in order to assess the economic attractiveness of alternatives and demonstrate economic additionality as follows:

The first scenario considered the continuation of the use of R6 as fuel. The second scenario considered the switch from fossil fuels R6 to NG including CDM into the switch of fossil fuels. The analysis was conducted on a ten years period for both scenarios, as is the common practice for investment choices.

The investment on the scenario with fuel switching would differ in those figures concerning implementation of CDM procedures (monitoring activities and the payments of validation and registration activities) to one not considering CDM. During operation, the difference would be on verification payments, following and monitoring activities cost and issuance of CER's. The capital investment detail is shown in table 4 below.

Table 4. Capital investment to switch fossil fuels (R6 to NG)

Item	Value USD (2006)
Design and engineering	7,569
Organization and construction	29,549
Quality and environmental management systems adaptations	2,000
Non recurrent	4,350
Intangibles subtotal	*43,468*
Infrastructure	18,952
Soil modification	20,500
Combustion equipments	448,633
Installation of measurement equipment	15,475
Equipments for analysis	220
Equipments for control and monitoring	6,769
Tangibles subtotal	*510,549*
Total	***554,017***

Operational costs are driven by fuel prices. During the crediting period, fuel prices were estimated according to current prices and forecasting models of national level government studies. See tables 5 and 6.

NG price will grow until it reaches the tariffs set by the CAMISEA project in 2008. The price component corresponding to distribution and transport is fixed, according to the vendor, but this is regulated as well, and could rise following national dispositions settled between the contract administrator and the final user or distributor. After 2008, projections are conservative and it is assumed that the final price remains constant.

Since the implementation of the CAMISEA project the NG price scheme will be adapted to reflect the market price of hydrocarbons on an annual phase basis. In a period from two to three years (2008) the price of natural gas will be reflecting the full fare established by the exploitation contracts.

Table 5. Price structure of natural gas for industrial use (USD$/sm^3)[9]

Year	Price at well	Price of transport & distribution	Total excluding tax	Total plus fare raise according to Cálidda[10]
2005	0.0612	0.0752	0.1364	
2006	0.0919	0.0752	0.1670	
2007	0.1072	0.0752	0.1824	0.1999
2008	0.1225	0.0752	0.1977	0.2166
2009	0.1225	0.0752	0.1977	0.2166
2010	0.1225	0.0752	0.1977	0.2166
2011	0.1225	0.0752	0.1977	0.2166
2012	0.1225	0.0752	0.1977	0.2166
2013	0.1225	0.0752	0.1977	0.2166
2014	0.1225	0.0752	0.1977	0.2166
2015	0.1225	0.0752	0.1977	0.2166
2016	0.1225	0.0752	0.1977	0.2166
2017	0.1225	0.0752	0.1977	0.2166

R6 price will tend to be low during the next 4 years (see table 6). Following project activity implementation, Petroperú decisions has shown that this assumption is right.[11]

Table 6. Estimated behaviour of R6 price[12]

Year	Price USD / BBL[13]	Percent variation[14]	Price USD / GAL
2005	39.8	113.71%	1.3675
2006	35.2	100.57%	1.2095
2007	35.0	100.00%	1.2026
2008	34.8	99.43%	1.1957
2009	34.6	98.86%	1.1889
2010	34.4	98.29%	1.1820
2011	35.0	100.00%	1.2026

[9] Please refer to GCO – 010 document for more information.

[10] Cálidda is a Peruvian company, in charge of the distribution of the Natural Gas in the department of Lima and the Constitutional Province of Callao.

[11] Petroperú is Petroleos del Perú and is the major oil state company (http://www.petroperu.com.pe/main.asp?T=3361). See PreciosCombustibles20061122.pdf and PreciosCombustibles20070124.pdf

[12] Please refer to "Ministerio de Minas y Energía, Dirección General de Hidrocarburos; Plan Referencial de Hidrocarburos 2005 – 2014; Abril de 2005. Capítulo 5 Precios Petróleo y Derivados" GCO – 011 document for more information.

[13] FOB prices at USA Gulf Cost in fixed dollars of 2004. See GCO – 014 document for more information.

[14] Year of reference: 2007

Year	Price USD / BBL[13]	Percent variation[14]	Price USD / GAL
2012	35.6	101.71%	1.2232
2013	36.2	103.43%	1.2438
2014	36.8	105.14%	1.2644
2015	36.8	105.14%	1.2644
2016	36.8	105.14%	1.2644
2017	36.8	105.14%	1.2644

The main effect of these variables on NPV analysis results in the figures showed in the table 7 below. A discount rate was used (11.38%) and calculated according the WACC methodology[15].

Table 7. NPV analysis results for two scenarios

Scenario	NPV (USD)
R6 (continuing)	-5,716,039
NG CDM (fuel switching and CDM – without CER's revenues)	-6,101,398

From NPV values of table 8 it can be concluded that during the period under analysis, it is more attractive to continue using R6 and that to include project activity as a CDM is an incentive to alleviate financial costs.

(b) **Technological barrier: risk of fuel supply;** The industrial use of NG in the country is rather new, companies in the food processing industry started using natural gas around 2004 and even though technology to burn natural gas is available, only a few industries had made the switching. The national project of CAMISEA natural gas includes the exploitation of CAMISEA field, transport and distribution of natural gas by building and operating two pipelines (one for natural gas and the other one for liquids of natural gas) and the distribution network at Lima and Callao. Recently, it has become a national concern the durability of CAMISEA transmission pipeline of natural gas due to welding failures[16].

(c) **Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;** the majority of industries in the fish meal and fish oil processing sector are using fuel oil in their plants[17]. There is not a foreseeable plan by the Ministerio de Energia y Minas (MEM) in the country to forbid or even reduce the consumption of this type of fuels. Additionally, the prices of natural gas will rise upon the price structure imposed by the exploitation and distribution contracts and those of R6 will be lower for the next couple of years. See Table 6 above.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

[15] Please refer to PricewaterhouseCoopers study for more information.

[16] See http://www.servindi.org/archivo/2007/2223

[17] Please refer to "Plantas Harineras en el litoral" document for more information

Project activity emissions consist of those emissions released with the burning of fossil fuel after the fuel switch. In the context of this project activity, this fossil fuel is natural gas. IPCC default values for emission coefficients are used.

Annual project emissions PE_y in [tCO_2], during each year y of the crediting period are expressed with equation 6 applying the respective assumptions to equation 1 (Section B4, page 7).

Equation 6. Annual project emissions from stationary combustion of natural gas

$$PE = Q\_NG \cdot \left(EF\_NG\_CO_2 + EF\_NG\_CH_4 \cdot GWP\_CH_4 + EF\_NG\_N_2O \cdot GWP\_N_2O\right)$$

Where:

Q_NG is the quantity of natural gas used by the plant in the project scenario for each year of the crediting period. It is measured in [TJ]. *Q_NG* is monitored each year of the crediting period.

EF_NG_CO2 is the IPCC default CO_2 emission factor per unit of natural gas associated with fuel stationary combustion. It is measured in [tCO_2/TJ]. See table 3 (Section B4, page 8).

$EF\_NG\_CH_4$ is the IPCC default CH_4 emission factor per unit of fuel oil associated with fuel stationary combustion. It is measured in [tCH_4/TJ]. See table 3 (Section B4, page 8).

$EF\_NG\_N_2O$ is the IPCC default N_2O emission factor per unit of fuel oil associated with fuel stationary combustion. It is measured in [tN_2O/TJ]. See table 3 (Section B4, page 8).

After all, project emissions become:

Equation 7. Annual project emissions based on natural gas consumption

$$PE = Q\_NG \cdot (56.1 + 0.001 \cdot 21 + 0.0001 \cdot 310) = 56.1 \cdot Q\_NG \text{ [tCO}_2\text{]}$$

The operation of the Callao Sur plant depends on the availability of the natural resource of *anchoveta* for industrial fishing according to the biomass quotas designated by PRODUCE and IMARPE. (Likely[18]).

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

Data / Parameter:	***Q_FF***			
Data unit:	[t]			
Description:	Quantity of fish meal produced at the plant each year using fossil fuel.			
Source of data used:	Measured			
Value applied:	**Data**	**Value**	**Fossil Fuel**	**Year**
	Q_FF_{FO}	8,001.70	R6	2006

[18] Virtually certain > 99% probability of occurrence, Extremely likely > 95%, Very likely > 90%, Likely > 66%, More likely than not > 50%, Unlikely < 33%, Very unlikely < 10%, Extremely unlikely < 5%.

	Q_FF_{NG}	1,624.60	NG	2006
Justification of the choice of data or description of measurement methods and procedures actually applied:	Daily data was analyzed for 2005 and 2006 production[19].			
Any comment:	This value is measured on a daily basis and it is aggregated each year. It is the source to calculate *η_FO* and *η_NG* during the first year of the project activity.			

Data / Parameter:	***Q_FO***
Data unit:	[TJ]
Description:	Quantity of Fuel oil consumed each year during the project activity
Source of data used:	Measured and calculated
Value applied:	70.94 (year 2006)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Through invoices, dispatch orders from warehouse and in situ measurements the amount of fuel oil in gallons is obtained. The value in TJ is calculated based on the amount of gallons consumed and the calorific value of fuel oil (see table 3, page 8, *CP_R6*)
Any comment:	The consumption value measured on the period before the fuel switching is used to calculate *η_FO*. After the start of the project activity this value is calculated with equation 3 from *Q_NG* and *η_NG*.

Data / Parameter:	***η_FO***
Data unit:	[t/TJ]
Description:	Fuel oil efficiency
Source of data used:	Calculated from Q_FF_{FO} and *Q_FO*.
Value applied:	115.33 (year 2006)
Justification of the choice of data or description of measurement methods and procedures actually applied:	It is calculated as the quotient of Q_FF_{FO} and *Q_FO* for the same period
Any comment:	

Data / Parameter:	$EF\_FO\_CO_2$
Data unit:	[tCO_2/TJ]
Description:	Emission factor of carbon dioxide for fuel oil stationary combustion
Source of data used:	Estimated
Value applied:	77,400

[19] See Production Data 2005 2006

Justification of thechoice of data or description of measurement methods and procedures actually applied:	IPCC, 2006 Guidelines, Volume 2, Table 2.3 "Emission factor for stationary combustion in manufacturing industries and construction"
Any comment:	

Data / Parameter:	***EF_FO_CH₄***
Data unit:	[tCH_4/TJ]
Description:	Emission factor of methane for fuel oil stationary combustion
Source of data used:	Estimated
Value applied:	0.003
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC, 2006 Guidelines, Volume 2, Table 2.3 "Emission factor for stationary combustion in manufacturing industries and construction"
Any comment:	

Data / Parameter:	***EF_FO_N₂O***
Data unit:	[tN_2O/TJ]
Description:	Emission factor of nitrous oxide for fuel oil stationary combustion
Source of data used:	Estimated
Value applied:	0.0006
Justification of the choice of data or description of measurement methods and procedures actually applied:	IPCC, 2006 Guidelines, Volume 2, Table 2.3 "Emission factor for stationary combustion in manufacturing industries and construction"
Any comment:	

Data / Parameter:	***Q_NG***
Data unit:	[TJ]
Description:	Quantity of Natural gas consumed each year during the project activity
Source of data used:	Measured and calculated
Value applied:	14.79 (year 2006)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Through invoices and in situ measurements the amount of natural gas consumed in standard cubic meters is obtained. The value in TJ is calculated based on the amount of standard cubic meters consumed and the calorific value of natural gas (see table 3, page 8, *CP_NG*)

Data / Parameter:	***η_NG***

Data unit:	[t/TJ]
Description:	Natural gas efficiency
Source of data used:	Calculated from Q_FF_{NG} and Q_NG.
Value applied:	109.84 (year 2006)
Justification of the choice of data or description of measurement methods and procedures actually applied:	It is calculated as the quotient of Q_FF_{NG} and Q_NG for the same period
Any comment:	

Data / Parameter:	***EF_NG_CO$_2$***
Data unit:	[tCO_2/TJ]
Description:	Emission factor of carbon dioxide for natural gas stationary combustion
Source of data used:	Estimated
Value applied:	56,100
Justification of the choice of data or description of measurement methods and procedures actually applied:	IPCC, 2006 Guidelines, Volume 2, Table 2.3 “Emission factor for stationary combustion in manufacturing industries and construction”
Any comment:	

Data / Parameter:	***EF_NG_CH$_4$***
Data unit:	[tCH_4/TJ]
Description:	Emission factor of methane for natural gas stationary combustion
Source of data used:	Estimated
Value applied:	0.001
Justification of the choice of data or description of measurement methods and procedures actually applied:	IPCC, 2006 Guidelines, Volume 2, Table 2.3 “Emission factor for stationary combustion in manufacturing industries and construction”
Any comment:	

Data / Parameter:	***EF_NG_N$_2$O***
Data unit:	[tN_2O/TJ]
Description:	Emission factor of nitrous oxide for natural gas stationary combustion
Source of data used:	Estimated
Value applied:	0.0001

Justification of the choice of data or description of measurement methods and procedures actually applied:	IPCC, 2006 Guidelines, Volume 2, Table 2.3 “Emission factor for stationary combustion in manufacturing industries and construction”
Any comment:	

Data / Parameter:	***GWP_CH$_4$***
Data unit:	[tCO_2/tCH_4]
Description:	Global warming potential of methane
Source of data used:	Estimated
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied:	IPCC, 1995, “The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report, page 22.”
Any comment:	

Data / Parameter:	***GWP_N$_2$O***
Data unit:	[tCO_2/tN_2O]
Description:	Global warming potential of nitrous oxide
Source of data used:	Estimated
Value applied:	310
Justification of the choice of data or description of measurement methods and procedures actually applied:	IPCC, 1995, “The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report, page 22.”
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

The emission reductions *ER* for each year are calculated using equation 8, where *BE* is obtained from equation 5 (Section B.4) and *PE* from equation 7 (Section B.6). According to version 10 of the AMS-III.B. “Switching fossil fuels”, point 6, there is no leakage calculation required (*LE* = 0).

Equation 8. Annual emission reductions due to project activity

$$ER = BE - PE \quad [tCO_2]$$

The ratios used to estimate *Q_FO* after project implementation depend on how much material is entering the production process. The starts and stops of the plant during the fishing season are the only occurrence of changes in these ratios because of combustion equipment preheating and cleaning activities. When the plant is in operation those ratios are steady. However, the data used to calculate the fuel efficiencies

(η_FO and η_NG) does not exclude those events; therefore, they are represented by the fuel efficiencies. The next table present the monitored data for calculation of fuel efficiencies

Table 8. Data used to calculate fuel efficiencies

Variable	Unit	2005	2006
Days	d	43	46
Q_RF_{FO}	t	36,572.07	34,415.44
Q_RF_{NG}	t	NA	6,899.90
Q_FO	TJ	80.05	69.85
Q_NG	TJ	NA	14.80
Q_FF_{FO}	t	8,169.35	8,001.70
Q_FF_{NG}	t	NA	1,624.60
RF/FF_{FO}		4.48	4.30
RF/FF_{NG}		NA	4.25
η_FO	t/TJ	102.05	114.56
η_NG	t/TJ	NA	109.81

Then,

Equation 9. Quotient of efficiencies for fossil fuels

$$\frac{\eta\_NG}{\eta\_FO} = 0.958538$$

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

The next table presents the estimated consumption of natural gas and corresponding project emissions, based on a constant quantity of raw fish entering the production process each year and a constant quantity of fish meal produced, in this case, around twelve thousand five hundred tones of fish meal per year (12.561,55 t/y).

Table 9. Data used to calculate fuel efficiencies

Year	Q_NG [TJ]	PE [tCO_2]	BE [tCO_2]	ER [tCO_2]
Year 1	112.76	6,325.76	8,366.74	2,040.98
Year 2	112.76	6,325.76	8,366.74	2,040.98
Year 3	112.76	6,325.76	8,366.74	2,040.98
Year 4	112.76	6,325.76	8,366.74	2,040.98
Year 5	112.76	6,325.76	8,366.74	2,040.98
Year 6	112.76	6,325.76	8,366.74	2,040.98
Year 7	112.76	6,325.76	8,366.74	2,040.98
Year 8	112.76	6,325.76	8,366.74	2,040.98
Year 9	112.76	6,325.76	8,366.74	2,040.98
Year 10	112.76	6,325.76	8,366.74	2,040.98
Total	1,127.59	63,257.56	83,667.39	20,410

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

B.7.1 Data and parameters monitored:

As per the requirements of AMS III.B., the 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 necessary data are probably readily available, but may need to be organized into appropriate records and be supported by receipts for fuel purchases.

Based on the above the data/ parameters that would be monitored are as follows:

Data / Parameter:	*Q_NG*
Data unit:	[TJ]
Description:	Quantity of Natural gas consumed each production day during the project activity
Source of data used:	Measured and calculated
Value applied:	14.80 (year aggregate 2006)
Description of measurement methods and procedures to be applied:	The Plant Chief is responsible for recording the reading of the gas flow meter each day at the beginning of shift. With vendor invoices the amount of natural gas consumed in cubic meters (standard and not standard) is obtained (standard conditions are pressure of 101.325 kilopascals and temperature of 298,15 Kelvin degrees). The value in TJ is calculated based on the amount of standard cubic meters consumed and the calorific value of natural gas set by the vendor on the invoice (see table 3, *CP_NG*).
QA/QC procedures to be applied:	The natural gas consumption is monitored in normal plant operations that already have QA/QC procedures in place. Invoices of the local natural gas company are contrasted with on site measurements to assure quality of the data on a daily basis.
Any comment:	100% of the data will be monitored and stored electronically.

Data / Parameter:	*Q_FF*
Data unit:	[t]
Description:	Quantity of Fish Meal produced
Source of data used:	Measured and calculated
Value applied:	

Description of measurement methods and procedures to be applied :	The Plant Chief is responsible for recording the amount of fish meal leaving the production process each production day. It is measured on a bag unit and the weight of the total production per day is obtained by multiplying the total number of bags by an average bag weight estimated using INDECOPI[20] procedures.
QA/QC procedures to be applied:	
Any comment:	100% of the data will be monitored and stored electronically.

Data / Parameter:	*Q_RF*
Data unit:	[t]
Description:	Quantity of Raw Fish entering production process
Source of data used:	Measured and calculated
Value applied:	
Description of measurement methods and procedures to be applied :	The Quality Chief is responsible for recording the amount of raw fish entering the production process each production day.
QA/QC procedures to be applied:	
Any comment:	100% of the data will be monitored and stored electronically.

Data / Parameter:	*RF/FF*
Data unit:	Non dimensional
Description:	Ratio between Raw Fish entering the production process and Fish Meal leaving production process each production day
Source of data used:	Calculated
Value applied:	
Description of measurement methods and procedures to be applied :	It is the quotient between Q_RF and Q_FF
QA/QC procedures to be applied:	
Any comment:	100% of the data will be monitored and stored electronically.

Data / Parameter:	*E/FF*
Data unit:	TJ/t
Description:	Ratio between energy consumed in the production process and quantity of fish meal produced.
Source of data used:	Calculated
Value applied:	

[20] INDECOPI is the Instituto Nacional para la Defensa de la Competencia y de la Protección de la Propiedad Intelectual. http://www.indecopi.gob.pe/index.jsp

Description of measurement methods and procedures to be applied :	It is the quotient between Q_NG in TJ and the Q_FF in t produced each day.
QA/QC procedures to be applied:	
Any comment:	100% of the data will be monitored and stored electronically. This data will be used as a mean of contrast to assess if fossil fuel was used in the production process.

B.7.2 Description of the monitoring plan:

Project operator and manager is TASA. TASA has, due to company policies and engineering best practices, a complete set of maintenance and operations procedures, which include the monitoring of process variables, instruments calibration and quality control. For this reason, no major changes in monitoring and QA/QC procedures will be required for this SSC CDM project activity related variables and parameters.

Step 1
Data on the quantity of fuel combusted (sm^3), raw fish entering production process (t), fish meal leaving production process (t) will be collected on a daily volume basis. These data will be based on fuel receipts and metering on site the amount of raw fish and fish meal.
Responsible: Quality and Production Area

Step 2
Data on the fuel's calorific value will be collected (required to local supplier and obtained through monthly invoices) and fuel data will be converted to a common energy content basis (TJ). This step is pretending to compare on a periodical basis, if necessary, data used at the project activity begin as input parameters to calculate project emissions reductions. The fuel consumption data from Step 1 and the data from Step 2 should be on a common basis before calculating emissions.
Responsible: Production Area

Step 3
Check to ensure that all units are consistent and converted correctly across parameters.
Responsible: Production Area

Step 4
Estimate CO2 emissions by applying Equation 8
Responsible: Production Area

Missing data
When fuel flow rate meter are not in operation because of maintenance or failure or results from fuel measurements are erroneous or lost the procedures for substituting for missing data consist of data substitution based on averages for the period before and/or after the equipment outage, supported by operational data such as fish meal output (Q_FF [t] per day).

This plan uses a combination approach that specifies the use of average substitution values for short duration (less than one day) and infrequent (less than two per month) outages, but then directs the use of more conservative adjustment factors or default substitution values when the duration of outages exceeds the limits stated above.

Equipment calibration and testing
Fuel flow meters for measuring fuel consumption are required to careful calibration and testing procedures to ensure that the data collected is unbiased.

There are two gas meters in the plant besides one owned by Cálidda vendor installed inside the pressure reduction natural gas station and is not accessible to regular workers. Cálidda is fully responsible for this third flow meter and its procedures of calibration and testing.

Item	1. Flow meter	2. Flow meter
Brand	Actaris	Actaris
Model	G400 Fluxi 2100tz	Fluxi TZ G 1600
Year	2006	2005
Serial	1031804001 / B	8963401003
Maximum Working Pressure	19.3 bar	19.3 bar
Minimum flow rate	32 m^3/h	130 m^3/h
Maximum flow rate	650 m^3/h	2.500 m^3/h
Volume	2.70 L	Not Available
Diameter	3"	Not Available

The number two flow meter was acquired to be installed after the pressure reduction natural gas station and was calibrated and tested by the manufacturer on December 1 of 2005[21]. It is planned to calibrate and test this flow meter twice a year prior to the beginning of production periods.

Fuel consumption by on site metering
These data will be in the form of volume (sm^3) and it is in gallons for residual 6 records. It will be gathered using a gas turbine meter. In the case of residual fuel oil, it was gathered through linear level measurement of tanks stocks. To avoid biases, calibration and testing will be performed to ensure data accuracy and adequate precision. Fuel meter data will also be compared with purchase records for quality control purposes. Fuel consumption monitoring data will be collected using applicable national or international technical standards.

Fuel consumption by purchase records
Fuel purchase or delivery records (invoices) provide adequate accuracy and precision, given that CO_2 emission estimate are more likely to be needed on annual, monthly or daily basis than a continuous basis. To increase the certainty and quality of the activity data being used, TASA will determine and compare how fuel suppliers measure their fuel deliveries and whether their procedure and measurement equipment is consistent with the TASA's data quality needs.

Quality management and uncertainty

[21] See Actaris official calibration certificate

Quality management procedures are focused on reducing the uncertainty in data and emission estimates and increasing the transparency of documentation. In addition, the following stationary combustion specific quality management procedures are considered:

- Preparation of a quality management plan. Monitoring and quality management plans are updated to reflect any changes in monitoring equipment or procedures that have the potential to effect the quality of emissions data.
- Compare fuel consumption data to that used to estimate other energy or emissions data. Fuel data should be consistent.
- Ensure that adequate quality management procedures are being employed by other parties to which any fuel analysis or other data collection functions that have been outsourced.
- Compare facility level fuel meter data to fuel purchase or receipt data, taking into account changes in fuel stocks.
- Regularly calibrate and test all measurement equipment.

The quality management plan addresses the following issues:

Time series consistency
Changes in data quality, the characteristics of data, or methods for estimating emissions can lead to problems with time series consistency. These changes include cases when improvements have been intentionally made to the data collected or methods used.

Completeness
Estimates should include emissions from all fuels consumed in all combustion units within the project activity boundary over the crediting period. Where it is not practical to include all emissions or combustion units, then exclusions will be documented and explained. The project activity emissions can be checked by comparing the list of facilities used to estimate greenhouse gas emissions to lists compiled for other reporting purposes, such as environmental reporting, financial reporting, or other corporate wide reports. In cases where data is missing for entire facilities or portions of the company then, as a preliminary measure, proxy data such as equipment counts and assumed utilization levels can be used to estimate emissions.

Uncertainty
Assessing uncertainty in the data associated with greenhouse gas emission estimates where measurement equipment is used, results from calibration tests and original equipment manufacture (OEM) precision information can be used as inputs to assessing data uncertainty. TASA will attempt to identify likely causes of uncertainty in emission estimates and make efforts to reduce those uncertainties.

Documentation and archiving
In order to ensure that estimates are transparent and verifiable, information and data will be documented. All raw data used to estimate emissions will also be archived for a reasonable period of time (The crediting period plus two years more). The following information will be documented for stationary combustion emission estimates:

- Description of facilities or installations and type of combustion activities carried out that result in greenhouse gas emissions

- Description of fuel and material inputs to and outputs from each activity related to greenhouse gas emissions
- Description of the methods applied to estimate emissions for each activity, facility, or combustion unit
- Description and list of metering or monitoring devices for each source or facility
- A description of quality management procedures implemented
- A discussion of any changes that may have affected the accuracy, time series consistency, or completeness of the emission estimates
- Changes to monitoring equipment or procedures that have the potential to have an effect on data collection
- Any subtraction of emissions from the storage of CO_2 in geologic or other formations or transfer of CO_2
- A discussion of the likely causes of uncertainty (statistical and systematic bias) and available data on the precision of measurement instrumentation or calibration errors.
- Description of steps taken to deal with confidential business information

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

Date of completion of the application of the methodology to the project activity: 05/02/2007.
Contact information
Responsible for the application of the baseline and monitoring methodology: Ing. José Castro
Entity: TASA (Project participant)
Phone: +51 (1) 577 3357
E-mail: jcastro@tasa.com.pe

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:

The implementation of project activity started on November 2006

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

The expected operational lifetime of the project activity is twenty (20) years.

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

The project activity will use a fixed crediting period of ten years

C.2.1. Renewable crediting period

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

Intentionally left blank

C.2.1.2. Length of the first crediting period:

Intentionally left blank

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/01/2008 or registration date

C.2.2.2. Length:

Ten (10) years equivalent to one hundred and twenty (120) 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 letter of approval by the host Party is given by the Consejo Nacional del Ambiente (CONAM), CDM National Authority, and it is linked to the compliance of the following criteria of sustainable development:

- The project activity must be technologically viable.
- The project activity must be socially and environmentally responsible.
- The project must comply with all the legal requirements (national, regional, local and by sector) in order to be executed.

To assess the environmental impacts of this project activity, project participant reviewed the environmental management plan of TASA Callao Sur plant and the conditions exposed by the environmental permit emitted by CONAM when the plant was first built. National law allows doing modifications on a processing unit without the need of another environmental permit only if the size of the works will not exceed fifty percent of the original capacity or value of the unit. This project activity falls into this category.

Following are some characteristics which projects and participants must comply to be eligible as CDM projects:

- The project must demonstrate to have real, measurable long term benefits, concerning GHG mitigation.
- Emission reduction must be additional to those that would occur in the absence of the certified project activity.
- Projects must contribute to the sustainable development of host party.
- Project participant must make the necessary investments to implement and operate the project activity.
- Project participant must deliver the CER's according to programmed amounts and dates.
- Project participant must comply with all requirements established by CDM Executive Board.

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:

No significant environmental impacts are expected for this project activity. See section D, numeral 1. However, TASA, through its commitment to the environment, designated INSPECTORATE, to elaborate an air quality study in the surrounding areas in order to establish the range of possible air pollution with particulate matter and other atmospheric emissions produced by the combustion of R6 at Callao Sur plant ("Modelación de la dispersión de las Emisiones Atmosféricas Provenientes de la planta Callao Sur")[22]. The conclusions of this study are as follows:

[22] For more information refer to the document Modelación (INF 03-07-0115/MA).

- The TASA Callao Sur plant will not contribute to significant adverse effects in air quality of surrounding areas.
- Meteorology influencing modeling area indicates that the zone has a high diluting capacity and high atmospheric dispersion, with a neutral atmospheric stability and lightly unstable, which facilitates air pollutants emitted to not make high impact episodes.
- Measured winds at the zone, have moderate intensity and come from south-southeast and south, mainly, and not becoming determinant in locating the maximum impact zone, which corresponds to the same site where the plant is located and is not a residential zone.
- Finally, adding maximum contributions recorded on the model of TASA Callao Sur plant, it is obtained environmental concentrations of SO_2, NO and PM-10 below the current air quality norms in Peru; It is important to note that if the air quality norms were exceeded at maximum impact point, this is not defined as an urban area.

The following image shows TASA Callao Sur plant as an emission source and the points of interest included in the model.

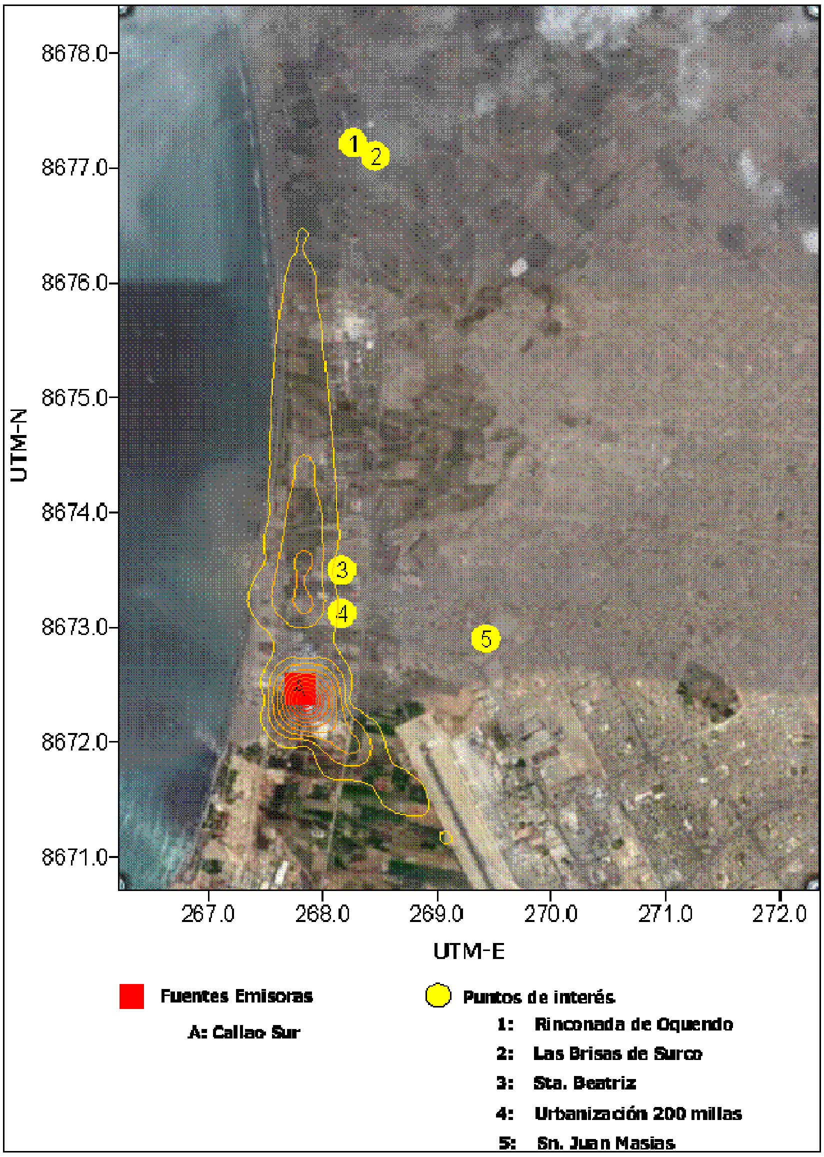

Image 1. Emission source and point of interest

SECTION E. Stakeholders' comments

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

Local stakeholders were invited to comment about this project activity through the local leaders identified by the company (i.e.: Local priest, Callao University and Vida, Insitituto para la Protección del Medio Ambiente). During these meetings the project activity was presented, explained and feedback was received and compiled. All local stakeholder comments were the most important inputs for TASA when designing community, social and environmental projects for the coming periods.

E.2. Summary of the comments received:

Universidad Nacional del Callao (UNAC), San Agustin's local priest (which includes several surrounding neighborhoods) and Vida, Instituto para el Medio Ambiente were three identified stakeholders who made comments, although, they were not about the project activity itself, they were valuable input at the time of choosing social and environmental projects. Comments were focused on education, training and skills development (capacity building) for different groups, from senior students to young people living in nearest communities and women head of the family.

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

Even though, modeling study results conclude that currently there are no impacts on urban areas because of R6 combustion at TASA Callao Sur plant, TASA, interested in minimizing their social and environmental impacts, has identified the following projects:

Sustainability Project CDM - 1	
Area	Preservation and environmental care
Program	Surrounding air quality survey
Target	Neighboring community and Universidad del Callao.
Objective	Promote air quality investigation and measurement practices and air contamination impact on the community through the installation of an external monitoring unit to obtain the particulate material measurement.
Reporting Indicator	Number of monitoring reports Number of programmed thesis
Actions	Study of the current situation about the air local quality Quotations / Approval Establish corporate agreement with Universidad del Callao Define measurement equipment Prequalification of under graduate students Development of the training on measuring techniques Establish support net into the community/enterprise Incorporate under graduate practices into TASA´s programs
Institution	Universidad Nacional del Callao INSPECTORATE

Sustainability Project CDM - 2		
Area	**Technical training**	
	Electrical Industrial technicians	3 years
	Mechanical technicians	3 years
	Electronics and automathization technicians	3 years
Program	**Teenager professional training**	
Focus Group	Teenagers form Callao Sur´s community (last year of high School)	
Target	Improve the quality of life of teenagers from Callao Sur by providing technical training and job opportunities. It will also be usefull as a parameter and example to other teenagers in the community.	
Reporting Indicator	Number of teenage candidates Number of teenage candidates that finish the course Slots taken (TASA and other companies)	
Actions	Define technical careers aligned with the business Recognitions of teenagers in surrounding areas Pre-qualify teenagers for technical courses Establish a corporative agreement with SENATI Vacancies available at SENATI Establish community support framework Include stage programs in TASA Internal announcements to cover the job opportunities with TASA personnel's children Grant best positions according to performance Labor exchange	
Institution	SENATI	

Sustainability Project CDM - 3	
Area	**Managerial Development (Training of productive workshops)**
Program	**Community Center for Collection of milled plastic and glass in Callao Sur**
Target	Nearby Community to the Callao Sur plant who requires installing a new business
Objective	Help improve the socioeconomic situation of the Bolognesi community and support their initiatives to generate income.
Reporting Indicator	Number of Project Participants. Frequency of usage of deposits for material (glass, plastic, paper, others). Average per capita deposit of recyclable materials sales. Number of organizations and / or persons buyers of the material.
Actions	Coordinate with the Municipality to locate a suitable area and start procedures for permissions and licenses. Find support across an NGO. Coordinate with the leaders / organizers for the project execution, generating a population commitment and the self management of the project. Establish agreements with persons or institutions for the purchase of the recycled materials. To form an association between the project participants which will facilitate credits for the acquisition of machinery in the future. Compilation Campaign of Solid Waste to teach the population across about the importance of the segregation of waste: Contest between families.
Institution	De Vida NGO (Arturo Alfaro)

Sustainability Project CDM - 4	
Area	**Social - Educational**
Program	**Practical awareness workshops about environmental care**
Target	All nearby community
Objective	Educate the Callao Sur's community on the care and preservation of the environment, use of industrialized Natural Gas, Climate Change impact and Social, Environmental and Economic benefits.
Reporting Indicator	Number of participants in the workshops Solid waste management and disposal program 20 Environmental Workshops with different topics
Actions	Creation of Training teams Educational videos production Elaboration of Educational Records Advertising materials such as spots, posters and/or flyers. Drama workshops about environmental impacts Organize activities with our staff about environmental care Organize practical workshops with the community Form supporting groups to organize recycling activities
Institution	Local

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Tecnológica de Alimentos S.A. TASA
Street / P.O. Box:	Av. Prolongación Centenario 1954 Zona industrial Los Ferroles
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State/Region:	
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FAX:	
E-Mail:	
URL:	http://www.tasa.com.pe
Represented by:	
Title:	TASA Callao Sur Plant Superintendent
Salutation:	Engineer
Last Name:	José
Middle Name:	
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Mobile:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There are no Parties included in Annex I to the Convention or any sources of public funding for the project activity thus, this project activity will not result in a diversion of official development assistance and it is separate from and is not counted towards the financial obligations of any Parties.

Annex 3

BASELINE INFORMATION

Risk analysis

The major risks and their probability of occurrence concerning baseline, are:

- Change of regulatory framework in a way that to switch to NG became mandatory for fish processing industries. (Unlikely[18]).
- A R6 price rise and a fall of NG price. (Unlikely[18]).
- Activity project become a common practice (Business As Usual - BAU). (Likely[18]).

Annex 4

MONITORING INFORMATION

TASA designed and started the implementation of a plan for monitoring NG and R6 consumption according to their management system and best practices available. Following is the internally approved document in its first version.

TASA	CÓDIGO: Favor llenar	VERSIÓN: 1	PÁGINA: 1 de 3
TÍTULO: **PROCEDIMIENTO PARA EL REGISTRO DE INFORMACIÓN DEL CONSUMO DE GAS NATURAL Y PETRÓLEO RESIDUAL (R6)**			
RUBRO	CARGO	FIRMA	FECHA
ELABORADO POR:	SANTIAGO RODRIGUEZ		19-03-2007
REVISADO POR:	JOSE CASTRO		
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1. Objetivo

Proveer a la planta Callao Sur un manual de procedimientos para registrar eficazmente los consumos de Gas Natural y Petróleo (R6).

2. Alcance

El presente documento será aplicado y/o consultado por el Superintendente de la planta, Jefe de Planta, Operarios, Comité de seguridad industrial y brigadistas de planta.

3. Responsabilidades

La administración del presente documento es responsabilidad del área de producción de la planta en coordinación con el Superintendente, este último verificará la información semanalmente en la hoja de registro. Ver Anexo 1.

4. Descripción del proceso

4.1 Secuencia de operación con gas

Primero: Los operadores de calderos y secadores junto con el Jefe de turno inspeccionan las instalaciones de gas, incluye las válvulas principales, tren de gas, accesorios de seguridad, entre otros.

Segundo: El operador debe recibir orden del jefe de turno para iniciar la operación con gas natural. El jefe de turno verificará en el contómetro de la planta y se anotará la primera lectura en la línea de gas.

Tercero: Al inicio del proceso el operador supervisado por el Jefe de turno, abre las válvulas de corte o de abastecimiento de gas tanto para secadores como para calderos. Luego el operador procederá a purgar las líneas de gas de los equipos correspondientes y se verificaran las presiones de trabajo.

Cuarto: El operador de calderos así como de secadores iniciarán el proceso con orden del jefe de turno, respetando las disposiciones internas de seguridad industrial. En la secuencia de inicio de consumo de gas, el operador abre la válvula de corte del tren del gas de cada caldera y/o secador a estar operativo. El operador verifica las presiones de trabajo del tren de gas y ante alguna anomalía deberá dar parte al Jefe de turno para las acciones respectivas.

Quinto: Finalizado el proceso de consumo de gas, el operador cierra la válvula de corte de gas y purga esta línea.

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Sexto: Los operadores dan aviso al jefe de turno por la parada de equipos para inspección del consumo de gas en el contómetro externo de la estación distribuidora de gas y el área de producción lo registrará en la hoja de control interno de planta.

4.2 Secuencia de operación con Petróleo (R6)

Primero: Los operadores de calderos y secadores junto con el Jefe de turno inspeccionan las instalaciones de petróleo, incluye las válvulas principales, accesorios de seguridad, entre otros.

Segundo: El operador debe recibir orden del jefe de turno, el inicio de operaciones con petróleo. El jefe de turno junto con el asistente de almacén verificará la primera lectura manual del stock de petróleo residual para efectos de control interno.

Tercero: El operador de calderos y el operador de secadores iniciaran con conocimiento del jefe de turno, el precalentamiento del petróleo (eléctrico/vapor).

Cuarto: Alcanzado las condiciones establecidas de proceso el operador procederá al arranque de los equipos, respetando las disposiciones internas de seguridad industrial. Verificando las presiones de trabajo y ante alguna anomalía deberá dar parte al Jefe de turno para las acciones respectivas.

Quinto: Finalizado el proceso el operador procede a cerrar las válvulas de alimentación de petróleo, a cada equipo y dará aviso al jefe de turno de la parada de equipos.

Sexto: El jefe de turno junto con el asistente de almacén verificará manualmente el stock final de petróleo y el área de almacén lo registrará en su hoja de control interno de planta.

5. Registros

El registro del consumo de gas se observa en el cuadro de control de insumos del anexo Nº 1. Siendo estos registros archivados por espacio mínimo de 2 años calendarios para efecto de futuras auditorias tanto internas como externas.

6. Calibración de instrumentos.

La calibración del contómetro o medidor de flujo de gas es realizado por un laboratorio acreditado, mínimo una vez por año, siendo el responsable de este procedimiento el área de mantenimiento.

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RUBRO	CARGO	FIRMA	FECHA
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ANEXO N° 1

DETALLE CONSUMO GN PRODUCCION XX-XX-2007 AL XX-XX-2007

FECHA	HORA	RESPONSABLE	CONSUMO GN							CONSUMO BUNKER 6		TOTAL GLN B6/TN HAR	HARINA PRODUCIDA(TN)	OBSERVACIONES
			Lecturas contómetro M3		M3 CONT	M3 STD	MPIE3	M3 STD/TN HAR	A GLN B6/TN HAR	GLN	GLN/TN HAR			
			Inicio	Corte										
TOTALES					0	0	0.000							