



**CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01**

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NOTE:

- (i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.
- (ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).



SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

“Programme of activities to switch from residual fuel oil to LPG in manufacturing industries in Peru”
(the “Programme”).

Version 03.

Date: 08 November 2012

A.2. Description of the small-scale Programme of Activities (PoA):

1. General framework for the Programme of Activities

The *Programme of activities to switch from residual fuel oil to LPG in manufacturing industries in Peru* consists of offering incentives to industrial facilities in Peru to replace residual fuel oil consumption with a low-carbon fuel: liquefied petroleum gas (LPG). Repsol YPF Comercial del Perú S.A. (RYCOPESA), a wholly owned subsidiary of Repsol YPF, is the coordinating entity of the Programme and will provide the incentives for undertaking the fuel switch. This activity is being undertaken in the context of a company-wide effort to reduce GHG emissions using the leverage provided by the CDM.

In 2002, Repsol YPF approved and published its commitment to mitigate Climate Change, stating its readiness to contribute responsibly to this great challenge and to mobilize all operations world-wide in this regard. As a result of this commitment, Repsol YPF developed a Carbon Strategy which includes a Group-wide GHG reduction target and mechanisms to identify and promote emissions reductions projects. The Strategy places the CDM at the forefront and seeks to provide the incentives needed for the business units to undertake GHG reduction projects that will permit the Company to achieve energy efficiency savings, contribute to sustainable development and meet its GHG reduction objective.

It was within the context of the Company’s efforts to identify GHG reduction opportunities and promote the CDM that the fuel switch opportunity in potential clients of RYCOPESA arose. The CDM Programme of Activities will allow RYCOPESA to offer much needed incentives to industrial consumers of residual fuel to switch over to LPG. This in turn is consistent with both Repsol YPF’s strategy of promoting sustainable development by using low-carbon fuels and the Peruvian Government’s plans to promote an efficient use of energy (Law No. 27345 of 2000 on the Promotion of Energy Efficiency and the 2007 Regulations for the Promotion of Energy Efficiency Act).

RYCOPESA produces the LPG locally, thereby providing a greater reduction in the environment impact than would otherwise occur and contributing to the energy security of Peru.

2. Objective of the Programme of Activities

The purpose of the Programme is to provide the necessary incentives to industrial consumers of residual fuel oil to undertake a fuel switch to a low-carbon fuel: liquefied petroleum gas (LPG). Residual fuel oil is the fuel of choice amongst industrial plants due to its low cost relative to other fuels. The potential revenues from the CDM, as well as the qualitative benefits of participation in a CDM Programme of Activities, will allow RYCOPESA to finance the costs of the fuel switch and offer LPG at a sufficient discount in order to make it more competitive with residual fuel oil.



The Programme activities will be undertaken in industries within the geographical boundary of Peru. These industries include either new facilities or retrofit/replacement of existing installations. Residual fuel oil, currently combusted in equipment² for energy output³ generation purposes, will be replaced by LPG. The potential CPAs are mainly small to medium sized industrial consumers currently using residual fuel. These can be found in many different sectors of the economy, all of which are within the scope of this PoA.

Some examples of such sectors are as follows:

- Food (making bread, fish flour, pastries, drying pasta, cooking fish, pasteurizing milk and dairy products, etc.).
- Cooking farm produce
- Producing aluminium profiles
- Smelting and metal processing
- Welding and melting

Within a particular CPA, the fuel switch will be carried out in a single element process or may include several element processes within the facility. In those element processes that will be undertaken in the PoA, a single energy source (residual fuel oil in the baseline and LPG after the implementation of the Programme activity) is consumed in a single equipment (boiler, furnace, turbine, etc) in order to generate a single output (such as steam, heat or electricity). The output will be variable depending on the nature of the industry where the CPA is implemented, but mainly it will be steam, heat or electricity. These will be for on-site captive use and/or export to other facilities included in the project boundary.

In order for an enterprise in Peru to be able to use LPG as an energy source instead of the residual fuels used traditionally, it must make investments to adapt the fuel storage system, feeding system and burners. As mentioned before, this industry would not make the needed investment to change the fuel without the support of an external incentive, since there is no economic motivation being the cost of residual fuel oil significantly lower than of that of LPG. Moreover, consumption of gas in process heating is not common in the industrial sector, thereby representing an important barrier to the transition to a new storage system and burning process with more sophisticated controls and accuracy.

For this reason, RYCOPESA, under the Programme of Activities, will facilitate and install the equipment required to change fuels and assume the expenses of adapting the client's systems; that is, replacing the storage, feeder systems and the burners. However, the financing and installation of the equipment on its own is not sufficient to incentivize potential clients to switch due to the lower price of residual fuel. As such, RYCOPESA will offer the LPG at a sufficient discount to incentivise the switch. In order to do so it must obtain additional income from the sale of CERs for the investment and sale of LPG to be profitable.

The expected outcome of implementing the Programme of Activities is a reduction in the emissions of greenhouse gases by the industry in Peru, when compared to the emissions that would have occurred without the Programme of Activities. The Programme will also lead to several additional environmental, technological and economic benefits.

² In most cases, this equipment will involve boilers, furnaces or turbines.

³ Such as steam, heat or electricity



a. Local environmental benefits

The Programme of Activities will lead to local environmental benefits in sectors not covered by the current laws and regulations, as explained above.

The proposed Programme of Activities, by replacing residual fuel oil with LPG, reduces not only the GHG emissions, but also the emission of other gases with major impacts on air quality, such as CO, NO, NO_x or SO₂ and particulate.

The most significant air pollutants generated in the combustion of heavy fuels such as residual fuel oil include particulate matter (PM₁₀ and PM_{2.5}), lead, carbon monoxide, nitrogen oxide, volatile organic compounds and hydrocarbons. All of these have negative impacts on human health.

The reaction in the atmosphere of the nitrogen oxides and the hydrocarbons with sunlight also causes the formation of photochemical oxidants, primarily ozone (O₃). This gas causes smog, material deterioration and respiratory diseases.

In this respect, along with carbon monoxide, toxic particulate and heavy metals, the gaseous fuel footprint is smaller than that of liquid fuels, such as residual fuels⁴. The following provides a graph with the magnitude scales for pollutant emissions regarding the different fuels. Note that, in the case of switching over from a fossil fuel to LPG, NO₂ is reduced by approximately 12%, the level of hydrocarbons drops by approximately 25%, and the particulate level is reduced almost entirely.

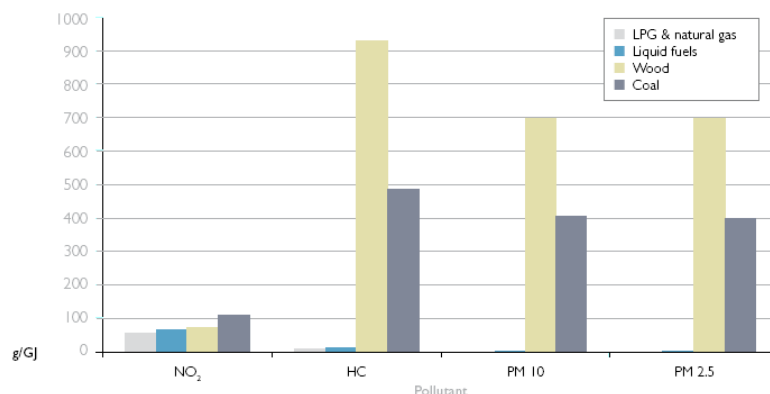


Figure 1. Emissions of priority pollutants caused by stationary combustion, by type of fuel.

Source: LPG and local air quality – A scientific review, Atlantic Consulting.

Switching fuels will contribute in a positive manner to improving air quality locally, preventing the emission of particulate from the combustion of heavy fuels.

b. Technological benefits

The Programme of Activities includes the installation of new LPG burners, storage tanks and feeding systems at the industrial plants. This represents a technological benefit for the small industries because the use of LPG as a fuel provides for better flame control.

⁴ LPG and local air quality – A scientific review, Atlantic Consulting.



Moreover, the Programme involves the transfer of equipment into Peru. This transfer occurs both “South to South”, and “North to South”. The specific origin of the equipment could be variable depending on the Programme activity and will be specified in each CPA-DD. Some examples of the equipment to be installed and their origin are:

- LPG Burners made in Italy (Baltur)
- Vaporizers made in the USA (Ransome) and Mexico (Algas)
- Storage tanks from 1.89 to 113.56 cubic meters (from 500 to 30,000 gallons)⁵ made in Mexico (Trinity Industries).
- Valves made in the USA or Italy.
- Pressure regulators from Mexico or the USA.

Finally, the Programme of Activities includes the installation of specific equipment to improve the control and data collection of several key parameters needed to keep optimal conditions in each production process.

c. Economic benefits

This Programme of Activities will also offer economic benefits to the clients that participate in it. These benefits include the use of a cleaner, higher-quality fuel at a competitive price compared to the going market price.

Peruvian small industries that currently use liquid fuels are often victims of the theft of those fuels. Switching to gaseous fuels will make it more difficult to steal since it is not possible to store them in containers that are not designed for that purpose.

The utilization of local equipment will be another factor to be taken into consideration, since it will reinforce the manufacturing sector related to the equipment acquired. In this instance, RYCOPESA will install Peruvian storage tanks from 0.0189 to 0.379 cubic meters (from 5 to 100 gallons). Moreover, all the piping components will be made in Peru as well.

In the long term, the Programme also promotes the conversion of the country towards an environmentally more sustainable industrial sector, which contributes to encouraging sustainable development globally.

3. Confirmation that the Programme of Activities proposed is a voluntary action by the coordinating entity

The coordinating entity for the Programme of Activities will make the investment required to adapt the facilities of the Peruvian small industries to be included in the Programme voluntarily. There are no regulations in Peru that obligate RYCOPESA to make these investments.

The Peruvian industries that choose to participate in the Programme of Activities will also do so voluntarily.

⁵ A conversion factor of 1 gallon = 0.003785411784 cubic meter has been used. Source: "[Appendix G - Weights and Measures](#)". *The World Factbook*. Washington: [Central Intelligence Agency](#), January 17, 2007. <https://www.cia.gov/library/publications/the-world-factbook/appendix/appendix-g.html>. Retrieved February 4, 2007.



A.3. Coordinating/managing entity and participants of SSC-POA:

Name of Party involved (*) (host) indicates a host Party)	Private and/or Public Entities participating (*) in the Programme (as appropriate)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Peru (Host)	Repsol YPF Comercial del Perú S.A. (RYCOPESA)	No
(*) According to the CDM modalities and procedures, when making the CDM-PDD public during the validation stage, an involved Party may or may not have given its approval. When requesting registration, the Party/Parties involved must give their approval.		

Table 1. - Table of parties involved in the PoA.

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

Peru.

A.4.1.1. Host Party(ies):

Peru.

A.4.1.2. Physical/ Geographical boundary:

The Programme of Activities will be implemented within the geographical limits of the host country, Peru.

Therefore, the requirement that all national and/or sector policies and regulations applicable to the activities in the Programme be the same is fulfilled.



Figure 2. Map of Peru. Source: media.maps.com.



A.4.2. Description of a typical small-scale CDM programme activity (CPA):

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

Based on Appendix B of the document *Simplified modalities and procedures for small scale CDM projects*, version 7 of November 2005, the activities in the Programme are Type III “Other project activities that both reduce anthropogenic emissions by sources”, Category III.B “Switching fossil fuels”. Pursuant to annex A of the Kyoto Protocol, the Programme belongs to sectoral scope 1 “Energy industries”.

The Programme of Activities consists of switching residual fuel oil, traditionally consumed by industrial clients in Peru, for a light fuel such as LPG.

Liquefied Petroleum Gases (LPG) are aliphatic hydrocarbons, primarily butane, propane, isobutane, propylene and butylene. The butane and propane are produced during the extraction of crude oil and natural gas, although it is also obtained during the oil refining processes, especially as a sub-product of fluid catalytic cracking (FCC).

Technically, the replacement of fuels with LPG in industries requires replacing the current burners designed for liquid fuels with others that can work with LPG. It is also necessary to replace the fuel storage and feeding system.

It is not possible to use the same burners used previously for residual fuel oil with LPG since the boilers are designed for short-flame fuels and if LPG is burned with the same burner, the longer LPG flame could damage the equipment. Therefore, costly LPG burners with flame modulation must be installed in order to undertake the fuel switch.

This modification will not increase the life of the equipment, nor significantly change the production process, since the only modification will be to change the burners. No other components of the equipment are to be updated. Therefore, the industrial process is expected to remain equivalent after the fuel switch, that is, the operational conditions, the type of raw material processed, the type or quality of the products manufactured, etc will remain equivalent throughout the crediting period and will be comparable to the operational conditions, the type of raw material processed, the quality of the products manufactured, etc in the baseline.

According to methodology AMS-III.B, version 16, the project is the physical, geographical site where the switching of energy source takes place. It includes all installations, processes or equipment affected by the switching. In cases where the energy produced by the project activity is delivered to another facility, the boundary also extends to the industrial, commercial facilities consuming energy generated by the system.

The operation flow for the equipment to be replaced is shown below:

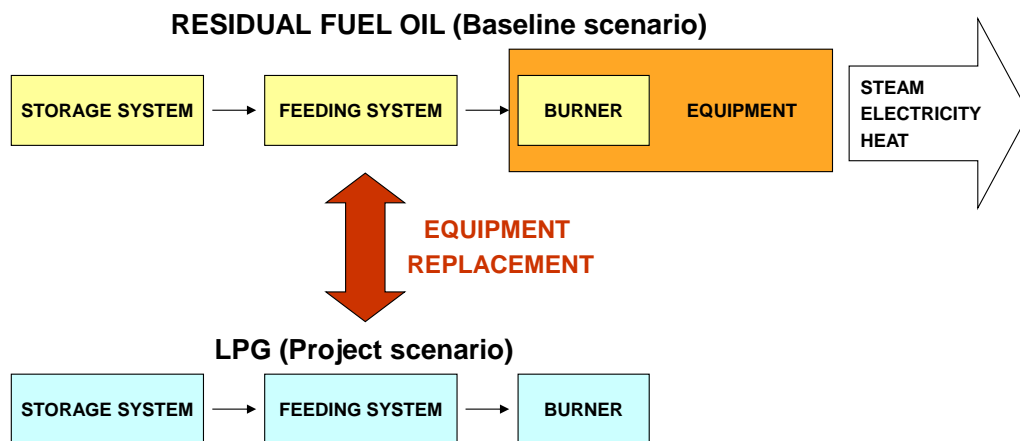


Figure 3. – Operation flow for the replaced equipment.

The most significant technical specifications of the burner to be supplied by RYCOPESA are:

- Operation in two stages of power (high/low flame).
- Suitable for working with all types of combustions chambers.
- Air-gas mixed in the deflector.
- Possibility of obtaining optimum combustion values by regulating the oxidizing air and the deflector.
- Easy maintenance because the mixing group can be removed without disassembling the burner in the boiler.

The storage tanks to be supplied by RYCOPESA will have a capacity of between 1.89 to 113.56 cubic meters (500 and 30,000 gallons).

The figures below show the different types of tanks that will be installed.



Figure 4. Ground level tanks



Figure 5. Semi-buried tanks



Figure 6. Underground tanks

Note: when necessary, the storage system will include vaporizers.

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA

The proposed Programme of Activities covers industries in Peru, mainly small and medium-sized, that could take advantage of a fuel switch from residual fuel oil to LPG by adapting their facilities voluntarily. The Programme activities that could be chosen for inclusion in the PoA must meet the requirements specified below, developed following the requirements indicated “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” (version 02.1):



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Eligibility Criteria			
N°	Category (“Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” - version 02.1)	Description	Evidence to be checked at CPA inclusion
1	(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;	Each SSC-CPA must be located within the geographical boundary of Peru.	Location will be specified in the CPA-DD. Evidence: Statement of CME that the location is within the geographical boundary of Peru.
2	(b) Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);	Each SSC-CPA must be identified uniquely and defined explicitly by providing geographical information and the exact date on which the credit period begins and ends;	An unique numbering or identification system for the implemented CPAs will be applied. The specific number or identification code will be included in the CPA-DD. Geographical information and the exact date on which the credit period begins and ends will be associated with this number or identification code. Evidence: A Programme logo with the specific number or identification code will be stuck in the equipment installed.
3		Each SSC-CPA must be neither registered as an individual CDM project activity nor included as a CPA in another registered PoA involving fuel switching;	A statement will be included in the CPA-DD in order to specify that the CPA is not part of another single CDM project activity or CPA under another PoA. Evidence: Check on UNFCCC website with date of access.
4	(c) The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;	The measure to be undertaken in this PoA (fossil fuel switch from residual fuel oil to LPG in industries), which will mainly require the replacement of the current burners designed for liquid fuels with others that can work with LPG, the fuel storage tank and feeding system, will not affect the level/type of service and the performance specifications of the single equipment (boiler, furnace, turbine, etc) included in the element process. The characteristics of the single output (such as steam, heat or electricity) produced in this single equipment will remain equivalent throughout the crediting period and will be comparable to its characteristics in the baseline.	Each SSC-CPA must be undertaken in industries that use, before the fossil fuel switch, residual fuel oil as a single energy source of the element process included in the project boundary. This fuel must be consumed in a single equipment (boiler, furnace, turbine, etc) in order to generate a single output (such as steam, heat or electricity). The fuel switch will not change the level/type of service and the performance specifications of the single equipment considered in the element process, since the only modification will be the replacement of burners. No other components of this equipment will be updated. Therefore, the characteristics of the single output (such as steam, heat or electricity) produced are expected to remain equivalent after the fuel switch. Evidence: LPG supply contract in which the equipment to be installed for the fossil fuel switch implementation is described.
5	(d) Conditions to check the start date of the CPA through documentary evidence;	Companies in which the Project activity will be implemented must have signed a contract for the supply of the LPG to become part of the PoA;	The date of signature of the supply contract will represent the starting date of the small-scale CPA since it is the binding decision on behalf of both parties to execute the fuel switch project. Evidence: LPG supply contract.
6		CPAs will implement AMS-III.B Switching fossil fuel (version 16);	The CPA-DD will be completed using AMS-III.B Switching fossil fuel (version 16) and main sections included in this document such as B.5.2. Ex-ante calculation of emission reductions or



			B.6.1. Description of the monitoring plan will be developed according the requirements included in this methodology. Evidence: CPA-DD
7	(e) Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;	The fuel switch carried out in the CPA must be implemented in a single element process or may include several element processes within the facility;	A detailed description of the element process will be included in the CPA-DD. In those element processes that will be part of the PoA, a single energy source (residual fuel oil in the baseline and LPG after the implementation of the Programme activity) is consumed in a single equipment (boiler, furnace, turbine, etc) in order to generate a single output (such as steam, heat or electricity). Evidence: Historical information, if available, on the use of residual fuel oil and the consumption of LPG monitored after CPA implementation; a description of the equipment in which the fossil fuel is consumed; and a description of the energy output generated and its use in the productive process.
8		Multiple fossil fuel switching in a single element process cannot be carried out in a CPA;	CPAs will carry out a single fuel switching from residual fuel oil (R6) to LPG. Evidence: Historical information, if available, on the use of residual fuel oil. LPG supply contract and the consumption of LPG monitored after CPA implementation.
9		CPAs will involve new facilities or retrofit/replacement of existing installations;	The CPAs to be included in this PoA will be implemented in new facilities or existing installations. A description of the type of facilities in which the fuel switch will be carried out will be included in the CPA-DD. Additionally, the LPG supply contract will always include a description of the equipment to be installed. Evidence: CPA-DD and LPG supply contract.
10		Each SSC-CPA primarily aims at reducing emissions through fuel switching. If the fuel switching is part of an initiative focused primarily on energy efficiency, the CPA cannot be included in the PoA;	The CPAs include the installation of new LPG burners, storage tanks and feeding systems at the CPA's industrial plant. This represents a technological benefit because the use of LPG as a fuel provides for better flame control but it does not significantly improve the energy efficiency of the element process. If the fuel switching was part of an initiative focused primarily on energy efficiency, a more ambitious initiative would be developed and additional equipment should be installed. Evidence: LPG supply contract in which the equipment to be installed for the fossil fuel switch implementation is described.
11		CPAs for activities that propose switch from fossil fuel to renewable biomass, biofuel or renewable energy cannot be included in the PoA;	CPAs will carry out a single fuel switching from residual fuel oil (R6) to LPG. Evidence: LPG supply contract and the consumption of LPG monitored after CPA implementation.
12		CPAs for activities involving the use of waste gas cannot be included in the PoA;	CPAs will carry out a single fuel switching from residual fuel oil (R6) to LPG. Evidence: LPG supply contract and the consumption of LPG monitored after CPA implementation.
13		CPAs involving emission reductions on account of shift from use of a grid electricity or electricity	CPAs will carry out a single fuel switching from residual fuel oil (R6) to LPG.



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	exported to a grid cannot be included in the PoA;	Evidence: LPG supply contract and the consumption of LPG monitored after CPA implementation.
14	It must be possible to directly measure and record the energy output and consumption within the project boundary. In case of CPAs in which the estimated annual emission reductions are equal to or less than 600 tCO ₂ e per year per element process it must be possible to directly measure and record at least the energy consumption in the element process;	A procedure with a description of the steps to be followed for the review of inclusion of CPAs has been defined and implemented as a part of the PoA's management system. As indicated in this procedure, an assessment of the monitoring plan requirements will be done before including the CPAs in the PoA. It will be assessed if the measurement equipment necessary to comply with the monitoring plan is operational and if it would be necessary to install additional equipment. Evidence: Internal assessment for the inclusion of CPAs.
15	The energy output (heat, steam or electricity) produced under the CPA will be for on-site captive use and/or export to other facilities included in the project boundary;	The energy output (heat, steam or electricity) produced under the CPA to be included in the PoA will mainly be for on-site captive use. In those cases in which the energy output is exported to other facilities, these will be included in the project boundary and a contract between the supplier and consumer(s) of the energy will be entered into force specifying that only the facility generating the energy is the owner of the CERs generated. Evidence: A description of the type of facilities in which the fuel switch will be carried out will be included in the CPA-DD and CER ownership contract when energy output is exported.
16	In those CPAs in which the energy produced by the project activity is delivered to another facility, or facilities, within the project boundary, a contract between the supplier (CPA) and consumer(s) of the energy must be entered into force specifying that only the facility generating the energy (CPA) will claim emission reductions from the energy displacement;	In those cases in which the energy produced by the CPA is delivered to another facility a contract between the supplier and consumer(s) of the energy will be entered into force specifying that only the facility generating the energy is the owner of the CERs generated. Evidence: CER ownership contract.
17	CPAs involving an integrated change of the element process where the fuel switch is implemented cannot be included in the PoA;	The operational conditions, the type of raw material processed, the type or quality of the products manufactured, etc of the CPA will remain equivalent throughout the crediting period and will be comparable to the operational conditions, the type of raw material processed, the quality of the products manufactured, etc in the baseline. The CPAs include the installation of new LPG burners, storage tanks and feeding systems at the CPA's industrial plant. That will not affect the production process and it is expected and therefore the characteristics of the CPA's process will remain equivalent. Evidence: LPG supply contract in which the equipment to be installed for the fossil fuel switch implementation is described. In those cases in which CPAs have a quality management system or their products are produced following specific standards, these can be used as an example of evidence to assess this eligibility criterion.



18		<p>CPAs developed in existing facilities must have historical information on the use of fossil fuels and the plant energy output from at least three years prior to project implementation. For facilities that are less than three years old, all historical data shall be available (a minimum of one year data would be required). For existing facilities having no historical data/information on baseline parameters such as efficiency, energy consumption and output, the baseline parameters can be determined using a performance test/measurement campaign prior to the implementation of the project activity.</p> <p>In CPAs with an estimated annual emission reductions equal to or less than 600 tCO₂e per year per element process a simplified approach for calculating emission reductions based on the amount of fossil fuel consumed in the project activity, may be used and no historical information on the use of fossil fuels and the plant energy output is required.</p>	<p>Evidence: In case of CPAs with an estimated annual emission reductions more than 600 tCO₂e per year per element process, the historical information on the use of residual fuel oil and the plant energy output (for existing facilities having no historical data/information on baseline parameters such as efficiency, energy consumption and output, determined using a performance test/measurement campaign prior to the implementation of the project activity).</p> <p>In case of CPAs with an estimated annual emission reductions equal to or less than 600 tCO₂e per year per element process, the expected consumption of LPG.</p>
19	(f) The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality;	<p>Additionality shall be demonstrated by means of one of the two following approaches:</p> <p>Approach 1) Micro-scale CPAs are additional if: a) each of the independent subsystem/measure in the CPA achieves an estimated annual emission reduction equal to or less than 600 tCO₂e per year and b) end user are households/communities/ SMEs (with the exception of CPAs implemented in special underdeveloped zone of Peru as identified by the government in accordance with the paragraph 2 (a) from the “Guidelines for demonstrating additionality of microscale project activities, version 04.0”, which will be automatically additional).</p> <p>Approach 2) Small-scale CPAs are additional if, following the “Guidelines on the demonstration of additionality of small-scale project activities (version 09.0)”, the investment analysis shows that the Programme activity is not financially attractive (the IRR obtained from the Programme activity does not exceed the benchmark IRR), and the sensitivity analysis indicates that it is unlikely to be financially attractive compared to the benchmark under any reasonable variations in the assumptions.</p>	<p>An assessment on whether the CPAs can be considered as Micro-scale CPAs will be done prior to its inclusion in the PoA. In case of Small-scale CPAs, additionality assessment will be specified in the CPA-DD.</p> <p>Evidence: Estimated emission reductions and enterprise indicators determined by the International Finance Corporation (IFC) to define SMEs (number of employees, total assets and total annual sales). Investment analysis and data sources used (invoices, supply contract, etc).</p>
-	(g) The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;	This category is not applicable to this PoA and no eligibility criteria is required	
-	(h) Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;	This category is not applicable to this PoA and no eligibility criteria is required	



20	(i) Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation);	<p>The target group in this PoA is:</p> <p>1) Companies in Peru, mainly small and medium-sized part of different industrial sectors (for example: Food processing, Cooking farm produce, Smelting and metal processing, etc).</p> <p>2) Industries that include either new facilities or retrofit/replacement of existing installations.</p> <p>3) Small-scale or Micro-scale projects. In the first case, the emissions reductions achieved must be equal to or less than 60.000 tCO₂e per year. In case of Micro-scale projects the emissions reductions achieved must be equal to or less than 600 tCO₂e per year and the industries in which the fuel switch is implemented are households/communities/SMEs⁶ (two out of three must be met: ≤300 employees, ≤\$15,000,000 total assets, ≤\$15,000,000 total annual sales).</p>	<p>Evidence: Geographical location of the CPA, economic sector in which is included and other enterprise indicators to evaluate if the company can be considered as a Micro-scale or Small-scale CDM project (Emissions reductions, Number of employees, Total assets and Total annual sales).</p>
-	(j) Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys;	This category is not applicable to this PoA and no eligibility criteria is required	
21	(k) Where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those thresholds throughout the crediting period of the CPA;	CPAs must meet the eligibility criteria for small-scale or micro-scale CDM project activities;	<p>The CPA will remain under small-scale or micro-scale CDM project activities throughout the crediting period of the CPA.</p> <p>Evidence: Estimated emission reductions when evaluating the inclusion of the CPA under the PoA and monitored emissions reductions once the CPA is implemented.</p>
22	(l) Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories.	The SSC-CPAs to be included in the PoA must not be de-bundled from another CDM Programme Activity, nor from a large-scale CDM project.	<p>In order to avoid registering a SSC-CPA that is in fact a de-bundled component of another CPA or CDM project, a de-bundling check will be done.</p> <p>Evidence: For each CPA, it will be checked if the annual emission reductions in each subsystems are greater than 1% of the small scale thresholds defined by the methodology applied, which is 600 tCO₂e, and de-bundling check has to be performed for that CPA. Additionally, for each CPA, it will be checked if within 1 km of the boundary of the proposed SSC-CPA at the closest point, there is any activity having the same activity implementer as the proposed SSC-CPA, or having a coordinating/managing entity which also manages a large scale PoA of the same technology/measure.</p> <p>For each CPA deemed to be a debundled component, it will be checked if the total size of such CPA combined with a registered SSC-CPA or registered CDM does exceed the limits for small scale CDM.</p>

⁶ Peruvian national legislation defines micro and small enterprises but there is no an official description of SMEs. For this reason, the definition of the International Finance Corporation (IFC), part of the World Bank Group will be used.



Note: The requirements described in (c) of “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” (version 02.1) are included in applicability criteria 6 to 18. The requirements described in (g), (h) and (j) of the Standard are not applicable to this PoA.

Provisions for updating the eligibility criteria in case the methodology applied by the PoA is revised or replaced.

As indicated in the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” (version 02.1), if the version of methodology applied by the PoA is revised or replaced, subsequent to being placed on hold, RYCOPESA will update the eligibility criteria to the requirements of the revised or new methodology with immediate effect. A new version of the PoA-DD and generic CPA-DD containing updated eligibility criteria validated by a DOE will be submitted to the Board for approval.

- (a) Once changes have been approved by the Board, the inclusion of all new CPAs will be based on the updated eligibility criteria applying the new generic CPA-DD;
- (b) CPAs that were included before the methodology was put on hold will apply the revised version of the generic CPA-DD only at the time of the renewal of the crediting period.

No action will be implemented if the version of methodologies applied by the PoA is revised without being placed on hold or is withdrawn for the purpose of inclusion in a consolidated methodology, unless otherwise indicated in the respective report of the meeting of the Board.

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

As per the “Procedures for Registration of a Programme of Activities as a Single CDM Project Activity and Issuance of Certified Emission Reductions for a Programme of Activities” (version 04.1); the additionality assessment of the PoA requires demonstration that in the absence of the CDM either:

- (i) The proposed voluntary measure would not be implemented, or
- (ii) The mandatory policy/regulation would be systematically not enforced and that noncompliance with those requirements is widespread in the country/region, or
- (iii) The PoA will lead to a greater level of enforcement of the existing mandatory policy /regulation.

The additionality argument for the PoA will be demonstrated using option *(i) The proposed voluntary measure would not be implemented.*

Options (ii) and (iii) do not apply to this PoA and additionality argument is not demonstrated using them.

There are no regulations in Peru that obligate RYCOPESA to make the investment required to adapt the facilities of the Peruvian small industries to be included in the Programme. RYCOPESA, as the coordinating entity for the Programme of Activities, will facilitate and install the equipment required to change fuels and assume the expenses of adapting the client’s systems; that is, replacing the storage, feeder systems and the burners and will offer the LPG at a sufficient discount to incentivise the switch



voluntarily. Additionally, the Peruvian industries that choose to participate in the Programme of Activities after the signature of a specific contract with RYCOPESA will also do so voluntarily.

In accordance with the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” (version 02.1), additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented CPAs would occur. Depending on the type of CPA, this should be done taking into account different principles:

- Micro-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of the “Guidelines for demonstrating additionality of microscale project activities (version 04.0)”.
- Small-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of the “Guidelines on the demonstration of additionality of small-scale project activities (version 09.0)”.
- Large scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements contained in the additionality section of the large scale methodologies.

The Programme of activities will consist of different CPAs which can include Micro-scale or Small-scale projects. Therefore, assessment and demonstration of additionality will be done at the CPA level using different approaches depending on the type of CPA (Micro-scale or Small-scale CPA).

Approach 1: Micro-scale CPAs

In these cases, additionality will be assessed following the “Guidelines for demonstrating additionality of microscale project activities (version 04.0)”. Those CPA that implement an approved Type III small scale CDM methodology and that aim to achieve emissions reductions at a scale of no more than 20 ktCO₂e per year, are additional if any one of the following conditions is satisfied:

- (a) *The geographic location of the project activity is an LDC/SIDS or special underdeveloped zone of the host country as identified by the government in accordance with the paragraph 2 (a) from the “Guidelines for demonstrating additionality of microscale project activities (version 04.0)”.*
- (b) *The project activity is an emission reduction activity with both conditions (i) and (ii) satisfied (see below);*
 - (i) *Each of the independent subsystems/measures in the project activity achieves an estimated annual emission reduction equal to or less than 600 tCO₂e per year; and*
 - (ii) *End users of the subsystems or measures are households/communities/SMEs.*

The PoA will implement the AMS-III.B Switching fossil fuels (version 16), an approved Type III small scale CDM methodology.

Since Peru is not considered an LDC/SIDS country, Programme activities shall be eligible under Approach 1 only if each of the independent subsystem/measure in the CPA achieves an estimated annual emission reduction equal to or less than 600 tCO₂e per year and end user are households/communities/SMEs (with the exception of CPAs implemented in special underdeveloped zone of Peru as identified by the government in accordance with the paragraph 2 (a) from the “Guidelines for demonstrating additionality of microscale project activities, version 04.0”, which will be automatically additional).



Peruvian national legislation defines⁸ micro and small enterprises but there is no an official description of SMEs. For this reason, the definition of the International Finance Corporation (IFC), part of the World Bank Group will be used. According to IFC, SMEs are those that⁹:

Enterprise indicators (two out of three must be met)	Micro	Small	Medium
1. Number of employees	≤10	>10; ≤50	>50; ≤300
2. Total assets	≤\$100,000	>\$100,000; ≤\$3,000,000	>\$3,000,000; ≤\$15,000,000
3. Total annual sales	≤\$100,000	>\$100,000; ≤\$3,000,000	>\$3,000,000; ≤\$15,000,000
IFC Global Financial Markets Department and IEG proxy			
Financial intermediary subloan amount	<\$10,000	\$10,000; <\$100,000	\$100,000; <\$1,000,000

CPAs included in Approach 1 will be additional if the requirements specified above are satisfied.

In cases where ex ante projected emissions reductions show an increase during the crediting period, additionality of those CPAs that go beyond the above mentioned limits in any year of the crediting period will be reassessed using Approach 2.

Approach 2: Small-scale CPAs

In these cases, additionality and therefore the demonstration that in the absence of the CDM the proposed voluntary measure would not be implemented will be assessed following the “Guidelines on the demonstration of additionality of small-scale project activities (version 09.0)”.

This document states that “project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers: (a) Investment barrier; (b) Technological barrier; (c) Barrier due to prevailing practice; (d) Other barriers”.

The additionality argument for the PoA will be demonstrated using option (a) Investment barrier.

Investment barrier

The investment barrier will be demonstrated based on the investment analysis Sub-step 2b, Option III. Apply benchmark analysis of the “Tool for the demonstration and assessment of additionality (version 06.0.0)”.

Step 2. Investment analysis

Sub-step 2a. Determination of the appropriate analysis method

⁸ “Texto Único Ordenado de la Ley de Promoción de la Competitividad, Formalización y Desarrollo de la Micro y Pequeña Empresa y del Acceso al Empleo Decente, Ley MYPE DECRETO SUPREMO N° 007-2008-TR,” <http://www.sunat.gob.pe/orientacion/mypes/normas/ds007-2008.pdf>

⁹ Source: Financing Micro, Small, and Medium Enterprises, Page (ICF, 2008): [http://www.ifc.org/ifcext/ieg.nsf/AttachmentsByTitle/MSME-FIFullReport/\\$FILE/MSME-Full-Report.pdf](http://www.ifc.org/ifcext/ieg.nsf/AttachmentsByTitle/MSME-FIFullReport/$FILE/MSME-Full-Report.pdf)



One of the options listed in the “Tool for the demonstration and assessment of additionality (version 06.0.0)” to conduct the investment analysis is to compare the profitability of the Programme activity with reference profitabilities expected in the country where the investment takes place. Therefore, the most appropriate analysis method in this case is “Option III. Apply benchmark analysis”, which involves an analysis of the cash flows deducted from the capital cost of the project investment, with the subsequent analysis of its Internal Rate of Return. It is worth mentioning that a simple cost analysis does not provide enough information, since there is additional income apart from what is obtained from the sale of the CER credits.

The IRR obtained from the Programme activity will be compared to a benchmark IRR. For the benchmark analysis, the Project IRR is considered the most suitable financial indicator. The post-tax Project IRR will be used, since it includes all in and out cash flows. According to the “Tool for the demonstration and assessment of additionality” (version 06.0.0) option a) was used to determine the discount rate and benchmark used for the benchmark analysis.

(a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data;

In order to estimate an adequate discount rate to evaluate the Programme activity financial feasibility the following will be considered:

- Government bond rates for 10 years in Peru published by the Ministry of Economy and Finance of Peru¹⁰.
- Country Risk for Peru published by the Organisation for Economic Co-operation and Development (OECD)¹¹.

From the above the total benchmark value would be: Government bond rates for 10 years in Peru + Country Risk for Peru.

Option III. Application of the benchmark analysis

The investment comparison analysis will be carried out at the SSC-CPA level. To verify the consistency of the investment analysis, a sensitivity analysis will be undertaken.

The CPA will be additional in those cases in which the investment analysis corroborates the fact that the Programme activity is not economically attractive and would not be undertaken in the absence of the PoA.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

A.4.4.1. Operational and management plan:

¹⁰ http://www.mef.gob.pe/index.php?option=com_content&view=article&id=682&Itemid=101189&lang=es

¹¹ Historical Country Risk Classification (OECD): <http://www.oecd.org/dataoecd/9/12/35483246.pdf>



RYCOPESA has developed a management system, following the requirements indicated “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” (version 02.1). RYCOPESA is responsible for its implementation.

Repsol’s Carbon Unit, the department responsible for providing the necessary advice in climate change matters to any Business Unit that are part of Repsol, will advise RYCOPESA’s Commercial staff and Technicians about some key aspects such as the assessment whether eligibility criteria included in PoA-DD are met; the development of CPA-DD, the verification of monitored data following QA/QC procedures, the development of the monitoring report, etc.

The management system includes the following:

(a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs

Role and responsibilities description	CPA's technical staff	RYCOPESA
Overall responsibility of development and implementation of the management system		Director of RYCOPESA
Collection of economic and technical data from the CPA		RYCOPESA's Commercial staff
Assessment whether eligibility criteria included in PoA-DD are met and demonstration of CPA's additionality		RYCOPESA's Commercial staff and Technicians
Assessment whether a proposed SSC-CPA has already been registered as a CDM project activity or as a CPA of another PoA or is requesting registration, is under review or for which review or corrections have been requested.		RYCOPESA's Commercial staff and Technicians
Development of CPA-DD		RYCOPESA's Commercial staff and Technicians
Collection of data to be monitored	Technicians responsible for production process (energy output)	Technicians of RYCOPESA (LPG combusted)
Calibration and maintenance of key monitoring equipment	Technicians responsible for maintenance and calibration of monitoring equipment (equipment to monitor the energy output)	Technicians of RYCOPESA (equipment to monitor the LPG consumed)
Checking of monitored data following QA/QC procedures	Technicians responsible for production process	RYCOPESA's and Technicians
Verifying and recording the data		RYCOPESA's Commercial staff and Technicians
Calculations of the emission reductions of year y		RYCOPESA's Commercial staff and Technicians
Development of the Monitoring report		RYCOPESA's Commercial staff and Technicians

Table 2. - Role and responsibilities description.



RYCOPESA is responsible for managing all SSC-CPAs to be included in the proposed PoA. This will mean that those operating the SSC-CPA will be aware and will have agreed that their activity is subscribed to the proposed PoA. Therefore, the industrial clients that wish to participate in the PoA and benefit from the corresponding incentives will sign a supply contract with RYCOPESA in which they express their consent to include their activity in the Programme of Activities and will be made aware that they are participating in a climate change action Programme aiming to reduce greenhouse gas emissions.

(b) Training and capacity development for personnel

RYCOPESA staff is periodically trained by Repsol's Carbon Unit technicians in CDM and PoAs rules and the requirements to be met by the future CPAs.

All the CPA staff members involved in implementing the Programme activity will be trained by RYCOPESA's commercial staff before the CPA is included under the PoA.

Specifically, client's Plant Manager, as well as the technicians responsible for control of production process, maintenance and calibration of monitoring equipment and quality system management will be trained by RYCOPESA's technicians in order to make them aware of the rules of the CDM and PoA.

Client's staff	Training content
Plant Manager	<ul style="list-style-type: none">- Rules of the CDM and PoA- Eligibility criteria for inclusion of a CPA in the PoA (general issues)
Technicians responsible for production process	<ul style="list-style-type: none">- Rules of the CDM and PoA- Eligibility criteria for inclusion of a CPA in the PoA- Parameters to be monitored and monitoring procedures
Technicians responsible for maintenance and calibration of monitoring equipment	<ul style="list-style-type: none">- Rules of the CDM and PoA- Parameters to be monitored and monitoring procedures
Technicians responsible for quality system management	<ul style="list-style-type: none">- Rules of the CDM and PoA- Parameters to be monitored and monitoring procedures

Table 3. - Training content.

(c) Review of inclusion of CPAs

RYCOPESA has implemented a sequential analysis process that involves identifying potential CPAs, evaluating these by means of eligibility criteria and subsequent development and inclusion of these under the PoA.

A procedure with a description of the steps to be followed for the review of inclusion of CPAs has been defined and implemented.

The process for client's technical and economic data collection will be conducted by the RYCOPESA's commercial staff in parallel to the negotiation of the LPG supply contract. The information collected will be gathered and registered in CPA-specific spreadsheets.

After collecting the necessary data, RYCOPESA will assess whether the client meets the following requisites:



- Eligibility criteria, including those related to the demonstration of additionality, described in section A.4.2.2 below
- Requirements of the AMS-III.B methodology (version 16)
- Monitoring information described in Annex 4 of this PoA-DD

A DOE will assess whether the CPA is correct or not and meets the validation requirements. If so, the CPA will be proposed for inclusion under the PoA.

The Figure below describes the review process for inclusion of CPAs under the PoA:

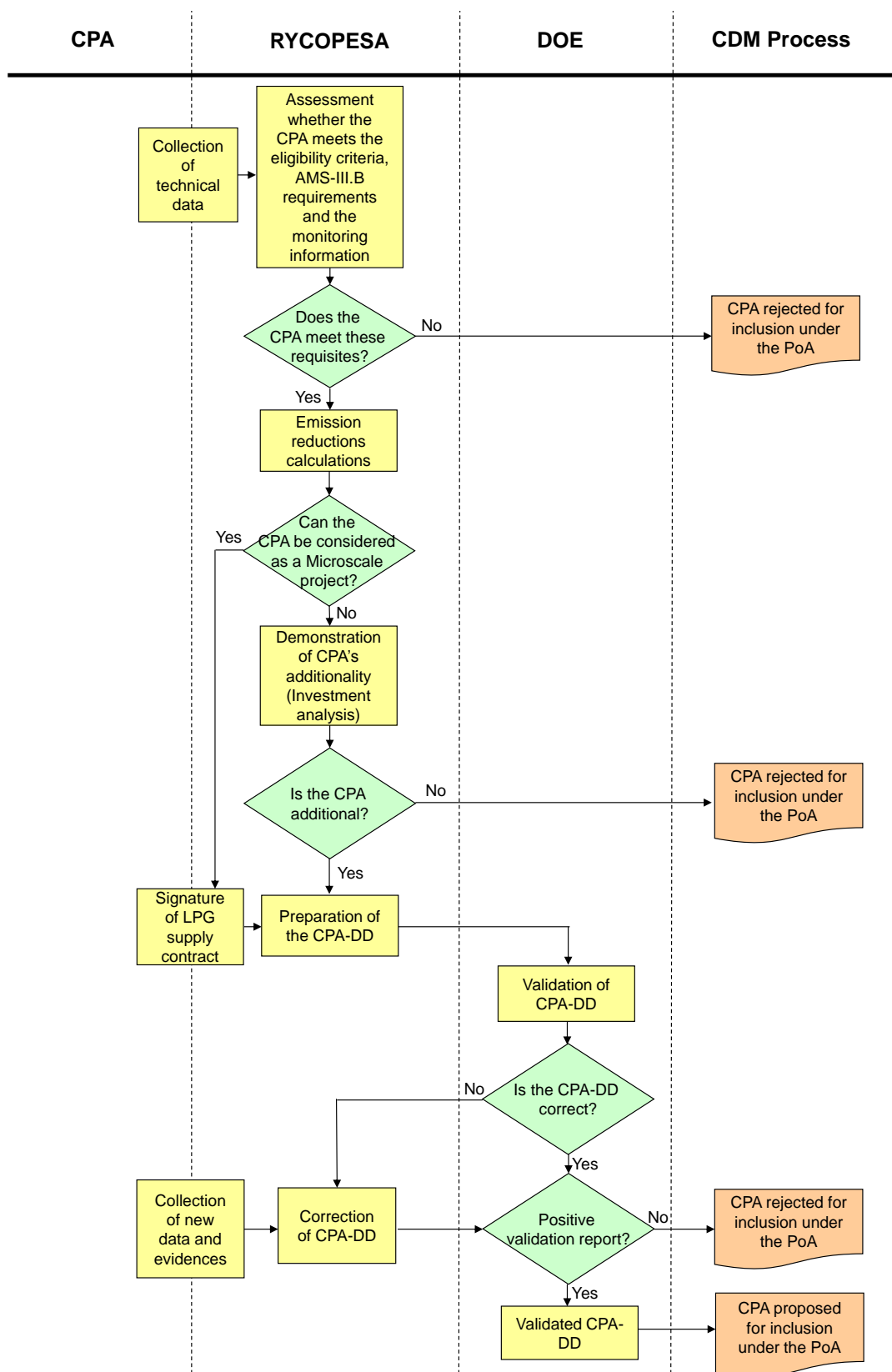


Figure 7. Review of inclusion of CPAs



(d) Procedures to avoid double counting

Prior to registering a new SSC-CPA within the proposed PoA, RYCOPESA, advised by Repsol's Carbon Unit, will check the CDM project database to establish whether a CDM project activity or CPA of another PoA of fuel switching has already been registered involving one specific industrial plant. This search will cover registered project activities, project activities requesting registration, project activities under review and project activities for which either a review or corrections have been requested. The process of checking will be duplicated by the DOE responsible for registering new SSC-CPAs under the proposed PoA.

In an instance where a CPA of another PoA or CDM project activity is already registered involving the same industrial plant as a proposed SSC-CPA, the coordinating entity will not proceed with the registration of the SSC-CPA. In the instance where a CPA of another PoA or CDM project activity is requesting registration, is under review or for which review or corrections have been requested, involves the same industrial plant as a proposed SSC-CPA, the coordinating entity will wait for these processes to be resolved before proceeding with registration of the new SSC-CPA.

- (i) *The SSC-CPA included in the PoA is not a de-bundled component of another CDM Programme Activity (CPA) or CDM project activity.*

The coordinating entity intends to implement multiple CPAs within Peru, of the same sectoral scope. The SSC-CPAs included in the PoA will not be de-bundled from another CDM Programme Activity, nor from a large-scale CDM project. In order to avoid registering a SSC-CPA that is in fact a de-bundled component of another CPA or CDM project, the coordinating entity will follow the guidance provided by the "Guidelines on assessment of de-bundling for SSC project activities", version 3:

If each of the independent subsystems/measures (e.g. biogas digester, solar home system) included in the CPA of a PoA is no greater than 1% of the small scale thresholds defined by the methodology applied¹³, then that CPA of PoA is exempted from performing de-bundling check i.e. considered as being not a de-bundled component of a large scale activity.

For each CPA, it will be checked if the annual emission reductions in each subsystems are greater than 1% of the small scale thresholds defined by the methodology applied, which is 600 tCO₂e, and de-bundling check has to be performed for that CPA.

In case the de-bundling check has to be performed for a CPA, it will be done according to what the "Guidelines" states:

For the purposes of registration of a Programme of Activities (PoA)¹⁴, a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity¹⁵, which satisfies both conditions (a) and (b) below:

¹³ i.e. 15 kW installed capacity or 0.6 GWh annual energy savings or 0.6 ktCO₂e annual emission reductions.

¹⁴ Only those POAs need to be considered in determining de-bundling that are: (i) in the same geographical area; and (ii) use the same methodology; as the POA to which proposed CPA is being added.

¹⁵ Which may be a (i) registered small-scale CPA of a PoA, (ii) an application to register another small-scale CPA of a PoA or (iii) another registered CDM project activity.



- (a) *Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;*
- (b) *The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.*

For each CPA, it will be checked if within 1 km of the boundary of the proposed SSC-CPA at the closest point, there is any activity having the same activity implementer as the proposed SSC-CPA, or having a coordinating/managing entity which also manages a large scale PoA of the same technology/measure.

Finally, according to the “Guidelines”:

If a proposed small-scale CPA of a PoA is deemed to be a debundled component in accordance with paragraph 2 above, but the total size of such a CPA combined with a registered small-scale CPA of a PoA or a registered CDM project activity does not exceed the limits for small-scale CDM (...), the CPA of a PoA can qualify to use simplified modalities and procedures for small scale CDM (...) project activities.

For each CPA deemed to be a debundled component, it will be checked if the total size of such CPA combined with a registered SSC-CPA or registered CDM does exceed the limits for small scale CDM.

(e) Control process for each CPA under the PoA

The relevant parameters included in the monitoring plan shall be monitored and electronically recorded for each of the CPAs independently. RYCOPESA will be responsible for the management of records and data associated with each CPA in accordance with monitoring requirements stipulated in AMS-III.B (version 16) and detailed in Section E and Annex 4 below.

RYCOPESA, advised by Repsol’s Carbon Unit, will be responsible for emission reduction calculations and preparation of Monitoring Report for CPA verification. Monitoring reports will be prepared separately for each of the CPAs for the purpose of verification and request for issuance of CERs.

RYCOPESA shall maintain the data about each of the CPA’s and share the same with the DOE as required. The record keeping will be in electronic format. The record is of two types: the first is a record of the various CPA and their status; the second is a detailed record of each CPA. In summary, the data to be stored for each CPA included in the PoA are:

- **Name and description** of the Company/Organization
- **CPA’s code** and the **geographical location** of each CPA (latitude and longitude).
- **Quantity of LPG combusted annually.**
- **Quantity of energy output** (steam, heat or electricity) of the element process in those CPAs that reduce more than 600 tCO₂/year.
- **Quantity of electricity/thermal energy** exported to other facilities, if any.

(f) Measures for continuous improvements of the PoA management system

The PoA will be managed following a process management model. In order to improve the PoA management system the actions indicated below will be undertaken:



- Definition of indicators to measure the performance in emission reductions achievement
- Gap analysis in order to identify possible errors in responsibilities and the different tasks defined for CPA's staff and RYCOPESA staff.
- Analysis of differences between actual and estimated results in emission reductions achievement in order to determine their root causes
- Corrective actions implementation

A.4.4.2. Monitoring plan:

The flow to be followed to carry out the monitoring of the reduction of emissions generated by the different CPAs is the following:

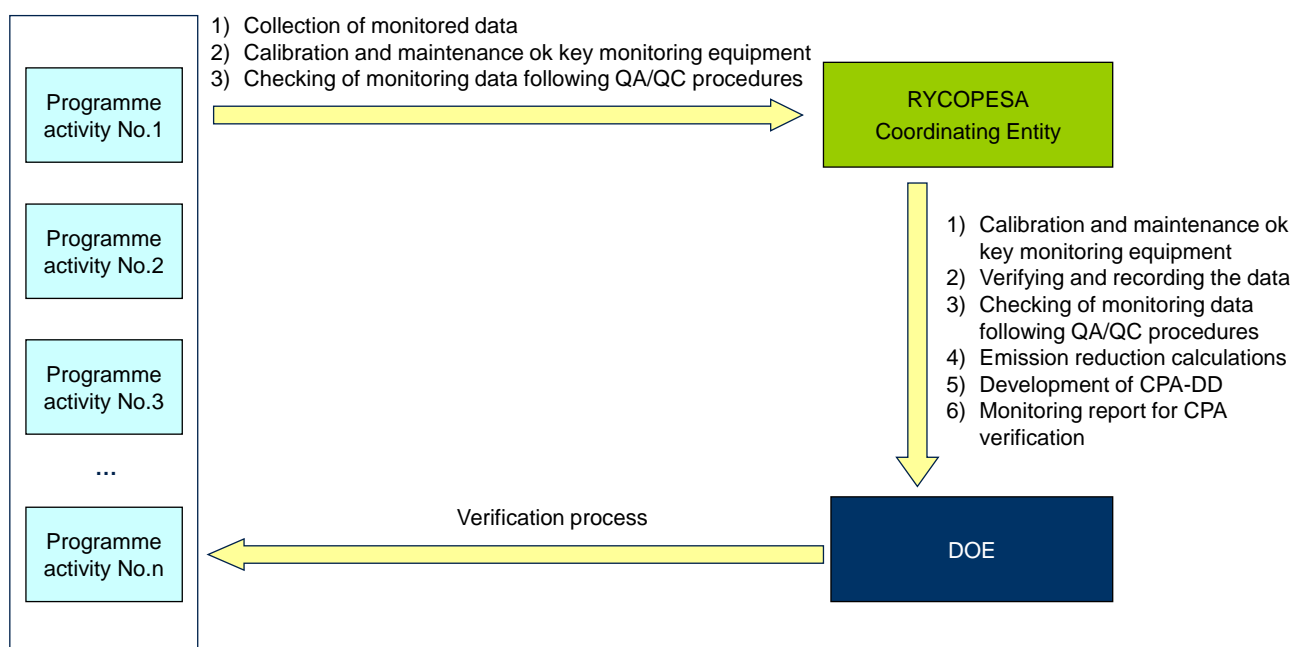


Figure 8 - Monitoring flow

Monitoring will be carried out for each CPA independently. Parameters described in section E.7.1 shall be monitored by the CPA according to the procedures and monitoring framework established in E.7.2. The monitored data will be submitted to RYCOPESA which will store the data in an electronic database. Primary data will be stored by the Programme activities in plant records and will be gathered in electronic format in client's management system.. The database will record the start and end dates of each monitoring period and the emission reductions attributable for the monitoring period. Database will be maintained by RYCOPESA in digital format to the extent possible with data control procedures in place. Appropriate record keeping procedures will be implemented to ensure that each monitoring period dataset can be transparently attributed to its corresponding CPA, preventing any occurrences of double counting.



RYCOPESA, advised by Repsol's Carbon Unit, will generate a monitoring report for the DOE to verify corresponding to the monitoring period under consideration. This report will unambiguously set out the data relating to the emission reductions generated by that specific CPA during the monitoring period.

Verification of each CPA shall be done by an appointed DOE. The records and documentation pertaining to monitoring and verification for all the CPAs participating in the program will be maintained by RYCOPESA and shall be made available to DOE for checking status at any point of time. The DOE will be provided with all the monitoring reports and other Programme related documents of each CPA during verification. The DOE shall hold all technical discussions with the RYCOPESA and Repsol's Carbon Unit and may visit only the sample facilities/CPAs as described below.

To verify the data from the different CPAs, the DOE should follow the statistical sampling method described below and the requirements included in the "Standard for sampling and surveys for CDM Project activities and Programme of activities" (version 03.0):

- Objectives and Reliability Requirements:

As indicated in the Procedures for registration of a Programme of Activities as a single CDM Project Activity and issuance of certified emission reductions for a Programme of activities (version 04.1), if the coordinating/managing entity does not wish to have all CPAs verified, statistically sound sampling method/procedure to be used by DOEs for verification of the amount of GHG reductions shall be proposed. Therefore, the objective of this sampling plan is to establish the minimum sample size of CPAs to be verified by the DOE yearly throughout the duration of the Programme of Activities.

The sample will have a confidence interval of 95% with a margin error of $\pm 10\%$.

- Target Population and sampling frame:

The target population comprises those CPAs included in the registered PoA.

- Sampling Method:

Simple random sampling method will be used since the populations (CPAs) are homogeneous. A simple random sample is a subset of a population chosen randomly, such that each element of the population has the same probability of being selected.

- Sample size:

According to the Bayesian's statistics, the formula for the sampling margin of error (e) is the following²⁰:

$$e = Z \cdot \sqrt{\frac{p \cdot (1-p)}{n}} \cdot \sqrt{\frac{N-n}{N-1}}$$

Where:

N: this is the size of the population (total number of Programme activities).

n: this is the size of the sample (total number of Programme activities to be verified).

Z: this is a constant that depends on the level of confidence assigned. The level of confidence indicates the probability of the results inferred from the sample being accurate. E.g.: 80% confidence (Z=1.28) indicates that there is a 20% probability that the results are not accurate.

²⁰ Source: [West Chester University of Pennsylvania Courses Server](#)



e: this is the desired sampling margin of error. The sampling margin of error is the difference that may exist between the results obtained by verifying a sample (n) and the results that would be obtained if the total number of Programme activities (N) were verified.

p: this is the proportion of Programme activities in the total number of Programme activities (N) that have the verified characteristic.

Solving the above formula, the minimum sample size (n) is:

$$n = \frac{N \cdot p \cdot (1-p) \cdot Z^2}{((N-1) \cdot e^2 + p \cdot (1-p) \cdot Z^2)}$$

- **N:** this will depend on the number of CPAs registered when conducting the verification.
- **Z:** the sample should be taken with a Confidence Level value of 95%, so the corresponding constant is $Z = 1.96$.
- **e:** the proposed sampling margin of error to be considered is 10%.
- **p:** this detail is generally unknown and $p=0.5$ is normally assumed, as it is the safest option.

For the proposed parameter values, the size of the sample to be verified is as shown in the following tables.

N	2	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
n	2	5	9	13	17	20	23	26	28	31	33	35	37	39	41	42	44	45	47	48	49
N	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205
n	50	52	53	54	55	55	56	57	58	59	60	60	61	62	62	63	63	64	65	65	66

Table 4.- Sample size (n) selection tables.

The sample will be drawn at random from the sampling frame using random number tables.

A.4.5. Public funding of the programme of activities (PoA):

No public financing will be used in this PoA and related CPAs.

SECTION B. Duration of the Programme of Activities (PoA).

B.1. Starting date of the programme of activities (PoA):

04/11/2010

B.2. Length of the programme of activities (PoA):

The duration of the Programme of Activities will be 28 years.



SECTION C. Environmental Analysis

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

1. Environmental Analysis conducted at the PoA level X
2. Environmental Analysis conducted at the SSC-CPA level

The environmental analysis was carried out at the PoA level, since there is no negative impact caused by switching from a residual fuel oil to a lighter one that produces less greenhouse gas emissions, as well as lower emissions of other polluting gases. Therefore, no case-by-case environmental analysis is required for each CPA included in the Programme of Activities.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

The Programme activities will be carried out in industrial facilities, mainly small and medium-sized. There are no negative impacts on the environment derived from switching from residual fuel oils to lighter fuels; in fact, the environmental impact is positive. With this Programme, not only are greenhouse gas emissions reduced, but due to the cleaner nature of LPG and its combustion, the emission of other pollutants is also reduced, such as SO₂, NO_x, HC or particulate PM₁₀ and PM_{2.5}.²² The Programme activities will then improve air quality in the surroundings of the industry, including the local population.

The environmental impact beyond the borders of the host country will also be positive, since, as mentioned above, the Programme activities reduce the emission of greenhouse gases, thereby reducing the local contribution to global climate change. It also reduces the emission of other pollutant gases, contributing to the improvement of air quality and representing, in any case, a positive cross-border environmental impact.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA);

According to the laws/regulations of Peru²³, no environmental impact study is required for the modifications necessary in industrial facilities for their inclusion in the Programme of Activities.

The industries involved already burned hydrocarbon fuels before implementing the Programme, and the production processes will not be changed compared to the initial situation. The Programme activity will only replace the fuel storage, distribution and burning system.

²² LPG and Local Air Quality. Atlantic Consulting 2009.

²³ General Environmental Act (No. 28,611) (<http://www.acnur.org/biblioteca/pdf/6768.pdf>)



SECTION D. Stakeholders' comments

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

1. Local stakeholder consultation is done at PoA level ☒
2. Local stakeholder consultation is done at SSC-CPA level

Since the Programme of Activities will be implemented within the geographical limits of the host country, Peru, the local stakeholder consultation is done at PoA level.

The following provides a list of interest groups or stakeholders that have participated in the public information process for RYCOPESA's fuel switch PoA in Peru:

- Ministry of the Environment (Ministerio de Ambiente) – www.minam.gob.pe/
- Ministry of Energy and Mining (Ministerio de Energía y Minas) – www.minem.gob.pe/
- Supervisory Entity for Investments in Energy and Mining (Organismo Supervisor de la Inversión en Energía y Minería (OSINERGMIN)) – www.osinerg.gob.pe/
Public institution which regulates, supervises and oversees national compliance with legal and technical dispositions related to activities in the electric, hydrocarbon and mining industrial sectors.
- Peruvian Environmental Network (Red Ambiental Peruana (RAP))
Association of private institutions (NGOs) to improve the environmental management.
- National Environment Fund (Fondo Nacional del Ambiente (FONAM)) – <http://www.fonamperu.org/default.php>
Private institution, with no profit motive in mind, responsible for promoting public and private investment associated to the development of environmental projects in Peru.
- Economic and Social Research Consortium (Consortio de Investigación Económico y Social (CIES)) – <http://cies.org.pe/>
Peruvian umbrella organisation with 45 institutional members, including think tanks, research centres, NGOs, private consultancies and public agencies which contributes to Peru's development by proposing research based public policies to overcome economic, social and environmental challenges.
- Ministry of Production (Ministerio de la Producción) – <http://www.produce.gob.pe/portal/>
- Regional Government of Callao (Gobierno Regional del Callao) – <http://www.regioncallao.gob.pe/regionCallao/>
- Ministry of Health (Ministerio de Salud) – <http://www.minsa.gob.pe/portada/>
- Pontifical Catholic University of Peru (Pontificia Universidad Católica del Perú) – <http://www.pucp.edu.pe/content/index.php>
- Metropolitan Municipality of Lima (Municipalidad Metropolitana de Lima) – <http://www.munlima.gob.pe/>



- Association for the Promotion of National Infrastructure (Asociación para el Fomento de la Infraestructura Nacional) – <http://www.afin.org.pe/index.php>
- National Society of Mining, Petroleum and Energy (Sociedad Nacional de Minería, Petróleo y Energía) – <http://www.snmpe.org.pe/0/home.aspx>

Business organization, with no profit motive in mind, composed of private institutions from mining, hydrocarbon and electric sectors.

The table below shows the dates when letters were sent and the dates when comments from stakeholders were received:

STAKEHOLDER	Letter sent on:	Comments received on:
Ministry of the Environment	November 13 th , 2009	December 16 th , 2009
Ministry of Energy and Mining	November 13 th , 2009	-
Supervisory Entity for Investments in Energy and Mining	November 13 th , 2009	-
Peruvian Environmental Network	November 13 th , 2009	-
National Environment Fund	November 13 th , 2009	-
Economic and Social Research Consortium	November 13 th , 2009	November 30 th , 2009
Ministry of Production	November 13 th , 2009	December 12 th , 2009
Regional Government of Callao	November 13 th , 2009	-
Ministry of Health	November 16 th , 2009	-
Pontifical Catholic University of Peru	November 18 th , 2009	November 30 th , 2009
Metropolitan Municipality of Lima	November 16 th , 2009	December 11 th , 2009
Association for the Promotion of National Infrastructure	May 25 th , 2010	June 30 th , 2010
National Society of Mining, Petroleum and Energy	May 25 th , 2010	-

Table 5.- Stakeholder consultation

D.2. Brief description how comments by local stakeholders have been invited and compiled:

To engage stakeholders, the following steps were taken:

First, a letter is sent with in-depth information on the impacts expected of the Programme by the coordinating entity, and each agent involved is asked for feedback on them with a view to improving any impact not initially detected in the best way possible.

The letters are provided in local language and include the following:

- Location of the Programme activities.
- Technical information explaining what the Programme activity consists of.
- Explanation of how the Programme activity reduces emissions.
- Level of quality of the Programme activity and standards applied.
- General information on the effect of climate change and mitigation.
- Information on the Clean Development Mechanism.
- Contact information.

A period of two weeks within the reception of the letters is offered to the stakeholders in order to send any comments. The feedback was then filed and answered, attempting to clarify the aspects of the Programme that may not have been sufficiently clarified in the initial notification. The relationship with



the agents involved will be maintained with a view to improving any aspects that could cause any inconvenience during the period in which the Programme is underway.

D.3. Summary of the comments received:

Hereunder is shown a summary of the comments received:

- Economic and Social Research Consortium – Consorcio de Investigación Económico y Social.(CIES)
 - Mr. Javier Portocarrero - Executive Director
 - Comments: Welcomes the initiative to promote the first effort of its kind in Peru. CIES is very interested in *knowing* the first results of the initiative.
- Ministry of Production – Ministerio de la Producción
 - Ing. Carmen Mora Donayre – Director of environmental issues in industry
 - Comments: states that being a CDM project involving switch from residual fuel to LPG, the Programme coincides with the national climate change strategy. They refer to the Ministry of the Environment regarding the CDM evaluation cycle.
- Ministry of the Environment – Ministerio del Ambiente
 - Mrs. Rosario Gomez Gamarra – Vice-minister of strategic development of the natural resources.
 - Comments: the Ministry of the Environment promotes and welcomes the development of initiatives that reduce GHG emissions, such as the Programme. Moreover, the Ministry has a specific procedure to evaluate Programme of Activities.
- Metropolitan Municipality of Lima - Municipalidad Metropolitana de Lima
 - Ing. Israel Jorge Huarca Mejia – Sub-manager of environment.
 - Comments: welcomes the development of the initiative as it is the first PoA in Peru. They recommend meeting the criteria included in Peruvian technical standards for the utilization of fuels.
- Pontifical Catholic University of Peru - Pontificia Universidad Católica del Perú
 - Mrs. Patricia Ruiz-Bravo. Director of Social Responsibility.
 - Comments: relevant project due to the need to reduce GHG emissions and carry out projects to develop technology in Peruvian industry. They ask the following questions:
 1. Which is the percentage of GHG emissions reduction by switching from residual fuel oil to LPG?
 2. What facilities will be offered to the clients who decide to switch the fuel?
 3. What benefits imply the Programme for Repsol YPF?
- Association for the Promotion of National Infrastructure - Asociación para el Fomento de la Infraestructura Nacional
 - Mr. Juan Pacheco. General Manager.
 - Comments: They believe that investing in the technological conversion of the small and medium enterprises from conventional to clean technologies could encourage their productivity and



competitiveness because it would mean savings in their industrial processes; in addition, that would make their products internationally certifiable.

D.4. Report on how due account was taken of any comments received:

RYCOPESA has done the following to ensure it has taken due account of comments received:

- Committed to keep the stakeholders informed about the first results of the Programme of Activities;
- Data collection from the PoA will be supplied to the Ministry of the Environment in order to allow it to evaluate the PoA with its own specific procedures.
- Peruvian technical standards for the utilization of fuels are currently met and will be assured in the PoA.

The technical standards which are referred in Stakeholder's response are the following:

- *General regulation of the Supervisory Entity for Investments in Energy and Mining:* establishes that the Supervisory Entity for Investments in Energy and Mining will supervise and oversee the Energy Sector Entities in order to ensure quality, safety and efficiency of services and/or products provided to final users.
- *Biofuels quality control procedure and modification in hydrocarbon penalty regime:* establishes different types of fines in case of an inadequate commercialization of LPG cylinders.
- *Timeline for the reduction of sulphur content of diesel fuel N° 1 y 2*

RYCOPESA and the products that the Company commercializes comply with all technical standards included in valid regulatory requirements that are applicable nationally and internationally.

The LPG that RYCOPESA will provide to those CPAs included in the PoA complies with all technical standards required by the regulations approved by the Supervisory Entity for Investments in Energy and Mining (OSINERGMIN) in Peru. To ensure this, the Company performs extensive internal quality controls of the products placed on the market and is additionally subject to strict reviews by the authorized public entities.

SECTION E. Application of a baseline and monitoring methodology

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

The approved small-scale baseline and monitoring methodology used is: *AMS-III.B. Switching fossil fuels (version 16)*

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

Type III - Other Project Activities. Category B - Switching fossil fuels (version 16)

The AMS-III.B methodology (version 16) applies to this PoA because it complies with the requirements established by it. The following specifies the compulsory criteria for use of the methodology and how they are fulfilled:



<u>Compulsory criteria for use of the methodology</u>	<u>Fulfillment by the project</u>
1. This methodology comprises fossil fuel switching in industrial, residential, commercial, institutional or electricity generation applications.	This PoA applies to Peruvian industries that switch from a fossil fuel to a lower carbon content fossil fuel.
2. Fuel switch may be in a single element process or may include several element processes within the facility. Multiple fossil fuel switching in an element process however is not covered under this methodology.	The fuel switch will be carried out in a single element process or will include several element processes within the facility. In those element processes that will be undertaken in the PoA, a single energy source (residual fuel oil in the baseline and LPG after the implementation of the Programme activity) is consumed in a single equipment (boiler, furnace, turbine, etc) in order to generate a single output (steam, heat or electricity). No multiple fuel switches will be carried out in this PoA.
3. This methodology is applicable for new facilities as well as for retrofit or replacement of existing installations.	The PoA covers: 1) the retrofit of existing installations by replacing the fuel storage, distribution and burning system; 2) the installation of the fuel storage, distribution and burning system in new facilities in which residual fuel oil would have been consumed in the absence of the PoA.
4. Fuel switching may also result in energy efficiency improvements. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this methodology. If fuel switching is part of a project activity focused primarily on energy efficiency, the project activity falls under a Type II methodology.	The Programme of Activities is focused on reducing emissions by switching fuels and does not seek to improve energy efficiency. The PoA includes the installation of new LPG burners, storage tanks and feeding systems at the industrial plants. The aim of the PoA will not be to improve energy efficiency in any case.
5. New facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the general guidelines to SSC CDM methodologies. The requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the general guidelines to SSC CDM methodologies. If the remaining lifetime of the affected systems increases due to the project activity, the crediting period shall be limited to the estimated remaining lifetime, i.e. the time when the affected systems would have been	In case of CPAs involving new facilities or capacity additions compared to the baseline scenario, Programme activity will be included in the PoA if it complies with the related and relevant requirements in the General Guidelines to SSC methodologies (version 17). The Programme activities cover only the replacement of the fuel storage, distribution and burning system. That will not affect the life of the thermal energy conversion equipment. Additionally, in the baseline scenario, if it becomes necessary to replace the equipment at the end of its useful life, it would be with a view to continuing to use the same type of residual fuel



replaced in the absence of the project activity.	oil, since it is a more economical option than switching to LPG in the absence of the Programme.
6. This methodology is not applicable to project activities that propose switch from fossil fuel use in the baseline to renewable biomass, biofuel or renewable energy in the project scenario. A relevant Type I methodology shall be used for such project activities that generate renewable energy displacing fossil fuel use. This methodology is also not applicable to project activities involving the use of waste gas; these project activities might be eligible under AMS-III.Q.	The fuel switch to be undertaken in the Programme activities will be from residual fuel oil to LPG.
7. The facility may involve grid connected elemental processes however this methodology does not cover emission reductions on account of shift from use of a grid electricity or electricity exported to a grid.	This PoA does not involve emission reductions on account of shift from use of grid electricity.
8. This category is applicable to project activities where it is possible to directly measure and record the energy use/output (e.g. heat, steam and electricity) and consumption (e.g. fossil fuel) within the project boundary. In case of project activities that meet the criteria under paragraph 17 below, this methodology is applicable only where it is possible to directly measure and record at least the energy consumption in the element process (e.g. fossil fuel input).	This Programme of Activities will involve CPAs in which it is possible to directly measure and record the energy output (e.g. steam, heat or electricity) and consumption (e.g. fossil fuel) within the project boundary. In case of CPAs in which the estimated annual emission reductions are equal to or less than 600 tCO ₂ e per year it will be possible to directly measure and record at least the energy consumption (e.g. fossil fuel)
9. Heat, steam or electricity produced under the project activity shall be for on-site captive use and/or export to other facilities included in the project boundary. In case of electricity generation plants, the generated electricity may also be supplied to users via mini/isolated grid(s) system exclusively supplied by fossil fuel units.	Heat, steam or electricity produced under the CPAs are expected to be mainly for on-site captive use. However, in those CPAs in which the electricity generated is exported to other facilities included in the project boundary, the electricity supplied via mini/isolated grid(s) system will be exclusively supplied by fossil fuel units.
10. In case energy produced by the project activity is delivered to another facility, or facilities, within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into specifying that only the facility generating the energy can claim emission reductions from the energy displacement.	In those CPAs in which energy produced by the project activity is delivered to another facility, or facilities, within the project boundary, a contract between the supplier and consumer(s) of the energy will be entered into specifying that only the facility generating the energy (CPA) will claim emission reductions from the energy displacement.
11. Regulations do not constrain the facility from using the energy sources cited in paragraph 1 before or after the fuel switch. Regulations do not	There are no regulations in Peru that neither constrain from using residual fuel oil nor require the use of low-carbon energy sources.



require the use of low carbon energy source (e.g. natural gas or any other fuel) in the element processes.	
12. The project activity does not result in integrated process change. The purpose is to exclude measures that affect other characteristics of the process besides switch of energy sources e.g. operational conditions, type of raw material processed, use of non-energy additives, change in type or quality of products manufactured etc.	The PoA includes the installation of new LPG burners, storage tanks and feeding systems at the industrial plants. Therefore, CPAs will not involve an integrated change of the element process where the fuel switch is implemented. It is expected that the operational conditions, the type of raw material processed, the type or quality of the products manufactured, etc will remain equivalent throughout the crediting period and will be comparable to the operational conditions, the type of raw material processed, the quality of the products manufactured, etc in the baseline.
13. Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO ₂ equivalent annually.	Programme activities to be included in the PoA will not exceed 60 kt of CO ₂ in any case.
14. The project boundary is the physical, geographical site where the switching of energy source takes place. It includes all installations, processes or equipment affected by the switching. In case energy produced by the project activity is delivered to another facility, the boundary also extends to the industrial, commercial facilities consuming energy generated by the system.	The project boundary will be the physical, geographical site where the switching of energy source takes place. It is expected that it will include the replacement of the fuel storage, distribution and burning system. In those CPAs in which the energy produced is delivered to another facility, the boundary also will comprise the industrial, commercial facilities consuming energy generated by the system.
15. In case of existing facilities, historical information (detailed records) on the use of fossil fuels and the energy output (e.g. heat, steam or electricity) in the element process from at least three years prior to project implementation shall be used in the baseline calculations, e.g. information on coal use and heat output by a district heating plant, diesel use and steam generated by an industrial 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 collecting baseline validation data). For facilities that are less than three years old, all historical data shall be available (a minimum of one year data would be required).	Existing facilities to be included in the PoA will have historical information (detailed records) on the use of fossil fuels and the energy output in the element process from at least three years prior to project implementation. For facilities that are less than three years old, all historical data will be available with a minimum of one year. In cases where the estimated annual emission reductions are equal to or less than 600 tCO ₂ e per year per element process a simplified approach for calculating emission reductions will be used and the amount of fossil fuel consumed in the project activity in year y, FC _y , will be used as a proxy for determining baseline emissions.
16. For existing facilities having no historical data/information on baseline parameters such as efficiency, energy consumption and output (e.g. the available data is not reliable due to various factors such as the use of imprecise or non-calibrated measuring equipment), the baseline	For those existing facilities in which no historical data/information on baseline parameters such as efficiency, energy consumption and output are available, a performance test/measurement campaign, will be carried out prior to the implementation of the project activity, to



parameters can be determined using a performance test/measurement campaign to be carried out prior to the implementation of the project activity. The project proponent may follow the relevant provisions from the Tool to determine baseline efficiency of thermal and electricity systems. In the case of project activities that export to other facilities within the project boundary, historical data from the recipient plants is also required.	determine the baseline parameters. In cases where the estimated annual emission reductions are equal to or less than 600 tCO ₂ e per year per element process a simplified approach for calculating emission reductions will be used and the amount of fossil fuel consumed in the project activity in year y, FC _y , will be used as a proxy for determining baseline emissions.
17. In case of project activities where the estimated annual emission reductions of each of the element processes are equal to or less than 600 tCO ₂ e per year per element process an alternative approach may be used to calculate baseline emissions as per paragraph 21 using equation 3 instead of applying equation 1.	In case of CPAs where the estimated annual emission reductions of each of the element processes are equal to or less than 600 tCO ₂ e per year per element process, an alternative approach will be used to calculate baseline emissions based on the amount of fossil fuel consumed in the project activity in year y.

E.3. Description of the sources and gases included in the SSC-CPA boundary

The only emission source included within the limits of the Programme activity is the combustion of fuel (residual fuel oil in the baseline and LPG after the implementation of the Programme activity) by each of the CPA included in the Programme of Activities to obtain the energy output.

The only gas included within the limits of the Programme activity will be CO₂, since it is the primary emission from the combustion of fossil fuels. The gases CH₄ and N₂O are excluded from the scope of the Programme activity for reasons of materiality. However, leakage from the extraction, refining, transportation and distribution of the fuels are calculated.

The Programme activity boundary encompasses the fossil fuel fired thermal equipments utilized in the facility. In the case of the PoA, Programme activity boundary will vary depending on the type of industry included as CPA. The equipments in which the combustion occurs will include boilers, furnaces, etc. These energy generated in these thermal energy conversion equipment will be utilized in steam, heat or electricity generation.

In those CPAs in which the energy produced is delivered to another facility, the boundary also will comprise the industrial, commercial facilities consuming energy generated by the system.

The Programme activity limits are defined as shown in the following figures.



BEFORE IMPLEMENTING THE PROGRAMME

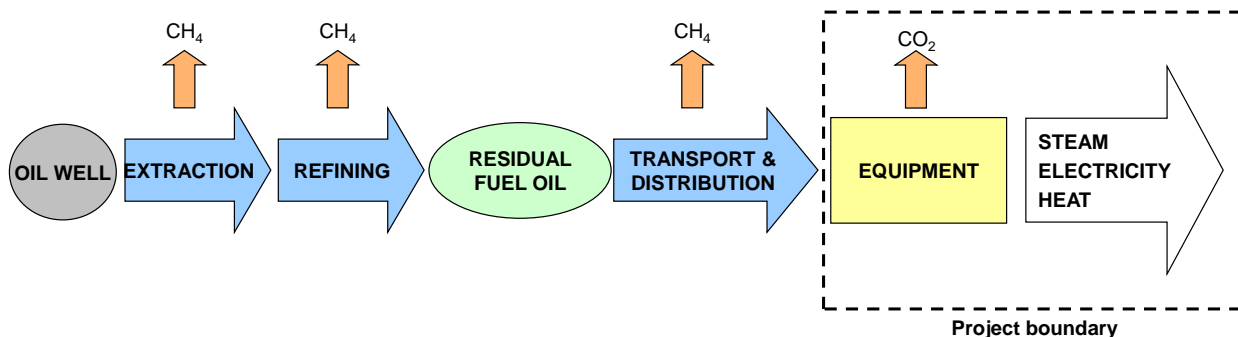


Figure 9. – Limits of the Programme activity before implementing the PoA.

AFTER IMPLEMENTING THE PROGRAMME

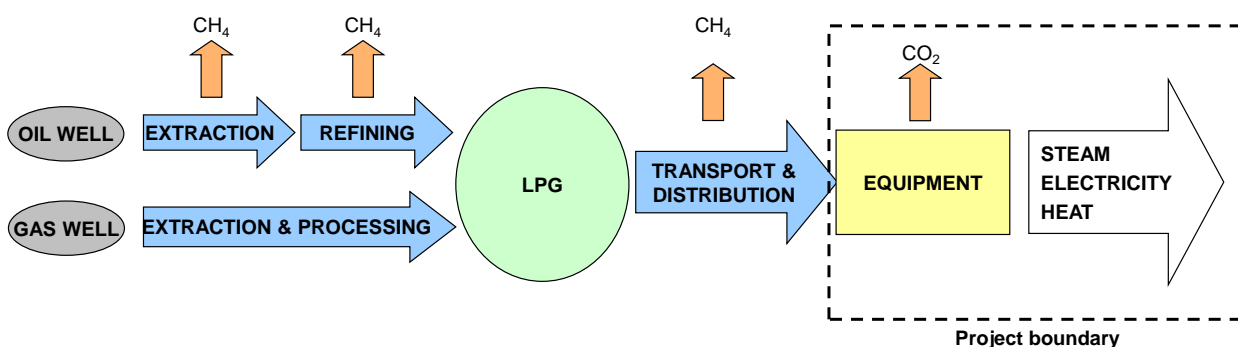


Figure 10. – Limits of the Programme activity after implementing the PoA.

E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

The baseline is the scenario that most likely would have occurred in the absence of the Programme. Based on the arguments provided below, the baseline has been determined to be the current practice in industry of consuming residual fuel oil for process heating. This conclusion is based on the fact that residual fuel oil is the most common fuel in Peru for industrial processes, and the energy matrix for industry in Peru has been relatively constant in terms of the mix of fuels used.

In Peru, the consumer energy matrix by sector and type of fuel clearly leans towards the consumption of residual fuel oil in the industrial sector. The second fuel used most in this sector is gasoil/diesel. The primary use of LPG in Peru is residential consumption, and its contributions to the industrial and transportation sectors are very small. This is due primarily to economic reasons; the difference in price makes the industrial sector, which is more sensitive to this factor, more inclined towards heavier fuels. The following table shows the consumption of oil-derivative fuels in Peru.



	LPG	Petrol	Aviación	Kerosene	Other Kerosene	Diesel Oil	Residual Fuel-oil
Total Final Consumption	725	883	1	452	83	2954	1121
Industry	140	24	0	0	4	503	846
Transport	92	752	1	452	0	2405	22
Residential	493	0	0	0	71	4	0
Commercial and Public Services	0	107	0	0	8	18	2
Agriculture / Forestry	0	0	0	0	0	24	251

Table 6. - Final fuel consumption in Peru (in thousands of tons).

Source: IEA Statistics, Oil in Peru in 2006

As shown, industrial LPG consumption is much lower than fuel oil and other heavy fuels such as diesel.

The following table shows the production of fuels in Peru. The most important fuel as regards production is residual fuel oil, which explains its heavy consumption at the industrial level, since it is offered at a more affordable price.

	Crude	LNG	LPG	Petrol	Aviación	Kerosene	Other Kerosene	Diesel Oil	Residual Fuel-oil
Production	4001	1343	193	1464	0	504	83	2638	2878

Table 7. – Fuel production in Peru (in thousands of tons).

Source: IEA Statistics, Oil in Peru in 2006

There is no official exhaustive statistical information in Peru regarding the consumption of fuels in industrial equipment such as boilers; even less on the number of boilers that exist. The best base available for estimating the consumption of fuel and the number of industrial boilers in the country is the National Survey of Boilers (ENC) taken by the Ministry of Industry, Tourism, Integration and International Trade Negotiations in 2000 (MITINCI 2000)²⁴. In this survey, a total of 1,147 boilers were declared with the participation of 369 companies from the productive and services sectors.

The most commonly used fuels in boilers are residual oil 500 (R500) with 58.9%, residual oil 6 (R6) with 24.3%, diesel oil 2 with 9.2% and cane bagasse with 5.6% (MITINCI 2000). Oil-derived fuels account for 94.4% of the total fuel consumption of boilers. Biomass accounts for the remaining 5.6%.

Two of the possible industrial sectors to be included in the PoA are manufacturing companies and fish flour. Based on this survey, which was responded, amongst others, by 269 manufacturing companies included in Section D (Divisions 15 to 37) of the CIIU (International Standard Industrial Classification) and 69 fish flour, oil and canned fish producers, the number of boilers and their total power (in MW) are the following.

SECTOR	Number of firms	Number of boilers	Boiler's power (MW)
Manufacturing industries	269	649	2,825
Producers of fish flour, oil and canned food (fishing)	66	371	12,628

Table 8. – Source: MITINCI National Boiler Survey, 2000.

In the ENC, the companies reported their fuel consumption in gallons (liquid fuels) and in tons (solid fuels). These units have been converted to energy units (TJ) based on the lowest calorific power of the different fuels.

²⁴ <http://www.oeko.de/files/forschungsergebnisse/application/octet-stream/download.php?id=578>



Fuel	Specific gravity	LHV	
	ton/m3 (15.5 °C)	GJ/gal	GJ/ton
LPG	0.545	0.09246	44.84
Diesel-2	0.856	0.13790	42.59
Residual Oil-4	0.901	0.14285	41.87
Residual Oil-5	0.934	0.14612	41.35
Residual Oil-6	0.964	0.14903	40.85
Residual Oil-500	0.980	0.15053	40.49
Bagasse	-	-	6.28
Wood	-	-	15.06
Sawdust	-	-	13.05
Anthracite coal	-	-	29.00
Bituminous coal	-	-	32.40

Table 9. – LHV and specific weight of fuels consumed in the industry.

Source: Feasibility Study for a CDM Project. Improving Energy Efficiency in Industrial Boilers in Peru. Gesellschaft für Technische Zusammenarbeit (GTZ), Germany, and the Ministry of Industry (MITINCI), Peru

The results of the ENC are shown below.

Fuel	Companies with information on annual consumption in the National Survey			Projection of consumption for every manufacturing company that answered the survey			Projection of consumption for every manufacturing company that did not answer the survey			TOTAL PROJECTION		
	No. Of boilers	Capacity (MW)	Consumption (TJ)	No. Of boilers	Capacity (MW)	Consumption (TJ)	No. Of boilers	Capacity (MW)	Consumption (TJ)	No. Of boilers	Capacity (MW)	Consumption (TJ)
Total	348	1,967	16,767	649	2,825	24,468	501	1,246	7,183	1,150	4,071	31,650
Residual Petrol 500	118	944	944	161	1,077	8,074	61	410	3,078	222	1,487	11,152
Residual Petrol 6	88	572	572	135	709	6,232	47	249	2,185	182	958	8,417
Residual Petrol 5	9	17	17	12	21	245	-	-	-	12	21	245
Residual Petrol 4	2	2	2	2	2	14	-	-	-	2	2	14
Diesel Petrol 2	105	192	192	253	378	1,238	392	587	1,920	645	965	3,158
GLP	9	18	18	26	172	667	-	-	-	26	172	667
Cane Chaff	12	215	215	25	326	5,490	-	-	-	25	326	5,490
Carbon	0	0	0	0	0	0	-	-	-	0	0	0
Wood	0	0	0	9	30	not estimated	-	-	-	9	30	not estimated
Others	5	5	5	26	109	2,508	-	-	-	26	109	2,508

Table 10. – Fuel consumption forecast, number of boilers and capacity in manufacturing companies.

Source: Feasibility Study for a CDM Project. Improving Energy Efficiency in Industrial Boilers in Peru. Gesellschaft für Technische Zusammenarbeit (GTZ), Germany, and the Ministry of Industry (MITINCI), Peru

Fuel	Companies with information on annual consumption in the National Survey			Projection of consumption for every manufacturing company that answered the survey			Projection of consumption for every manufacturing company that did not answer the survey			TOTAL PROJECTION		
	No. Of boilers	Capacity (MW)	Consumption (TJ)	No. Of boilers	Capacity (MW)	Consumption (TJ)	No. Of boilers	Capacity (MW)	Consumption (TJ)	No. Of boilers	Capacity (MW)	Consumption (TJ)
Total	213	1,640	9,298	371	2,628	15,035	170	1,218	6,903	541	3,846	21,938
Residual Petrol 500	155	1,174	6,512	245	1,752	9,715	122	872	4,835	367	2,623	14,550
Residual Petrol 6	52	426	2,657	112	832	5,183	43	316	1,972	155	1,148	7,155
Residual Petrol 5	0	0	0	0	0	0	-	-	0	0	0	0
Residual Petrol 4	0	0	0	0	0	0	-	-	0	0	0	0
Diesel Petrol 2	1	0	1	6	3	6	1	0	1	7	3	6
GLP	3	23	27	5	25	29	3	17	20	8	42	50
Cane Chaff	0	0	0	0	0	0	-	-	0	0	0	0
Carbon	2	17	101	2	17	101	1	12	75	3	29	177
Wood	0	0	0	0	0	0	-	-	0	0	0	0
Others	0	0	0	1	0	not estimated	-	-	0	1	-	not estimated

Table 11. – Fuel consumption forecast, number of boilers and capacity in industrial fishing companies.

Source: Feasibility Study for a CDM Project. Improving Energy Efficiency in Industrial Boilers in Peru. Gesellschaft für Technische Zusammenarbeit (GTZ), Germany, and the Ministry of Industry (MITINCI), Peru



Of the capacity installed in manufacturing companies, 36.5% consume R500 fuel oil, 23.5% consume R6, while just 4.2% of the installed capacity uses LPG as its fuel. For the industrial fishing companies, these percentages are 68.2%, 29.8% and 1.09%, respectively.

The MITINCI made a complete forecast for the manufacturing and fishing companies that did not answer the surveys, with the following results. Of the 1,691 boilers studied, 55.6% use residual fuel oil, while just 2% use LPG. The fuels used most are Residual Fuel Oil 500 (R500) at 58.9%, Residual Fuel Oil 6 (R6) at 24.3%, Diesel 2 at 9.2% and Sugarcane Bagasse at 5.6%.

Fuel	Number of boilers	Capacity (MW)	Fuel Consumption (TJ)
Total	1,691	7,917	51,080
Residual Petrol 500	589	4,110	25,701
Residual Petrol 6	337	2,106	15,572
Residual Petrol 5	12	21	245
Residual Petrol 4	2	2	14
Diesel Petrol 2	652	968	3,164
GLP	34	215	717
Cane Chaff	25	326	5,490
Carbon	3	29	177
Wood	9	30	not estimated
Others	27	109	not estimated

Table 12. – Complete forecast in manufacturing and industrial fishing companies.

Source: Feasibility Study for a CDM Project. Improving Energy Efficiency in Industrial Boilers in Peru. Gesellschaft für Technische Zusammenarbeit (GTZ), Germany, and the Ministry of Industry (MITINCI), Peru

These results show that the baseline scenario corresponds to the continuation in the use of residual fuels, in keeping with the current practice in Peruvian industries.

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA):

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

As indicated in Section A.4.3, assessment and demonstration of additionality is to be done at the CPA level.

In accordance with the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” (version 02.1), additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented CPAs would occur. Depending on the type of CPA, this should be done taking into account different principles:

- Micro-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of the “Guidelines for demonstrating additionality of microscale project activities (version 04.0)”.



- Small-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of the “Guidelines on the demonstration of additionality of small-scale project activities (version 09.0)”.
- Large scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements contained in the additionality section of the large scale methodologies.

The *Programme of activities to switch from residual fuel oil to LPG in manufacturing industries in Peru* will consist of different CPAs which can include Micro-scale or Small-scale projects. Therefore, assessment and demonstration of additionality will be done at the CPA level using different approaches depending on the type of CPA (Micro-scale or Small-scale CPA).

Approach 1: Micro-scale CPAs

In these cases, additionality will be assessed following the “Guidelines for demonstrating additionality of microscale project activities” (version 04.0). Those CPA that implement an approved Type III small scale CDM methodology and that aim to achieve emissions reductions at a scale of no more than 20 ktCO₂e per year, are additional if any one of the following conditions is satisfied

- (a) *The geographic location of the project activity is an LDC/SIDS or special underdeveloped zone of the host country as identified by the government in accordance with the paragraph 2 (a) from the “Guidelines for demonstrating additionality of microscale project activities (version 04.0)”.*
- (b) *The project activity is an emission reduction activity with both conditions (i) and (ii) satisfied (see below);*
 - (i) *Each of the independent subsystems/measures in the project activity achieves an estimated annual emission reduction equal to or less than 600 tCO₂e per year; and*
 - (ii) *End users of the subsystems or measures are households/communities/SMEs.*

The PoA will implement the AMS-III.B Switching fossil fuels (version 16), an approved Type III small scale CDM methodology.

Since Peru is not considered an LDC/SIDS country, Programme activities shall be eligible under Approach 1 only if each of the independent subsystem/measure in the CPA achieves an estimated annual emission reduction equal to or less than 600 tCO₂e per year and end user are households/communities/SMEs (with the exception of CPAs implemented in special underdeveloped zone of Peru as identified by the government in accordance with the paragraph 2 (a) from the “Guidelines for demonstrating additionality of microscale project activities, version 04.0”, which will be automatically additional).

Peruvian national legislation defines²⁵ micro and small enterprises but there is no an official description of SMEs. For this reason, the definition of the International Finance Corporation (IFC), part of the World Bank Group will be used. According to IFC, SMEs are those that²⁶:

²⁵ “Texto Único Ordenado de la Ley de Promoción de la Competitividad, Formalización y Desarrollo de la Micro y Pequeña Empresa y del Acceso al Empleo Decente, Ley MYPE DECRETO SUPREMO N° 007-2008-TR,” <http://www.sunat.gob.pe/orientacion/mypes/normas/ds007-2008.pdf>

²⁶ Source: Financing Micro, Small, and Medium Enterprises, Page (ICF, 2008): [http://www.ifc.org/ifcext/ieg.nsf/AttachmentsByTitle/MSME-FIFullReport/\\$FILE/MSME-Full-Report.pdf](http://www.ifc.org/ifcext/ieg.nsf/AttachmentsByTitle/MSME-FIFullReport/$FILE/MSME-Full-Report.pdf)



Enterprise indicators (two out of three must be met)	Micro	Small	Medium
1. Number of employees	≤10	>10; ≤50	>50; ≤300
2. Total assets	≤\$100,000	>\$100,000; ≤\$3,000,000	>\$3,000,000; ≤\$15,000,000
3. Total annual sales	≤\$100,000	>\$100,000; ≤\$3,000,000	>\$3,000,000; ≤\$15,000,000
IFC Global Financial Markets Department and IEG proxy			
Financial intermediary subloan amount	<\$10,000	\$10,000; <\$100,000	\$100,000; <\$1,000,000

CPAs included in Approach 1 will be additional if the requirements specified above are satisfied.

In cases where ex ante projected emissions reductions show an increase during the crediting period, additionality of those CPAs that go beyond the above mentioned limits in any year of the crediting period will be reassessed using Approach 2.

Approach 2: Small-scale CPA

In these cases, additionality and therefore the demonstration that in the absence of the CDM the proposed voluntary measure would not be implemented will be assessed following the "Guidelines on the demonstration of additionality of small-scale project activities (version 09.0)".

This document states that “project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers: (a) Investment barrier; (b) Technological barrier; (c) Barrier due to prevailing practice; (d) Other barriers”.

The additionality argument for the PoA will be demonstrated using option (a) Investment barrier.

Investment barrier

The investment barrier will be demonstrated based on the investment analysis Sub-step 2b, Option III. Apply benchmark analysis of the “Tool for the demonstration and assessment of additionality (version 06.0.0)”.

Step 2. Investment analysis

As mentioned in section A.4.3., the most appropriate analysis method in this case is “Option III. Apply benchmark analysis”, which involves an analysis of the cash flows deducted from the capital cost of the project investment, with the subsequent analysis of its Internal Rate of Return. The investment analysis will be conducted from the point of view of RYCOPESA and the financial returns obtained from investing in the equipment to be installed in the client’s operations and offering a discount to market price that is sufficient to incentivize the client to switch. The indicator that will be used is Project IRR.

The IRR obtained from the Programme activity will be compared to a benchmark IRR. For the benchmark analysis, the Project IRR is considered the most suitable financial indicator. The post-tax Project IRR will be used, since it includes all in and out cash flows. According to the “Tool for the demonstration and assessment of additionality” (version 06.0.0) option a) was used to determine the discount rate and benchmark used for the benchmark analysis.



(a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data;

In order to estimate an adequate discount rate to evaluate the Programme activity financial feasibility the following will be considered:

- Government bond rates for 10 years in Peru published by the Ministry of Economy and Finance of Peru²⁷.
- Country Risk for Peru published by the Organisation for Economic Co-operation and Development (OECD).²⁸

From the above the total benchmark value would be: Government bond rates for 10 years in Peru + Country Risk for Peru.

For each CPA, the Programme activity IRR without taking into account revenues from CERs will be calculated. This IRR will be compared with the IRR estimated previously, the benchmark, and in each case a conclusion will be reached regarding whether or not the Programme activity is additional.

For the IRR calculation, the cash flows considered in each CPA will be the following parameters (in USD):

Gross LPG sales
Gross LPG costs
Primary Transport
Secondary Transport
Contribution margin
Capital cost of equipment
Expenses
Maintenance and technical development
Commercial services
Customer Service
Post-sales and collections
Advertising and marketing
Supervision and sales
Sales management
Product management
Equipment maintenance
Vaporizers
Tanks
Operative costs
Vaporizers
Tanks
Residual value

²⁷ http://www.mef.gob.pe/index.php?option=com_content&view=article&id=682&Itemid=101189&lang=es

²⁸ Historical Country Risk Classification (OECD): <http://www.oecd.org/dataoecd/9/12/35483246.pdf>



Amortization
Structure Personnel
Other expenses
Asset amortization
Earnings before interest and taxes (EBIT)
Earnings after taxes
Total Cost Cash Flow

In order to consider revenues from CERs in the investment analysis of the Programme Activity, the following parameters will be included:

Income from sale of certificates
Result of sales of certificates
Earnings before interest and taxes (EBIT) considering CER revenues
Earnings after taxes considering CER revenues
Total cost Cash Flow considering CER revenues

Sensitivity Analysis:

To verify the consistency of the investment analysis, a sensitivity analysis will be undertaken. According to what is stated in “Combined tool to identify the baseline scenario and demonstrate additionality (version 4.0.0)”, only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues are subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude). As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and –10%, unless this is not deemed appropriate in the context of the specific project circumstances. The variation necessary in these parameters to reach the benchmark IRR will be calculated.

This sensitivity analysis will include, among other possible parameters depending on the case of each Programme activity, at least the following entries:

	Parameter
Sensitivity analysis	LPG price
	LPG sales
	Investment
	Expenses
	Transport costs

The CPA will be additional in those cases in which the investment analysis corroborates the fact that the Programme activity is not economically attractive and would not be undertaken in the absence of the PoA.



E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

The Programme of activities will consist of different CPAs which can include Micro-scale or Small-scale projects. Therefore, assessment and demonstration of additionality will be done at the CPA level using different approaches depending on the type of CPA (Micro-scale or Small-scale CPA).

Approach 1: Micro-scale CPAs

In these cases, additionality will be assessed following the “Guidelines for demonstrating additionality of microscale project activities (version 04.0)”.

To prove that a CPA can be considered as a Micro-scale CPA the following information has to be provided and assessed:

- Estimated annual emission reductions, calculated based on the approach presented in Section E.6.2.
- Enterprise indicators (Number of employees, Total assets and Total annual sales), in order to demonstrate that the industry in which the CPA will be implemented is a SME, as indicated in Section E.5.1.

Approach 2: Small-scale CPAs

In these cases, the additionality argument for the PoA will be demonstrated using option (a) Investment barrier, of the “Guidelines on the demonstration of additionality of small-scale project activities (version 09.0)”.

The investment barrier will be demonstrated based on the investment analysis Sub-step 2b, Option III. Apply benchmark analysis of the “Tool for the demonstration and assessment of additionality (version 06.0.0)”.

To prove that a CPA is not financially attractive as laid out in Section E.5.1, the SSC-CPA-DD shall adapt the financial parameters mentioned above. The following information has to be provided and assessed:

- The applicable benchmark, calculated based on the approach presented in Section E.5.1.
- The IRR of the CPA, calculated based on the approach presented in Section E.5.1. The key parameters for the calculation have to be adapted based on Programme activity information.
- A sensitive analysis on, LPG price, LPG sales, Investment costs, Expenses cost and Transport costs, as presented in Section E.5.1.

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:



The baseline emissions are calculated according to the equations established in AMS-III.B *Switching fossil fuels*, version 16, and in accordance with the IPCC National Inventory Guidelines (2006 version).

To calculate the emission leakage emissions, the ACM0009 methodology (version 3.2), *Consolidated baseline and monitoring methodology for fuel switching from coal or petroleum fuel to natural gas* will be used.

The estimates for the reduction of emissions for the CPAs are described in section E.6.2.

Provisions regarding the revisions of the CPAs in case the methodology is put on hold or withdrawn.

- If the approved methodology is put on hold or withdrawn, for any reason other than for the purpose of inclusion in a consolidated methodology, no new CPAs shall be included to the PoA.
- If the methodology is subsequently revised or replaced by inclusion in a consolidated methodology, the PoA shall be revised accordingly and the changes shall be validated by a DOE and approved by the Board if new CPAs are to be included. The Board's approval defines a new version of the PoA and the PoA specific CDM-CPA-DD.
- Once changes have been approved by the Board, each new CPA shall use the latest version of the PoA specific CDM-CPA-DD.
- CPAs that were included before the methodology was put on hold, shall apply the latest version of the PoA specific CDM-CPA-DD at the time of the renewal of the crediting period.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

Baseline

According to the AMS-III.B methodology, version 16, the baseline emissions are determined according to the following 2 options:

Option 1: CPAs with an estimated annual emission reductions more than 600 tCO₂ per year

AMS-III.B methodology, version 16, establishes in its paragraph 18:

18. The emission baseline is the current emissions of the facility expressed as emissions per unit of output. Baseline emissions shall be determined as follows:

$$BE_y = EF_{BSL} * Q_{PJ,y} \quad (1)$$

Where:

BE_y Baseline emissions in the project activity in year y (tCO₂e)



EF_{BSL} Emission factor for the baseline situation (tCO₂/ MWh)

$Q_{PJ,y}$ Net energy output in the project activity in year y (MWh)

The emission factor in the baseline situation (EF_{BSL}) is the coefficient for the fossil fuel used in the baseline expressed as emissions per unit of energy output and shall be calculated as following:

$$EF_{BSL} = \sum_{i,j} FC_{i,j,BL,y} * NCV_j * EF_{CO_2,j} / Q_{BSL,j} \quad (2)$$

Where:

EF_{BSL} Emission factor for the baseline situation (tCO₂/ MWh)

$FC_{i,j,BL,y}$ Amount of fuel j consumed by the element process i during the year y operating at the baseline energy scenario (mass or volume unit)

NCV_j Net calorific value of the fuel type j (kJ /unit)

$EF_{CO_2,j}$ CO₂ emission factor of the fuel type j (tCO₂/ kJ)

$Q_{BSL,j}$ Net energy generated in the element process j in the baseline situation during the corresponding period of time for which the total fuel consumption was taken, in accordance with paragraph 15 (MWh)

Option 2: CPAs with an estimated annual emission reductions equal to or less than 600 tCO₂ per year

AMS-III.B methodology, version 16, establishes in its paragraph 21:

21. In case of project activities where the estimated annual emission reductions of each of the element processes are equal to or less than 600 tCO₂e per year per element process the amount of fossil fuel consumed in the project activity in year y, FC_y , can be used as a proxy for determining baseline emissions using the following equation:

$$BE_y = FC_{PJ,y} * NCV_{FF,PJ,y} * EF_{FF,CO_2,BL} \quad (3)$$

Where:

$FC_{PJ,y}$ Amount of fuel consumed in the project activity during year y (mass or volume unit)

$NCV_{FF,PJ,y}$ Net calorific value of the fossil fuel used in the project activity in TJ/mass or volume unit

$EF_{FF,CO_2,BL}$ CO₂ emission factor of the fossil fuel used in the baseline activity (tCO₂/TJ)

Project Emissions

According to the AMS-III.B methodology, version 16, the emissions of the project are the emissions related to the consumption of fossil fuel. The project emissions are determined according to equation (4):



$$PE_y = FC_{PJ,y} * NCV_{FF,PJ,y} * EF_{FF,CO2,PJ} \quad (4)$$

Where:

$EF_{FF,CO2,PJ}$ CO₂ emission factor of project fuel combusted in the project activity in tCO₂/TJ

$NCV_{FF,PJ,y}$ Net calorific value of the fossil fuel used in the project activity in TJ/mass or volume unit

Leakage

Based on the methodology AMS-III.B, version 16, the following conditions apply in a Programme activity under a Programme of Activities:

Leakage emissions resulting from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary shall be considered, as per the guidance provided in the leakage section of ACM0009. In case leakage emissions in the baseline situation are higher than leakage emissions in the project situation, leakage emissions will be set to zero.

The leakage emission source considered is the fugitive methane emissions associated with the extraction, processing, transportation and distribution of the fuels considered in the baseline and project scenarios.

The quantity of LPG consumed in all element processes of the Programme activity in which the fuel switch has been undertaken will be multiplied by a specific emission factor for these upstream emissions ($EF_{LPG,upstream,CH4}$). The product of the quantity of residual fuel oil consumed multiplied by the respective methane emission factor ($EF_{k,upstream,CH4}$) will then be subtracted as follows:

$$LE_y = \left[FC_{project,y} \cdot NCV_{LPG,y} \cdot EF_{LPG,upstreamCH4} - \sum_k FC_{baselinek,y} \cdot NCV_k \cdot EF_{k,upstreamCH4} \right] \cdot GWP_{CH4} \quad (5)$$

Where:

LE_y Leakage emissions due to upstream fugitive CH₄ emissions in the y (tCO₂e)

$FC_{project,y}$ Quantity of LPG combusted in all element processes during the year y (mass unit)

$NCV_{LPG,y}$ Average net calorific value of the LPG burned in year y (GJ per unit of mass or volume)

$EF_{LPG,upstreamCH4}$ Emission factor of the upstream leakage emissions caused by the production of LPG (t per GJ of fuel at the point of consumption)

$FC_{baselinek,y}$ Quantity of type k fuel (residual fuel oil) that would be burned in the absence of the project activity in all processes in the year y (t/year)

NCV_k Average net calorific value of the type k fuel (residual fuel oil) that would be burned in the absence of the project in year y (GJ/t).



$EF_{k,upstreamCH_4}$ Emission factor of the upstream leakage emissions caused by the production of type k fuel (residual fuel oil) in t per GJ of fuel produced

GWP_{CH_4} Global warming potential of methane valid for the relevant commitment period.

The Emission factors of the upstream leakage emissions caused by the production of LPG and residual fuel oil will be calculated from reliable sources as indicated in Annex 3.

Emission Reductions

Emission reductions in year y (ER_y) are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (6)$$

Where:

BE_y Baseline emissions in year y (t CO₂/y)

PE_y Project emissions in year y (t CO₂/y)

LE_y Leakage emissions in year y (t CO₂/y)

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

Data / Parameter:	$FC_{Residual, BL}$
Unit:	metric tonnes
Description:	Quantity of residual fuel oil (e.g. R500 and R6) consumed in the element process during the last three years (average of the three years) or during the last year if the activity has been operational for fewer than three years.
Source used:	Plant records
Applied value:	Specific value for each CPA
Justification of the selection of data or description of the methods for measurement and procedures applied:	The average quantity of residual fuel oil consumed during the last three years or during the last year if the activity has been operational for fewer than three years.
Comments:	

Data / Parameter:	$EF_{Residual, CO_2, BL}$
Unit:	tCO ₂ e/MJ
Description:	Emission factor for residual fuel oil (e.g. R500 and R6)
Source used:	IPCC 2006 Guidelines.
Applied value:	0.0000755
Justification of the selection of data or description of the	Emission factor of the residual fuel oil provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 1. Lower value has been chosen in a conservative manner.



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methods for measurement and procedures applied:	http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Comments:	Any future revision of the IPCC Guidelines will be taken into account.

Data / Parameter:	$NCV_{Residual}$
Unit:	MJ/t
Description:	Net calorific value of the residual fuel oil (e.g. R500 and R6)
Source used:	IPCC 2006 Guidelines.
Applied value:	39,800
Justification of the selection of data or description of the methods for measurement and procedures applied:	Net Calorific Value of the residual fuel oil provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 1. This value already includes the oxidation factor. Lower value has been chosen in a conservative manner. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf .
Comments:	Any future revision of the IPCC Guidelines will be taken into account.

Data / Parameter:	$EF_{LPG,CO_2,PJ}$
Unit:	tCO ₂ e/MJ
Description:	CO ₂ emission factor for the LPG
Source used:	IPCC 2006 Guidelines
Applied value:	0.0000656
Justification of the selection of data or description of the methods for measurement and procedures applied:	Emission factor of the LPG provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 1. Higher value has been chosen in a conservative manner. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Comments:	Any future revision of the IPCC Guidelines will be taken into account.

Data / Parameter:	$NCV_{LPG,PJ}$
Unit:	MJ/t
Description:	Net calorific value of LPG
Source used:	IPCC 2006 Guidelines
Applied value:	52,200
Justification of the selection of data or description of the methods for measurement and procedures applied:	Net calorific value of LPG provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 1. Higher value has been chosen in a conservative manner. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
Comments:	Any future revision of the IPCC Guidelines will be taken into account.



Data / Parameter:	Q_{BSL}
Unit:	MJ
Description:	Net energy generated in the element process in the baseline situation during the corresponding period of time for which the total fuel consumption was taken (average value).
Source used:	Plant records
Applied value:	Specific value for each CPA
Justification of the selection of data or description of the methods for measurement and procedures applied:	The average quantity of net energy generated during the last three years or during the last year if the activity has been operational for fewer than three years.
Comments:	This parameter will not be calculated in those CPAs with an estimated annual emission reductions equal to or less than 600 tCO ₂ per year.

Data / Parameter:	$EF_{Residual, upstream, CH_4}$
Unit:	tCO ₂ /MJ
Description:	Emission factor of the methane leakage emissions existing upstream caused by the production of residual fuel oil (e.g. R500 and R6).
Source used:	<i>Fuel and Energy Production Emission Factors</i> , written by Dr. C. A. Lewis as part of the MEET Project: <i>Methodologies for Estimating Air Pollutant Emissions from Transport</i> .
Applied value:	0.00000528
Justification of the selection of data or description of the methods for measurement and procedures applied:	This value includes the emissions from extraction, refining, distribution and transportation. Taking into account that the source of the fuel oil is essentially unknown and given that there are three types of refining and a factor for each type, the average of the three factors has been determined.
Comments:	Annex 3 shows details of the calculation of this factor.

Data / Parameter:	$EF_{LPG, upstream, CH_4}$
Unit:	tCO ₂ /MJ
Description:	Emission factor of the methane leakage emissions existing upstream caused by the production of LPG
Source used:	<i>Fuel and Energy Production Emission Factors</i> , written by Dr. C. A. Lewis as part of the MEET Project: <i>Methodologies for Estimating Air Pollutant Emissions from Transport</i> .
Applied value:	0.00000791
Justification of the selection of data or description of the methods for measurement and procedures applied:	This value includes the emissions from extraction, refining, distribution and transportation. Taking into account that the source of the LPG is essentially unknown and given that there are three types of refining and a factor for each type, the average of the three factors has been determined.
Comments:	Annex 3 shows details of the calculation of this factor.



E.7. Application of the monitoring methodology and description of the monitoring plan:

E.7.1. Data and parameters to be monitored by each SSC-CPA:

Data / Parameter:	$Q_{PJ,y}$
Unit:	MJ
Description:	Net energy output generated in the element process in the project activity situation in year y.
Source used:	Onsite measurements
Value applied for the calculation of the emission reductions in B.5.	Specific value for each CPA
Description of the measurement methods and procedures to be applied:	Measurements will be undertaken in each element process using calibrated energy meters as per the established industrial practice. The measurement of the energy generated will differ depending on the type of CPA: <ul style="list-style-type: none"> • For electricity generation, direct measurement via a counter will be used. • For steam generation, direct measurement via, for example, a multivariable vortex will be used. • For heat generation, indirect measurement via differences in temperature, differences in weight of the product, etc will be used to estimate the energy output.
QA/QC procedures to be applied:	Energy meters will be subjected to regular maintenance operations and calibrations. The consistency of metered energy output generated will be cross-checked by an annual energy balance that is based on consumed quantities of fossil fuels.
Comments:	The value applied for ex-ante calculation of the emission reductions will be a forecast of the future energy generated based on historical data and the forecasted LPG consumption. This parameter will not be measured in those CPAs with an estimated annual emission reductions equal to or less than 600 tCO ₂ per year.

Data / Parameter:	$FC_{LPG,i,y}$
Unit:	metric tonnes
Description:	Quantity of LPG combusted in year y
Source used:	Receipts from the LPG supply company, based on the meter on the tanker truck.
Value applied for the calculation of the emission reductions in B.5.	The total amount of LPG consumed annually by any client will be the sum of the quantities stated in all the receipts except the last one, because that quantity of LPG might not have been consumed at the moment of the calculation.
Description of the measurement methods and procedures to be applied:	The amount of LPG supplied will be measured by the tank meter and written in longhand in the receipt.
QA/QC procedures to be applied:	The tanker truck meters will be subject to regular maintenance operations and calibrations.



Comments:	<p>The value applied for ex-ante calculation of the emission reductions is a forecast of the future consumption of LPG. This value will be based on:</p> <ul style="list-style-type: none"> • <i>The unitary power (nominal power rating) of the thermal energy conversion equipment included in the Programme activity boundary (boiler).</i> • <i>A correction factor to calculate the real power (versus nominal power rating) of this equipment in order to estimate the actual consumption of LPG.</i> • <i>The Net Calorific Value (NCV) of the LPG.</i> • <i>The hours per shift in which the boiler is used.</i>
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Data / Parameter:	$E_{exported, PJ, y}$
Unit:	MWh/GJ
Description:	Electricity/thermal energy generated in the CPA and used by the recipient end in year y.
Source used:	Onsite measurements
Value applied for the calculation of the emission reductions in B.5.	Specific value for each CPA
Description of the measurement methods and procedures to be applied:	<p>The measurement of the energy used will be undertaken in the recipient end as per the established industrial practice and will differ depending on the type of CPA:</p> <ul style="list-style-type: none"> • For electricity generation, direct measurement via a counter will be used. • For steam generation, direct measurement via, for example, a multivariable vortex will be used. • For heat generation, indirect measurement via differences in temperature, differences in weight of the product, etc will be used to estimate the energy output.
QA/QC procedures to be applied:	<p>Energy meters will be subjected to regular maintenance operations and calibrations.</p> <p>The consistency of metered energy output generated will be cross-checked with the measurements of the energy generated in the CPA's facility.</p>
Comments:	<p>The value applied for ex-ante calculation of the emission reductions will be a forecast of the future energy generated based on historical data and the forecasted LPG consumption.</p> <p>This parameter will only be measured in those CPAs in which the heat, steam or electricity produced is exported to other facilities.</p>

E.7.2. Description of the monitoring plan for a SSC-CPA:



The purpose of the monitoring plan is to provide guidance for the implementation of measurement and record management operations in order to determine GHG emissions reductions.

The monitoring plan provides the procedures needed for meeting CDM requirements for verification and certification.

The monitoring plan specifies the parameters needed to be measured, stored and used for the purpose of calculating the emission reductions generated by the Programme activity. Information regarding monitoring procedures is included in Annex 4.

Clear roles and responsibilities will be assigned to all staff involved in the Programme of Activities. RYCOPESA will be responsible for the application of the monitoring plan and will coordinate the interaction within all these components.

Role and responsibilities description	CPA's technical staff	RYCOPESA
Overall responsibility of development and implementation of the management system		Director of RYCOPESA
Collection of economic and technical data from the CPA		RYCOPESA's Commercial staff
Assessment whether eligibility criteria included in PoA-DD are met and demonstration of CPA's additionality		RYCOPESA's Commercial staff and Technicians
Assessment whether a proposed SSC-CPA has already been registered as a CDM project activity or as a CPA of another PoA or is requesting registration, is under review or for which review or corrections have been requested.		RYCOPESA's Commercial staff and Technicians
Development of CPA-DD		RYCOPESA's Commercial staff and Technicians
Collection of data to be monitored	Technicians responsible for production process (energy output)	Technicians of RYCOPESA (LPG combusted)
Calibration and maintenance of key monitoring equipment	Technicians responsible for maintenance and calibration of monitoring equipment (equipment to monitor the energy output)	Technicians of RYCOPESA (equipment to monitor the LPG consumed)
Checking of monitored data following QA/QC procedures	Technicians responsible for production process	RYCOPESA's and Technicians
Verifying and recording the data		RYCOPESA's Commercial staff and Technicians
Calculations of the emission reductions of year y		RYCOPESA's Commercial staff and Technicians
Development of the Monitoring report		RYCOPESA's Commercial staff and Technicians

Table 13.- Roles and responsibilities

The coordinating entity will check that the equipment remain in each plant during the crediting period, despite the fact that one client might not consume LPG (nor generate CERs) during a certain period of time.



The coordinating entity will monitor also the remaining lifetime of project equipment. In each CPA, the requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the General Guidelines to SSC methodologies (version 17). If the remaining lifetime of the affected systems increases due to the Programme activity, the crediting period shall be limited to the estimated remaining lifetime, i.e. the time when the affected systems would have been replaced in the absence of the Programme activity.

All the CPA staff members involved in implementing the Programme activity will be trained by RYCOPESA's technicians before the start of the relevant monitoring steps.

Specifically, client's Plant Manager, as well as the technicians responsible for control of production process, maintenance and calibration of monitoring equipment and quality system management will be trained by RYCOPESA's technicians in order to make them aware of the rules of the CDM and PoA.

Client's staff	Training content
Plant Manager	<ul style="list-style-type: none">- Rules of the CDM and PoA- Eligibility criteria for inclusion of a CPA in the PoA (general issues)
Technicians responsible for production process	<ul style="list-style-type: none">- Rules of the CDM and PoA- Eligibility criteria for inclusion of a CPA in the PoA- Parameters to be monitored and monitoring procedures
Technicians responsible for maintenance and calibration of monitoring equipment	<ul style="list-style-type: none">- Rules of the CDM and PoA- Parameters to be monitored and monitoring procedures
Technicians responsible for quality system management	<ul style="list-style-type: none">- Rules of the CDM and PoA- Parameters to be monitored and monitoring procedures

Table 14.- Training content

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

The baseline study and monitoring methodology has been determined on 19/03/2012 by:

Contact person: Mr. Jamie MacKinnon
Company name: Repsol YPF
Telephone number: (+34) 91 348 8100
Fax number: (+34) 91 348 9946
E-mail: jmackinnon@repsol.com



Annex 1

**CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and
PARTICIPANTS IN THE PROGRAMME of ACTIVITIES**

Organization:	REPSOL YPF COMERCIAL DEL PERU S.A. (RYCOPESA)
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Building:	Torres, 5 Piso 6
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State/Region:	Lima
Postfix/ZIP:	27
Country:	Peru
Telephone:	
FAX:	
E-Mail:	
URL:	http://www.repsol.com
Represented by:	
Title:	
Salutation:	Mister
Last Name:	De La Torre Vivar
Middle Name:	
First Name:	Luis Alberto
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Mobile:	
Direct FAX:	2157314
Direct tel:	(511) 215 7300
Personal E-Mail:	ladelatorrev@repsol.com



Annex 2

INFORMATION ON PUBLIC FINANCING

The Programme does not have any public financing source.



Annex 3

BASELINE INFORMATION

The Specific information is provided at CPA level.

INFORMATION REGARDING LEAKAGE EMISSIONS

No reliable and accurate national data on fugitive emissions for LPG and residual fuel oil is available. Additionally, detailed emissions factors for these fossil fuels are not included in the default values provided in methodology ACM0009 (version 03.2). Therefore, specific LPG and residual fuel oil upstream leakage emission factors ($EF_{LPG, upstream, CH_4}$ and $EF_{k, upstream, CH_4}$) need to be estimated so as to calculate the emission reductions in each CPA.

For this purpose, the document *Fuel and Energy Production Emission Factors*, written by Dr. C. A. Lewis as part of the MEET Project: *Methodologies for Estimating Air Pollutant Emissions from Transport* has been taken into account.

In this document, specific emissions factors for the relevant system elements of several fossil fuels value chains (extraction, refining and transportation and distribution) are estimated. An emission factor for CO₂e has been calculated using the emissions factors for CO₂ and CH₄ included in the document. Units have been converted into tonnes per Gigajoule (t/GJ) using, when necessary, NCV default values indicated in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories:

Extraction	Emission factor for CO ₂	Emission factor for CH ₄	Emission factor for CO ₂ e	NCV	Emission factor for CO ₂ e
	kg/t	g/t	t/t	GJ/t	t/GJ
LPG	143.4	703.6	0.1582	47.3	0.0033
Crude oil	147.6	640.8	0.1611	40.4	0.0040

Refining	Emission factor for CO ₂	Emission factor for CH ₄	Emission factor for CO ₂ e
	kg/GJ	g/GJ	t/GJ
SIMPLE REFINERY EMISSIONS			
LPG	3.5000	0.2800	0.0035
Heavy fuel oil	1.0000	0.1600	0.0010
FCC REFINERY EMISSIONS			
LPG	4.3000	0.3600	0.0043
Heavy fuel oil	1.5000	0.1800	0.0015
HYDROCRACKER REFINERY EMISSIONS			
LPG	3.9000	0.2800	0.0039
Heavy fuel oil	1.0000	0.1600	0.0010
AVERAGE REFINERY EMISSIONS			
LPG			0.0039
Heavy fuel oil			0.0012



Taking into account that the source of the fuel oil is essentially unknown and given that there are three types of refining and a factor for each type, the average of the three factors has been determined.

Transport and distribution	Emission factor for CO ₂	Emission factor for CH ₄	Emission factor for CO ₂ e
	kg/GJ	g/GJ	t/GJ
LPG	0.63	1.43	0.0007
Heavy fuel oil	0.12	0.14	0.0001

Leakage emission factors due to emissions in the production of LPG and heavy fuel oil. *Source: Fuel and Energy Production Emission Factors, written by Dr. C. A. Lewis as part of the MEET Project: Methodologies for Estimating Air Pollutant Emissions from Transport, 2007;*

Therefore, adding the emission factors due to extraction, refining, transportation and distribution, the estimated totals obtained are shown in the following table.

TOTAL	Emission factor for CO ₂ e
	tCO ₂ e/GJ
LPG	0.00791
Heavy fuel oil	0.00528

It is important to mention that the structural contributions are compensated, having extracted the emission data from a single document. Therefore, the data could, in this sense, be estimated to be independent of the production, transportation and distribution system.

With these estimates, all that is left is to enter the variables $FF_{Project,y}$ and $FF_{baseline,k,y}$ into the equation, which will be specific for each CPA.



Annex 4

MONITORING INFORMATION

DATA VARIABLE	DATA SOURCE	DATA UNIT	MEASURED, CALCULATED OR ESTIMATED	MONITORING EQUIPMENT/PROCEDURE	MONITORING AND RECORDING FREQUENCY	QA/QC PROCEDURES	ALTERNATIVE DATA SOURCE	For how long is archived data to be kept?
Net energy output generated in the element process	Energy meter readings at the facility as primary source.	MJ	Measured	Measurements will be undertaken in each element process using calibrated energy meters. The measurement of the energy generated will differ depending on the type of CPA: <ul style="list-style-type: none">• For electricity generation, direct measurement via a counter will be used.• For steam generation, direct measurement via, for example, a multivariable vortex will be used.• For heat generation, indirect measurement via differences in temperature, differences in weight of the product, etc will be used to estimate the energy output. Data will be recorded in plant records as well as in an electronic database.	As per the established industrial practice. This will be specified in each CPA.	Programme activity's technical staff will calibrate and operate energy meters following the manufacturer specifications. The monitoring equipment will be subjected to regular maintenance operations and calibrations. The consistency of metered energy output generated will be cross-checked by an annual energy balance that is based on consumed quantities of fossil fuels.	Amount of fuel combusted in the element process and the efficiency of the equipment in which the energy output is generated.	Crediting period + 2 years



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Quantity of LPG combusted	Receipts from the LPG supply company, based on the meter on the tanker truck.	Tonnes	Measured	<p>The total amount of LPG consumed annually by any client will be the sum of the quantities stated in all the receipts except the last one, because that quantity of LPG might not have been consumed at the moment of the calculation.</p> <p>The amount of LPG supplied will be measured by the tank meter and written in longhand in the receipt.</p>	In each fuel delivery	<p>Supply company's technical staff will operate the tanker truck meters following the manufacturer specifications. The tanker truck meters will be subject to regular maintenance operations and calibrations. The consistency of metered fuel consumption quantities will be cross-checked by an annual energy balance that is based on purchased quantities and stock changes.</p>	Fuel consumption quantities stated in receipts from the LPG supply company, based on the meter on the tanker truck.	Crediting period + 2 years
Electricity/thermal energy generated in the CPA and used by the recipient end in year y.	Energy meter readings at the recipient's facility as primary source.	MWh/GJ	Measured	<p>Measurements will be undertaken in each element process using calibrated energy meters. The measurement of the energy generated will differ depending on the type of CPA:</p> <ul style="list-style-type: none"> • For electricity generation, direct measurement via a counter will be used. • For steam generation, direct measurement via, for example, a multivariable vortex will be used. • For heat generation, indirect measurement via differences in temperature, differences in weight of the product, etc will be used to estimate the energy output. <p>Data will be recorded in plant records as well as in an electronic database.</p>	As per the established industrial practice. This will be specified in each CPA.	<p>Recipient's technical staff will calibrate and operate energy meters following the manufacturer specifications. The monitoring equipment will be subjected to regular maintenance operations and calibrations. The consistency of metered energy output generated will be cross-checked with the measurements of the energy generated in the CPA's facility.</p>	Measurements of the energy generated in the CPA's facility	Crediting period + 2 years