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

CONTENTS

Annexes

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):

>>

Heat Retention Cooking in South Africa
Electronic Filename: PoADD-v10-HRC-SA111112

A.2. Description of the small-scale programme of activities (PoA):

>> The following information shall be included here:

1. *General operating and implementing framework of PoA*
2. *Policy/measure or stated goal of the PoA*
3. *Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.*

Introduction

The predominant cooking fuels for low-income families in South Africa are electricity and paraffin. The programme described here reduces the amount of fossil fuels and electricity used for cooking by low-income families[1]. Through reduction in fossil fuel consumption, the programme will decrease both green house gas emissions and cash expenditure on these cooking fuels.

To achieve this, the programme promotes wide-spread use of a heat-retention device known as the Wonderbag (WB). This is a thermally insulated bag into which a cook transfers a pot heated on a stove. The food in the pot continues to cook, while the stove is no longer in use, so conserving fuel.

Market trials have shown that the WB is popular. Cash savings in fuel expenditure are commonly found to be between 30% and 40%. A reduction in cash outlay on electricity is readily apparent to users of the WB due to the common pre-payment system used by most low-income families in South Africa.

The WB is popular for the additional reason that it adds a significant convenience to household management; it allows most of the cooking operation to be done safely without the stove being lit (or switched on in the case of electric stoves). This leads to decreased incidence of domestic accidents linked to open flames, spillage of paraffin, or hot plates. Furthermore, the food in a WB stays hot for a long period so meal-times are flexible and tasks outside the kitchen or away from the home can be accomplished more easily during the cooking process, as supervision of the stove is no longer needed. Child care can take place safely away from the kitchen or safely within the kitchen with the stove unlit, while cooking is underway.

The programme aim is to establish regular WB use in between 1 and 3 million kitchens, through a series of CDM Programme Activities (CPAs).

[1] It also reduces consumption of these fuels in institutions such as schools and in commercial kitchens, and while this program focuses primarily on domestic energy saving, it also encompasses energy saving in non-domestic kitchens.

General operating and implementing framework of SSC-PoA
The coordinating/managing entity (CME) is J.P. Morgan Energy Ventures Corporation (JPMVEC). JPMVEC will act as the focal point for the Executive Board of the CDM in all aspects relating to validation, verification, registration and issuance of carbon credits generated by the programme.

The programme concept, and the programme's mitigation of green house gas emissions, are the initiative of Natural Balance Ltd (NB). NB's role is to establish and regulate a group of Programme Activity Implementers (PAIs)[2].

Implementation of the programme is the responsibility of the PAIs. These each prepare and manage a single CDM programme activity (CPA).

A key partner is the social support organization, Lovelife. Lovelife manages a network of over 1 million families in 730 low-income communities throughout the 9 provinces of South Africa. This network offers a starting-point for large-scale transformation of cooking patterns, as the PAI members will largely be recruited from Lovelife graduates of the Lovelife community training programmes. This link will facilitate on-the-ground marketing approaches within the communities marketed to these families but also supported with follow-up from professionals recruited from Lovelife youth training programmes.

Other partner organizations will also be engaged in the later stages of the programme, to help broaden the market for WBs within the low-income segments of the South African population as well as reaching other segments of the population; these include voluntary organizations, conventional retail outlets, social programmes launched by corporations, and local government and parastatal initiatives.

Policy/measure or stated goal of the SSC-PoA
This SSC-PoA has the goal of introducing large-scale adoption of heat retention cooking to predominantly domestic and non-domestic kitchens in South Africa through the sale and after-sale support of WBs over the next 28 years. This will constitute a market transformation, improving the livelihoods of between 1 and 3 million low-income families through reduction in cash expenditure on cooking fuels and electricity, while also reducing global greenhouse gas emissions.

Confirmation that the proposed SSC-PoA is a voluntary action by the coordinating/managing entity.
There is no law, policy or mandatory requirement in South Africa stipulating the adoption of heat Retention Cookers. . This proposed SSC-PoA is a voluntary action by the national coordinating/managing entity and the primary project participants, JPMVEC and NB.

Contribution of the proposed SSC-PoA to sustainable development

Air quality and water pollution

Almost 20 years ago, South Africa was one of the top ten countries contributing to global greenhouse gas emissions (estimated at 1.2% of the global total in 1990)[3]. This amounted to 15% of greenhouse gas emissions for the African continent. The most significant emissions of greenhouse gases in South Africa

[2] The PAIs are also know as Wonderbag Outreach Teams (WOTs).

[3] Van Tienhoven, A.M.: Status of Air Pollution in South Africa (16 November 1999) downloaded from http://www.sei.se/rapidc/pdfs/AirPollAfrica.PDF on 6 March 2009.

come from power stations; for example, Eskom, the national electricity utility, estimated in 1999 that by 2010 its sulphur dioxide emissions could reach up to 1.2 million tons per year[4].

The Wonderbag improves air quality in the home, because less fuel needs to be burned for cooking, and the principal fuel after electricity in South Africa is paraffin (kerosene) which has an indoor air pollution characteristic. Wonderbag also reduces electricity use; as a result it prevents some of the devastating ambient air pollution associated with coal-burning power stations.

The Wonderbag cover is made of 100% cotton. It is filled with expanded polystyrene (EPS) that consists primarily of carbon and hydrogen. EPS is ecologically harmless, contains no CFCs and is fully recyclable by:

- Grinding it down to produce new EPS.
- Using it as a lightweight aggregate for concrete and insulating mortars.

In general the EPS is expected to be re-used continuously in new bags when the cotton liner finally expires. If not re-used, a series of plastics recovery stations have been established at municipal drop-off centres, where community members can drop off plastics to avoid these being dumped in landfill sites. Polystyrene can also be dropped off at no cost. Recyclers will collect the polystyrene from these centres. The Wonderbag has no negative noise or visual impacts.

Economic impact

The Wonderbag is a poverty-reduction method for households in that tests in 2009 showed that it saves on average 15 KWhr of electricity or 1.6 litres of paraffin per week. This constitutes a significant income saving. With less money being spent on cooking fuel, consumers will have more discretionary income which will benefit local businesses.

In Table A.2.1 below, the expenditure on household fuel by households in the bottom five income deciles is shown against potential Wonderbag savings.

Table A.2.1: Annual expenditure and savings on household fuel by income decile[5]

(Rands)	I	II	III	IV	V
Electricity, gas and other fuels	606	809	924	1012	1062
30% annual saving	182	243	277	304	319

Field tests have shown that the Wonderbag reduces typical fuel bills by between 30 and 40%. At the lower figure, a rand value over one year can be attached to the Wonderbag for each decile, as has been done in the second row of the table.

Manufacture of the Wonderbag will introduce much needed jobs. At least 10 jobs in the cutting, making and trimming (CMT) sector will be created in the pilot phase; this will increase to 61 by the end of the first year, and from there to at least 87 by the end of year 2. With respect to manufacturing jobs in the target communities, it is expected that there will be opportunities in the later years of the programme.

[4] Ibid.

[5] "Income and expenditure of households 2005/06" Statistics South Africa, Pretoria 2007..

Further, the programme is a source of viable livelihood for the members of the PAIs. The local marketing, sales, after-sales service, associated with the Wonderbags will develop lasting entrepreneurial skills. The PAI will operate as an independent cost centre, resulting in valuable business management experience for its members. The number of new jobs in retailing is estimated to be over 1000 by the end of the fifth year of the programme.

The Wonderbag has no impact on foreign exchange requirements as the product is made locally.

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

>> The following information shall be included here:

1. *Coordinating or managing entity of the PoA as the entity which communicates with the Board*
2. *Project participants being registered in relation to the PoA. Project participants may or may not be involved in one of the CPAs related to the PoA.*

Name of Party Involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
South Africa (host)	Natural Balance (Pty) Ltd.	No
United Kingdom	J.P.Morgan Ventures Energy Corporation	No

- Natural Balance (NB) is a company incorporated in South Africa and is a Participant.
- JPMorgan Ventures Energy Corporation (JPMVEC) is a company incorporated in the United States of America, and is a Participant. JPMVEC is also the Focal Point for all Scopes of Authority and the coordinating/managing entity (CME) of this SSC-PoA.

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

A.4.1. Location of the programme of activities:

South Africa

A.4.1.1. Host Party(ies):

South Africa

A.4.1.2. Physical/ Geographical boundary:

The geographical area within which all CPAs will be implemented is South Africa.

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

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A SSC-CPA will be conducted by a single PAI and will establish usage of WBs in predominantly domestic homes, varying in number between 30,000 and 75,000. Each activity will remain within the limits defined by the CDM EB for small-scale methodology application[6].

The PAI will market and sell the WBs, while also providing instructions as to usage and after-sales services, and will keep a record of date of sale of each WB.

Each PAI will operate nominally within a specific geographic area, while also operating throughout South Africa and thus operating in areas nominally attributed to other CPAs; indeed, different PAI offices may be located in the same areas. Geographically overlapping PAI activity is expected to occur. This policy is adopted to ensure efficient market transformation through competition amongst WB retailers, and is in accordance with the requirements and spirit of paragraph 9 of Annex 32 to the EB47 Report.

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

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The Wonderbag (WB) is a heat-retention cooker. This is an insulated container designed to hold a hot cook-pot safely for several hours, so that food can be cooked through heat retention. When using the device, cooking is done in two stages: first, conventionally on the stove, bringing the food up to temperature and boiling for long enough to ensure that high temperature is achieved throughout. Second, the pot is immediately transferred to the WB where it is thermally insulated and continues to cook. The WB consists of a filling of polystyrene granules sown into a cotton bag.

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

>> Here only a description of criteria for enrolling the CPA shall be described, the criteria for demonstrating additionality of CPA shall be described in section E.5

- They are described appropriately in a CPA-DD document which is approved by the CME and validated by the DOE assigned by the CME
- The relevant CPA-DD conforms to the POA-DD and to the applied methodology
- Their record-keeping systems follow those of the programme as a whole
- Their projected sales implies a total customer base not exceeding 75,000 in one year, in order to remain within the small-scale energy saving limits defined by the CDM.
- The PAI responsible has signed a contract with NB which permits it to participate in the programme
- In accordance with the provisions of EB55 Annex38, the criteria for demonstration of additionality of a CPA are also listed:

[6] In the case of WB users cooking on electricity the CPAs will typically not exceed energy savings of 60 GWhr (elec)/year as prescribed for Type II small scale methodologies. In the case of WB users cooking on paraffin the CPAs will typically not exceed energy savings of 180 GWhr (thermal)/year. In order to meet these small-scale thresholds, one of the eligibility criteria has been identified as a limiting size for each CPA of 75,000 Wonderbags. Future monitoring will update the split of WB users using paraffin and electricity, and also the mean saving achieved by the Wonderbag, so resulting in variations in the total annual energy saving of the project; in case that this causes the threshold to be exceeded, verification will be limited to threshold value just as in the case where usage rates exceed the threshold.

- That the conditions under which distribution is to take place are challenging (for example, lack of conventional distribution infrastructure weak safety and security, high crime rates) and give rise to barriers insurmountable without carbon accreditation, implying the specific criterion that this CPA trains and deploys a specialized staff team to promote and secure adoption and continuing usage of the product.
- That uncertainty amongst potential lenders or funders as to the viability of distribution of Wonderbags within this CPA, constitutes an impassable investment barrier. The evidence submitted for validation of the programme, in the form of refusals by banks and other potential funders to lend or invest, is directly applicable and relevant to this CPA.
- That the predominant prevailing practice and behavioural conditions found in this CPA do not reflect any considerable change from reliance on conventional technologies (electric and kerosene cooking without heat retention and without equivalent energy-saving practice or technology), as evidenced specifically for this CPA in relevant literature and reports.

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):

>> The following shall be demonstrated here:

(i) The proposed PoA is a voluntary coordinated action;
(ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;
(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;
(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

The information presented here shall constitute the demonstration of additionality of the PoA as a whole.

How anthropogenic emissions of GHG are reduced by a SSC-CPA registered under this programme:

The most common cooking fuels in South Africa are electricity and paraffin (kerosene). Paraffin is a CO2-emitting fossil fuel and electricity in South Africa is predominantly generated by combustion of fossil coal and is therefore CO2 emitting. The SSC-CPA will establish usage of heat retention cookers. Their usage reduces significantly the use of both electricity and paraffin as well as other CO2-emitting fuels, and therefore reduces anthropogenic emissions of GHG.

The Proposed PoA is a Voluntary Coordinated Action

South Africa has no national law, policies or mandatory requirements stipulating the adoption of heat retention cookers. Thus this proposed PoA is a voluntary action.

The proposed voluntary coordinated action would not be implemented in the absence of the PoA

The proposed activity could not be implemented in the absence of the PoA, due to the presence of cost and prevailing practice barriers described below. At the same time the baseline situation, the continued use of fossil fuels and electricity for cooking at current levels of consumption is not prevented by those barriers.

Assessment and Demonstration of Additionality of the Proposed PoA
Additionality of the PoA is demonstrated here following the guidance given in EB 39 Report Annex 10 "Tool for the demonstration and assessment of additionality" version 05.2. The numbering in this section follows the numbering provided in that document. While the Tool refers to analysis of a Project, it is applied here to a proposed PoA , and the word Project has therefore been replaced with "Programme".

Step 1: Identification of alternatives to the programme activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the programme activity

(1) In the absence of the programme, certain alternatives (consistent with South Africa's laws and regulations) exist. These are the scenarios of:

a) Implementation of the programme without being registered as a CDM programme
b) Adoption by low-income families of low-emission or zero-emission cook-stoves and fuels
c) Continuation of the current situation whereby no programme activity or other alternatives are undertaken

Alternative a) is the manufacture and distribution of WBs, to achieve regular use in 1 to 3 million low-income homes, without assistance from carbon finance.

The text below examines the feasibility of this alternative via a survey of potential barriers. In order to present an outcome for Step 1a as required by the Tool, the conclusions reached below may be summarized here. In practice initiatives seeking to disseminate the WB widely have already been tried in the market with extremely limited success. Such initiatives have not been able to achieve an effective method of distribution in the town-ships and other low-income areas which could lead to the sales volumes proposed by the current Programme.

Alternative a) is therefore shown to be not a credible alternative to the Programme Activity.

Alternative b) is the adoption by low-income families of low-emission or zero-emission cook-stoves and fuels. The text below examines the feasibility of this alternative via a survey of potential barriers. In order to present an outcome for Step 1a as required by the Tool, the conclusions reached below may be summarized here, follows:

The cost and practicality of bio-coal, bio-fuel-gels, solar cook-stoves, or other zero or low-emission cooking fuels and associated cook-stoves, continues to be prohibitive. The technologies are not mature and not yet affordable or available.

Alternative b) is therefore not a credible alternative.

Alternative c) is the continuation of the current situation whereby the full population of low-income homes in South Africa continue to use current fuels (primarily electricity and kerosene) at current rates and Heat Retention Cookers are a known technology predominantly sold in small numbers at a relatively high price to a specific market segment consisting of relatively wealthy homes.

Alternative c) is a credible alternative and reflects the baseline situation

Outcome of Sub-step 1a: The outcome of sub-step 1a is that that the only realistic alternative to the proposed programme is continuation of the current situation as outlined in Alternative c) above. The programme will therefore reduce greenhouse gases compared to the baseline situation and the programme is additional.

Sub-step 1b: Consistency with mandatory laws and regulations:
(2) All the alternative scenarios listed above are in compliance with mandatory laws and regulations.
(3) Not applicable
(4) The programme is not the only alternative which is consistent with mandatory laws and regulations, and the programme is therefore additional.

Step 2: Investment analysis
In accordance with the "Tool for demonstration and assessment of additionality version 5.2", the option of Step 3 is adopted here.

Step 3: Barrier analysis
This step determines whether the programme faces barriers that prevent it from being implemented without its registration under the CDM, and do not prevent at least one of the alternatives from being implemented.

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM programme activity
The proposed activity faces the following investment, technological, and behavioural (prevailing practice) barriers if implemented without the CDM:

(a) Investment barriers

This project entails significant investment to meet the costs of promotion and distribution of the Wonderbag, especially given that the vast majority of the potential customer base lives in informal communities without modern distribution and product promotion infrastructure. The community of potential investors or funders has taken these circumstances as grounds for uncertainty as to acceptance of the Wonderbag among the population and refused to finance the project. Natural Balance has approached a number of financial institutions and organizations requesting funding support for this project. The company has entered into detailed discussions with the organizations listed here, but has not been successful in obtaining finance.

National Empowerment Fund
Industrial Development Corporation
Standard Bank PLC
Nedbank
TFS Green
Department of Trade and Industry (SA)
Gauteng Enterprise Propeller
JP Morgan Philanthropy
Microsoft Foundation
First National Bank

(b) Technological barriers:
In the case of this programme, no technological barriers exist as the technology is simple and well proven, and does not require specialized skill or specialized organizational capacity to manufacture, operate, and maintain.

(c) Behavioural barriers (prevailing practice)
A major barrier to the programme implementation is habit and resistance to behavioural change. Despite financial savings and convenience associated with a device like the WB, people tend prefer to continue customary ways of doing things such as cooking. The programme therefore revolves around an intense, pervasive, and sustained effort to support customers through pre-sales, sales and after-sales familiarisation activities and the availability of specialised skills and organisational capacity (in the form of a close relationship between NB and the partner organisation Lovelife).

The programme therefore constitutes a very clear example of "first-of-its-kind" with respect to large-scale diffusion of use within the low-income majority population of the country.

Large-scale diffusion to between 1 and 3 million homes is a market transformation goal. It requires a fundamental and permanent shift in normal day-to-day behaviour in homes, a shift in habit by very busy mothers and grandmothers who will commonly revert to customary patterns of cooking even after a period of experimentation with new approaches. To overcome this inertial prevailing practice, the programme will apply novel (and expensive) methods of direct selling, familiarisation, awareness-building and customer support, over a period of decades.

(d) Other barriers: the distribution challenge
The logistics of distribution in the market areas targeted are very tough. This arises from a combination of factors: low disposable incomes, high crime rates in informal communities, absence of effective home delivery services, the high bulk and low value nature of the product, and so on. A great deal of work was done since early 2009 to develop effective distribution strategies and solve the logistics challenges. The solutions have been worked out and costed carefully. The first plank of the solution is a concerted recruitment drive, managed under each PAI (or "WOT manager") working through the existing loveLife community network, that will assemble a team (the WOT team) of direct sales agents who will be the driving force and members of the WOTs. The second plank is an intensive training programme that will equip the team members with skills and information required to be both effective salespeople and agents of kitchen behaviour-change. The third is an interactive, cookery-focused events programme tentatively branded "Wonderfeasts". These events serve as the main marketing opportunity for the Wonderbag to find new homes, for existing users to develop their usage patterns and share their best practice and favourite recipes, and for the WOT managers to identify new sales agents and implementation partners.

Outcome of Sub-Step 3a: The above analysis shows that the programme faces real and significant barriers. The registration of the programme under the CDM will provide a revenue source over and above WB sales revenue, which will remain available through a great many years, so underpinning a large-scale market transformation. Without this long-term extra revenue source, the programme could not achieve this goal and is therefore additional.

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed programme activity)

(2) The table A.4.3.2 below shows the extent to which the identified barriers also affect the alternative scenarios.

Table A.4.3.2

Alternative	Identified barrier	Justification	Eliminate from further consideration
a) Implementation of the programme without being registered as a CDM programme	Both (a) the Investment barrier and (c) the Behavioural barrier	As described above. The programme is "first-of-its-kind" with regard to behavioural changes it requires, and thus affected strongly by a prevailing practice barrier. Further, it is not financially viable, thus facing significant investment barriers.	Yes, this is not a viable alternative
b) Adoption by low-income families of low-emission cook-stoves and fuels	Both (a) the Investment barrier and (c) the Behavioural barrier (resistance to change of prevailing practice) affect this scenario.	The most likely low-emission technology options are bio-fuel stoves and fuels but these are not commonly available nor technologically mature and are unaffordable to the population targeted by the programme. This scenario would demand funding to even higher levels than the proposed programme (to achieve same level of service) which would imply lack of sustainability through market distortion and failure due to lack of funds	Yes; this is not a viable alternative
c) Continuation of the current situation whereby no programme activity or other alternatives are undertaken	None of the identified barriers prevent this scenario	Electric and paraffin cooking can continue to take place unhindered by the barriers identified, since expenditure on a new kitchen device is not required, financing not required, and no behavioural change is required	No. This is the most likely scenario in the absence of the programme registered under CDM

(3) The evidence required to demonstrate the effects summarised on the Table above, is available.

Outcome of Sub-Step 3b: The barriers identified in 3a above would not affect the baseline alternative of continuation of the current situation.

Outcome of Sub-Step 3: Both sub-steps 3a and 3b are satisfied, and thus the programme is additional.

Step 4: Common Practice Analysis

The programme is "first-of-its-kind" as described in Sub-Step 3a above. Neither the technology nor its practice has diffused to the significant extent propose here, in the relevant sector, despite knowledge of its existence over past years. The relevant sector in this case is the low-income majority population of South Africa. Heat Retention Cookers have been used in limited instances since the Second World War, when the availability of fuel was scarce, and there exists some low-volume marketing currently in the South African market. Amongst the wealthier segment of the population, which tends to adopt

environmentally-friendly technology more easily, cookers[7] are ordered online from various local and international websites, and then posted or couriered to the customer. According to Statistics South Africa's Census (2001), 8.6% of South African households had computers in 2001. The Community Survey (2007) suggested that this had risen to 15.7% by 2007. This distribution strategy is thus severely limited to a very small population almost exclusively outside the targeted low-income communities.

Some charity-based distribution, in partnership with community-based organisations, currently takes place[8], but these projects are limited by the relatively small reach of the organisations with which they partner, in comparison with the significant reach of Lovelife.

The "Tool for demonstration and assessment of Additionality" requests an analysis of other operational activities which "are in the same region, rely on a similar technology, are of a similar scale and take place in a comparable environment with respect to regulatory framework." The evidence is that there are no such activities, because (a) the scale of the proposed programme is fundamentally different from current sales of heat- retention devices, and (b) the socio-economic group or market areas (the low-income townships and low-income rural populations) constitute a significantly different region or environment.

Therefore there is no comparable or similar activity and steps 4a and 4b are not applicable.

Outcome of Section B.5: In summary the programme is additional for the following reason: Implementation of the proposed programme without the CDM is prevented by a investment barrier and a prevailing practice barrier, whereas one alternative to the programme, use of fossil fuels and electricity for cooking at current levels of consumption, is not prevented by these barriers. At the same time no activity with a similar scale aimed at the specific target market exists, and the programme is therefore not common practice.

Overseas Development Assistance (ODA)
The proposed programme of activities does not use any ODA funds.

[7] One such device is the "Hotbag", which comes in three sizes. At the moment, these are sold through the internet, through environmental retail outlets.
[8] The "Salathiso" Hotbox for example is made by a group of HIV-positive women from Kayamandi near Stellenbosch. It is advertised through environmental and poverty alleviation networks. The sales of Wonderboxes have been estimated as relatively small.

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

A.4.4.1. Operational and management plan:

>> Description of the operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA, including:

1. *A record keeping system for each CPA under the PoA,*
2. *A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA,*
3. *The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.*
4. *The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;*

Operational and management arrangements

The programme is operated by Natural Balance Ltd, whose role is to devise and implement a regulatory and incentive framework under which WBs will be manufactured by appropriate bodies, and then marketed by Programme Activity Implementers (PAIs). Natural Balance will provide:

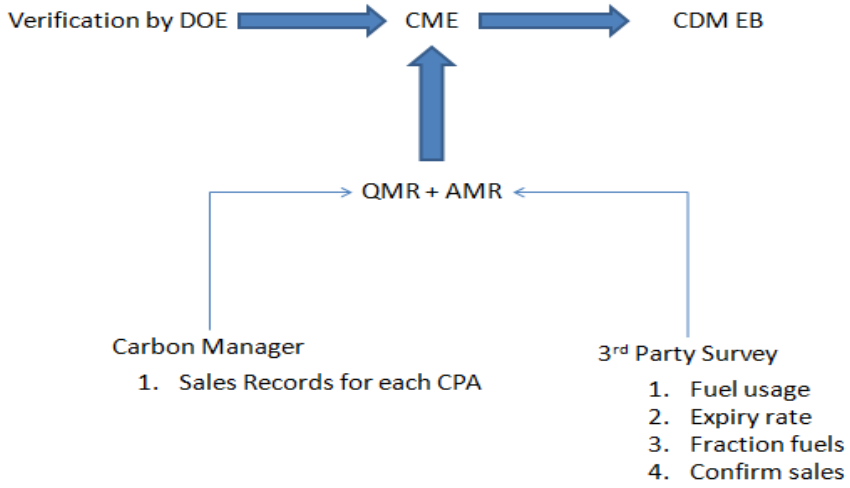
- technical support and secure purchasing contracts to Wonderbag manufacturers,
- technical support, guidelines, and secure wholesale contracts for local retail entrepreneurs (PAIs)
- oversight of record-keeping by all parties involved in Wonderbag manufacture and distribution. NB is responsible to spot check PAI records and assure their accuracy. This aspect of the function of Natural Balance is presented on the operational diagram presented here as a key role of the MB Carbon Manager.
- Commissioning of annual monitoring surveys by a credible 3rd part consultant
- quarterly and annual reports summarising CPA sales records and correlation against manufacturing and shipping records, together with results of annual monitoring surveys. These reports are marked as QMR and AMR on the diagram.

The CME will support the process of data collection by analysis of quarterly reports and co-operation with regard to preparation of annual reports for submission to the verifying DOE.

Manufacturing will be undertaken by sub-contractors located variously. The initial contract will be signed with the voluntary organization Youth for Survival, under the leadership of Moshy Mathe. Youth for Survival is expected to train at least 1000 young female entrepreneurs to manufacture Wonderbags for the Programme. Distribution will be undertaken by the PAIs. A major source of recruitment for the PAIs will be graduates of the mpintshi and groundBREAKER programmes of the lovelife network[9].

Operational Diagram.

[9] loveLife is a voluntary organization has been an active part of life in 730 communities in South Africa, providing social support and AIDs prevention through a range of measures which build a positive future for the major population of South Africa



Record keeping by CPAs and Program Co-ordinator, and check on double-counting
Each PAI will maintain a unique sales record, which will be correlated against wholesale purchase contracts between the PAI and NB, manufacturing records, shipping records, and stock records kept by NB and the manufacturers/shippers.

NB will maintain up-to-date and clear manufacturing, shipping, and stock records. NB will also provide guidance to manufacturing, shipping, storage, retail (PAIs) and other sub-contractors, on record keeping while providing quality control through supervision and spots checks. It will be possible therefore for a verifier to confirm the accuracy of the sales record, and to confirm that no WB has been double-counted. NB will ensure that no PAI is conducting a similar activity as a stand-alone CDM project activity nor as another CPA within another PoA.

The potential for double-counting is further eliminated by annual monitoring of the baseline. This removes the risk that a carbon saving claimed by another project is counted also by this programme. For example if there is trend whereby a fraction of households of the type purchasing WBs switch from kerosene to non-fossil alternative, the baseline will reduce as this trend will be apparent from the randomised survey approach. WB users who have switched to low or zero-emission cooking methods/fuels will also be treated as drop-offs, so introducing a conservative multiplier effect.

Check on debundling
The debundling provisions do not apply as the energy saved by each WB is less than 1% of the limit set for small-scale POAs. In accordance with paragraph 9 of Annex 32 to the EB47 Report, "Guidance for determining the occurrence of de-bundling under a Programme of Activities (PoA)", if each independent subsystem/measures included in the CPA of a PoA is no greater than 1% of the small scale threshold defined by the methodology applied, than 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.

Subscription to POA
The contract signed between Natural balance and each PAI ensures that the PAI is aware of and has agreed that their activity is being subscribed to the PoA.

The monitoring plan is designed to eliminate any risk of double-counting between CPAs. The templates for the records are identical between PAIs such that comparisons can be carried out easily and duplication becomes easy to detect. Furthermore, the ex-post monitoring of the baseline removes the risk of double-counting arsing from trends toward low-emission cooking stimulated by other carbon projects.

A.4.4.2. Monitoring plan:

>> The following information shall be provided here:

(i) Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.

(ii) In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA;

Monitoring and verification shall be by annual sampling, following the guidance provided in the CDM Draft General Guidelines on Sampling and Surveys (EB47, Annex27). The ex-post parameters to be monitored are:

- Household energy consumption[10] (both baseline and project values), both electricity and fossil fuels
- Quantity of units operational
- Relative numbers of electricity-using and fossil-fuel-using Wonderbag users

The annual monitoring survey shall determine these parameter values for all active CPAs. The procedure may either consist of a single-stage process which randomly samples households across all the CPAs, or it may consist of a two-stage process whereby a sample of CPAs are randomly selected and within these, a random selection is made of households. Both procedures are statistically sound (see Section E.7.2) and

[10] Measurement of household energy consumption in randomly sampled homes, as opposed to measurement specifically of the cook-stove energy consumption, is chosen as the most accurate and practically feasible method of measuring the effect of the Wonderbag on electricity and kerosene consumption. The effect of the Wonderbag on energy consumption is known by comparing household energy use measured when there is no Wonderbag in use (baseline scenario) with household energy use measured when there is a Wonderbag in use (project scenario). The option of gathering information through questionnaires, rather than measurement, is rejected as being less reliable. The fitting of electricity meters to cook-stoves is rejected as impractical, and also it is inaccurate as it does not capture the overall effect of Wonderbag use (for example the light in the kitchen may be on for a longer period as a rebound effect of use of the Wonderbag). The field officer visiting the sampled home inspects the sealed electricity meter and cross-checks readings against receipts, doing this at the start and end of a test period of one week (see section below: *E.7.2 II Calculation of emission reductions in a Monitored Period*). Measurement of kerosene is a reliable and practical procedure, as the field officer visiting the household records volumes displaced from a household supply kept in a container of standard volume. This is done at the start and end of the test week. As in the case of electricity, any rebound effect (for example changes in kerosene use for hot water or lighting) can be captured in this way. The random sampling procedure and analysis following the CDM General Guidelines accommodates variations in household size (number of people living in each home) which effects the amount of food cooked. The statistical analysis takes into account variations of this kind (see section below: *E.7.2 II Sampling Protocol*).

either one may be adopted each year by the CME for DOE verification depending on practical feasibility and costs.

Measurements will be taken of energy consumption in a sample of households which have purchased the Wonderbag, and a count will be made of the number of the sampled homes found not using the device; the portion of such homes is referred to as the Drop-Off Fraction or DOF. For conservativeness, emission reductions assume that a drop-off has made no use of the Wonderbag throughout the full year monitored, such that no claim is made for emission reductions achieved prior to actual drop-off date.

In addition to sampling of energy consumption amongst users, energy consumption amongst equivalent non-users will also be measured annually, in order to make sure of accurate assessment of emission reductions in a context where the baseline conditions may change.

The monitoring procedure will count the number of fossil fuel users (types i / usage scenarios i) and electricity users (usage scenarios i) in the random sample of Wonderbag customers, and calculate the fraction of each in comparison to total sample size. These fractions will be applied both to the total sales count of all CPAs and the total sales count of each CPA to derive estimates of the number of each type of Wonderbag user.

The relative quantities of each type will be compared with the result of the same analysis of the baseline sample. If the two results differ by more than +/- 20% then an investigation will be conducted and an explanation provided.

Each CPA is responsible to keep an accurate record of the date of each sale of a Wonderbag, together with an informed and justified estimate of the date it is first used in a kitchen. In the case of bulk sales, the CPA is responsible equally to make informed and justified estimates of dates of individual sales and dates of first use, and include these on its sales record.

Wherever reasonably possible, sample sizes will be sufficient to ensure that the precision of the sample means are 90/10 or better, in which cases the sample means will be used to estimate emissions reductions. If such samples sizes are difficult to achieve in practice, a conservative 90% lower bound on emissions reductions will be used. This is the value for which there is 90% confidence that the true mean emission reduction is at least as large. To ensure a conservative result when converting energy measurement to annual energy values, the monitoring surveys will be carried out in weeks not containing holidays or feasts nor in unusually cold weather. Energy measurement will take place over a period of seven days in sampled households. Baseline measurements will take place in homes randomly picked from homes of equivalent socio-economic to neighbouring sampled project households.

A credible third party consultant will be hired to carry out the annual sampling survey.

Furthermore, operational and management procedures are established to ensure that there is no risk that the count of Wonderbags will be incorrect through double-counting.

The principal method of ensuring is the maintenance of a unique sales records by the PAI, and its correlation against other records, principally purchase contracts between the PAI and NB, manufacturing records, shipping records, and stock records kept by NB and the manufacturers/shippers. All such data will be presented in the annual monitoring report presented to the verifier, with detail as to how it can be verified. It will be possible therefore for a verifier to confirm the accuracy of the sales record.

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

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No public funding will be used for the implementation of the PoA

SECTION B. Duration of the programme of activities (PoA)

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

>>

01/06/2009 (This date corresponds to start date of the first CPA and marks transition from product performance tests to low-volume low-budget market testing supported by advanced carbon finance agreed between JPMCC and NB in the Term Sheet of 19 Dec 2008. This date has been submitted to the CDM secretariat by acknowledged letter of 29 January 2010 as the early start date of CPA01 in compliance with para 72 of the EB47 report of May 2009).

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

>>

28 years

SECTION C. Environmental Analysis

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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 is done at PoA level X
2. Environmental Analysis is done at SSC-CPA level ☐

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

>>

No negative impact in the buildings in which the Wonderbag is used, or to the local, national, or global environment is caused by implementation of the PoA. Moreover the implementation of all CPAs will be in this respect identical, hence the environmental analysis is conducted on a PoA level only.

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),:

>>

Under South African law and regulation, none of the activities or processes constituting a typical CPA of this programme require Environmental Impact Assessments. The relevant law and regulations are found in section 53(1) of the National Environmental Management: Biodiversity Act (No. 10) 2004, and in sections 24 and 24D of the National Environmental Management Act (1998); specifically, notices No. R. 386 and R. 387 (2006). The 25 activities (under Notice 386) and 10 activities (under Notice 387) that require EIAs do not include any activities of a typical CPA.

SECTION D. Stakeholders' comments

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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 X
2. Local stakeholder consultation is done at SSC-CPA level ☐

Note: If local stakeholder comments are invited at the PoA level, include information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable.

A local SHC was conducted on 13 August 2009, at PoA level. Market trials of the WB showed that consumer and local stakeholder interest was highly similar in each CPA area, thus a single SHC for the PoA is appropriate.

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

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A public invitation to a Wonderbag national stakeholder consultation (SHC) was published in the *Mail & Guardian* newspaper[11]. The advert elicited reaction from as far afield as Cape Town and Bloemfontein.

The SHC event took place on 13 August 2009 at the Central Energy Fund (CEF) premises in Sandton, Johannesburg. A total of 35 people attended the event.

The attendees participated in a lively discussion about the programme's strengths and challenges and valuable feedback was obtained from the variety of stakeholders.

The spirit of the gathering was aptly summarised by Mr Lufuno Mukwevho, Assistant Director of the DNA. He commented that the DNA is very impressed with the positive social, environmental and economic impacts of the programme as outlined in the day's discussions, and he appreciated its contribution to sustainable development.

The invitation list for the national SHC included representatives from government, the energy industry, NGOs the media and civil society. Also invited were developers of similar technologies, members of PAIs (also known as Wonderbag Outreach Teams - WOTs) and potential investors.

The government and energy industry invitation list was compiled with the assistance of the head of the National Energy Efficiency Agency. Community and civil society representatives were invited in cooperation with the loveLife network.

[11] This method of advertisement was the most appropriate to facilitate communication of the interests of the low-income populations who are the potential end-users of the Wonderbag, since these interests are most effectively represented by NGOs and civil society bodies who read this newspaper. The very extensive lovelife network also contributed to effective representation of the target customer population. In practice these methods of identifying stakeholders were successful as the low-income populations were represented by NGOs and civil society bodies.

Each person on the invitation list received a personal invitation to the event, first telephonically and then via email. Those who requested it also received by email or post in advance of the meeting, a description of the programme and its carbon saving potential in non technical format.

D.3. Summary of the comments received:

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The principal comments made during the national SHC were as follows

1. At community level, sales should not only be door-to-door, but at organizations as well, such as schools
2. The Wonderbag should be marketed to suburban kitchens, and the extended application of the Wonderbag as a means to keep food warm and cold should be publicised
3. The price could be lower to allow more access by poor people
4. Households in general need to have two Wonderbags, not just one, to fully realise its savings potential

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

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The key comments listed above have been addressed as follows:

1. The programme had so far focused on domestic use of Wonderbags. In view of this comment, the decision was taken that the potential of the Wonderbag to introduce social, economic, and environmental benefits to local communities, could be extended by also introducing heat retention cooking to institutional kitchens (such as schools) and to commercial kitchens (local restaurants). Accordingly the mission of the programme was expanded, to become the adoption of regular use of Wonderbags in 1 to 3 million homes and also in non-domestic kitchens. This approach also integrates with the concept of introducing the Wonderbags to children in the schools, in order to instill an energy-saving mindset during their formative years.

2. The target market is predominantly the low-income suburbs well as poor rural areas; wealthy suburban markets have not been considered as a central part of the mission of the programme. Nevertheless this comment has been addressed by acceptance in the programme design that energy saving amongst wealthier population segments with its associated environmental benefit, is also important, and accordingly there will be freedom for the PAIs/WOTs to explore this market.

3. The price cannot be reduced in the first years of the programme, as even with carbon finance it is already minimized. Further, the price chosen is appropriate as a method of ensuring valuation of the product, an essential step in achieving initial market acceptance. Instead of an unfeasible price in early years, PAI/WOTs are encouraged and helped to develop innovative ways of expanding sales amongst poor families, and are free to develop credit arrangements for which they take responsibility. In this way the programme develops local business capacity in the communities and develops economic precedents which underpin sustainability. In later years, it is possible that that the flow of carbon revenue will permit a price decrease, which will permit greater access to the product.

4. PAI/WOTs will be explaining to households how to use two as well as one, and also recipes and instructions will take this option into account.

SECTION E. Application of a baseline and monitoring

This section shall demonstrate the application of the baseline and monitoring methodology to a typical SSC-CPA. The information defines the PoA specific elements that shall be included in preparing the PoA specific form used to define and include a SSC-CPA in this PoA (PoA specific CDM-SSC-CPA-DD).

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

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NOTE: The approved SSC baseline and monitoring methodology should be approved for use in a PoA by the Board.

II.C. Demand-side energy efficiency activities for specific technologies Version 13

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

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NOTE: In the case of CPAs which individually do not exceed the SSC threshold, SSC methodologies may be used once they have first been reviewed and, as needed, revised to account for leakage in the context of a SSC-CPA.

The methodology is an approved CDM SSC methodology designed to facilitate initiatives such as the CPAs proposed under this PoA. These CPAs facilitate conditions under which small companies or agencies such as the PAIs distribute or sell energy efficient devices to domestic consumers.

The methodology is designed to encourage the adoption of energy-efficient equipment and appliances (e.g., lamps, ballasts, refrigerators, motors, fans, air conditioners, pumping systems) at many sites. The heat retention cooker is adopted at many sites, and is an energy-efficient appliance. Like efficient lamps or pumping systems, which are powered from energy sources such as motors operated by combustion of fuel, treadles operated by humans, electricity generators, the heat retention cooker (HRC) is powered by a cook-stove operated by combustion of fuel or by an electricity generator. The HRC is part of a cooking system consisting of the fuel or the electricity supply, the cooker converting it to heat, and the HRC, in the same way that a pump is part of a pumping system which contains a motor or motive mechanism such as a treadle, valves and pistons, and external pipework, any or all of which components can be either individually or combined the key to improved efficiency.

Each HRC system in the form of the Wonderbag used in domestic kitchens as tested, saves approximately 800 kWhrs of energy per year. This is considerably less than 1% of the energy limit for Type II projects using small-scale methodologies. The CPAs are each small-scale and do not exceed the thresholds (60 GWhrs for electrical savings and 180 GWhrs for thermal savings) prescribed for the methodology; they are expected to launch and operate in parallel as well as serially. The SSC-PoA framework is designed specifically for this type of scenario.

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

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Source		Gas	Included ?	Justification / Explanation
Baseline	Combustion of fossil fuels such as kerosene in the home; generation of electricity in power stations using fossil fuels	CO_2	Yes	Major source of emissions
		CH_4	No	Not included in interest of conservativeness as negligible quantity and difficult to quantify
		N_2O	No	Not included in interest of conservativeness as negligible quantity and difficult to quantify
Project activity	Combustion of fossil fuels such as kerosene in the home; generation of electricity in power stations using fossil fuels	CO_2	Yes	Major source of emissions
		CH_4	No	Not included in interest of conservativeness as negligible quantity and difficult to quantify
		N_2O	No	Not included in interest of conservativeness as negligible quantity and difficult to quantify

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

>>

In the absence of the project activity, the baseline scenario is predominantly the domestic consumption of grid electricity and fossil fuels in South Africa amongst householders not using heat retention cookers. Baseline measurement is included in the monitoring plan, and will be evaluated by way of annual sampling of such households throughout the project period. The baseline households will be identified as homes with socio-economic and cultural status equivalent to the homes purchasing Wonderbags. In practice this will be accomplished by augmentation of the random sampling approach used to identify project households selected for energy measurement. For each project household visited, a group of neighbouring homes of equivalent status will be identified and a random selection made of one. Sample size will be sufficiently large to achieve a precision of at least 90/10 with a proviso that should such a sample size not be achievable in practical terms the more conservative approach of adopting the lower bound of a 90% confidence interval, may be adopted. The monitoring plan also allows for measurement of baselines in the case of non-domestic kitchens where the Wonderbag is adopted as an energy-saving device. In this case the same sampling approach as outlined above will be applied.

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:

>> Here the PPs shall demonstrate, using the procedure provided in the baseline and monitoring methodology applied, additionality of a typical CPA.

Additionality of a typical CPA is demonstrated here following the guidance given in EB 39 Report Annex 10 "Tool for the demonstration and assessment of additionality" version 05.2. The numbering in this section follows the numbering provided in that document.

Step 1: Identification of alternatives to the CPA consistent with current laws and regulations

Sub-step 1a: Define alternatives to the CPA

In the absence of the CPA, certain alternatives (consistent with South Africa's laws and regulations) would exist. These are the scenarios of:

a) Implementation of the CPA without being registered as a CDM project
b) Adoption by low-income families of low-emission or zero-emission cook-stoves and fuels
c) Continuation of the current situation whereby no CPA or other alternatives are undertaken

Alternative a) is the manufacture and distribution of WBs, to achieve regular use in up to75,000 homes, without assistance from carbon finance. The text below examines the feasibility of this alternative via a survey of potential barriers. In order to present an outcome for Step 1a as required by the Tool, the conclusions reached below may be summarized here. In practice initiatives seeking to disseminate the WB widely have already been tried in the market with extremely limited success. Such initiatives have not been able to achieve an effective method of distribution in the town-ships and other low-income areas which could lead to the sales volumes proposed by the current CPA.

Alternative a) is therefore shown to be not a credible alternative to the CPA.

Alternative b) is the adoption by low-income families of low-emission or zero-emission cook-stoves and fuels. The text below examines the feasibility of this alternative via a survey of potential barriers. In order to present an outcome for Step 1a as required by the Tool, the conclusions reached below may be summarized here, follows: The cost and practicality of bio-coal, bio-fuel-gels, solar cook-stoves, or other zero or low-emission cooking fuels and associated cook-stoves, continues to be prohibitive. The technologies are not mature and not yet affordable or available.

Alternative b) is therefore not a credible alternative.

Alternative c) is the continuation of the current situation whereby the full population of low-income homes in South Africa continue to use current fuels (primarily electricity and kerosene) at current rates and Heat Retention Cookers are a known technology predominantly sold in small numbers at a relatively high price to a specific market segment consisting of relatively wealthy homes.

Alternative c) is a credible alternative and reflects the baseline situation

Outcome of Sub-step 1a: The outcome of sub-step 1a is that that the only realistic alternative to the proposed CPA is continuation of the current situation as outlined in Alternative c) above. The CPA will therefore reduce greenhouse gases compared to the baseline situation and the CPA is additional.

Sub-step 1b: Consistency with mandatory laws and regulations:
(2) All the alternative scenarios listed above are in compliance with mandatory laws and regulations.
(3) Not applicable
(4) The CPA is not the only alternative which is consistent with mandatory laws and regulations, and the CPA is therefore additional.

Step 2: Investment analysis
In accordance with the "Tool for demonstration and assessment of additionality version 5.2", the option of Step 3 is adopted here.

Step 3: Barrier analysis
This step determines whether the CPA faces barriers that prevent it from being implemented without its registration under the CDM, and do not prevent at least one of the alternatives from being implemented.

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CPA
The proposed activity faces the following investment, technological, and behavioural (prevailing practice) barriers if implemented without the CDM:

(a) Investment barriers

A typical CPA entails significant investment to meet the costs of promotion and distribution of the Wonderbag, especially given that the vast majority of the potential customer base lives in informal communities without modern distribution and product promotion infrastructure. The community of potential investors or funders has taken these circumstances as grounds for uncertainty as to acceptance of the Wonderbag among the population and refused to finance the CPAs comprising this programme.. Natural Balance has approached a number of financial institutions and organizations requesting funding support for this project. The company has entered into detailed discussions with the organizations listed here, but has not been successful in obtaining finance.

National Empowerment Fund
Industrial Development Corporation
Standard Bank PLC
Nedbank
TFS Green
Department of Trade and Industry (SA)
Gauteng Enterprise Propeller
JP Morgan Philanthropy
Microsoft Foundation
First National Bank

(b) Technological barriers:
In the case of this CPA, no technological barriers exist as the technology is simple and well proven, and does not require specialized skill or specialized organizational capacity to manufacture, operate, and maintain.

(c) Behavioural barriers (prevailing practice)
A major barrier to the CPA implementation is habit and resistance to behavioural change. Despite financial savings and convenience associated with a device like the WB, people tend prefer to continue customary ways of doing things such as cooking. The CPA therefore revolves around an intense, pervasive, and sustained effort to support customers through pre-sales, sales and after-sales familiarisation activities and the availability of specialised skills and organisational capacity (in the form of a close relationship between NB and the partner organisation Lovelife).

The CPA therefore constitutes a very clear example of "first-of-its-kind" with respect to large-scale diffusion of use within the low-income majority population of the country.

Large-scale diffusion to between 1 and 3 million homes is a market transformation goal. It requires a fundamental and permanent shift in normal day-to-day behaviour in homes, a shift in habit by very busy mothers and grandmothers who will commonly revert to customary patterns of cooking even after a period of experimentation with new approaches. To overcome this inertial prevailing practice, the CPA will apply novel (and expensive) methods of direct selling, familiarisation, awareness-building and customer support, over a period of decades.

(d) Other barriers: the distribution challenge
The logistics of distribution in the market areas targeted are very tough. This arises from a combination of factors: low disposable incomes, high crime rates in informal communities, absence of effective home delivery services, the high bulk and low value nature of the product, and so on. A great deal of work was done since early 2009 to develop effective distribution strategies and solve the logistics challenges. The solutions have been worked out and costed carefully. The first plank of the solution is a concerted recruitment drive, managed under each PAI (or "WOT manager") working through the existing loveLife community network, that will assemble a team (the WOT team) of direct sales agents who will be the driving force and members of the WOTs. The second plank is an intensive training CPA that will equip the team members with skills and information required to be both effective salespeople and agents of kitchen behaviour-change. The third is an interactive, cookery-focused events programme tentatively branded "Wonderfeasts". These events serve as the main marketing opportunity for the Wonderbag to find new homes, for existing users to develop their usage patterns and share their best practice and favourite recipes, and for the WOT managers to identify new sales agents and implementation partners.

Outcome of Sub-Step 3a: The above analysis shows that the CPA faces real and significant barriers. The registration of the CPA under the CDM will provide a revenue source over and above WB sales revenue, which will remain available through a great many years, so underpinning a large-scale market transformation. Without this long-term extra revenue source, the CPA could not achieve this goal and is therefore additional.

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed CPA)

(4) The table A.4.3.2 below shows the extent to which the identified barriers also affect the alternative scenarios.

Table A.4.3.2

Alternative	Identified barrier	Justification	Eliminate from further consideration
d) Implementation of the CPA without being registered as a CDM project	Both (a) the Investment barrier and (c) the Behavioural barrier	As described above. The programme is "first-of-its-kind" with regard to behavioural changes it requires, and thus affected strongly by a prevailing practice barrier. Further, it is not financially viable, thus facing significant investment barriers.	Yes, this is not a viable alternative
e) Adoption by low-income families of low-emission cook-stoves and fuels	Both (a) the Investment barrier and (c) the Behavioural barrier (resistance to change of prevailing practice) affect this scenario.	The most likely low-emission technology options are bio-fuel stoves and fuels but these are not commonly available nor technologically mature and are unaffordable to the population targeted by the CPA. This scenario would demand funding to even higher levels than the proposed CPA (to achieve same level of service) which would imply lack of sustainability through market distortion and failure due to lack of funds	Yes; this is not a viable alternative
f) Continuation of the current situation whereby no CPA or other alternatives are undertaken	None of the identified barriers prevent this scenario	Electric and paraffin cooking can continue to take place unhindered by the barriers identified, since expenditure on a new kitchen device is not required, financing not required, and no behavioural change is required	No. This is the most likely scenario in the absence of the CPA registered under CDM

(5) The evidence required to demonstrate the effects summarised on the Table above, is available.

Outcome of Sub-Step 3b: The barriers identified in 3a above would not affect the baseline alternative of continuation of the current situation.

Outcome of Sub-Step 3: Both sub-steps 3a and 3b are satisfied, and thus the CPA is additional.

Step 4: Common Practice Analysis

The programme is "first-of-its-kind" as described in Sub-Step 3a above. Neither the technology nor its practice has diffused to the significant extent propose here, in the relevant sector, despite knowledge of its existence over past years. The relevant sector in this case is the low-income majority population of South Africa. Heat Retention Cookers have been used in limited instances since the Second World War, when the availability of fuel was scarce, and there exists some low-volume marketing currently in the South African market. Amongst the wealthier segment of the population, which tends to adopt environmentally-friendly technology more easily, cookers are ordered online from various local and

international websites, and then posted or couriered to the customer. According to Statistics South Africa's Census (2001), 8.6% of South African households had computers in 2001. The Community Survey (2007) suggested that this had risen to 15.7% by 2007. This distribution strategy is thus severely limited to a very small population almost exclusively outside the targeted low-income communities.

Some charity-based distribution, in partnership with community-based organisations, currently takes place, but these projects are limited by the relatively small reach of the organisations with which they partner, in comparison with the significant reach of Lovelife.

The "Tool for demonstration and assessment of Additionality" requests an analysis of other operational activities which "are in the same region, rely on a similar technology, are of a similar scale and take place in a comparable environment with respect to regulatory framework." The evidence is that there are no such activities, because (a) the scale of the proposed programme is fundamentally different from current sales of heat- retention devices, and (b) the socio-economic group or market areas (the low-income townships and low-income rural populations) constitute a significantly different region or environment.

Therefore there is no comparable or similar activity and steps 4a and 4b are not applicable.

Outcome of Section B.5: In summary the CPA is additional for the following reason:
Implementation of the proposed CPA without the CDM is prevented by a investment barrier and a prevailing practice barrier, whereas one alternative to the CPA, use of fossil fuels and electricity for cooking at current levels of consumption, is not prevented by these barriers. At the same time no activity with a similar scale aimed at the specific target market exists, and the CPA is therefore not common practice.

Overseas Development Assistance (ODA)
The proposed CPA does not use any ODA funds.

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

>> Here the PPs shall provide the key criteria for assessing additionality of a CPA when proposed to be included in the registered PoA. The criteria shall be based on additionality assessment undertaken in E.5.1 above. The project participants shall justify the choice of criteria based on analysis in above section.
It shall be demonstrated how these criteria would be applied to assess the additionality of a typical CPA at the time of inclusion.

NOTE: Information provided here shall be incorporated into the PoA specific CDM-SSC-CPA-DD that shall be included in documentation submitted by project participants at registration of PoA.

The key criteria for assessing additionality of a CPA will be as follows, in conclusion of the additionality analysis above:

- That the conditions under which distribution is to take place are challenging (for example, lack of conventional distribution infrastructure weak safety and security, high crime rates) and give rise to barriers insurmountable without carbon accreditation, implying the specific criterion that this CPA trains and deploys a specialized staff team to promote and secure adoption and continuing usage of the product.
- That uncertainty amongst potential lenders or funders as to the viability of distribution of Wonderbags within this CPA, constitutes an impassable investment barrier. The evidence

submitted for validation of the programme, in the form of refusals by banks and other potential funders to lend or invest, is directly applicable and relevant to this CPA.

- That the predominant prevailing practice and behavioural conditions found in this CPA do not reflect any considerable change from reliance on conventional technologies (electric and kerosene cooking without heat retention and without equivalent energy-saving practice or technology), as evidenced specifically for this CPA in relevant literature and reports.

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 emission reductions achieved by a typical CPA will be estimated and measured by application of the following options within AMS II.C:

For fossil fuels users within the CPA: as prescribed by the methodology and detailed in Section E.6.2 below. Both baseline and project national fuel consumption will be measured for each fossil use through representative sampling each year and multiplied by the emission factor of the relevant fossil fuel.

For electricity users within the CPA: as prescribed by the methodology and detailed in Section E.6.2 below, applying Option 2 for assessment of electricity-using baseline. Both baseline and project electricity national consumption will be measured by way of representative sampling each year and multiplied by the emission factor of the South African grid.

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

>>

I. Calculation of Grid Emission Factor

The CO2 emission factor for grid displacement is calculated by first assessing the grid operating and build margins, and then calculating a combined margin. This is done here following the procedure prescribed in the "Tool for calculation of the emission factor of an electricity system" version 2.

The operating margin refers to existing power plant whose electricity generation would be affected by the project activity. The build margin refers to power units whose construction would be affected. The tool prescribes 6 steps as follows:
STEP 1. Identify the relevant electricity systems.
STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).
STEP 3. Select a method to determine the operating margin (OM).
STEP 4. Calculate the operating margin emission factor according to the selected method.
STEP 5. Identify the group of power units to be included in the build margin (BM).
STEP 6. Calculate the build margin emission factor.
STEP 7. Calculate the combined margin (CM) emissions factor.

Step 1: Identify the relevant electricity systems.

96% of the national electricity grid of South Africa consists of Eskom generated electricity. The remainder is private or municipal power generation[12]. The calculation presented here excludes the non-Eskom generation, in order to achieve a conservative result, since in general the non-Eskom generators have lower efficiencies.

In this calculation, the whole SA transmission system is taken as a homogenous mix of electricity supply by all generators. This is a reasonable assumption as the regional generation and consumption of Eskom transmission grids are interlinked and no distinction can be made between provincial or sectoral generation and consumption. For example: Cape Town, although located close to a nuclear power station, receives electricity via the transmission line from coal-fired power stations in Mpumalanga.

The complete list[13] of power generation plants operational since 2001 is given on the Eskom web-site and table 1 replicates the information provided.

[12] National Electricity Regulator, Electricity Supply Statistics for South Africa

[13] http://www.eskom.co.za/live/content.php?Item_ID=4226&Revision=en%2F0

Table 1 Information available on Eskom web-site

		Fuel Consumption			Electricity Generation		
		Coal in tonnes/year and Kerosene in litres/year			MWh/year		
		2005	2006/7	2007/8	2005	2006/7	2007/8
Arnot	Coal	5,456,640	8,063,020.00	6,210,700	11,495,036	15938102	11905060
Duvha	Coal	11,765,290	15915147	12,425,531	24,479,488	31550562	23622732
Hendrina	Coal	6,883,375	8,746,546.00	7,794,220	12,410,151	16083288	13756351
Kendal	Coal	15,161,339	20,115,835.00	15,986,131	26,461,793	34164855	26517420
Kriel	Coal	10,518,778	11,722,579.00	9,059,934	20,510,202	22468695	17762398
Lethabo	Coal	15,602,785	22792396	18,314,572	22,498,940	32052833	25701723
Matimba	Coal	9,369,375	18,075,673.00	14,862,323	28,401,085	34983880	29021742
Majuba	Coal	14,338,444	11,834,508.00	12,853,342	17,620,119	22828565	23680971
Matla	Coal	12,929,861	16,867,123.00	13,795,309	23,782,480	30864194	24549833
Tutuka	Coal	8,599,359	11,654,556.00	10,627,575	16,500,638	23389829	20980242
Koeberg	Nuclear	0			0		
Acacia	Gas	17,488,444			47,848		
Port Rex	Gas	10,999,357			30,094		
Colley Wobbles					0		
First Falls	Hydro	0			0		
Gariep	Hydro	0			402,432		
Ncora	Hydro	0			0		
Second Falls	Hydro	0			0		
Van Der Kloof	Hydro	0			322,928		
Drakensberg	Pump Storage	0			1,818,463		
Palmiet	Pump Storage	0			796,020		
Camden	Coal	390,000	1604548	3218873	756,540	2815982	5171057
Grootvlei	Coal	0	0	130747.7	0	0	237138
Komati	Coal	0	0	0	0	0	0

STEP 2. Choose whether to include off-grid power plants in the project electricity system

For simplicity no off-grid power stations are included in the calculation, and the following option is adopted:

Option I. Only grid power plants are included in the calculation

In accordance with the Tool version 2, it is therefore the case that the calculation here corresponds to the calculation prescribed also by version 1 of the Tool.

Step 2: Select an Operating Margin Method

The tool distinguishes certain types of plant as "low-cost/must-run resources". These are defined as follows:
''Low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include

hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must run, it should also be included in this list, i.e. excluded from the set of plants."

The tool for calculation of the grid emission factor allows the operating margin to be calculated via any one of the following methods:

(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch data analysis OM, or
(d) Average OM

The Simple OM method can be used if low-cost/must-run resources constitute less than 50 % of total grid generation. From Table 1, it is apparent that that Hydro and Nuclear, classified as both low-cost and must-run power plants, constitute considerably less than 50% of the national grid. The Simple OM method is adopted here.

For this method the emission factor can be calculated using either of the two following data vintages:

• *Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation. For off-grid power plants, use a single calendar year within the 5 most recent calendar years prior to the time of submission of the CDM-PDD for validation.*

• *Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year y-1 may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year preceeding the previous year y-2 may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.*

The ex-ante option is chosen for the project activity. The grid emission factor is calculated here using a 3-year average, based on the data available for 2005, 2006/07 and 2007/08, as presented in table 1.

Step 3: Calculation of the operating margin emission factor

Option A1 as defined by the Tool is adopted. Accordingly, the Simple Operating Margin emission factor is calculated by application of the following equation:

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,m,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{grid,OMsimple,y}$ = Simple operating margin CO2 emission factor in year y (tCO2/MWh)

FCi,m,y = Amount of fossil fuel type i consumed by power plant/unit min year y (mass or volume unit)

NCVi,y =		Net calorific value (energy content) fossil fuel type i in year y (GJ/mass or volume)
EFCO2,i,y	=	CO2 emission factor of fossil fuel type i in year y (tCO2/GJ)
EGm,y	=	Net electricity generated and delivered to the grid by power plant/unit m in year y (MWh)
m plants/units	=	All power plants/units serving the grid in year y except low cost/must-run power
i	=	All fossil fuel types combusted in power plant/unit m in year y
y	=	The relevant year as per the data vintage chosen in step 3

The simple operating margin is calculated using the ex ante option. Table 1 reproduces information on the Eskom website for electricity generation and fuel consumption during 2005, 2006/07 and 2007/08. The calorific values for coal and kerosene are found in the IPCC 2006 guidelines. "Low-cost/must-run" plants are identified as nuclear, hydro, low-cost biomass and solar generation. Therefore the power plants included were coal-fired and liquid fuel OCGT power stations.

Table 2 sets out default values used in the calculation, for net calorific value and CO2 emissions of the relevant fuels.

Table 3 calculates total fuel consumption and electricity generation over the three years for the eligible plants, and also calculates the emissions of each plant and their emission factors. Table 4 tabulates the total fuel consumptions of all the plants and compares this with their total electricity generation, thus applying the equation above to determine the Simple Operating Margin Grid Emission factor.

Table 2 Parameter Values

	Coal			Kerosene		
NCV	19.9	GJ/tonne	Ref 1 Table 1.2	42.4	GJ/tonne	Ref 1 Table 1.2
EF_{CO2}	0.0895	tCO2/GJ	Ref 1 Table 1.4	0.0708	tCO2/GJ	Ref 1 Table 1.4
Ref 1	IPCC 2006 Guidelines Vol 2 Ch 1 (lowest value of 95% confidence interval)					

Table 2 Plant Emission factors

Plant name		Fuel Consumption Total 2005 to 2008		Electricity Generation Total 2005 to 2008		Emissions	Emission factor
		Coal	Kerosene	Coal	Kerosene		
		tonnes	litres	MWh	MWh	tCO2	tCO2/MWh
Arnot	Coal	19,730,360		39,338,198		35,140,758	0.89
Duvha	Coal	24,190,821		56,030,050		43,085,062	0.77
Hendrina	Coal	23,424,141		42,249,790		41,719,566	0.99
Kendal	Coal	51,263,305		87,144,068		91,302,509	1.05
Kriel	Coal	31,301,291		60,741,295		55,749,164	0.92
Lethabo	Coal	33,917,357		80,253,496		60,408,509	0.75
Matimba	Coal	42,307,371		92,406,707		75,351,543	0.82
Majuba	Coal	39,026,294		64,129,655		69,507,781	1.08
Matla	Coal	43,592,293		54,646,674		77,640,053	1.42
Tutuka	Coal	30,881,490		60,870,709		55,001,478	0.90
Koeberg	Nuclear						
Acacia	Gas		17,488,444		47,848	42,892	0.90
Port Rex	Gas		10,999,357		30,094	26,977	0.90
Colley Wobbles	-						
First Falls	Hydro						
Gariep	Hydro						
Ncora	Hydro						
Second Falls	Hydro						
Van Der Kloof	Hydro						
Drakensberg	Pump Storage						
Palmiet	Pump Storage						
Camden	Coal	5,213,421		8,743,579		9,285,363	1.06
Grootvlei	Coal	130,748		237,138		232,868	0.98
Komati	Coal						

Table 3 Calculation of Operating Margin

Fuel Consumption Total 2005 to 2008		Electricity Generation Total 2005 to 2008	Emissions	Emission factor
Coal	Kerosene			
tonnes	tonnes	MWh	tCO2	tCO2/MWh
344,978,892	23,274,533	646,869,301	614,494,523	0.95

Step 4: Identify the group of power units to be included in the build margin

The Tool requires that:

The sample group of power units m used to calculate the build margin consists of either:
(a) The set of five power units that have been built most recently; or

(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use the set of power units that comprises the larger annual generation.

Power plant registered as CDM project activities should be excluded from the sample group m. However, if the group of power units, not registered as CDM project activity, identified for estimating the build margin emission factor includes power unit(s) that is(are) built more than 10 years ago then:
(i) Exclude power unit(s) that is (are) built more than 10 years ago from the group; and
(ii) Include grid connected power projects registered as CDM project activities, which are dispatched by dispatching authority to the electricity system.

Capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.

Eskom provide data on commissioning dates of all their power stations. Whereas the data provided indicates that Camden and Grootvie were not generating from 2001 to 2005 and later, these stations qualify as return-to-service or retrofits and were both commissioned in 1969. Indeed, all the stations listed by Eskom have build dates exceeding ten years past. In this case it is reasonable to investigate the most recent 20% of the power capacity. The two most recent commissioning dates are Majuba (1996) and Kendal (1988). Table 5 shows that these two stations make an average contribution to the Eskom power output over the years 2005 to 2008 of 23%, and accordingly these two stations are adopted here for calculation of the build margin.

Table 5 Most recent 20% of capacity

		Electricity Generation
		Total 2005 to 2008
	Kendal	87,144,068
	Majuba	64,129,655
	Total Generation	646,869,301
	Fraction of Total Generation	23%

Step 5: Calculate the build margin emission factor

The build margin emissions factor is the generation-weighted average emission factor (tCO2/MWh) of power units as identified in Step 4, calculated as follows:

$$EF_{grid,BM,y} = \sum_{i,m} FC_{i,m,y} * NCV_{i,y} * EF_{CO2,i,y} / \sum_{m} EG_{m,y}$$

Where

$EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO2/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power units m in year y (MWh)
$EF_{CO2,i,y}$ = CO2 emission factor of power unit m in year y (tCO2/GJ)
m = Power units included in the build margin

Table 4 Calculation of Build Margin							
Plant name		Fuel Consumption		Electricity Generation		Emissions	Emission factor
		Total 2005 to 2008		Total 2005 to 2008			
		Coal					
		tonnes		MWh		tCO2	tCO2/MWh
Majuba	Coal	39,026,294		64,129,655		69,507,781	1.08
Kendal	Coal	51,263,305		87,144,068		91,302,509	1.05
	Total	90,289,599		151,273,723		160,810,290	1.06

Step 6: Calculate the combined margin emission factor

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

$EF_{grid,BM,y}$ = Build Margin CO2 emission factor in year y (tCO2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (tCO2/MWh)
w_{OM} = Weighting of operating margin emissions factor (%)
w_{BM} = Weighting of build margin emissions factor (%)

The following default values are used for w_{OM} and w_{BM}:
w_{OM} = 0.5 and
w_{BM} = 0.5 for the first crediting period, and
w_{OM} = 0.25 and
w_{BM} = 0.75 for the second and third crediting period

Table 5 Calculation of Combined margin		
EFgrid,OM,y	0.95	tCO2/MWh
WOM	0.5	
EFgrid,BM,y	1.06	tCO2/MWh
WBM	0.5	
Combined margin	1.01	tCO2/MWh

The result of the assessment is therefore that the relevant value of the Grid Emission Factor, as it applies to this programme ex-ante, is 1.01 tCO2/MWh.

II. Calculation of emission Reductions

Methodology document:
11. The emission reduction achieved by the project activity shall be determined as the difference between the baseline emissions and the project emissions and leakage.

$ERy = (BEy - PEy) - LEy$

Where:

ERy	Emission reductions in year y (tCO2e)
LEy	Leakage emissions in year y (tCO2e)

For electricity using households:

The methodology offers an Option 2 for assessment of electricity-using baseline which is appropriate[14] in this case as follows:

$BE_y = E_{BL,y} . EF_{CO2,ELEC,y}$

Where

$EF_{CO2,ELEC,y}$ Grid emission factor in year *y* calculated in accordance with the provisions in AMS-I.D (tCO2/MWh). This parameter is calculated ex-ante.

$E_{BL,y} = EER_{BL,y} . Q_y / (1 - l_y)$

Where

$EER_{BL,y}$ Specific Energy consumption in the baseline (MWh/unit). *EER* is calculated as total annual electricity consumed in the baseline divided by total quantity of annual output in the baseline. In this programme, the units of $EER_{BL,y}$ are MWh/household and the value of EER reflects total electricity consumption by a representative Wonderbag user as found from surveying and sampling. This parameter will be measured **ex-post**, each year, as part of the monitoring plan.

Q_y Total quantity of supply in project year 'y' (unit) to users of electricity /usage scenario i. The units are Wonderbag sales and the number of WB sales will be measured **ex-post**, each year, as part of the monitoring plan.

l_y Average annual technical grid losses (transmission and distribution) during year *y* for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable

[14] The provision that this option can only be used where comparable conditions for the output in the baseline and project can be established, is satisfied by the adoption in this monitoring plan of baseline energy consumption as an ex-post parameter, which is done specifically to make sure that conditions for project and baseline are similar. Given ex-post tracking of the baseline, the sub-provision in the methodology that historical baseline data of more than 1 year, does not apply (as this is intended to ensure that ex-ante baseline values are accurate and does not apply to ex-post baseline assessment).

The energy consumption in the project scenario is measured in the same way as above, since this is exactly equivalent to use of the alternative expression $E_{PJ,y} = \sum_i (n_{,i,}. p_{,i,}. o_{,i,})/(1-l_y)$ in the case of cook-stoves where $p_{,i,}. o_{,i,}$ resolves to EER and Q_y is n.

$PE_y = E_{PJ,y} . EF_{CO2,ELEC,y}$

Where

$E_{PJ,y} = EER_{PJ,y} . Q_y / (1 – l_y)$

$EER_{PJ,y}$ This parameter is the total household electricity consumption of a representative Wonderbag using household, as found from surveying and sampling. This parameter will be measured **ex-post**, each year, as part of the monitoring plan. In cases where a usage scenario *i* is identified which is an alternative to a domestic home (such as use of a large-size Wonderbag in an institutional kitchen) then the expression $E_{PJ,y,} = \sum_i EER_{PJ,i,y} . Q_{y,i} / (1 – l_y)$ may be used[15].

For fossil-fuel using households

Methodology document:
5. If the energy displaced is fossil fuel based, the energy baseline is the existing level of fuel consumption or the amount of fuel that would be used by the technology that would have been implemented otherwise. The emissions baseline is the energy baseline multiplied by an emission factor for the fossil fuel displaced. Reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain.

Baseline:

$BE_y = F_{BLi,,y} . Q_{Fossil,i,y} . EF_{CO2,Fossil,i}$

Where

$EF_{CO2,Fossil,i}$ Emission factor for the fossil fuel i displaced
$F_{BLi,,y}$ Energy content of fossil fuel i /usage scenario i[16] used in a representative household in a year. This parameter will be measured **ex-post**, each year, as part of the monitoring plan.

[15] For projections of emission reductions within each CPA, the assumption is made that each sale of a WB, whatever size and whether it is used in a domestic or non-domestic application, results in emission reductions at domestic scale assuming either electricity or paraffin use. This is conservative since some Wonderbags may be large-size, or may be standard size and used more intensively than in the domestic situation. During project operation two approaches are allowed by the equations: (a) continuation of this approach (b) a count of sales to alternative "usage scenarios" involving non-domestic users i who use a large size WB or use a standard bag more intensively.

[16] During project operation, the fossil fuels used by Wonderbag customers will be monitored and $F_{BL,y}$ will be evaluated according to the specific fuel *i* or by application of a conservative value. In addition to variation in fuel type, non-domestic usage scenarios *i*, may occur amongst fossil fuel users as well as amongst electricity users, and these may be distinguished during project operation.

$Q_{Fossil,i,y}$ Quantity of Wonderbag sales to users of fossil fuel i/usage scenario i in year y. The number of WB sales will be measured **ex-post**, each year, as part of the monitoring plan.

Project:

$PE_y = E_{PJ,y} . EF_{CO2,Fossil}$

Where

$E_{PJ,y}$ = Energy consumption in project activity in year *y*. This shall be determined **ex post** based on monitored values

Therefore:

$E_{PJ,y} = F_{PJ,y} . Q_{Fossil,y}$

Where

$F_{PJ,i,y}$ Energy content of fossil fuel i /usage scenario i used in a representative household in a year. This parameter will be measured **ex-post**, each year, as part of the monitoring plan.

Leakage

Methodology document: If the energy efficiency technology is equipment transferred from another activity, leakage is to be considered.

This is not the case, and therefore leakage is set to zero.

III Fixed parameter values

Fixed parameter values are provided in the next section for:

$EF_{CO2,Fossil,i}$ Emission factor for the fossil fuel displaced
$EF_{CO2,ELEC,y}$ Grid emission factor
l_y Average annual technical grid losses

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

Ex-ante (fixed value) parameters:

Data / Parameter:	$EF_{CO2,Fossil,i}$
Data unit:	kgCO2/TJ
Description:	Emission factor for the fossil fuel displaced
Source of data used:	IPCC default value
Value applied:	For example: Kerosene 71,500; LPG 63,000; Coal 94,600
Justification of the choice of data or description of	IPCC default values are used as country or project specific data are not available.

measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	NCV_i
Data unit:	TJ/Gg
Description:	Net calorific value of the fossil fuel displaced
Source of data used:	IPCC default value
Value applied:	For example: Kerosene 43.8; LPG 47.3; Coal 18.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default values are used as country or project specific data are not available. NCV values are used to calculate the energy consumption values $F_{BL,y,i}$ and $F_{PJ,y,i}$ from the mass values which are obtained by measurement or census data.
Any comment:	

Data / Parameter:	$EF_{CO2,ELEC,y}$
Data unit:	tCO_2/MWh
Description:	Grid emission factor calculated in accordance with the provisions in AMS-I.D
Source of data used:	Data provided in the ESKOM website as referenced in Section E.6.2 above.
Value applied:	1.01
Justification of the choice of data or description of measurement methods and procedures actually applied :	As calculated in Section E.6.2 above following the "Tool for calculation of the emission factor of an electricity system" version 2.
Any comment:	

Data / Parameter:	l_y
Data unit:	fraction
Description:	Average annual technical grid losses (transmission and distribution) during year *y* for the grid serving the locations where the devices are installed, expressed as a fraction.
Source of data used:	Page 105 of the Eskom Annual Report 2008
Value applied:	0.08

Justification of the choice of data or description of measurement methods and procedures actually applied :	The Methodology states that *"This value shall not include non-technical losses such as commercial losses (e.g.theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g. appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable".*
Any comment:	

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

I. Ex-post (monitored) parameters applying to electricity users:

Data / Parameter:	$EER_{BL,i,y}$
Data unit:	MWh/household/year
Description:	Specific Energy consumption in the baseline
Source of data used:	Annual survey of sample of Wonderbag users. Expected emission reductions are calculated from the value measured by March 2009 Baseline Study.
Value of data applied for the purpose of calculating expected emission reductions	0.049
Description of measurement methods and procedures to be applied:	Electrical energy consumption measured during annual monitoring survey, by virtue of readings of household KWhr meters.
QA/QC procedures to be applied:	The annual monitoring survey will be conducted by a credible independent consultant, and will follow the statistical method outline in section E.7. Expert 3rd party input will be sought on statistical validity of the survey each year.

Data / Parameter:	$EER_{PJ,i,y}$
Data unit:	MWh/household/year
Description:	Specific Energy consumption in the project
Source of data used:	Annual survey of sample of Wonderbag users. Expected emission reductions are calculated from the value measured by March 2009 Baseline Study.
Value of data	0.033

applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	Electrical energy consumption measured during annual monitoring survey, by virtue of readings of household KWhr meters.
QA/QC procedures to be applied:	The annual monitoring survey will be conducted by a credible independent consultant, and will follow the statistical method outline in section E.7. Expert 3rd party input will be sought on statistical validity of the survey each year.
Any comment:	

Data / Parameter:	$DOF_{Elec.i}$
Data unit:	fraction
Description:	The portion of households which purchased a Wonderbag and are estimated to be no longer using it
Source of data used:	Annual survey of sample of Wonderbag users.
Value of data applied for the purpose of calculating expected emission reductions	Zero, since the expected emission reductions are calculated on the basis of an estimated volume of sales.
Description of measurement methods and procedures to be applied:	Each home selected for sampling from the sales record will be visited and the number of homes in which the Wonderbag is not used will be counted. If the purchased Wonderbag has been moved to another address, this will be recorded in the interest of conservativeness as a Drop-Off, unless a further visit is made to the new address and the use of the Wonderbag is confirmed.
QA/QC procedures to be applied:	The annual monitoring survey will be conducted by a credible independent consultant, and will follow the statistical method outline in section E.7. Expert 3rd party input will be sought on statistical validity of the survey each year.
Any comment:	

Data / Parameter:	$Q_{SalesElec,i,y}$
Data unit:	Number
Description:	The quantity of Wonderbag sales to users of electricity under usage scenario *i*
Source of data used:	Annual survey of sample of Wonderbag users
Value of data	60,000

applied for the purpose of calculating expected emission reductions in the first CPA	
Description of measurement methods and procedures to be applied:	Each home selected for sampling from the sales record will be visited and the number of homes in which the Wonderbag is used with electricity under usage scenario *i*, will be counted. The fraction of these homes in comparison to the total sample population will be calculated and applied to the total sales volume to derive the appropriate value of this parameter.
QA/QC procedures to be applied:	The annual monitoring survey will be conducted by a credible independent consultant, and will follow the statistical method outline in section E.7. Expert 3rd party input will be sought on statistical validity of the survey each year.
Any comment:	

II. Ex-post (monitored) parameters applying to fossil fuel users:

Data / Parameter:	$F_{BL,i,y}$
Data unit:	TJ/household/year
Description:	Specific Fossil Fuel Energy consumption in the baseline
Source of data used:	Annual survey of sample of Wonderbag users. Expected emission reductions are calculated from the value measured by March 2009 Baseline Study.
Value of data applied for the purpose of calculating expected emission reductions	2.3 kg of kerosene multiplied by NCV of kerosene
Description of measurement methods and procedures to be applied:	Fossil fuel energy consumption measured during annual monitoring survey, by virtue of weighing of household fuel supply or of tracking of depletion of fuel supply in containers of known volumetric characteristics
QA/QC procedures to be applied:	The annual monitoring survey will be conducted by a credible independent consultant, and will follow the statistical method outline in section E.7. Expert 3rd party input will be sought on statistical validity of the survey each year.

Data / Parameter:	$F_{PJ,i,y}$
Data unit:	TJ/household/year
Description:	Specific Fossil Fuel Energy consumption in the baseline
Source of data used:	Annual survey of sample of Wonderbag users. Expected emission reductions are calculated from the value measured by March 2009 Baseline Study.
Value of data applied for the	1.4 kg of kerosene multiplied by NCV of kerosene

purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	Fossil fuel energy consumption measured during annual monitoring survey, by virtue of weighing of household fuel supply or of tracking of depletion of fuel supply in containers of known volumetric characteristics
QA/QC procedures to be applied:	The annual monitoring survey will be conducted by a credible independent consultant, and will follow the statistical method outline in section E.7. Expert 3rd party input will be sought on statistical validity of the survey each year.
Any comment:	

Data / Parameter:	$DOF_{Fossil.i}$
Data unit:	fraction
Description:	The portion of households which purchased a Wonderbag and are using Fossil fuel, and are estimated to be no longer using it
Source of data used:	Annual survey of sample of Wonderbag users.
Value of data applied for the purpose of calculating expected emission reductions	Zero, since the expected emission reductions are calculated on the basis of an estimated volume of sales.
Description of measurement methods and procedures to be applied:	Each home selected for sampling from the sales record will be visited and the number of homes in which the Wonderbag is not used will be counted. If the purchased Wonderbag has been moved to another address, this will be recorded in the interest of conservativeness as a Drop-Off, unless a further visit is made to the new address and the use of the Wonderbag is confirmed.
QA/QC procedures to be applied:	The annual monitoring survey will be conducted by a credible independent consultant, and will follow the statistical method outline in section E.7. Expert 3rd party input will be sought on statistical validity of the survey each year.
Any comment:	

Data / Parameter:	$Q_{SalesFossil,i,y}$
Data unit:	Number
Description:	The quantity of Wonderbag sales to users of fossil fuels of type *i* under usage scenario *i*
Source of data used:	Annual survey of sample of Wonderbag users
Value of data applied for the	10,000

purpose of calculating expected emission reductions in the first CPA	
Description of measurement methods and procedures to be applied:	Each home selected for sampling from the sales record will be visited and the number of homes in which the Wonderbag is used with fossil fuel type *i* under usage scenario *i*, will be counted. The fraction of these homes in comparison to the total sample population will be calculated and applied to the total sales volume to derive the appropriate value of this parameter.
QA/QC procedures to be applied:	The annual monitoring survey will be conducted by a credible independent consultant, and will follow the statistical method outline in section E.7. Expert 3rd party input will be sought on statistical validity of the survey each year.
Any comment:	

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

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I. Description of the Monitoring Plan for a SSC-CPA

Each CPA is subject to annual monitoring by way of a survey undertaken each year which determines national values for the following parameters:

- Household energy consumption (both baseline and project values), both electricity and fossil fuels
- Relative numbers of electricity-using and fossil-fuel-using Wonderbag users
- Fraction of Wonderbags sold, which have dropped out of use (the "Drop-off Fraction") with respect both to fossil users and electricity users

The annual monitoring survey shall determine these parameter values for application to all active CPAs with respect to a specific monitoring and verification period which is identical for all CPAs. The sampling procedure may either consist of a single-stage process which randomly samples households across all the CPAs, or it may consist of a two-stage process whereby a sample of CPAs are randomly selected and within these, a random selection is made of households. Both procedures are statistically sound and either one may be adopted each year by the CME depending on practical feasibility and costs.

II. Application of the Monitoring Methodology

Methodology document:
15. If the devices have variable current (ampere) characteristics, monitoring shall consist of metering the "energy use" of an appropriate sample of the devices installed. Monitoring shall also include annual checks of a sample of non-metered systems to ensure that they are still operating.

To apply this methodology, measurements will be taken of energy consumption in a sample of households which have purchased the Wonderbag, and a count will be made of the number of the sampled homes found not using the device; the portion of such homes is referred to as the Drop-Off Fraction or DOF. The sample size will be determined as described below in the section "Sampling Protocol".

For conservativeness, emission reductions assume that a drop-off has made no use of the Wonderbag throughout the full year monitored, such that no claim is made for emission reductions achieved prior to actual drop-off date.

In addition to sampling of energy consumption amongst users, energy consumption amongst equivalent non-users will also be measured annually, in order to make sure of accurate assessment of emission reductions in a context where the baseline conditions may change.

Accordingly the following equations will be applied for emission reduction calculation:

For Electricity users:

$ER_{Elec,y} = \sum_i (E_{BL,y} - E_{PJ,y}) . Q_{SalesElec,y,i} . (1-DOF_{Elec,i}) . EF_{CO2,Elec}$

Where

$Q_{SalesElec,y,i}$ Quantity of Wonderbags sold to electricity users with usage scenario *i*

$DOF_{Elec,i}$ Drop Off Fraction. The portion of electricity using purchasers no longer using the Wonderbag (in usage group i).

For fossil fuel users:

$ER_{Fossil,y} = \sum_i (F_{BL,y} - F_{PJ,y}) . Q_{SalesFossil,y,i} . (1-DOF_{Fossil,i}) . EF_{CO2,Fossil,i}$

Where

$Q_{SalesFossil,i,,y}$ Quantity of Wonderbags sold to fossil fuel i /usage scenario i customers

$DOF_{Fossil,i}$ Drop Off Fraction. The portion of fossil fuel i /usage scenario i customers no longer using the Wonderbag.

In order to distinguish the relative values of $Q_{SalesFossil,i,,y}$ and $Q_{SalesElec,i,y}$ the monitoring procedure will count the number of fossil fuel users (types i / usage scenarios i) and electricity users (usage scenarios i) in the random sample of Wonderbag customers, and calculate the fraction of each in comparison to total sample size. These fractions will be applied both:

- to the total sales count of all CPAs to derive the total programme emission reduction for the monitored period following the equation above
- to the total sales count of each CPA to derive the sub-counts ($Q_{SalesFossil,i,,y\ (CPAn)}$ and $Q_{SalesElec,i,y,(CPAn)}$) for each CPA(n).

The relative quantities of energy types (and usage scenario types) will be compared with the result of the same analysis of the baseline sample. If the two results differ by more than +/- 20% then an investigation will be conducted and an explanation provided.

Calculation of emission reductions in monitored period

Each CPA is responsible to keep an accurate record of the date of each sale of a Wonderbag, together with an informed and justified estimate of the date it is first used in a kitchen. In the case of bulk sales, the CPA is responsible equally to make informed and justified estimates of dates of individual sales and dates of first use, and include these on its sales record.

The parameter values $E_{B,i,y}$ $E_{PJ,i,y}$ $F_{BLi,,y}$ $F_{PJ,i,y}$ are the annual energy consumed in a household. To derive these values in practice during the sampling procedure, energy consumption is measured in each sampled home over a week. The week in question is chosen to be a conservative representation of the household consumption pattern over the whole year. The annual consumption value is divided by 365 days to generate a daily energy consumption figure, so that it is possible to calculate the emission reduction of each Wonderbag sold individually. This done by multiplying by the number of days which have elapsed between the date of first use of the individual Wonderbag and the date representing the end of the monitored period. The total emission reduction is therefore calculated as the sum of the emission reductions of each Wonderbag sold.

$$ER_{monitoring\ period} = \sum_x (F_{BL,day} - F_{PJ,day}) \cdot D_x \cdot Q_{SalesFossil,day} \cdot (1\text{-}DOF_{Fossil}) \cdot EF_{Fossil,\ CO2} + \sum_x (E_{BL,day} - E_{PJ,day}) \cdot D_x \cdot Q_{SalesElec,day} \cdot (1\text{-}DOF_{Elec}) \cdot EF_{ELEC,\ CO2}$$

Where

F_{day} and E_{day}	Energy consumed per day (annual energy divided by 365)
D_x	number of days elapsing between first use of Wonderbag x and the end of the monitoring period.
$Q_{SalesElec,day}$	The Quantity of Wonderbags starting used with electricity on Day x
$Q_{SalesFossil,day}$	The Quantity of Wonderbags starting used with fossil fuel on Day x
x	Sale date adjusted for delay between sale and start of use

Sampling protocol

Wherever reasonably possible, sample sizes will be sufficient to ensure that the precision of the sample means are 90/10 or better, in which cases the sample means will be used to estimate emissions reductions. If such samples sizes are difficult to achieve in practice, a conservative 90% lower bound on emissions reductions will be used. This is the value for which there is 90% confidence that the true mean emission reduction is at least as large. To ensure a conservative result when converting energy measurement to annual energy values, the monitoring surveys will be carried out in weeks not containing holidays or feasts nor in unusually cold weather. Energy measurement will take place over a period of seven days in sampled households. Baseline measurements will take place in homes randomly picked from homes of equivalent socio-economic to neighbouring sampled project households.

The national Wonderbag sales record will be used as a basis for random selection of the project sample. This record contains the dates of sale and installation (or conservative approximations of these dates) of each Wonderbag. A fraction of the entries will also include the names and addresses of customers, collected for example through completion of warranty cards and maintenance of customer registration sheets by PAIs. This fraction will be appropriate for representative random sampling. If a home visit indicates that the Wonderbag purchased is in use at another known address, the sample can be taken at the address in which the bag is used.

The required sample size is determined by the following factors: the coefficient of variation (cv) of the quantity being estimated, the expected level of non-compliance in the sample and the desired precision. To achieve 90/10 precision, assuming perfect compliance, the use of simple random sampling, a coefficient of variation *cv* and a population size of *N*, the minimum required sample size will be equal to

$$n = N \,.\, (16.7 \,.\, cv)^2 / (N + (16.7 \,.\, cv)^2)$$

The coefficient of variation and expected rate of non-compliance will be estimated from the most recent previous monitoring data (or 2009 data in the case of the first monitoring period). The final sample size will be at least 10% larger than calculated from the above formula, to allow for error in the estimate of *cv* and expected levels of non-compliance. For estimates of baseline, the population size will be assumed infinite (this is a conservative adjustment), in which case the above formula simplifies to $n = (16.7*cv)^2$. For the purpose of monitoring project emissions, the population size is equal to the number of WBs on the sales record.

An indication of sample sizes for 90/10 precision can be obtained from the cv values observed during the 2009 surveys. These indicated that a sample size of approximately 300 project and 300 baseline test will be needed to obtain 100 to 150 protocol-compliant results which satisfy 90-10 precision.

The sampling procedure may either consist of a single-stage process which randomly samples households across all the CPAs, or it may consist of a two-stage process whereby a sample of CPAs are randomly selected and within these, a random selection is made of households.

If and when the single-stage approach is adopted, the statistical procedure is as described above. If the two-stage process is followed, than the first step is to randomly select a group of CPAs. This approach ensures that every CPA has an equal probability of selection, so the sample is representative of the entire population of CPAs.

The size of the CPA sample is determined by the requirement to achieve 90/10 precision for the estimate of mean value of the parameter investigated. This can be achieved through different combinations of across-CPA sample size and within-CPA household sample sizes; if less CPAs are surveyed, more houses within the CPAs will need to be surveyed to achieve the required precision, and vice versa. The relative costs and practicalities of surveying across several CPAs will be balanced against the relative costs and practicalities of household surveys and a decision taken as to the most efficient balance between across-CPA surveying and within-CPA surveying, always adhering to the equation presented here to ensure statistically valid results.

At the second stage, a representative sample of appliances is sampled from every CPA which was selected in the first stage sample. Every sampled appliance is then checked for the ex-post parameters listed. This sample will also test for false records (non-existence of the installation as opposed to the installation not being operative). Sample size shall be chosen for a 90/10 precision (90% confidence interval and 10% margin of error) wherever reasonably possible. When 90/10 precision is not feasible, the lower bound of the 90% confidence interval will be adopted, as this will be a conservative approach and may in some cases be the only feasible approach in practical terms.

To start the process, the size of the sample of CPAs (labelled m in the equations below) and of the within-CPA samples (n_i) will be determined by estimates of the within-CPA and between-CPA variances obtained from the most recent survey undertaken. This is likely to be the survey of the previous year, and in the case of the first monitoring period, will be the results of the 2009 survey. Once these sample sizes are known, they may be increased by 10% to ensure adequacy and applied to the survey under preparation.

The variance of the estimate of the population mean for each parameter is given by this equation:

$$\text{Var}(Y) = \frac{1}{(N_1 + \ldots + N_M)^2}\left(\frac{M^2}{m}(1-\frac{m}{M})S_1^2 + \frac{M}{m}\sum_{i \in C_1}\frac{N_i^2}{n_i}(1-\frac{n_i}{N_i})S_i^2\right)$$

Where

Var(Y)	Variance of the estimated mean value of the parameter investigated
M	The population of CPAs within the programme of activities
N_i	The population of Wonderbag users within the *i*-th CPA sampled
m	The number of CPAs in the sample
n_i	The number of Wonderbag users in the *i*-th CPA sampled
S_1	Between-CPA variance
S_i	Within-CPA variance
C_1	Set of all CPAs

The precision of the estimated mean is:

$$\alpha = 1.67 \cdot \sqrt{\text{var}(Y)} / Y \cdot 100$$

Where

α	The precision achieved at 90% confidence as in 90/ α
Y	The estimated population mean for the parameter investigated

Quality assurance and check on double-counting

A credible third party consultant will be hired to carry out the annual sampling survey.

Furthermore, operational and management procedures are established to ensure that there is no risk that the count of Wonderbags will be incorrect through double-counting.

The principal method of ensuring is the maintenance of a unique sales records by the PAI, and its correlation against other records, principally purchase contracts between the PAI and NB, manufacturing records, shipping records, and stock records kept by NB and the manufacturers/shippers. All such data will be presented in the annual monitoring report presented to the verifier, with detail as to how it can be verified. It will be possible therefore for a verifier to confirm the accuracy of the sales record.

The WBs sold by the PAI will distinctive to each PAI, so that there is no danger that WBs sold by another company are included in the sample. As far as feasible in practice, each WB will have a distinctive colour code, serial number, or equivalent permanent marking to distinguish both:

- its age
- the PAI responsible for its sales and monitoring

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)

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The monitoring methodology and baseline study (2009 survey) have been completed in March 2009. The person responsible for the monitoring methodology is Adam Harvey of JPMCC (details in the participants contact list below). The baseline study (2009 survey) was carried out by an independent consultant:
Scott Burnett
Molora Consulting, 10 First Street, Melville

Annex 1

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

Organization:	JP Morgan Ventures Energy Corporation
Street/P.O.Box:	125 London Wall
City:	London
Postfix/ZIP:	EC2Y 5AJ
Country:	UK
Telephone:	+44 207 777 4829
E-Mail:	matthew.forsyth@jpmorgan.com
URL:	www.jpmorgan.com
Salutation:	Mr
Last Name:	Forsyth
First Name:	Matthew
Direct tel:	+44 207 777 4829

Organization:	Natural Balance Pty
Street/P.O.Box:	BDO House, 1 Richefond Circle, Ridgeside Office Park
City:	Umhlanga
Postfix/ZIP:	4319
Country:	South Africa
Telephone:	+27 (31) 083 321 7877
E-Mail:	sarah@naturalbalancesa.com
URL:	www.naturalbalancesa.com
Salutation:	Ms
Last Name:	Collins
First Name:	Sarah
Mobile:	+27823405583
Direct tel:	+ 27 (31) 083 321 7877

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The program is not in receipt of any public funding

Annex 3

BASELINE INFORMATION

The baseline information is detailed in the consultant's report: Wonderbag Kitchen Survey & Tests Report March 2009, Scott Burnett, Molora Consulting, 10 First Street, Melville, 2092, South Africa

Annex 4

MONITORING INFORMATION

The information is provided in Section E.7 above.

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