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

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small scale project activity

A.1 Title of the small scale project activity:

Title: SBBC Fuel Switch Project

Version: 01 Initial adoption

Date: March 14, 2008

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

The project activity takes place at SBBC Societe Briqueterie Bati Chaouia brick works (hereafter named SBBC) located on the eastern boundaries of the town of Berrechid , in Morocco, about 30 km south of the city of Casablanca. The brick plant has been operated and owned by the El Eulj family since 1998. The brick works is the single largest brick manufacturing facility in Morocco with a daily maximum design capacity of 1.6000 metric tons. There are approximately 70 brick works in Morocco, with an estimated annual production volume of 2,97 million tons (2003)[1]. Due to housing shortage in the country a great demand exists and the production volume is expected to increase.

The energy question is of paramount importance in the brick industry as very high temperatures are required in the manufacturing process and significant amount of operational expenses are energy related. Currently, the common practice in brick works all over the world is to use fossil fuels. Natural gas is used most frequently. In Morocco due to the lack of natural gas almost all brick manufacturing facilities uses fuel oil. Only a few works use some other energy sources like petroleum coke.[2] Currently the SBBC features three production lines of almost equal capacity build and placed into service between 1999 and 2004. The dryers and the kilns are heated by fuel oil and petroleum coke. Furthermore the dryers are heated with recovered heat from the kilns. At the input unit of the overall process, coal is blended to the clay as body fuel.

The project activity will reduce greenhouse gas (GHG) emissions by primarily substituting partly body fuel, dryer fuel and kiln fuel from fossil sources to renewable sources at the brick works. The project activity will apply bio-organic matters, like fatty acids as well as nutshells and residual wood. The bio-organic matter will be purchased from local food industry as well as from wood industry from the Anti-Atlas region. The fuel conversion implies the replacement of part of the existing burners at both process units dryers and kilns with new burners capable to the acceptance of bio-fuels, technical improvements of the clay-processing unit and combined secondary measures to adjust the furnace air technique in order to deal with the altered heat properties associated with the switch of body fuel. As a side effect an increase of energy efficiency of the kilns will result.

World wide the use of renewable sources of thermal energy in brick works is limited to a few select manufacturing facilities in Northern Italy, Germany, Spain, the Netherlands, US and the UK. Most of the manufactures that have switched to renewable sources use landfill gas. Only a small brick maker in Italy

[1] M. Kornmann, Y. Fehry Fassy 2005, Etude díanalyse du potentiel de la filiËre Briques et Tuiles au Maro. Page 14 and 17.

[2] M. Kornmann, Y. Fehry Fassy 2005, Etude díanalyse du potentiel de la filiËre Briques et Tuiles au Maro. Page 27

uses rendering fat and vegetable oils[3]. The problem by use of renewable fuels basically is that no commercial burner system for such fuels is available on the market today. [4] [5]

Sustainable development

The project activity is in line with the national goal to reduce greenhouse gas emissions and promote environmental friendly techniques. The national sustainable development criteria[6] have been taken into consideration and the project activity clearly contributes to sustainable development due to following aspects:

Environmental contribution

- Positive contribution to climate change due to reduction of CO_2 emissions by substitution of fossil fuels as well as avoidance of methane emissions from disposing organic matter in landfill site;
- Positive impact on local air quality due to decrease of fossil fuel use leading to considerable reduction of sulphur dioxide;

Socio-economic contribution

- Positive contribution to the energy self reliance of Morocco due to reduction of fossil fuel imports;
- Promotes forward to a sustainable society and increases the log term sustainability of the brick works by decreasing the dependence on fossil fuels and accordingly reducing foreign expenditure via a greater use of domestic renewable fuels;
- Enhance skills development, because the local employees of the brick works will be trained to operate and maintain new theology. The employees participate better and with greater emphasis to reach the final target. Hence, a better understanding of the existing and future production process will cause a higher degree of satisfaction and quality of job will improve;
- The operation an maintenance of the new theology will lead to a far higher individual qualification resulting in better job opportunities even outside the company;

Technical contribution

- Promotion of the best available techniques (BAT) like substitution of heavy oil and solid fuels by low emission fuels as well as modification of ceramic bodies as a cleaner technology;
- Enhances the knowledge about environmental friendly techniques by introducing state of the art technologies to Morocco.

For the purpose of being conservative, the emission reductions from methane avoidance will not be claimed as part of this project.

[3] Dezzutti, R. 2005. Ziegelei Gasser: additivi sostenibili e combustibili rinnovabili per ridurre l'impatto ambientale, L'Industria dei Laterizi, p. 95, 317-321.
[4] Mödinger 2004. Business and sustainable development in brick production. 13th Clean Air and Environmental Protection Congress and Exhbtion, London, UK.
[5] Mödinger 2005. Sustainable clay brick production. 5th International Colloquium Fuels in Fuels edited by Bartz, W.

[6] The national sustainable development criteria are published in the websites of the national DNA http://www.cdmmorocco.ma/en/procedures/criteres_eligib.php [04.01.08]

A.3. Project participants:

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)
Morocco (host)	SBBC Societe Briqueterie Bati Chaouia (Private entity)	No

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

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

A.4.1.1. Host Party(ies):

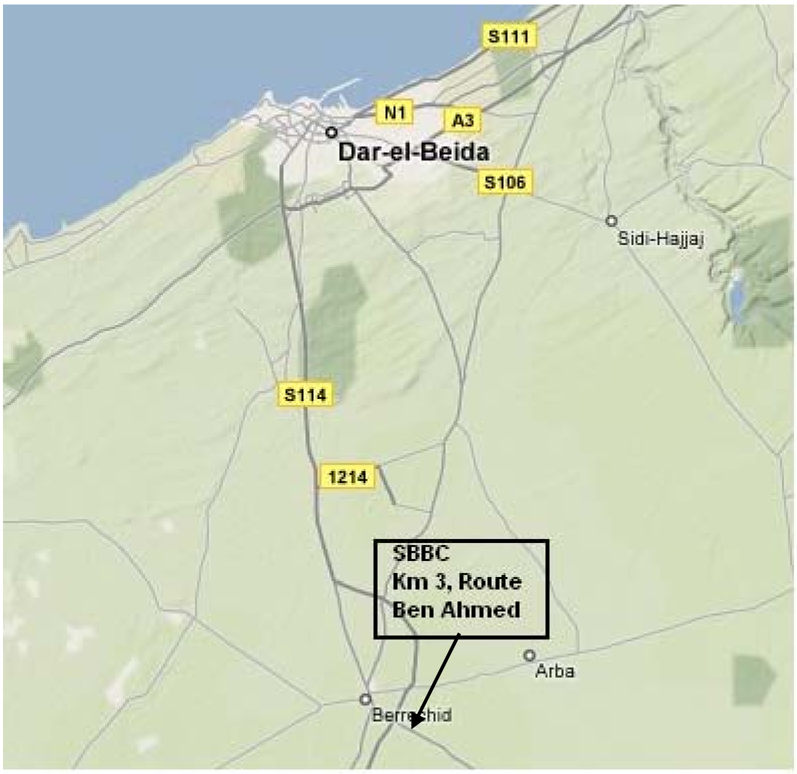
The project activity is located in the Kingdom of Morocco.

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

Region of Chaouia-Ouardigha

A.4.1.3. City/Town/Community etc:

City of Berrechid



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

The plant of the SBBC fuel switch project is located in the periphery of Berrechid at the connecting road between the cities Berrechid and Casablanca (Dar-el-Beida). The area is characterised by industrial activities where only some few settlements exist. The nearest housing is approximately 500 m away from the works. The geographical coordinates of SBBC brick works are 33°14'28.4" north, 7°32’45.9 east (approximation).

The exact address of the project site is:

SBBC Societe Briqueterie Bati Chaouia
Km 3 Route Ben Ahmed B.P.
Berrechid
Morocco

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

The project activity will reduce greenhouse gas emission primarily by switching fossil fuels. In addition the activities performed for the fuel switch will improve the energy efficiency. Thus the project activity comes under the sectoral scope "No. 01 – Energy industries" and the approved CDM methodology "III.B. – Switching fossil fuels" (version 12) will be used as covering methodology. The project activity will substitute fossil fuels with renewable biomass and hence the emission reductions attained through the substitution are calculated according the approved type I methodology "I.C.- Thermal energy for the user with or without electricity" (version 12).

Technical description

The project activities aims to a reduction of process related greenhouse gas emissions by primarily switching body fuel, dryer fuel and kiln fuel from fossil sources to renewable sources at the brick works of SBBC Societè Briqueterie Bati Chaouia in Berrechid, Morocco. The project activity will substitute the hitherto used fossil fuels with bio-organic matters mainly residues from food and wood industry. Suitable materials planned to be used as biofuels are fatty waste acids from olive oil extraction, olive and oil seed cake, waste wood, nut shells, paper making fines and residual wood (like rootstock, saw dust and brushwood). The bio-organic matter will be purchased from local food industry as well as from wood industry from the Anti-Atlas region. The bio-organic matter used is disposed in the baseline scenario in the landfill sites.

Although the basic principles of a brick manufacture are fairly uniform, individual manufacturing plants tailor their production to fit their particular raw materials and operation. Essentially, bricks are produced by mixing quarried clay with water, forming the clay into the desired shape, and drying and firing. Herein only the phases of brick manufacturing are presented that are of relevance for the project activity.

Forming

The first step in the forming process in SBBC is to produce a homogenous plastic clay-mix ready for molding. It is achieved by adding water to the clay in a mill. The preparation unit consists of a pan mill followed by a roller mill in which the raw material is crushed. After thorough mixing the tempered clay goes through a de-airing chamber in which a vacuum is maintained. De-airing removes air holes and bubbles, giving the clay increased workability and plasticity, thus resulting in greater strength. The column then passes through an automatic cutter to make the final dimension of the brick unit. Thereafter the prepared clay-mix is conveyed to the extruder to produce a column of clay in which two dimensions of the final unit are determined. The cutter spacing and the die sizes must be carefully calculated to compensate for normal shrinkage during drying and firing. Since 2006, 1% of coal is added as body fuel in the clay-mix. The project activity will partly substitute the coal with solid organic matter. This will require changes in the clay-body preparation such as improved grinding and mixing equipment. Furthermore this substitution forces modification of the heat recovery system and combustion air feed systems to deal with the increased amount of heat released by the body fuel. The improvements and modifications of body fuel in clay-mix will significantly improve the utilization of energy through the whole preparation process. This leads to decrease of fuel and electricity use. For the purpose of being conservative, the decrease of electricity demand caused by the energy efficiency measures is not considered.

Drying

The extent of drying time in the industry varies usually between 3 to 48 hours. Although heat may be generated specifically for dryers, it usually is at least partly supplied from the exhaust heat of kilns to maximize thermal efficiency. In all cases, heat and humidity must be carefully regulated to avoid cracking in the brick. In Morocco most of the brick manufacturing facilities use continuous chamber, which means that the drying process take rather long time. At SBBC the bricks are dried in the rapid dryer three to four hours at temperatures of roughly 140 ºC to achieve residual moisture of approximately 1,5 % (moulded bricks have water content of 15 - 25 %). The dryers are heated by recovered heat from the kilns and by additional oil fired boilers. The project activity will replace the oil burners with solid bio-fuel combustion chambers. Therefore modifications to the installations have to be made to ensure a sufficient combustion air supply. After drying, bricks are reloaded to kiln cars which are moved on rails to the kilns.

Firing

Bricks are fired between 10 and 40 hours, depending on the kiln type used and other variables. There are several types of kilns used by brick manufacturers. In Morocco, both Hoffman type and tunnel type kilns are in use. The firing at the tunnel type kilns at SBBC takes approximately 28 hours. On their way trough the kiln the bricks pass three main zone areas: preheating zone at temperatures up to 650 ºC, firing zone at temperatures of between 650 and 850 ºC, and cooling zone. During the firing process if organic matter and iron pyrites are present, oxidation takes place at temperatures between 300 and 500 ºC. Crystal water bound within the structure of the clay minerals is released at temperatures of between 500 and 650 ºC, whilst carbonates such as calcite and dolomite dissociate with the release of carbon dioxide in the temperature range 750 to 950 ºC. The most important changes relating to the development of ceramic properties involve the breakdown of the lattice structure of the original clay minerals, followed by the formation of new crystalline compounds and glassy phases. The temperature at which vitrification (glass formation) takes place, varies according to the mineralogy of the clay. Vitrification usually commences at about 900 ºC and is completed by about 1.050 ºC (for many brick clays) or about 1.100 ºC in the case of more refractory fireclays. During the vitrification stage of ceramic firing, many non-clay minerals such as quartz, oxides or iron, lime compounds and alkalis (oxides of sodium and potassium) become incorporated in the fired body. Some sintering and solid solution occurs, and eutectic reactions take place at the interface of mineral grains and melt phases.

The project activity will switch partly the organic matter in the clay from coal to solid biofuels. The rate of temperature change in the kiln depends among others on the raw materials adopted. The substitution alters the temperatures in the kiln and hence adjustments in air technique system are needed to deal with the increased amount of heat released. Furthermore the fossil fuels, fuel oil and petroleum coke used in the dryers will be substituted partly with liquid biofuels. Therefore changes have to be made in the burner technology where the existing boiler fuel burners are substituted with multi fuel burners for any kind of vegetable oil and vegetable oil derivatives.

After the firing process the bricks are moved with the kiln cars from the kilns to the packaging station where the bricks are pelletised for distribution to customers.

The project activity is estimated to substitute approximately 50 % of the energy required for drying and the ceramic conversion process with renewable sources. The substitution of coal to solid biofuels has an influence on the ceramic conversion process and results in alteration of the characteristics of the fired and unfired body and hence results in changes in the produced quantities and volumes. Clay, unlike metal, softens slowly and melts gradually when subjected to rising temperatures. If uncontrolled softening takes place due to changes in firing cycle and the bricks may stick together. Accordingly special process know-how is required to avoid these kinds of losses. Furthermore the switch to renewable fuels likes fatty acids and olive oil might, if wrong fuels applied, increase the corrosion of a kiln. Hence protective actions, like better suitable materials, enhanced maintenance and replacements need to be taken. This specific know-how for this project activity is provided by two European brick specialists.

Investment costs

The costs of the project activity are presented in table 1. The final costs might even be significantly higher, if the burner technique is modified to operate on 100 percent biofuels. The figures presented below do not accounting financial and technical risks of the conversion of the kilns.

Table 1. Costs of the project activity

Development costs	0,070 mil EUR
Installation costs	
Fuel mixture preparation	0,105 mil EUR
Kiln ventilation duct	0,419 mil EUR
Kiln chimney modifications	0,035 mil EUR
Combustion technique	0,129 mil EUR
Total project costs	**0,758 mil EUR**

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

The total emission reductions due to the project activity are calculated to 274.940 tons of CO_2-equivalent within a crediting period of 10 years. The annual estimation of the emission reductions due to the proposed project activity is given below.

Year	Annual estimation of emission reductions in tonnes of CO_2e
2008 (Jul-Dec)	8.728
2009	20.958
2010	26.794
2011	29.128
2012	29.128
2013	29.128
2014	29.128
2015	29.128
2016	29.128
2017	29.128
2018 (Jan-Jun)	14.564
Total estimated reductions (t CO_2e)	**274.940**
Total number of crediting years	**10**
Annual average over the crediting period of estimated reductions (tCO_2e)	**27.494**

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

The project activity is not subsidized by official development assistance or any other public funding from Annex I countries.

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

According to paragraph 2 of Appendix C of the “Simplified modalities and procedures for small scale CDM project activities”, a small scale project is considered as a debundled component of a large project activity if there is a registered small scale activity or an application to register another small scale activity:

- with the same project participants,
- in the same project category and technology,
- registered within the previous two years; and
- whose project boundary is within 1 km of the project boundary of the proposed small scale activity.

The project participants confirm that there are no other registered small scale CDM project activities registered within the previous two years or an application to register another small scale CDM project activity, either under their name or within the same project category and technology / measure. Hence, the SBBC fuel switch project is not a debundled component of a large project activity and the project activity is eligible to use the simplified modalities and procedures for small scale CDM project activities.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small scale project activity:

From appendix B of simplified modalities and procedures for small scale CDM projects, the following methodologies are applied for the project activity:

Project Type: III – Other project activities
Project Category: AMS-III.B. – Switching fossil fuels, version 12

Project Type: Type I – Renewable energy projects
Project Category: AMS- I.C. – Thermal energy for the user with or without electricity, version 12

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

As stated before the methodology “AMS-III.B. – Switching fossil fuels” will be used as covering methodology since:

1) The project activity primarily comprises fossil fuel switching in an existing industrial facility;
2) The project activity involves also the change of energy efficiency as a secondary side effect;
3) The project results in annual emission reductions of approximately 27.494 tons of CO_2, which is within the eligibility limit of maximum 60 000 tons CO_2 per annum for type III.B. small scale project activity.

As provided by the covering methodology AMS_III.B, the determination of the baseline, the project emissions, the emission reduction and the monitoring plan will follow the methodology AMS-I.C upon the switch from fossil fuel into renewable biomass

The proposed project activity conforms to project category "I.C. – Thermal energy for the user with or without electricity" defined in appendix B of the simplified modalities and procedures for small scale CDM project activities since:

1) The project activity is a renewable energy project, as it uses renewable biomass to generate energy. The biomasses used are biomass residues from industrial activities and hence the use of these biomass residues in the project activity does not involve a decrease of carbon pools and it is accordant with the definition of renewable biomass (EB 23, annex 18).

2) The project activity generates thermal energy, which will be used to displace energy previously generated by fossil fuels.

3) The total thermal energy capacity of the plant is only 19 MW[7], which is within the eligibility limit of 45 MW for type I small scale project activities.

B.3. Description of the project boundary:

Pursuant to the methodologies applied the project activity boundary is the physical, geographical site where combustion affected by the fuel switching measures takes place. Hence, the project boundary includes the thermal energy generation inside the SBBC brick works, as the thermal energy generated is solely used within the plant for drying the extruded brick and the ceramic conversion process. For determining the baseline and project emissions, the project boundary considered would encompass the project site that covers the clay-mix preparation, forming units, dryers and kilns. Although the project activity will decrease the electricity need, these emission reductions are not considered and hence emissions from electricity consumption are excluded. Thus, the spatial extent of the project boundary includes the project site. The baseline and project boundary are presented in figures 1 and 2.

[7] Since, the project activity is not a thermal energy production facility but a brick factory, the capacity is calculated based on the historic fuel use.

Figure 1. Baseline boundary.

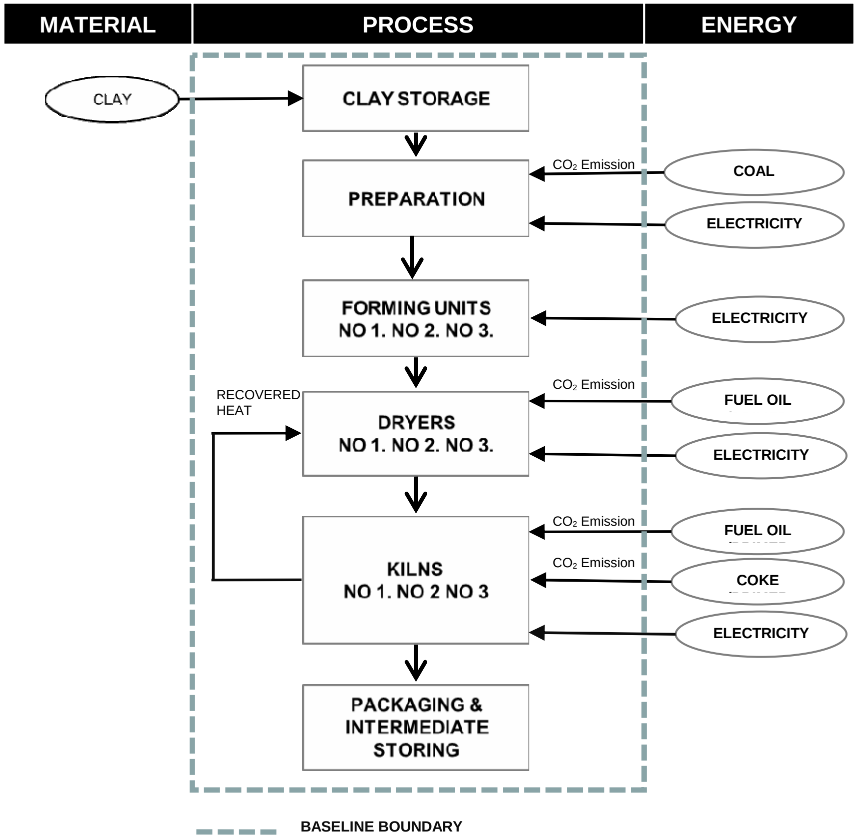
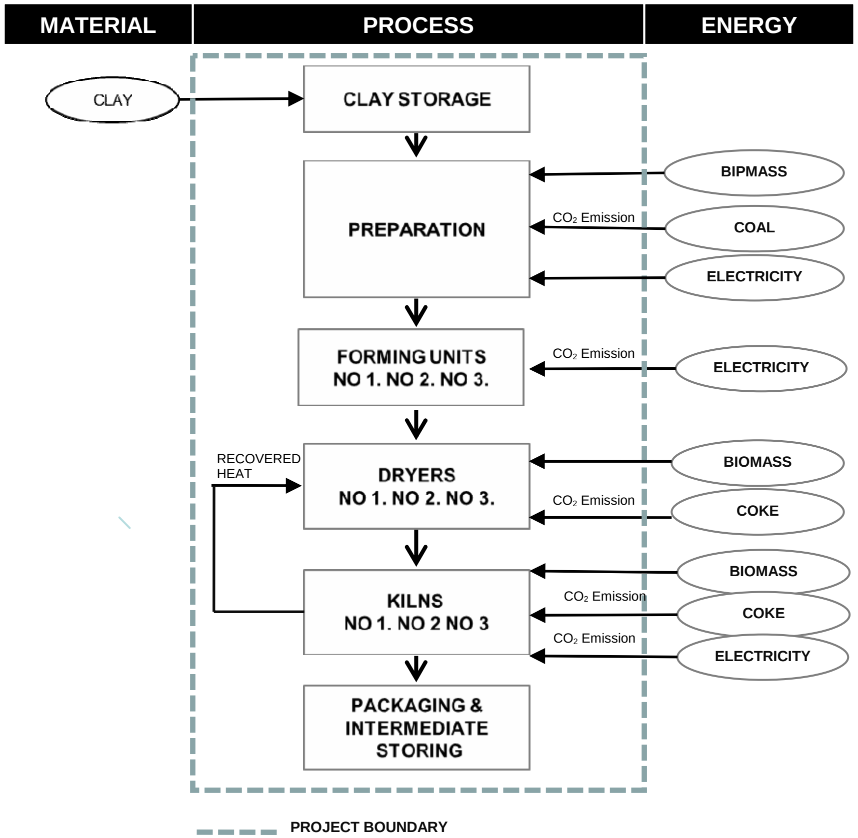


Figure 2. Project boundary



B.4. Description of baseline and its development:

According to the AMS III.B., version 12, paragraph 5. the baseline is: "… the current emissions of the facility expressed as emissions per unit of output (e.g., kg CO_2e/kWh). Emission coefficients for the fuel used by the generating unit before and after the fuel switch are also needed. IPCC default values for emission coefficients may be used." This paragraph will be used as guideline to illustrate the emission reductions achieved through this project activity.

The baseline will be calculated in accordance with the methodology AMS-I.C., version 12, paragraph 6., where "For renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission coefficient for the fossil fuel displaced. IPCC default values for emission coefficients may be used."

According the paragraph 15 of AMS-I.C., version 12, project activities that seek to retrofit and modify an existing facility need to consider a point in time at where the thermal energy generation facility would be replaced or retrofitted in the absence of the activity. From that point onwards, the baseline is assumed to correspond to the project activity and no emission reductions are assumed to occur. The common practice in the brick industry especially in developing countries is to hold and operate with the dryers and kilns as long as they last for. In practice this means that the typical overall lifetime of kilns and dryers are over 30 years. The market study of the brick and bonder industry in Morocco shows that the studied brick works are operating kilns couple decades long[8]. The SBBC brick factory features three lines of dryers and tunnel kilns that have been built between 1999 and 2004. The line 1 was build in 1999, the line 2 in 2003 and the line 3 in 2004. It is expected that in the absence of the project activity the SBBC would replace or retrofit the production lines earliest in 2029 and thus, the baseline for this project over the entire crediting live time is the thermal energy generated in SBBC brick works by fuel oil, coal and petroleum coke multiplied by the emission coefficient. All the variables and parameters applied are presented under section B.6.2.

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

In accordance with the paragraph 28 of the simplified modalities and procedures for small scale CDM project activities, the small scale project activity must demonstrate at least one of the barriers listed in attachment A to the appendix B of the simplified modalities and procedures, due to which the project activity would not have occurred in any case. With this respect, the project participants have identified the following barriers:

Regulatory barriers

Currently there are no legal obligations for brick works in Morocco that require the use of biofuels, reduction of fossil fuel use or GHG emissions. It is very unlikely that such enforcements would occur during the crediting period. Furthermore there are no voluntary incentives in Morocco that would encourage brick works to fuel switch activities.

[8] M. Kornmann, Y. Fehry Fassy 2005, Etude díanalyse du potentiel de la filiËre Briques et Tuiles au Maro. Page 34.

Prevailing Practice

The particular technology used in the project activity is not available in Morocco. It is a common practice in brick works all over the world to apply fossil fuels. Natural gas is used most frequently. The technology that will be installed is state of the art and unique, and cannot be purchased in the international market, least of all in Morocco. The know-how will be supplied by a European brick production specialist Mr. Fritz Mödinger, who is specialized to this kind of technical solutions according the individual needs of the manufacturing facility. Skilled labour to operate the technology is not locally available. Mr. Mödinger supervises the project activity and he will properly train the employees of the brick works so that operation can be managed by local labour throughout the whole project. This leads to a well trained and therefore highly motivated local work force.

Technological Barriers

The conversion to biofuels will incur higher maintenance. To perform the fuel-switch activity additional management effort and time are required, which detracts from normal operations. Also, the risk of technological failure is significantly higher in the project scenario as in the baseline scenario. In the firing process the blended organic matter in clay begins to gasify. It is very important for the ceramic properties of bricks to achieve exact temperatures in the differed parts of the firing process. With the switch to biofuels, especially due to the modifications in the body-fuel that increase the energy efficiency of the whole process, obtaining uniform firing temperatures will be more difficult and therefore more demanding management of the firing process is needed.

First of its kind

The project is “first of its kind” in the region. No other similar project activities could be identified in the region. Fuel oil is predominately used by same kind of industries in Morocco[9], as no natural gas is available. The project participant is only aware of same kind of activities in Northern Italy in the Gasser brick work in the province of Bolzano, where a small brick maker uses rendering fat and vegetable oils as fuel with similarly technique.

The above identified barriers clearly show that the planned project activity is additional to business-as-usual. The project is very unlikely to move forward without the additional financial support of the CDM. As the project is anticipated to generate 274.940 CO_2 credits in its ten-year crediting period, the carbon sales would be sufficient to alleviate the hurdles and push the project forward.

[9] M. Kornmann, Y. Fehry Fassy 2005, Etude díanalyse du potentiel de la filiËre Briques et Tuiles au Maro. Page 27

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Baseline emissions

AMS.I.C. – Thermal energy

According to the methodology AMS.I.C paragraph 6 the baseline emissions from renewable energy technologies that displace technologies using fossil fuels are "fuel consumption of the technologies that would have been used in absence of the project activity times emission coefficient for fossil fuel displaced". Hence the emissions are calculated as follows:

$$BE_y = FC_y \cdot EF_{CO2} \qquad (1)$$

Where:

$BE_{y.}$ = annual baseline emissions from fossil fuels displaced by the project activity, in t CO_2e,

FCy = the net fuel consumption in the absence of the project activity, in TJ,

EF_{CO2} = carbon emission factor of the fuel used, in t CO_2 / TJ,

For project activities that retrofit and modify an existing facility for renewable energy generation following adjustments to the baseline are done:

$$EGbaseline = MAX(EGhistorical, EGestimated,y) \text{ until } DATEBaseline\ Retrofit \qquad (2)$$

Where:

EGhistorical, = baseline at historical average levels (a minimum of 3 years excluding abnormal years),

EGestimated,y = estimated thermal energy that would have been produced by the existing units under the observed availability of renewable resource for a year,

DATEBaseline Retrofi = the point of time at which the thermal energy facility would likely be retrofitted in the absence of the project activity.

As trial runs of the project activity[10] have already started in the year 2007, the *EGhistoric* will be calculated based on the fuel records of the years 2004-2006. Furthermore, until 2004 the production capacity was significantly smaller as the plant was operating with fewer kilns. Hence, by considering only the years 2004-2006 the abnormal years are excluded. In addition due to increasing fuel oil prices the SBBC started to use petroleum coke in the beginning of the year 2007. Until 2006 the brick works has used fuel oil and coal only, but due to financial causes the SBBC switched partly to petroleum coke in the beginning of the year 2007. Currently, the purchase price of petroleum coke is significantly lower than of fuel oil, at which the lower caloric value of petroleum coke and the resulting higher mass demand is already considered. The price of petroleum coke is less volatile than the price of fuel oil, what is extremely relevant in a business with a small profit margin like brick manufacturing. Thus, if the project activity would not be undertaken, the brick works would in a large extend switch to petroleum coke which is even more carbon intensive than fuel oil.

The fuel consumption records of the year 2007 were used to project the future development of the baseline emissions. *EGestimated* was calculated based on the average energy need per brick produced during 2004-2006[11] and the percental fuel used of different fuel types in year the 2007. The solid biomass used for test trials is not considered to be a part of the baseline, as the use of solid biomass would not have take place without the project activity as explained in section B.5. Thus, the energy content of the solid biomass will be calculated in favour of fuel oil. Fuel oil was selected to be conservative, as its emission factor is lover than the emission factor from coal and petroleum coke.

In order to estimate the point of time when the existing equipment would need to be replaced (*DATEBaseline Retrofit)* the following approaches shall be taken into account (paragraph 15):

a) the typical average lifetime of the equipment type,
b) the common practice of the responsible company regarding replacement schedules,
c) the point in time when the existing facility need to be replaced in the absence of the project activity.

The common practice in the brick industry especially in developing countries is to hold and operate with the dryers and kilns as long as they last for. In practice this means that the typical overall lifetime of kilns and dryers are over 30 years. The market study of the brick and bonder industry in Morocco shows that the studied brick works are operating kilns over couple of decades long[12]. The SBBC brick factory features three lines of dryers and tunnel kilns that have been built between 1999 and 2004. The line 1 was build in 1999, the line 2 in 2003 and the line 3 in 2004. It is expected that in the absence of the project activity the SBBC would replace or retrofit the production lines earliest in 2029. Hence, the *DATEBaseline Retrofit* is far beyond the crediting life time of the project activity and it does not affect the baseline calculations.

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[10] Test trials of the project activity started in July 2007. Since that small amount of wood residues have been blended in the body fuel and the dryer no. 3 have been modified in order to do trials with solid biomass.[10] These modifications have improved the energy efficiency.

[12] M. Kornmann, Y. Fehry Fassy 2005, Etude díanalyse du potentiel de la filiËre Briques et Tuiles au Maro. Page 34.

AMS.III.B – Switching fossil fuels

According to the methodology AMS.III.B the "baseline is the current emissions of the facility expressed as emissions per unit of output" and hence the emissions will be presented per unit of output. This method is applied as the baseline and project emissions as well as achieved emission reductions are proportional to production capacity.

Project activity emissions

The project activity emissions consist of the emission related to the use of fossil fuels after fuel switch and they are calculated following the same methods as baseline emissions (equation 1). The SBBC aims to substitute at least 50 % of its fuel use with renewable sources. According to the responsible engineer, the 50 % substitution will be reached only until the third year after the start of the project activity. This is due to consecutive nature of the reconstruction and modification measures when implementing the project activity. The modifications will be done first for the production line no. 2 and thereafter for the lines no. 1 and no. 3. The substitution volume is expected to be 25 % for the first year, and 40 % for the second year.

Furthermore as a side effect, the mass specific energy demand of brick produced is expected to be decreased. The test-trails and modifications done during 2007 have already improved the specific energy need from 1.511 kJ/kg brick produced to 1.375 kJ/kg brick produced. It is estimated that the final mass specific energy demand will be reduced to 1.345 kJ/kg brick, which is near to the minimum specific energy need of kg brick. Hence, the project emissions are calculated ex-ante by applying an energy need of 1.345 kJ/kg brick, and a remaining demand of fossil fuel according to the pattern: 1^{st} year 75 %, 2^{nd} year 60 % and 3^{rd} year onwards 50 %. The SBBC aims to substitute as much as possible coal as it is the most polluting fuel from its fuel portfolio. However, at this point it is not clear in which relation the different kind of fossil fuels will be substituted and therefore the ex-ante project emissions will be calculated using the same percental shares for different kind of fossil fuels as in baseline.

Leakage

If the energy generating equipment is transferred from another activity, or if the existing equipment is transferred to another activity, leakage is to be considered. As there are no such transferences involved, there will be no leakage emissions considered when determining the emission reductions.

Emission reductions

The emission reduction (ER_y) achieved by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (*Leakage*):

$$ER_y = BE_y - PE_y - Leakage \qquad (3)$$

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

Data / Parameter:	$FC_{i\ baseline}$
Data unit:	TJ / t brick
Description:	The amount of fuel i consumed by SBBC in baseline.
Source of data used:	Calculated
Value applied:	see table below
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values applied bases on historical data of fuel use in SBBC brick work. For more detailed information please see annex 3.
Any comment:	

Fuel type i	**Fuel used (TJ / t brick)**
Fuel oil	0,000666
Coal	0,000404
Petroleum coke	0,000441
Total	0,001511

Data / Parameter:	***DATERetrofited***
Data unit:	date
Description:	Point in time when the existing equipment would need to be replaced in the absence of the project activity.
Source of data used:	Baseline setup
Value applied:	2029
Justification of the choice of data or description of measurement methods and procedures actually applied :	As justified under section B.6.1. the common practice in the brick industry especially in developing countries is to hold and operate with the dryers and kilns as long as they last for, which is typically over 30 years. The SBBC brick factory features three lines of dryers and tunnel kilns that have been built between 1999 and 2004. Hence, it is expected that in absence of the project activities retrofit activities would take place earliest in 2029.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Baseline emissions

EGhistoric is calculated based on annual average fuel consumption in the latest 3 year excluding abnormal years and it is presented in table 2.

Table 2. Historical fuel use by SBBC

Year	Production (t)	Fuel type	Fuel use (t)	NCV (TJ/Gg)	Fuel use (TJ)	Fuel use (TJ /t brick)	Fuel use (energy %)
2004	318.375	Fuel oil	12.318	39,36	484,84	0,001523	100%
2005	389.362	Fuel oil	14.881	39,36	585,72	0,001504	100%
2006	387.613	Fuel oil	11.988	39,36	471,85	0,001217	81%
		Coal	5.719	19,70	112,66	0,000291	19%
				Total 2006	584,51	0,001508	100%
Total	1.095.350	Fuel oil	39.187	39,36	1542,41	0,001408	
		Coal	5.719	19,70	112,66	0,000103	
EG historic	365.117	Fuel oil	13.062	39,36	514,13	0,001408	93%
		Coal	1.906	19,70	37,55	0,000103	7%
				Total EGhistoric	551,69	0,001511	100%

As justified in section B.6.1. the *EGestimated* is calculated based on the average energy need per brick produced during 2004-2006 and the percental fuel used of different fuel types in year the 2007. Because the solid biomass has been used for test trials only, it is not considered to be part of the baseline as justified under section B.6.1. The calculation of *EGestimated* is presented in table 3.

Table 3. Projected fuel use by SBBC

Year	Production (t)	Fuel type	Fuel use (t)	NCV (TJ/Gg)	Fuel use (TJ)	Fuel use (TJ /t brick)	Fuel use (energy %)
2007	504.261	Fuel oil	6.855	39,36	269,81	0,000535	39 %
		Coal	9.296	19,70	183,13	0,000363	27 %
		Petroleum coke	6.144	32,50	199,68	0,000396	29 %
		Wood	2.064	15,60	32,20	0,000064	5 %
Total			24.359		684,82	0,001358	100 %
EG estimated		***1)Total***				0,001511	100 %
		2)Fuel oil				0,000666	44 %
		3)Coal				0,000404	27 %
		3Petroleum coke				0,000441	29 %

1) Equal to Total EGhistoric, compare Section B.6.1
2) Quota (44%) = Quota 2007 of fuel oil + wood, compare Section B.6.1
3) Quotas correspond to 2007, compare Section B.6.1

According the equation 2 the *EGbaseline* is the maximum of the two parameter *EGhistoric* and *EGestimated*. Hence, *EGestimated* is applied as baseline. As justified in section B.6.1. the retrofit activities (*DATERetrofit*) would take place only after 2029 and hence thy do not effect the project activity during the 10 years crediting period. The baseline emissions from fuel use are calculated following the equation 1 and the justifications given in section B.6.1. The baseline emissions are presented in table 4.

Table 4. Baseline emissions per brick produced

AMS-I.C. **Type of fuel**	**Fuel use** (TJ/ t brick)	**CO_2 Emission Factor** (kg/TJ)	**CO_2 emissions** (kg/ t brick)	**CO_2 emissions** (t/ t brick)
Fuel oil	0,000666	74.100	49,38	0,0494
Coal	0,000404	96.100	38,83	0,0388
Petroleum Coke	0,000441	97.500	42,96	0,0430
	Baseline emissions factor (t CO2 /t brick)			**0,1312**

Since 2004, the production rate of SBBC has been increased steadily from 318.375 tons to 504.261 tons of bricks per year in 2007 (compare table 2 and 3) where, depending on the further development of the brick market, a moderate progression of productivity in the future might be realistic. For the ex-ante estimation of the amount of annual emission, a production rate of 400.000 t/y was applied considered as minimum value for the time being. Based on this production rate, the annual baseline emissions are:

400.000 t brick · 0,1312 t CO_2 /t brick = 52.480 t CO_2 e

Project emissions

As stated in B.6.1. the project activity emissions consist of the emission related to the use of fossil fuels and they are calculated according the same method as baseline emissions. The ex-ante project emissions follow the justifications given under section B.6.1. and they are presented in table 5.

Table 5. Project emissions.

Type of fuel	**Fuel use** (TJ/ t brick)	**CO_2 emission factor** (kg/TJ)	**CO_2 emissions** (kg/ t brick)	**CO_2 emissions** (t/ t brick)
1st year (July 1, 2008 – June 30, 2009)				
Biomass	0,000336250	0	0	0,00000
Fuel oil	0,000444865	74.100	32,96	0,03296
Coal	0,000269754	96.100	25,92	0,02592
Petroleum Coke	0,000294131	97.500	28,68	0,02868
			Project emission factor (t CO2 /t brick)	***0,08756***
2nd year (July 1, 2009 – June 30, 2010)				
Biomass	0,000538000	0	0	0,00000
Fuel oil	0,000355892	74.100	26,37	0,02637
Coal	0,000215803	96.100	20,74	0,02074
Petroleum Coke	0,000235304	97.500	22,94	0,02294
			Project emission factor (t CO2 /t brick)	***0,07005***
3rd year onwards (July 1, 2010 – June30, 2018)				
Biomass	0,000672500	0	0	0,00000
Fuel oil	0,000296577	74.100	21,98	0,02198
Coal	0,000179836	96.100	17,28	0,01728
Petroleum Coke	0,000196087	97.500	19,12	0,01912
			Project emission factor (t CO2 /t brick)	***0,05838***

In order to give an estimation of the amount of annual project emission, the expected minimum production 400.000 t is applied. The annual project emissions are:

For 1st year: *400.000 t brick · 0,08756 t CO_2 /t brick = 35.024 t CO_2 e*

For 2nd year: *400.000 t brick · 0,07005 t CO_2 /t brick = 28.020 t CO_2 e*

From 3rd year onwards: *400.000 t brick · 0,05838 t CO_2 /t brick = 23.352 t CO_2 e*

Leakage

No leakage could be identified.

Emission reductions

The emission reductions are calculated according the equation 3 and they are presented in table 6. As the emissions as well as achieved emission reductions are proportional to production capacity they will be expressed as emissions per unit of output as justified under section B.6.1.

Table 6. Emission reduction factors.

Year	BE_y (t CO_2 /t brick)	PE_y (t CO_2 /t brick)	***Leakage***	ER_y (t CO_2 /t brick)
1st year (July 1, 2008 – June 30, 2009)	0,1312	0,0876	0	0,0436
2nd year (July 1, 2009 – June 30, 2010)	0,1312	0,0701	0	0,0611
3rd year onwards (July 1, 2010 – June 30, 2018)	0,1312	0,0584	0	0,0728

The emission reductions presented below in section B.6.4. are calculated with the expected minimum production capacity of 400.000 tons. The production of SBBC has increased steadily. In 2007 the production reached 500.000 tons. Further production increase is expected. However, the ex-ante emission reductions are calculated with the expected minimum production capacity in order to be conservative.

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

Years	Estimation of project activity emissions (t CO2 e)	Estimation of baseline emissions (t CO2 e)	Estimation of leakage (t CO2 e)	Estimation of overall emission reductions (t CO_2 e)
2008 (Jul-Dec)	17.512	26.240	0	8.728
2009	31.522	52.480	0	20.958
2010	25.686	52.480	0	26.794
2011	23.352	52.480	0	29.128
2012	23.352	52.480	0	29.128
2013	23.352	52.480	0	29.128
2014	23.352	52.480	0	29.128
2015	23.352	52.480	0	29.128
2016	23.352	52.480	0	29.128
2017	23.352	52.480	0	29.128
2018 (Jan-Jun)	11.676	26.240	0	14.564
Total (t CO_2 e)	**249.860**	**524.651**	**0**	**274.940**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	***FC_i***
Data unit:	Mass unit
Description:	Amount of fuel type i consumed by the SBBC.
Source of data to be used:	Weigh slips from public weigh station.
Value of data	--
Description of measurement methods and procedures to be applied:	The data is measured and purchased by weight. The tanker car, which delivers the fuel to the SBBC is weighed at the public weight station before and after the delivery. The proportion of the data to be monitored is 100%. The monitored data will be archived in electronic form. The measurement method is described in the

	ISO 9001 manual of the factory.
QA/QC procedures to be applied:	High mass scales are very robust mechanical instrument being resistant of deviation within the uncertainty level, no special QA/QC procedures are necessary. Uncertainty level is low. In addition, it if foreseen to use the fuel purchase invoices of the suppliers as a cross check reference.
Any comment:	This parameter is used to determine the amount of different kind of fuel types used by the project activity.

Data / Parameter:	***NCV***
Data unit:	TJ / Gg
Description:	Net calorific value per mass unit of fuel i.
Source of data to be used:	Project specific laboratory analyses (done by the Brick and Tile Research Institute Essen Regd.) and IPCC default values (2006, Guidelines for National Greenhouse Gas Inventory, Vol. 2, p. 1.18).
Value of data	see table below
Description of measurement methods and procedures to be applied:	The methodology applied states that IPCC values may be used.
QA/QC procedures to be applied:	The validity of the figures is checked annually.
Any comment:	

Fuel type i	**NCV (TJ/Gg)**	
Fuel oil	39,36	l.a.
Coal	19,70	l.a.
Petroleum coke	32,50	IPCC
Wood and wood waste	15,6	IPCC

Data / Parameter:	$EF_{fuel\ i}$
Data unit:	kg CO_2/TJ
Description:	CO_2 emission factor per unit of energy from fuel type i.
Source of data used:	IPCC default values (2006, Guidelines for National Greenhouse Gas Inventory, Vol. 2, p. 1.23).

Value of data	<table><tr><th>Fuel type i</th><th>CO_2 emission factor (kg/TJ)</th></tr><tr><td>Fuel oil</td><td>74.100</td></tr><tr><td>Coal</td><td>96.100</td></tr><tr><td>Petroleum coke</td><td>97.500</td></tr></table>
Description of measurement methods and procedures to be applied:	The methodology applied state that IPCC values may be used.
QA/QC procedures to be applied:	The validity of the figures is checked annually.
Any comment:	

Data / Parameter:	$P_{brick,y}$
Data unit:	t
Description:	Production of bricks in year y.
Source of data used:	Weigh slips by SBBC.
Value applied:	--
Description of measurement methods and procedures to be applied:	The data is measured at sale by weight. The proportion of the data to be monitored is 100 %. The monitored data will be reported monthly and archived in electronic form. The measurement method is described in the ISO 9001 manual of the factory
QA/QC procedures to be applied:	The procedure is part of the standard quality management system. High mass scales are very robust mechanical instrument being resistant of deviation within the uncertainty level, no special QA/QC procedures are necessary. Uncertainty level is low. In addition, it if foreseen to use the fuel purchase invoices of the suppliers as a cross check reference.
Any comment:	

B.7.2 Description of the monitoring plan:

The emission reductions achieved by the project activity in each year will be assessed ex-post through direct measurements. According to the methodologies I.C. and III.B. the amount of fossil fuel and biomass input shall be measured. The specific fuel consumption of each type of fuel is specified ex-post. In addition, the amount of brick production is measured, and the fuel use, emissions and emission reductions are calculated per ton output as described in paragraph 9 of the methodology III.B. The monitored parameters are described in detail under section B.7.1.

The monitoring of the fuel and electricity consumption is a part of the standard operating procedure of brick works. Since the year 2004 the SBBC has a certified quality management system ISO 9001 (please see annex 4). The monitoring procedures as well as quality assurance methods are defined in the quality management plan. The engineers of the factory who are responsible for the development work will be responsible for the supervision of the monitoring activities. The technical staff of the works will continuously perform the project monitoring including the quality control and the quality assurance. The staff of the factory will be trained in terms of record keeping, overall maintenance, and procedures for corrective action before starting the operation. Mr. Mödinger, who supervises the whole project activity, is responsible for the training activities. The management structure of the project activity is presented below in the figure 3.

All data recorded will be archived in electronic form in a data logger. The weigh slips are calibrated according national regulations. Calibration certificates will be stored as paper copies or scanned copies in electronic form. The data will be archived two years after the ten years crediting period.

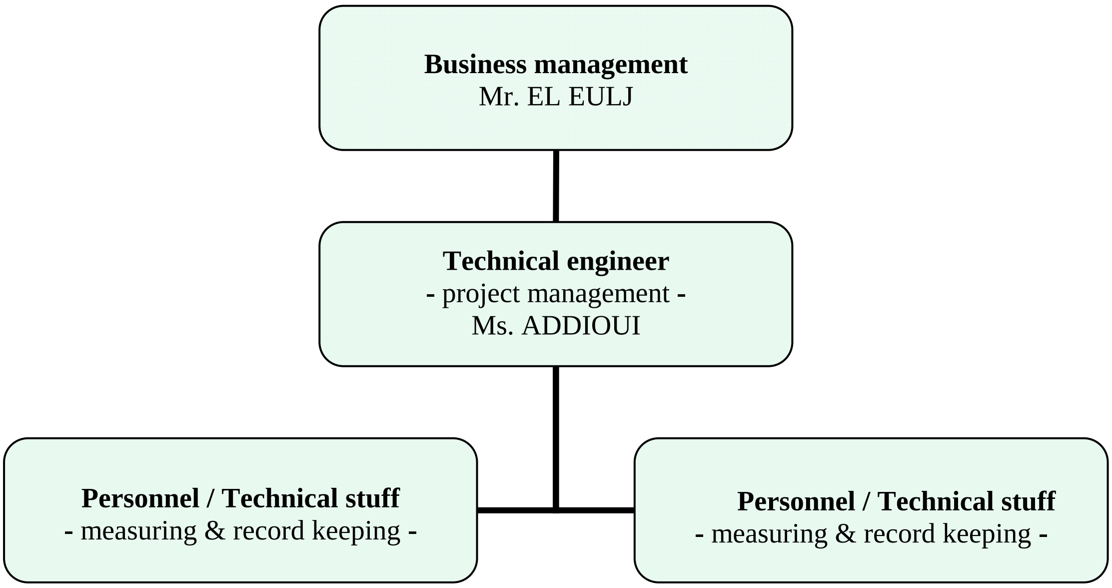

Figure 3. Organisation chart for fuel switch project by SBBC

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

Date of completing the final draft of the baseline: 14/03/2008

Name of person/entity determining the baseline:

Organization	GreenStream Network GmbH
Address	Grosser Burstah 31
Postal Zip/city	20457 Hamburg
Country	Germany
Represented by:	
Salut. / First Name /Last Name	Ms Laura Lahti
Telephone	+ 49 40 809063 109
Fax	
Email	laura.lahti@greenstream.net

Note: The above party is not a project participant.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

The test trials of the project activity started in July 2007. During the trials one dryer was modified in order to make experiments with solid biomass. Furthermore experiments were done with the body fuel. These changes have already decreased the specific energy need of the brick production. The complete retrofitting of the production line no. 2 started in January 2008. The retrofit activities for this production line are expected to be finished by the end of June, 2008. After this, the production lines 1 and 3 will be retrofitted. The retrofit activities are expected to be completed by the end of 2009.

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

30 years

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

C.2.1. Renewable crediting period

Not applicable.

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

Not applicable.

C.2.1.2. Length of the first crediting period:

Not applicable.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/07/2008

C.2.2.2. Length:

10 years

SECTION D. Environmental impacts

Neither the national legislation[13] nor the DNA does require an environmental impact assessment (EIA) for this kind of activities. The University of Hassan has completed an EIA of the SBBC brick works in the year 2003. According to this study the factory causes only minor negative impacts on the environment. In order to minimize potential negative impacts, SBBC has concluded offsetting measures, like planting trees, to improve the local air quality as well as to ensure erosion protection,.

The environmental effects gained from the project implementation are of positive nature, as the project activity takes place in an existing facility and it uses more sustainable and climate friendly fuels. The project activity will have positive impact on local air quality due to the decrease of fossil fuel use leading to considerable reduction of carbon dioxide (CO_2) emissions and sulphur dioxide (SO_2). The project activity also decreases fuel use due to increased fuel combustion efficiency and application of modern, more effective burners. However at discrete spots in the production hall where solid biomass is processed, these positive impacts on local air quality are associated by partially increased amounts of suspended particular matter (SMP). Regardless of this sole negative aspect, the overall effect of the project on the environment and the society, as described under A.2., is predominantly positive. The project activity is in line with the national goal to reduce greenhouse gas emissions and promote environmental friendly techniques.

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

Not applicable.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

Not applicable.

SECTION E. Stakeholders' comments

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

The stakeholders of this project are the employees of the SBBC brick works and the inhabitants living in the nearby settlements. These stakeholders were informed about the project activity and they were invited to comment the project in February 2008. Furthermore the national DNA was invited to participate to the local stakeholder process. The employees as well as inhabitants were invited by word of mouth. Additionally to that, a written announcement was hung out at the notice board of SBBC. Furthermore an informative flyer (see Annex 5) about the essential aspects of the project - the problem it addresses, the

[13] De la loi n° 12-03 relative aux études d'impact sur l'environnement (Law number 12-03 concerning environmental impact studies)

solution it proposes and the benefits it generates - was produced and hung out at the notice board of SBBC. The local DNA was invited directly via phone calls on behalf of the SBBC.

An information gathering was organized in the presentation room of SBBC brick work on Saturday, 9 February 2008. The persons present in the gathering are presented in table 7. In this gathering the project activity and its impacts where thoroughly explained to the stakeholders. The general director of the company, Mr. EL EULJ, presented the details of the planned CDM project and informed the employees about the motivation for the project and in which way their working environment will be influenced by the ongoing changes. Furthermore, he suggested a new form in which the employees are encouraged to participate in the enhancement process of the brickyards operation. The oral communication took place in Arabic and the written material used was in French. After the presentation the stakeholders where invited to ask questions and to comment the project activity. For organisational reasons with respect to the ongoing production process the gathering was split into two parts. The second gathering / presentation took place directly after the first one.

Table 7. The local stakeholders invited to the stakeholder process

No	**Name**	**Institution / Status**
1	JEBBAR, Abderrahim	SBBC / Responsible for preparation work
2	ABBA, Abdelkhalek	SBBC / Responsible for Burners
3	NAIMI, Kacem	SBBC / Mechanic
4	ABADI, Mustapha	SBBC / Responsible for lubrication
5	SOUISSI, Hamid	SBBC / Responsible for lubrication
6	BOULACHFAR, Ibrahim	SBBC / Assistant of the operator
7	FAKHAR, Mohamed	SBBC / Assistant of the operator
8	ROKAIBI, Hamid	SBBC / Operator
9	ABED, Said	SBBC / Responsible for purification
10	YASSINE, Nourdine	SBBC / Operator
11	DAFIR, Mustapha	SBBC / Assistant of the operator
12	HICHAM, Bentouil	SBBC / Quality control
13	ZITA, Mohamed	SBBC / Responsible for the destalking
14	BEN SGHIR, Youssef	SBBC / Quality control
15	MOUKLAA, Mohamed	SBBC / Responsible for the casting
16	EL GHARBI, Mounir	SBBC / Responsible for the production
17	ETTAKI, Ahmed	SBBC / Purchase
18	ALAOUI, Mohamed	SBBC / Responsible for the personal

19	SADIK, Bahria	SBBC / Purchase
20	SAMRANI, Zahra	SBBC / Accounting
21	BENNAOUI, Mohamed	SBBC / Responsible for the process engineering
22	EL IDRISSI, Bouchra	SBBC / Assistant of the administration
23	LHOU, Mohamed	SBBC / Mechanic
24	HICHAM, Chahin	SBBC / Mechanic
25	FETTAH, Mounir	SBBC / Responsible for the production
26	AMHOUTI, Abbellah	SBBC / Station chef
27	ABDELKARIM, Arsaouia	SBBC / Responsible for the production
28	ABDELGHAN, Elharafi	SBBC / Responsible for the maintenance
(29)	ADDIOUI, Zineb	SBBC/ Responsible for the development
(30)	EL EULJ, Mohamed	SBBC/ General director
(31)	AST, Felix	CO2 project engineer (extern expert)
(32)	MOEDINGER, Fritz	CO2 project engineer (extern expert)

E.2. Summary of the comments received:

The comments and questions posed are presented in table 8. The questions where answered by Mr. EL EULJ and Ms. ADDIOUI (development engineer of SBBC).

Table 8. Comments received

Person: Mr. ETTAKI	**Comment 1:** The CO_2 is not the only existing environmentally unsound gas.
Abbreviated answer: SBBC is aware that the fabric emits also other gases. However, this special project activity aims to reduce CO_2 emissions as the natural CO_2 balance is disturbed. The reduction of fossil fuel use reduces parallel to CO_2 also other pollutants.	

Person: BENNAOUI	**Comment 2:** Forest is important for the environment, but the use of wood as fuel leads to deforestation**.**
Abbreviated answer: SBBC agrees that deforestation needs to be avoided. The wood used as fuel by SBBC comes from wood that would have been cut down anyhow due to its age[14].	
Person: BENNAOUI	**Comment 3:** Differed kind of methods of treatment already exists for the reduction of emissions.
Abbreviated answer: If the local industry would have such treatment methods, we would not need the CDM. It is important to note that such methods are really cost intensive.	

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

The project activity did not receive any objections from the local stakeholders. SBBC is aware that the fabric emits also other gases than CO_2. The emissions of the fabric are in line with local environment regulation. As this stage no other activities are undertaken to reduce emissions.

[14] It should be noted that SBBC uses only waste wood (like felling waste and rootstock) from wood industry.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Societè Briqueterie Bati Chaoui
Street/P.O.Box:	Km 3.5 Route Ben Ahmed B.P.: 129
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E-Mail:	
URL:	
Represented by:	
Title:	General Director
Salutation:	Mr
Last Name:	EL EULJ
Middle Name:	Ben Abdelkrim
First Name:	Mohamed
Department:	
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Direct FAX:	
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CONTACT INFORMATION FOR CDM ACTIVITIES

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State/Region:	
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Country:	Germany
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E-Mail:	
URL:	www.greenstream.net
Represented by:	
Title:	
Salutation:	Ms
Last Name:	Lahti
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Direct tel:	+ 49 – 40 80963 109
Personal E-Mail:	laura.lahti@greenstream.net

Annex 2

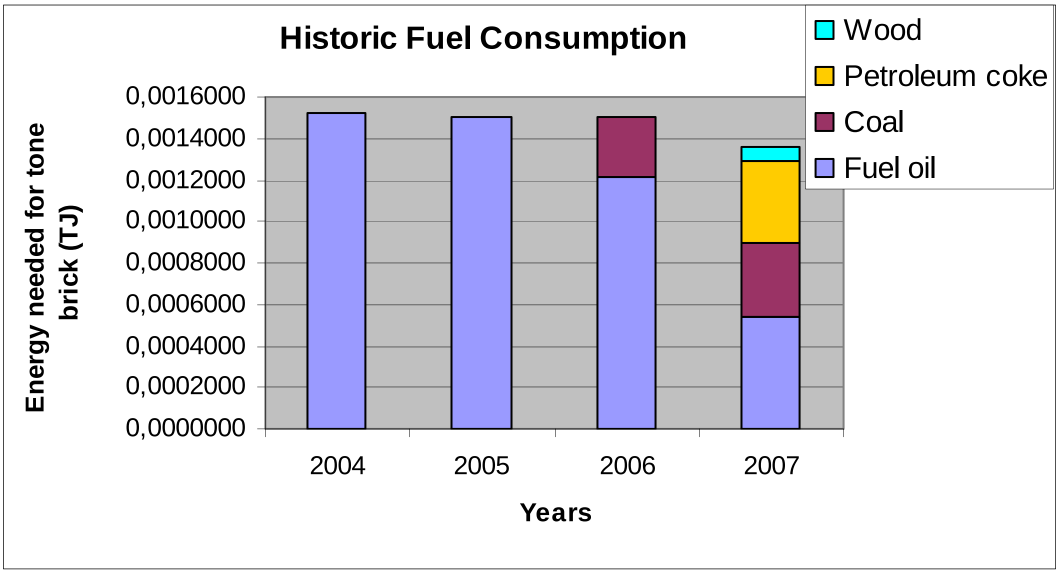
INFORMATION REGARDING PUBLIC FUNDING

Please see section A.4.4.

Annex 3

BASELINE INFORMATION

FUEL USE RECORD SBBC BRICK WORKS									
			fuel consumtion (heavy fuel oil)						
Year	**clay [t]**	**production [t]**	**unit 1**	**unit 2**	**unit 3**	**total fuel oil [t]**	**coal [t]**	**petroleum coke [t]**	**wood [t]**
2000	120.000	95.479	3.812			3.812			
2001	160.000	127.305	5.600			5.600			
2002	200.000	159.131	6.311			6.311			
2003	248.996	198.115	5.997	2500		8.497			
2004	399.349	318.375	5.155	4.760	2.403	12.318			
2005	542.989	389.362	6.049	5.160	3.672	14.881			
2006	444.175	387.613	3.317	4.666	4.005	11.988	5.719		
2007		504.261				6.855	9.296	6.144	**1.032**
Total		**1.599.610**				**70.262**	**15.015**	**6.144**	**1.032**



Energy need [thermal capacity] of SBBC

Energy need (average 2004-2006)		
Fuel oil	514,13	TJ
Coal	37,55	TJ
Annual average energy need	514,13	TJ
1TJ = 10[3] MWh/3.6		
Converted	166.189,43	Mwh
	18,97	**MW**

Annex 4

MONITORING INFORMATION

IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and OQS

hereby certify that the organization

SBBC

Société Briqueterie Bati Chaouia

Km3, Route Ben Ahmed

BP 129, Berrchid

Maroc

has implemented and maintains a

Quality Management System

which fulfills the requirements of the following standard

ISO 9001:2000

Issued on:	**2004-06-17**
Validity date:	**2007-06-17**
OQS certified since:	**2004-06-17**
Registration Number:	**AT-3792/0**

Dr. Fabio Roversi
President of IQNet

Viktor Seitschek
President of OQS

IQNet Partners*:

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<u>Annex 5</u>

STAKEHOLDER PROCESS

The stakeholder process is presented in section E. The whole process was documented with video. The photographs presented here are clips from the video. If required, the video can be provided to the DOE. The informative flyer about the project activity, which was published in the SBBCs notice board, is presented below.

Description du projet MDP de la SBBC :

Le mécanisme de développement propre

Le mécanisme de développement propre (MDP) est l'un des mécanismes de marché du protocole de Kyoto. Le protocole de Kyoto est un accord qui vise la réduction d'émissions de gaz à effet de serre afin de lutter contre le changement climatique. Dans le protocole de Kyoto, des pays industrialisés et certains pays émergeant se sont engagés à réduire leurs émissions de gaz à effet de serre par cinq pour cent au total sous les niveaux de 1990 entre 2008 et 2012. Cependant, les cibles de réduction d'émissions diffèrent d'un pays à l'autre. La réduction d'émissions de gaz à effet de serre est très importante afin d'éviter les impacts négatifs, comme l'élévation du niveau des mers et l'augmentation des températures, ce qu'arrivera sans doute si aucune action contre le changement climatique n'est prise.

Le MDP permet aux pays industrialisés avec des cibles d'émissions du protocole de Kyoto de s'engager dans des projets de réduction d'émissions dans des pays en voie de développement et d'utiliser les crédits de réduction d'émissions générés par ces projets (nommés réductions d'émissions certifiées, REC) pour atteindre leur cible de Kyoto. Le but du MDP est double : premièrement on suppose qu'il aide les pays industrialisés à respecter leurs cibles de Kyoto, ce qui est très important pour réduire les émissions de gaz à effet de serre et les impacts du changement climatique. Deuxièmement, mais aussi important, le MDP contribue au transfert de technologie et de développement durable dans le pays d'accueil, un pays en voie de développement comme le Maroc.

Le projet

Le projet de remplacement de combustibles a lieu dans la briqueterie à Berrechid, Maroc de la Société Briqueterie Bati Chatouia (SBBC). La question d'énergie a une grand importance pour l'industrie de briques, sachant que des températures très élevés sont nécessaires pour la production et une part significative des dépenses opérationnelles est liée à l'énergie. Actuellement, la SBBC est équipée de trois séchoirs chauffés par fioul et par la chaleur récupérée des fours et trois fours chauffés par fioul et coke de pétrole. Au début du processus complet, du charbon est mélangé avec de l'argile comme combustible interne et brûlé dans les fours.

Le projet réduira les émissions de gaz à effet de serre en remplaçant partiellement le combustible interne et le combustible des séchoirs et des fours de source fossile (fioul, coke de pétrole et charbon) par des combustibles de source renouvelable. Le projet utilisera des matières bio organiques, comme l'huile d'olive et des acides gras aussi bien que des résidus de pressage d'huile d'olive, des coquilles de noix et du bois résiduel. Les matières seront achetées de l'industrie alimentaire locale et de l'industrie du bois de la région Anti-Atlas. Le remplacement de combustibles implique aussi le remplacement d'une partie des brûleurs existants de sécheurs et de fours par des brûleurs nouveaux capables de brûler les biocarburants. Ils seront également nécessaires des améliorations techniques de l'unité de préparation d'argile et des mesures secondaires combinées pour ajuster la technique de ventilation des fours afin de pouvoir traiter les propriétés de chaleur changées suite au remplacement des combustibles. Comme un effet secondaire, une augmentation d'efficacité d'énergie des fours sera le résultat.

Le projet de remplacement des carburants sera surveillé par deux spécialistes de production de briques européens M. Fritz Mödinger et M. Felix Ast qui vont donner des conseils à la SBBC, pendant la mise en œuvre et le fonctionnement normale, liés au remplacement de combustibles et à l'augmentation d'efficacité d'énergie.

Les essais d'efficacité énergétique et de remplacement de combustibles ont commencé au milieu de 2007. La construction a déjà commencé en remplaçant les brûleurs de fioul de séchoirs de la chaîne de production par des chambres de combustion de biocarburants. De plus, les unités de préparation d'argile ont été modifiées afin de pouvoir utiliser de la biomasse comme combustible. Le prochain pas est la substitution partielle des combustibles fossiles, le fioul et le coke de pétrole par des biocarburants. Pour cela, des changements doivent êtres faits à la technologie des brûleurs ainsi qu'au système d'alimentation en air pour la combustion. Le changement sera en premier appliqué à la ligne de production numéro 3. La fin de ces activités de construction est prévue pour mai 2008. Après la mise en œuvre du remplacement des combustibles dans la ligne 3, la deuxième phase du projet commencera et des mesures identiques vont êtres appliquées aux lignes de production 1 et 2. La fin de cette deuxième phase est attendue pour la deuxième moitié de 2008.

Les modifications du processus exigent une collaboration intensive des employées. Pour le projet, des technologies et équipements inconnus jusqu'à présent seront utilisés. Cela demandera certainement une interaction autonome des employées sur place afin d'éviter des ruptures dans la production, tout en faisant confiance aux compétences et qualifications individuelles. Pour que la communication et le retour des réactions soient améliorés, un système d'enquête et de propositions sous forme papier sera établi.

Les impacts environnementaux et sociaux

Les effets environnementaux de la mise en œuvre du projet seront positives, comme le projet est effectué dans une installation existante et car des combustibles plus respectueuses aux enjeux climatiques sont utilisés. Le projet aura un impact positif sur la qualité d'air locale grâce à la diminution d'utilisation de combustibles fossiles, ce que mènera également à une réduction d'émissions considérable de dioxyde de carbone (CO_2) et de dioxyde de soufre (SO_2). Le projet diminue aussi la consommation de fioul grâce à l'efficacité de combustion améliorée et à l'utilisation de brûleurs modernes et plus efficaces. Cependant, ces impacts positifs sur la qualité d'air locale seront affaiblis par une plus grande émission de poussière due à l'utilisation de biocombustibles renouvelables solides.
Indépendamment de cet aspect négatif, le projet a un effet total positif sur l'environnement et le public. Le projet est sur une ligne avec le but national de réduction d'émissions de gaz à effet de serre et promeut des technologies respectueuses aux enjeux climatiques. Les critères du développement durable national ont été pris en compte et le projet contribue nettement au développement durable en raison des aspects suivants :

Contribution environnementale

- Contribution à la lutte contre le changement climatique, car des émissions de méthane par décomposition de matières organiques sur des décharges publiques sont évitées ainsi que des réductions d'émissions de CO2 grâce à la substitution des combustibles fossiles
- Impact positif sur la qualité d'air locale grâce à la réduction de l'utilisation des combustibles fossiles et par conséquence réduction d'émissions de dioxyde de soufre

Contribution socio-économique

- Contribution positive à l'indépendance énergétique du Maroc grâce à la réduction d'importations de fioul
- Promeut une société à développement durable de la briqueterie sur à long terme en diminuant la dépendance au fioul et réduisant en conséquence les dépenses par une utilisation plus large de carburants renouvelables
- De nouvelles technologies utilisées par la société exigent une meilleure participation des employées pour atteindre le but. Une meilleure compréhension du processus de production existant et nouveau mène à un degré de satisfaction plus élevé
- L'opération et la maintenance de la nouvelle technologie mèneront à une qualification individuelle plus haute aboutissant à de meilleures offres d'emplois même à l'extérieur de la société si l'employée cherche un nouvel emploi

Contribution technique

- Favoriser la meilleure des techniques disponibles, comme la substitution de pétrole et de fioul par des carburants à basses émissions et la modification du processus céramique avec un autre respectant l'environnement. Augmente la connaissance sur des technologies respectueuses aux enjeux climatiques en introduisant des technologies ultramodernes au Maroc