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PROJECT DESIGN DOCUMENT (CDM-SSC-PDD)

SECTION A. General description of the small-scale project activity:

A.1 Title of the small-scale project activity:

Installation of Energy Efficient Products and Technologies for CO2 Emission Reduction in Gilgit and Ghizer Districts of Northern Pakistan.

Revision history of this document:

Version Number	Date	Description and reason of revision
1.0	11 June 2009	Completed first draft and discussions with DNA
1.1	16 July 2009	Internal Q&A and submission to DOE

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

The proposed small scale project activity "Installation of Energy Efficient Products and Technologies for CO2 Emission Reduction in Gilgit and Ghizer Districts of Northern Pakistan" (the proposed project activity) is located in the Gilgit and Ghizer Districts of Northern Pakistan. The proposed project activity is developed jointly by Industrial Promotion Services (IPS), Greentech Solutions (Pakistan) Ltd, and Building and Construction Improvement Program (BACIP) - Aga Khan Building and Planning Services, Pakistan (AKPBS,P). The proposed project activity is to install a number of energy efficiency equipments in 10,000 households, reducing the use of fuels.

Traditional houses of Northern Region face a variety of issues and problems, which include: thermal inefficiency, poor lighting and ventilation, improper space management, and the problem of dust and dampness. There are additional structural and land encroachment issues. Most of the time, surface water of small water channels passing alongside houses infiltrates into the ground and is absorbed by foundation walls hence resulting in dampness in the house. All these housing and construction related problems have resulted in an increase in cutting trees for firewood (for cooking and heating) and construction, frequent repairing of walls and floors, and health hazards due to dampness and non ventilated houses. This, in turn, has also resulted in severe deforestation in most parts of the Region. There are also no immediate indications of a decrease in the use of wood under "business as usual" conditions.

Wood is used for cooking and heating by burning in open fires and inefficient smoky stoves. Open fires are inefficient as they waste a lot of calorific energy and hence require large quantities of wood. In addition to diminishing resources, the fuels emit noxious smoke within the households and into the atmosphere. When cooking is in an open fire in the wind, a large portion of the energy is lost to the atmosphere and only a small percentage of the heat gets transmitted to the pot. The use of unprocessed solid fuels, particularly wood, for cooking and heating in inefficient stoves without proper ventilation exposes people to high levels of indoor air pollution. The process of fuel wood collection is also very labor intensive and the increased level of time and energy spent on it translates into less time for productive work including income generation, health and hygiene are. The ever increasing demand for fuel wood has placed a great pressure on local forests and over the years it has resulted in rapidly

depleting forest cover, soil erosion and desertification. The type of deforestation resulting from a continuous use of fuel wood for household use takes on multiple forms and inflicts serious and often irreparable environmental damage. Resource depletion, loss of biodiversity, soil erosion, decreased agricultural yield and adverse climatic changes are some of the more visible impacts. In the poverty context, this is an alarming situation since the forest ecosystem are the main source of income and livelihood for many poor communities and the loss of this resource, without the creation of alternatives, has a direct bearing on their poverty status and vulnerability.

The proposed project aims to improve living conditions of communities living in the Gilgit and Ghizer districts of the Northern Areas in Pakistan by improving the energy efficiency of housing and thereby reducing the use of non-renewable biomass for heating and cooking purposes. The basic purpose of the project activity is to make home-improvement products that impact household health, economics and housing conditions more accessible and affordable, while simultaneously making the eco-system more sustainable by reducing human pressure on the environment and reducing the level of CO2 and allied hazardous emissions. This would be achieved by replacing the presently used inefficient products for heating and cooking with more energy efficient (EE) products and practices, thereby also reducing the consumption of wood in these products.

Thus, the objective of the project is promotion of a combination of Fuel Efficient Stoves (FES), Water Warming Facility (WWF), Roof Hatch Window (RFW), and House Insulation Technologies (HIT) in 10,000 household, over a period of two years, leading to up to 50-60% reduction in annual firewood consumption at the household level. It is estimated that on average each household uses about 6.5 tonnes of wood each year, and the combination of EE product installed in each households would reduce annual household firewood consumption by 2.0 - 2.5 tonnes of wood to give a cumulative saving of 20,000-25,000 tonnes of fuel wood annually as a result of the project's interventions. But this is only possible if at least 3 appliances are used in each household. After the appliances have been installed, planned for the initial two years of the project, fuel savings continue for the remainder of the crediting period i.e.8 years.

Together, the project participants provide an integrated approach where products for more efficient use of thermal energy utilization from fuel wood are not only introduced but also an entire manufacturing, supply and financing mechanism is set-up. In longer terms, the project aims to enhance the socio-economic conditions of the local people through the creation of a healthier environment and financial savings and also boosting the skills and economic organisation of the locals.

The project scenario is the installation of energy efficiency equipment in a large number of households, reducing the need for non-renewable biomass as fuel. The project aims to save 20,000 to 25,000 tonnes of non-renewable biomass usage per year. The baseline scenario, which is the same as the scenario existing prior to the implementation of the proposed project activity, is the continuation of the use of large quantities of non-renewable biomass as fuel in these households.

As non-renewable biomass is not considered a zero-emissions fuel, the establishment of the proposed project activity will lead to greenhouse gas (GHG) emission reductions. Following the baseline methodology, the emission reductions are estimated to be approximately 32,000 tonnes of CO2 equivalent (tCO2e) per year once the proposed project activity is fully operational.

Sustainable development

The proposed project activity will help to promote economic development and to improve the air quality. The project will assist Pakistan in stimulating and accelerating the commercialisation of energy efficiency

applications for households. The project will therefore help reduce GHG emissions versus the business-as-usual scenario with high levels of non-renewable biomass use. The project will improve air quality and local livelihoods.

The proposed project activity will contribute to sustainable development in the following ways:

- It will promote local economic development by creating local employment opportunities during both the manufacturing of the equipment, and implementation and operational phase of the proposed project activity.
- It will improve energy efficiency
- It will reduce the use of non-renewable biomass and lead to reduced deforestation.
- It will promote technology development, through the use of more-advanced technology.
- It will reduce GHG emissions in Pakistan compared to the baseline/business-as-usual scenario.
- It will reduce the emissions of other pollutants associated with the operation of inefficient stoves in households, in particular smoke.

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)
Pakistan (host)	• Industrial Promotion Services (IPS) • Greentech Solutions (Pakistan) Ltd • Building and Construction Improvement Program (BACIP) - Aga Khan Building and Planning Services, Pakistan (AKPBS,P)	No
United Kingdom of Great Britain and Northern Ireland	• Carbon Resource Management S.A.	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Contact information is given in Annex 1.

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):

Pakistan

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

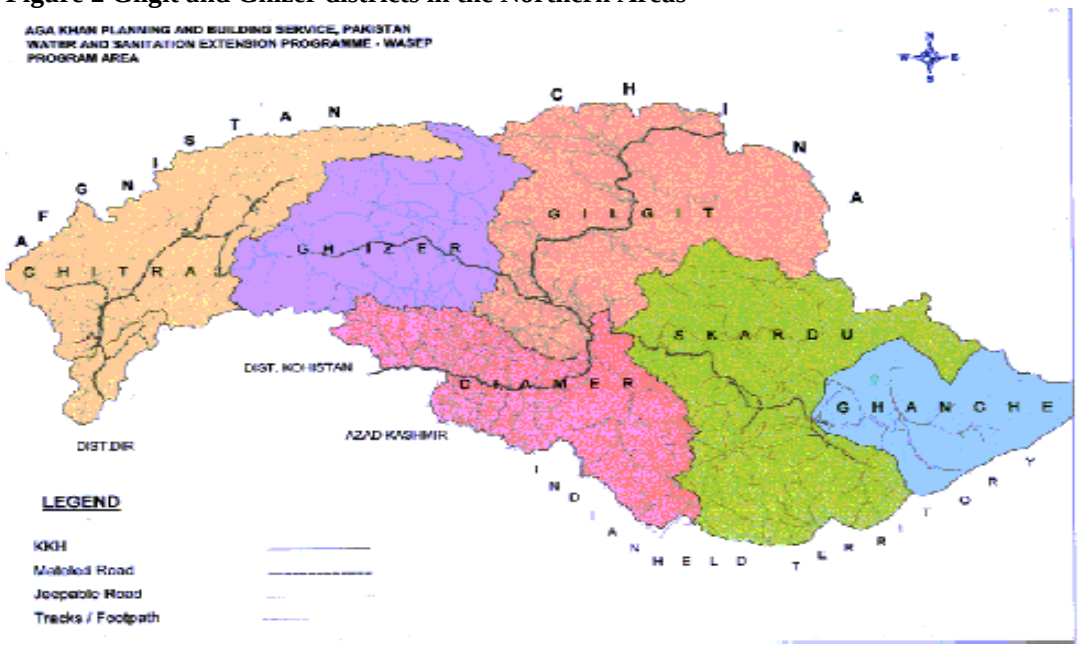
Northern Areas of Pakistan

Figure 1. The Northern Areas in Pakistan

A.4.1.3. City/Town/Community etc:

The project is focused on 2 districts in the Northern Areas, i.e. Gilgit and Ghizer. Their location is shown in the map of Northern Areas below.

Figure 2 Gilgit and Ghizer districts in the Northern Areas



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

The geographical coordinates and altitudes within the project area are:

Gilgit: 35° 54’ 59.89” (North), 74° 15’ 22.48” (East), Altitude: 1658 meters
Hunza (in Gilgit district): 36° 19’ 31.90” (North), 74° 40’ 09.46” (East), Altitude: 2423 meters
Gahkuch (Ghizer district): 36° 10’ 01.25” (North), 73° 44’ 59.16” (East), Altitude: 2269 meters

The project geographical area covers not just the main Gilgit town but the entire settlement area of the Gilgit district around the town, as well as the entire settlement area of the Ghizer District.

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

Type and category

Type: Type (ii) energy efficiency improvement project activities

Category: This proposed project activity falls within the scope of two categories, firstly energy efficiency improvements in the thermal application of non-renewable biomass, and secondly energy efficiency measures in buildings.

Sectoral scope: 03 Energy demand

Technology/measure of the project activity

Traditional houses of Northern Areas face a variety of issues and problems and the use of woody biomass and inefficient appliances result in emission of large amount of greenhouse gases, contributing to global climate change. The use of inefficient stoves also results in high levels of indoor air pollution, causing health problems particularly to women and young children. Poor housing conditions of cold, damp, dark, dusty, and smoky conditions inside the house also lead to high expenses for wood purchase and heavy workload, particularly to women, for collection of firewood for cooking and heating; and prevalence of indoor air pollution (IAP) -related diseases such as ARI, pneumonia, and eye soreness.

The project will promote adoption of a combination of at least 3 appliances in each household - out of Fuel Efficient Stoves (FES), Water Warming Facility (WWF), Roof Hatch Window (RFW), and House Insulation Technologies (HIT) - leading to 50-60% reduction in annual firewood consumption at the household level, in 10,000 households, which would be installed over a period of two years. Since on an average, each household uses about 6.5 tonnes of wood each year, the combination of EE product installation in each household is expected to reduce annual household firewood consumption by 2.0 - 2.5 tonnes of wood to give cumulative annual fuel wood savings of 20,000-25,000 tonnes within the 10,000 households. The fuel wood use would be monitored after installation of EE appliances in the households and will be monitored over the entire crediting period of 10 years after the installation of appliances.

Individual households will be required to enroll in the program before purchasing any product, and will agree to install at least three of the 6 listed products (i.e. FES, WWF, WI, FI, RHW, RI). The owner/ purchaser will also agree to maintain and use the products for eight years, and will also agree to regularly monitoring visit by the project to demonstrate at least 1.5 tonnes of fuel wood savings per year. Only BACIP original product designs and specifications would be acceptable in this program. Individual home owners will purchase these products through their own finances and for those households who would need a loan to purchase these products will be facilitated through the micro-finance banks.

The project will attempt to facilitate poor and ultra poor segments of the society through providing higher subsidies and help with access to micro-loans. Database developed by Local Support Organisations (LSO) - an umbrella local village organizations' coordinating structure - of poor segments of the society will be used to help identify these recipients. At the same time, LSOs would also be provided an incentive to act as sales agents of EE products in local villages, communities and households as an income earning means for their own financial sustainability.

Project activities will include targeting 12,000 to 15,000 households for EE product installation through providing awareness raising and promotional activates in 100 villages. About 50-100 manufactures of BACIP EE products will be established in these villages. EE products in at least 10,000 households are expected to be installed within two years form the time of project initiation.

The project will set up education, awareness and demand generation mechanisms, and village level resource and sales network in remote valleys. Other project activities will include setting up of material and product supply systems and setting up of project management activities. The project will also set-up and maintain a robust household level carbon emission reduction monitoring system (on sample base) to calculate annual CO2 reductions. A special subsidy incentive of PKR 1000.00 will be provided to households who become part of the project emission monitoring system, are conducting regular firewood monitoring and are regularly providing access and monitoring data to the project.

As part of the project's effort to measure and document socio-economic and environmental benefits and impacts of project interventions, specific measurement and assessment studies will be undertaken in project area in collaboration with various local developmental and public sector organizations involved in

similar environmental activities to promote energy efficiency in Northern Pakistan. The project will also undertake research activities to help improve energy efficiency and its use in the local communities and other renewable energy sources.

A general description of these EE products and technologies is provided as given below.

a*) Fuel Efficient Stoves (FES)/Water Warming Facility (WWF)*: The FES is made of mild iron sheet and has multiple openings on top of the stove to enable the use of two cooking pots at one time. There is a vertical chimney pipe to remove the smoke from the room. The FES has a WWF to heat up water while food is being cooked. The metal FES and the chimney together warm the room at the same time as providing heat for cooking. The FES replaces the open fire or older design of stoves.

b) *Roof Hatch Window (RHW)*: The Roof Hatch Window is designed to cover the open roof hole of the traditional house. This prevents the heat from leaving the room and conserves the warmth. Its translucent glass brings light to the room in the day and a side shutter can be opened as required for ventilation. The top glass shutter of the roof hatch window can be opened in summer for better ventilation.

c) *House Insulation Technologies (HIT)*: There are a number of low cost yet effective and easy to apply insulation on the walls, floors and roofs of houses. Some examples are:

wall insulation with ply board, plastic, and PE foam/dried straw filling;

- wall insulation with cement plaster on expanded metal mesh, plastic and PE foam/rock wool/dried straw;
- wall insulation with willow strips and stabilized mud plaster;
- wall insulation with hollow cement blocks or double layer wall with air cavity;
- roof insulation with PE foam/plastic packed with straw or wood shavings with false ceiling; and
- floor insulation with PE foam, locally made wool mats/straw mats.

Estimated fuel wood savings of all three technologies (FES, RHW, and HIT) results in an average savings of up to 60%, with a safe assumption that any household using these three products can save almost 50% of the firewood used in the house from the baseline. Based on experience the FES stoves are expected to have a lifetime of 6-8 years. The life times of the RHW and HIT technologies are expected to be much longer at about 15 years.

In general, the products to be promoted by the project would be priced as given below:

a) Stove with Water Warming facility – PKR 3,200 (approx. € 32*)
b) Roof Hatch Window - PKR 3,500 (approx. € 35)
c) Floor insulation – PKR 4,000 (approx. € 40)
d) PE Foam - PKR 55/sq.feet (approx. € 5.5)

(: at current conversion rate of € 1 = Pak Rupees 100)*

The percentage savings in fuel-wood usage estimated to accrue annually by the use of each of these products, individually as well as in combinations, are given below, with a caveat that these are average figures and actual figures would vary depending on size and altitude of the household:

Table 1: Fuel wood savings by product(s)

Single product	**Fuel Wood Saved (%/year)**
Fuel Efficient Stove (FES)	25-30
Water Warming Facility (WWF)	20-25
House Insulation Techniques (HIT)	10-15
Roof Hatch Window (RHW)	20-25
Combinations of two products	**Fuel Wood Saved (%/year)**
FES + WWF	35-40
FES + RHW	40-45
RHW + HIT	40-45
Combinations of three products	**Fuel Wood Saved (%/year)**
FES + WWF + HIT	50-55
RHW + WWF+ FES	55-60
Combinations of four products	**Fuel Wood Saved (%/year)**
WWF + FES + RHW + HIT	55-60

Source: BACIP Firewood Monitoring Yasin Valley (BACIP/CCTL), from the paper which is in process for publication by GEF.

As can be seen from the table above, at least 3 appliances have to be used in combination in a household to achieve maximum savings. Therefore, each of the project household would have to use at least 3 appliances to achieve savings of up to 50-60%.

These technologies have been specifically designed and manufactured using international expertise, improving the traditional designs still being used widely. The designs are not hi-tech, but rather appropriate technologies which are considered of good and efficient design in the Northern Areas in Pakistan.

The project contributes to sustainable development by improving the standard of households, improving health and environment and enabling income generation of the households by using appropriate firewood saving technologies. When installed and used properly, the EE products and technology provide at least PKR 7,000 savings (€ 70) per households per year assuming that every 1 Kg of firewood costs PKR 3.0 to a household. Installation of products will also result in reduction of smoke related diseases and save money in health bills. Installation of the EE products will also have a significant impact on time saving for women in firewood collection (3-4 hours/ day) and cleaning and dusting activities.
Benefits of the project for the entire Northern Areas are also significant as the overall environmental impact will include avoiding felling down of green trees and GHG conservation by avoiding CO2. Economic benefits to the region will include small scale enterprise development, employment generation, and skills enhancement.

The socioeconomic benefits of the project include, among others:

- At least 50 % saving on fuel wood purchase for heating and cooking;
- 25 % reduction in health bills;
- 50 % reduction in house repair expenditures;
- 50 % reduction in smoke related diseases; and
- Reducing women and children workload and time saving in fuel wood collection (8-10 person days per year).

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

Applying the baseline methodology and estimated annual net electricity supply, the ex-ante estimated emission reductions over the chosen 9-year crediting period are presented below.

Table 2 Estimated amount of emission reductions over the chosen crediting period

Years	Estimation of Annual Emission Reductions (in tonnes of CO2)
2010	16,295
2011	32,590
2012	32,590
2013	32,590
2014	32,590
2015	32,590
2016	32,590
2017	32,590
2018	32,590
2019	32,590
Total estimated reductions (tonnes CO2)	**309,605**
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period (tonnes of CO2)	**30,961**

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

No public funding will be used.

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

Debundling is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities.

The proposed project activity is not a debundled component of a large project activity, because there is neither a registered small-scale CDM project activity nor application to register another small-scale CDM project activity:

(a) With the same project participants;
(b) In the same project category and technology/measure; and
(c) Registered within the previous 2 years; and
(d) Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

SECTION B. Application of a baseline and monitoring methodology

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

Two methodologies are used:

- AMS-II.G. version 1 "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (valid from 1 Feb 08 onwards)
- AMS-II.E. version 10 "Energy efficiency and fuel switching measures for buildings" (valid from 2 Nov 07 onwards)

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

This project activity is using a combination of small appliances involving the efficiency improvement in the thermal applications of non-renewable biomass as well as energy efficiency measures in buildings, a combination of the methodologies AMS-II.G and AMS-II.E will be used.

The total savings from the implementation of the proposed project are up to 40,000 tonnes of fuel wood once the project is fully implemented and 10,000 households have subscribed. Using the default net caloric value of fuel wood from the IPCC of 0.015 TJ/tonne, the total thermal energy saved is 600 TJ. This is equivalent to 167 GWh thermal energy, which is less than the upper limit for Type II small scale projects of 60 GWh electric or an appropriate equivalent, with the appropriate equivalent for this project being 180 GWh thermal input. Hence the project is classified as a small scale project.

(i) AMS-II.G

This comprises small appliances involving efficiency improvements in the thermal application of non-renewable biomass. These include high efficiency biomass fired cooking stoves or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cooking stoves or ovens or dryers. It has to be shown by project participants that non-renewable biomass is being used, using appropriate survey methods.

Appliances used by the project which fall under this category are mentioned below:

Fuel Efficient Stoves: Smokeless stoves in many ranges (size and kind) of durable and easy to make designs have been developed. Customers' preference in this regard is well taken by adding in the design

of the stoves. The stove not only reduces firewood consumption, but also reduces indoor smoke emission due to its chimney; and

Water Warming Facility: Water Warming Facility (WWF) warms water during cooking therefore, saves extra fuel used for water heating/warming, reduces indoor smoke emission and reduces household chores related to fuel collection, extra activity for warming water etc. AKPBS,P studies show that a household can save up to 60% of firewood, improves personal hygiene, especially hand washing of children in winter due to availability of warm water in the house;

(ii) AMS-II.E

This comprises of any energy efficiency and fuel switching measure implemented at a single building, such as a house. It covers projects aimed primarily at energy efficiency through efficient appliances, better insulation and optimal arrangement of equipment. The technologies may replace existing equipment or be installed in new facilities. This category is applicable where it is possible to directly measure and record the energy use within the project boundary - which in the case of this project is a single house. It is also applicable where the impact of the measures implemented (energy efficiency improvements) by the project can be clearly distinguished from changes in energy use due to other variables not influenced by the project.

Appliances used by the project which fall under this category are mentioned below:

Roof Hatch Window: Roof Hatch window (RHW) is placed over the central opening of the traditional room. It improves the light level in the house, conserves the heat inside and stops dust transmission. Due to its heat conserving ability, a household with RHW can save up to 60% of fuel consumed for heating the house;

House Insulation Techniques (HIT): Wall insulation is used for existing and new walls. The insulation consists of a plastic foil and expanded metal mesh fixed onto wooden pegs and covered with plaster. There are different kinds of wall insulations techniques developed by BACIP. For floor Insulation, P.E. foam is laid on the floor as an insulation measure for protection from the cold.

B.3. Description of the project boundary:

In line with the methodology, the project boundary is the physical, geographical area of the use of non-renewable biomass, i.e. the individual households.

B.4. Details of the baseline and its development:

In accordance with the methodology AMS-II.E applied, the energy baseline consists of the energy use of the existing equipment that is replaced in the case of retrofit measures. Each energy form in the emission baseline is multiplied by an emission coefficient. For fossil fuels, the IPCC default values for emission coefficients may be used. And in accordance with the methodology AMS-II.G applied, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

The baselines of the two methodologies are complimentary, using the substitution fossil fuel for any reduced non-renewable biomass.

Wood is the only source of fuel available to most of the households in the Northern Region of Pakistan, with others using kerosene, and along with lack of appropriate thermal insulation of houses and the inefficient heating and cooking practices lead to an overuse of fuel wood, beyond the regeneration capacity of the local forests. A 2001 study[1] carried out by World Wide Fund for Nature-Pakistan (WWF-P) and Aga Khan Planning and Building Services, Pakistan (AKPBS,P) showed that 86% of all household in Northern Region use biomass as their primary fuel. The rest, on average, use kerosene (6.5 %), natural gas (5%), electricity (1.5 %), coal (0.5%) and others/ cow dung etc (0.5%). An internal household level (sampling methodology with stratified sampling size of 30 households) fuel wood monitoring study by AKPBSP in 2007 in Northern Pakistan, and a similar study in 2008 in a different NP valley documented a higher average household consumption of 6.9 tonnes in Northern Region before the installation of fuel saving technologies. Thus, conservatively and on an average, a household uses 6.5 tonnes of firewood per year for cooking and heating the house could be taken as the baseline scenario.

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:

CDM consideration

A notification was send to the DNA and UNFCCC (using CRM reference number 136) prior to the starting date of the project activity.

Timeline of the implementation of the project

Time	**Milestone**
Jan 2008	Project concept developed considering CER revenues income stream
June 2008	Board meeting decides to develop the proposed project as CDM
Sept 2008	Feasibility Study Report completed, taking CER revenue into account
Dec 2008	CDM development contract signed with CRM
Jan 2009	Notification of the intension to develop this project as CDM to UNFCCC/DNA
March 2009	Stakeholder consultation and draft documentation
June 2009	Discussions with DNA on PDD
Aug 2009	Submission of PDD to DNA for endorsement
Expected Sept 2009	*Contract with DOE*
Expected Sept 2009	*Submission of the PDD to DOE for GSP*
Expected Oct 2009	*Contracts for EE products manufacturing signed (expected starting date of the project)*
Expected Nov-2009	*EE products installation start (expected)*
Expected Dec 2010	*Complete installation of all EE products in target households*

Additionality

It is demonstrated that the proposed project activity is additional as per the options provided under attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities below.

[1] "Fuel wood consumption practices, interventions for fuel wood conservation at the household level and relative impact on conservation of forests & wood resources in the Northern Areas of Pakistan."

The project activity would not have occurred anyway due to a combination of the following barriers:

(a) *Investment barrier*: a financially more viable alternative to the project activity would have led to higher emissions;

(b) *Technological barrier*: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

(c) *Barrier due to prevailing practice*: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

(d) *Other barriers*: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

Up to 86% of the Northern Pakistan households use biomass as the main fuel with an average household utilizing 5.5 tonnes of fuel wood in the winter season (6 months)[2]. With an estimated 125,000 households in the NAs and Chitral the annual amount of fuel wood burnt in winters in these areas alone is about 5.5 million tons per annum. About 45% of the NAs and Chitral households purchase fuel wood, spending approximately RS. 3,000-4,000/month during the winter season. The rest of the households use collected fuel wood[3], a chore mostly done by women and children.

There is indeed large potential of energy savings and CO2 emissions reduction in these areas through the installation of energy efficient and home improvement products and technologies for socioeconomic and environmental benefits. Biomass savings link directly to reducing pressure on natural resources and reducing GHG emissions. Installation of such products also help decrease incidence of ARI, pneumonia and other health related disease in women and children by up to 50% (especially during winters) in houses using energy efficient products, with corresponding health related household expenditure savings of approximately RS 3,500/annum (approx. 25% of annual medical bills).
There are, however, several impediments in making these energy efficient cooking, heating and housing technologies widely available and to have installed in local communities at large[4]. Many of these impediments are structural, and inhibit large-scale adoption, and adaptation of these energy efficient housing and technologies. Some of these barriers specifically relate to:

[2] "Fuel wood consumption practices, Interventions for fuel wood conservation at the domestic household and relative impact on conservation of forests and wood resources in the Northern Areas of Pakistan", a joint study by WWF-P and AKPBS, P by Fakhar, Irshad and Abdul Khaliq Chaudry from PFI, 20001.

3 As cattle dung and Artemisia are scarce in the NAs, fuel wood consumed hence mostly comprises of natural forest wood (30%) and the rest collected from farmland and communal forest trees. Local communities, in some cases, also cut Juniper and Birch trees from the shoulders and surroundings of glaciers to cater for house construction and heating needs especially in bitter cold.

4 "A Socio-Economic Analysis of the Constraints and Potential for Greater Replication of Ten BACIP Home Improvement Products", S. Akbar Zaidi, October 2001.

- Lack of awareness in the aspects of production of EE products, lack of technical backstopping in the utilization and employment of EE techniques, and absence of mechanisms that would promote and support the marketability[5] of energy efficient products and technologies;
- Lack of local efforts to develop and support entrepreneurs that are interested in venturing in energy service business, and for institutions providing microfinance to address the need for EE products by every household[6];
- Absence of enabling environment conducive to project developers and investors venturing into EE housing construction and technology application. This relates to issues about the absence of EE policies of local governments, energy codes, and mechanism to mainstream energy and environment considerations in the local government development planning processes [7];
- Current purchase practice of firewood is mix of seasonal harvest earning, and not regular cash payments. This therefore constitutes a barrier that inhibits introduction of more EE techniques and products if capacity to make timely cash payments are limited [8];
- Weak private sector institutions to provide technical backstopping and support activities such as training, awareness-raising, joint research and joint promotion of EE technologies with various development organizations for outreach, replication and adoption [9];
- Lack of a comprehensive supply-demand structure. This relates to development of supply chain structures essential to ensuring provision of EE products and technologies at local level, training of sales persons, as well as facilitating SMEs on EE products sales and distribution systems [10]; and
- Lack of easily accessible information and technical repository for reference, documentation and application. This relates to the generation and dissemination of EE products and technologies for socio-economic and environmental benefits targeting stakeholders such as local communities, government, NGOs, International regional and sub-regional partners, for maximum exposure and large scale benefits [11] .

Addressing all of the above and removal of these barriers in Northern Pakistan is a key for larger scale installation of EE and HI product for GHG emissions reduction. As there is no current public policy and private/ finance sector involvement in addressing such barriers, and neither there is any or public and private sector financing being invested in the production, supply, and demand chain of these EE and HI products, this project will need the emission reduction revenue to invest into activities and actions that

[5] "Marketing of Appropriate Housing Technologies in the Northern Areas, Pakistan", a partnership study between AKRSP-Enterprise Development Program and AKPBS, P-BACIP, July 2001 and "A Socio-Economic Analysis of the Constraints and Potential for Greater Replication of Ten BACIP Home Improvement Products", S. Akbar Zaidi, October 2001.

[6] "Hydropower and Energy Background Paper of the (Draft) Northern Areas Economic Report; World Bank/ADB/AKDN June 2009"

[7] "Hydropower and Energy Background Paper of the (Draft) Northern Areas Economic Report; World Bank/ADB/AKDN June 2009"

[8] "Agriculture, Livestock and Forestry Background Paper of the (Draft) Northern Areas Economic Report; World Bank/ADB/AKDN June 2009"

[9] "Social Capital Background Paper of the (Draft) Northern Areas Economic Report; World Bank/ADB/AKDN June 2009"

[10] "Accelerating Private Sector Led Growth Background paper of the (Draft) Northern Areas Economic Report; World Bank/ADB/AKDN June 2009"

[11] "Hydropower and Energy Background Paper of the (Draft) Northern Areas Economic Report; World Bank/ADB/AKDN June 2009"

will remove these barriers, without which EE products cannot be installed in a large number of households in Northern Pakistan.

Carbon credits income will be used to remove these barriers, and therefore it can be concluded that the proposed project activity is additional and would not have happened without the CDM due to the existence of a variety of barriers.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Calculation of emission reductions has been made using the standard method stipulated by AMS-II.G and AMS-II.E. The emission reductions from the activities that fall under methodology AMS-II.E can be calculated using the formulae from methodology AMS-II.G, as the baseline fuel is non-renewable biomass.

In the absence of the project activity, the average consumption of fuel wood by one family is estimated by field measurement (Joint Field Study by WWF-P& AKPBS,P Fakhar & Irshad 2001 on fuel wood consumption practices in Northern Areas) to be 6.5 tonnes per year. The average consumption of families using a combination of energy efficient appliances and adopting thermal efficiency measures in buildings for the same purpose and thermal load (cooking traditional meals of the same type and quantity and heating buildings of traditional design) have been found by field measurement to be 4.0 – 4.5 tonnes per year. Therefore, adoption of energy efficient products by one household would result in a saving of between 2.0 - 2.5 tonnes of fuel-wood. Thus, for the entire population of 10,000 households annual fuel wood savings would range from 20,000 –25,000 tonnes.

The methodology AMS-II.G is for small appliances involving efficiency improvements in the thermal application of non-renewable biomass. These include high efficiency biomass fired cooking stoves or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cooking stoves or ovens or dryers. The formula to calculate emission reductions under this methodology, and which is applied to all energy efficiency activities in the project activity as they all use non-renewable biomass, is:

$ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{CO2,kerosene}$ ……. *Equation 1*

Where:

ER_y	Emission reductions during the year y in tCO2e – this is what we aim to calculate
$B_{y,savings}$	Quantity of biomass that is saved in tonnes – this will be calculated later
$f_{NRB,y}$	Fraction of biomass saved by the project activity in year y that can be established as non renewable biomass using survey methods
$NCV_{biomass}$	Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{CO2,krosene}$	Emission factor for the substitution of non-renewable biomass by similar consumers. The substitution fuel likely to be used by similar consumers is taken: 71.5 tCO2/TJ for Kerosene, 63.0 tCO2/TJ for Liquefied Petroleum Gas (LPG) or the IPCC default value of other relevant fuel. The relevant replacement fuel for the non-renewable biomass in the Northern Areas is kerosene. Therefore, emission factor for the substitution of non-renewable biomass by similar consumers is taken as 71.5 tCO2/TJ.

The fraction of biomass saved by the project activity that can be established as non renewable biomass using survey methods ($f_{NRB,y}$) is estimated as 85%.

The value of $B_{y,savings}$ is estimated using the following equation:

$$B_{y,savings} = B_y \times (1 - \eta_{old} \div \eta_{new}) \quad \text{……. } \textit{Equation 2}$$

Where:

B_y	Quantity of biomass used in the absence of the project activity in tonnes
η_{old}	Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction)
η_{new}	Efficiency of the system being deployed as part of the project activity (fraction)

The efficiency of the individual systems being replaced, measured using representative sampling methods or based on referenced literature values (fraction) is taken as 0.3, i.e. 30% efficiency.

The efficiency of the individual system being deployed as part of the project activity (fraction) is estimated to be increased by 50%, see Table 1 Section A.4.2, over the existing efficiency, therefore this value is 0.45 or 45%.

The efficiencies of some of the newly installed equipment under the proposed project activity can be determined directly, i.e. the fuel efficient stoves and water warming facilities, other equipment reduce heat losses which are not determined directly, but rather by the saved fuel use, i.e. roof hatch window and house insulation technology. Therefore, the savings are calculated from the baseline biomass use and the project biomass use:

$$B_{y,savings} = B_y - B_{y,project}$$

Where

$B_{y,project}$ Quantity of biomass used in the project activity in tonnes

The quantity of biomass used in the project activity is determined as described in the monitoring plan, on the basis of a representative sample of households.

B_y, the quantity of biomass used in the absence of the project activity in tonnes, is determined from the average biomass use established in the survey and the number of households covered by the proposed project activity, as follows:

$$B_y = B_{y,household} \times N$$

Where:

$B_{y,household}$	Quantity of biomass used in the absence of the project activity per households
N	Number of households in the project activity (i.e. 10,000)

The estimate of average annual consumption of biomass per household is determined from historical data or a survey of local usage: 65,000 tonnes woody biomass is used by 10,000 households @ 6.5 tonnes per household both for cooking and heating; based on field observations, cooking and water warming consumes 60% of total wood used while 40% is used for heating.

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

This section includes a compilation of information on the data and parameters that are not monitored throughout the crediting period but that are determined only once and thus remain fixed throughout the crediting period and that are available when validation is undertaken. Following EB guidance, data that is calculated with equations provided in the methodology or default values specified in the methodology are not included in the compilation.

Data / Parameter:	**By, households**
Data unit:	Tonnes
Description:	Quantity of biomass used in the absence of the project activity per household
Source of data used:	Survey
Value applied:	6.5
Justification of the choice of data or description of measurement methods and procedures actually applied:	
Any comment:	

Following EB guidance, data that is calculated with equations provided in the methodology or default values specified in the methodology are not included in this compilation.

B.6.3 Ex-ante calculation of emission reductions:

The proposed project activity deploys at least three energy efficient technologies in each household taking part. As these technologies are not completely independent, the savings are not simply additive. According to Table 1, total fuel savings from 3 technologies simultaneously deployed are 55-60%.

Therefore, $B_{y,savings}$ is calculated as follows:

$B_{y,savings} = B_y - B_{y,project} = B_y - (45\% \times B_y) = 65{,}000 - (65{,}000 \times 0.45) = 35{,}750$ tonnes.

This value of $B_{y,savings}$ is now put in Equation 1 to obtain the value of $ER_{y:}$

$ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{CO2,kerosene} = 35{,}750 \times 0.85 \times 0.015 \times 71.5 = 32{,}591$ tCO2e

However, it is possible that a small number of households will already have installed some energy efficiency technologies which would reduce $B_{y,savings}$ and thus the actual achieved reductions; this will be monitored.

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

Table 3: Summary of the ex-ante estimation of emission reductions

Years	Estimation of project activity	Estimation of baseline	Estimation of leakage	Estimation of overall emission

	emissions (tCO2e)	emissions (tCO2e)	(tCO2e)	reductions (tCO2e)
2010	0	16,295	0	16,295
2011	0	32,590	0	32,590
2012	0	32,590	0	32,590
2013	0	32,590	0	32,590
2014	0	32,590	0	32,590
2015	0	32,590	0	32,590
2016	0	32,590	0	32,590
2017	0	32,590	0	32,590
2018	0	32,590	0	32,590
2019	0	32,590	0	32,590
Total (tCO2e)	**0**	**309,605**	**0**	**309,605**

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

Two methodologies are used:

- AMS-II.G. version 1 "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (valid from 1 Feb 08 onwards)
- AMS-II.E. version 10 "Energy efficiency and fuel switching measures for buildings" (valid from 2 Nov 07 onwards)

In order to assess the leakages specified above monitoring shall include data on the amount of biomass saved under the project activity that is used by non-project households/users (who previously used renewable energy sources). Other data on non-renewable biomass use required for leakage assessment shall also be collected.

Monitoring shall ensure that the replaced low efficiency appliances are disposed off and not used within the boundary or within the region.

Project participants must determine the share of renewable and non-renewable biomass in the total biomass consumption using nationally approved methods (e.g. surveys or government data if available) and determine $f_{NRB,y}$.

and

II.E. Energy efficiency and fuel switching measures for buildings Technology/measure

In the case of retrofit measures, monitoring shall consist of:

- (a) Documenting the specifications of the equipment replaced; and
- (b) Calculating the energy savings due to the measures installed.

A Monitoring Plan, based on the above is described below.

B.7.1 Data and parameters monitored:

Data / Parameter:	$f_{NRB,y}$

Unit:	Fraction
Description:	Non-renewable woody biomass fuel in year y in project scenario
Source of data:	Benchmark data at project initiation
Value of data	85%
Brief description of measurement methods and procedures to be applied:	BI-ANNUAL SURVEY
QA/QC procedures to be applied (if any):	3RD PARTY STUDY AND REPORT
Any comment:	

Data / Parameter:	Installed EE products
Unit:	Individual Household
Description:	Type and quantity of EE products
Source of data:	Sales Record from Various sources
Value of data	
Brief description of measurement methods and procedures to be applied:	Sales record of Entrepreneurs, Resource persons, Sales points, Collation of data through log book entries
QA/QC procedures to be applied (if any):	3rd party study and internal report
Any comment:	Covering entire districts of Gilgit and Ghizer

Data / Parameter:	$B_{y,project}$
Unit:	Tones
Description:	Quantity of biomass use in the project activity
Source of data:	Individual Daily firewood use record
Value of data	2.925
Brief description of measurement methods and procedures to be applied:	Each sample household in Monitoring Plan to maintain daily firewood use record through a weigh scale and entered in daily chart. Village Resource person to collect and collate data on Monthly basis and sent to project maintained database.
QA/QC procedures to be applied (if any):	3rd party study and internal report
Any comment:	Covering entire districts of Gilgit and Ghizer It is expected that, with 3 new appliances installed, fuel savings will be 55%, therefore remaining fuel use will be 45% of the original value: 45% of 6.5 tonnes.

Data / Parameter:	N
Unit:	Number
Description:	Number of households
Source of data:	Record of household participating in the project
Value of data	10,000

Brief description of measurement methods and procedures to be applied:	The project shall maintain record of each sample household on a monthly basis. Village Resource person to collect data on Monthly basis and sent to project maintained database.
QA/QC procedures to be applied (if any):	
Any comment:	

B.7.2 Description of the monitoring plan:

The project CO2 emissions reduction monitoring Plan has three basic components.

(1) Establishment of a baseline of select project villages;
(2) Monitoring and record of overall sales and installation of EE products and technologies in district households; and
(3) Monitoring, record, and calculation of CO2 reduction in individual households.

(1) Establishment of a baseline of select project villages

In order to create a before and after scenario of project interventions and plans for better implementations of evaluation measures, a baseline data of the key project parameters not only to help the evaluation and review but also establish the reduction in carbon reduction will be undertaken in project villages.

This baseline would be established and will encompass the project villages and would record the general socio economic and environmental conditions of project villages, information related to wood use and the economic situation of artisans and crafts people.

The general information on the socio economic and environmental conditions will be gathered using through group discussion with the community and secondary information services. The primary investigation will be based on a standard questionnaire.

The baseline, among others, would specifically establish the following key areas:

1. Average wood used per household per year.
2. Socio economic conditions of the project village household
3. General awareness of energy efficient products.
4. Prevalence of energy efficient products in a house if already installed.

(2) Monitoring and record of overall sales and installation of EE products and technologies in district households.

All household willing to be part of the project and availing subsidy would need to register with the project prior to purchase of any EE product to be installed in that household. This registration will also provide a unique identification number to each household, to be maintained in the project data base. Once the householder purchases and installs these EE products and technologies through manufactures, installers, resource persons etc, the project staff will then verify the installation, (combination there off) on the registration form and the project database through the unique identification number.

In other words, the project will maintain a 100 percent census of all households (including the ones who may have one or two EE products already installed in the household prior to registration with the project) that become part of the project for installing a minimum of 3 of the six project prescribed EE products and technologies.

A monthly report will be produced through project database recording how many products have been installed in how many households and in what combination, etc.

Other data sources to have up-to-date information on the EE products installed, the ones in process, and demand/ backlog etc would be obtained through

They are 1) Project established entrepreneurs. 2). Project village based resource persons 3). Project established EE products sales points.

Project established Entrepreneurs: Entrepreneurs will maintain a register which records the name and village of the person who bought the product, buyer unique identification number, the name of the product bought, and date of issue, etc. This information will be collected through project field staff on monthly basis and entered into project data base.

Village based resource persons. Villagers and local households will also purchase the products through these village based resource persons. These resource persons will record the sales with the name of the buyer, unique identification number, and village of the person who bought the product, name of the product bought, and date of issue etc. This information will be collected through project field staff on monthly basis and entered into project data base.

Sales Points: To expedite the replication of energy efficient products, the project will help establish sales points in the project villages. Sales persons at these points will maintain similar record as above and will be similarly transmitted to the project data base.

To facilitate the above, logbook provided to manufactures, sales persons, and resource persons to maintain all the sales record. Project staff will train the manufactures, retailers, sales persons and resource persons in recording the required information.

(3) Monitoring, record, and calculation of CO2 reduction in individual households

A sample based monitoring system to monitor CO2 reductions per household will be established in the project districts of Gilgit and Ghizer.
A sample of 300 households will be selected for monitoring and will be equally distributed in the 2 districts of Ghizer and Gilgit.

50 percent of the sample household will be included in the carbon emission reduction monitoring in the first year, and 50 percent will be included in second year of the project implementation as per project schedule.

Sample household to be included in the CO2 Monitoring will be stratified for settlement altitude, since consumption of fuel wood is generally higher as the altitude rises due to prolonged winters at higher altitude..

Table 4: Settlement Altitude and sample distribution

S#	Altitudes	Sample Distribution (%)
1	Up to 4000 ft	33%
2	4001 ft to 6000 ft	33%
3	6001 ft to 8000 ft and above	34%

Sample household will be further stratified for those who buy fuel, those who collect fuel wood, and those who use both.

Table 5: Stratification of Sample Household

S#	Household Selection Criteria	Distributed Sample Size
1	Household buying firewood	33%
2	Households collecting firewood	33%
3	Household using combination of 1&2	34%

The amount of firewood reduced per house hold will be monitored in households where 3 products, or a combination thereof, of energy efficient products (Water Warming Facility, Roof Hatch Window, House Insulation Techniques, Roof Treatment Techniques, Fuel Efficient Stoves and Light Roofs) have been installed.

Household would be monitored through out the project life of eight years to measure CO2 reductions in the project area.

Household included in the monitoring plan will be provided an additional subsidy of RS. 1,000/- per year to monitor firewood use, provide access to data by the project, and be available for project staff monitoring visits.

Household Baseline survey

A detailed and comprehensive baseline data will be collected from the intervention villages of Gilgit and Ghizer districts, for each of the 300 sample households.

For each household included in the CO2 emissions reduction survey, a comprehensive baseline of the house would be established through as questionnaire. Some of the key parameters for information to be recorded include the following:

1. General Information regarding the households (e.g. village, tehsil, district where it is located), to be later recorded as unique household identification number.
2. Socio Economic conditions: household demography, density (number of adults and of children under 10 –eating), income earnings, access to basic health facility and access to utilities.
3. Firewood consumption practices
    a. Fuel-use priorities, source of fuel, quantity of fuel, distance to fuel source, fuel collection/purchasing responsibility, combination/mix/type of fuel, cost of fuel if purchase, time spent on fuel collection.
    b. Room/ housing structure and cooking/ heating area, separate/common, outdoor/indoor, type of stove, stove cleaning frequency, frequency of cooking, stove design and conditions (used for cooking and heating).

Firewood use data collection

One person in the selected household will be responsible for monitoring of the firewood consumption on daily basis, as per prior agreement. Due to the fact that women usually spend most of their time in the house, it will be ideal that women take the responsibility of monitoring the firewood consumption. But this can vary from one household to another depending upon women literacy rate. Literate family members may help in actual entering of the numbers on the measurement sheet.

It will be the responsibility of Project staff to train the responsible householder in weighing and recording the amount of firewood consumed. Daily, weekly, and monthly data sheets, also with Urdu (national language) version will be developed. Each selected house will be provided with a spring Balance together with data sheet for the noting and reporting the firewood use. The householders will be responsible to collect the month's data and send it to the Project main data base centre through village resource person on a monthly basis. The project team will also do monitoring visits to each household, at least once every two months to corroborate the monthly data sheets.

The data acquired from the firewood monitoring will be compared on bases of two criteria including, 1). The amount of firewood used before and after the intervention, to see savings in firewood consumption, 2). The amount of firewood saved by different product/ combinations so that weighting for different product combination is determined. A Sample of firewood and CO2 emissions calculations are as given in Table 6.

Table 6: The amount of firewood reduced and CO2 emissions avoided (by different product combinations as illustration) calculation table. (Sample)

	Products	**No. Sample**	**Product(s) already installed before registration**	**Total**	**Average/ HH**	**Total**	**Ave/HH**
Group	**Combinations (e.g.)**	**HH**	**Number and type**	**FW Saved**	**FW Saved**	**CO2 Avoided**	**CO2 Avoided**
1	FES-WWF-HIT						
	FES-WWF-RHW						
2	HIT-FES-WWF						
3	RHW-FES-WWF						
5	HIT-FES-WWF-RHW						
Total HH							

Table Key
FW = Firewood
RHW = Roof Hatch Window
WWF = Water Warming Facility
HIT = House Insulation Techniques (includes Wall Insulations and Floor Insulations)
RTT = Roof Treatment Techniques

A monthly report will be produced through project database calculating the amount of CO2 saved in the months, and over the cumulative period, based on the information on fuel wood reductions a received from sample households and based on how many products have been installed in how many households and in what combination, etc.

This monthly report will be combined with the monthly sales report of all products in all project household to produce a monthly report of total carbon emissions per month through installation of EE products and technologies in the project area. 12 monthly and two annual reports of project CO2 reductions will be produced in for the first two years of the project. After that, one annual report of CO2 emissions reductions will be produced for the next 5 years of the project life.

Responsibility

The responsibility for monitoring lies with the Developer, who operates the proposed project activity. The company has established a CDM Project Management Unit and assigned personnel to the monitoring and reporting tasks.

Training

Personnel from the CDM Project Management Unit will complete training within 3 months of registration of the proposed project activity. New personnel of the CDM PMU will complete training within 3 months of starting work. A CDM Manual will be compiled within 3 months of registration of the proposed project activity.

Quality control

The CDM Manager cross-checks the survey data received and compares the data with the expected savings as established ex-ante.

Reporting

The Monitoring Report will describe the monitoring procedures and the approved and signed off metering data, corrected errors, and the emission reduction calculations.

Record keeping

All data collected as part of the monitoring are archived electronically and kept at least for 2 years after the end of the last crediting period by the CDM Project Management Unit.

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

Date of completion of the baseline study and monitoring methodology: 01/05/2009.
Contact information of the entity and persons responsible:

- Khizer Farooq Omer, independent consultant, DMRS982@yahoo.com .
- *Khizer Farooq Omer 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:

01/09/2009

The starting date of a CDM project activity is the earliest of the date(s) on which the implementation or construction or real action of a project activity begins/has begun. The starting date of the proposed project activity is the date of the start of the marketing activities of the project participants to the households targeted under the proposed project activity.

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

10y-0m

The marketing and installation activities are expected to take place during the first two years of the proposed project activity. The energy efficient products installed have an average life span of 6-8 years per product and are therefore expected to be operational and functional for the remainder of the 10 year project life.

C.2 Choice of crediting period and related information:

C.2.1. Renewable crediting period

Not chosen

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

n/a

C.2.1.2. Length of the first crediting period:

n/a

C.2.2. Fixed crediting period:

A fixed crediting period is chosen

C.2.2.1. Starting date:

01/09/2010

C.2.2.2. Length:

10y-0m

SECTION D. Environmental impacts

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

The project has no adverse environmental impact. In fact, its primary focus is on reducing the use of fuel-wood leading to a decrease in CO2 emissions.

The following information regarding the natural resources within the Northern Areas in general and within the project area in particular is presented to substantiate the positive environmental impacts of the project:

Only 4.5% of the land has forest cover and that too faces threats from the growing population. Most forests are either outside the project area or located in some parts. A small percentage protected forest area falls within the project area while there is modest level of farm forestry being practised within the project area.

Analysis

As far as species used as fuel-wood are concerned, based on availability and need the consumers have no choice between wet and dried wood and even between soft and hard wood. The whole process revolves around the basic need and the availability of fuel wood (as and when required). The species most frequently used are listed below:

S.No.	Name of species (common/ local)	Scientific Names
1.	Deodar	*Cedrus deodara*
2.	Chilgoza	*Pinus gerardiana*
3.	Juniper	*Juniperus macropoda*
4.	Juniper (minor use at high altitude)	*Juniperus communis*
5.	Kail	*Pinus wallichiana*
6.	Chir (minor use)	*Pinus roxburghii*
7.	Spruce	*Picea smithiana*
8.	Eleagnus species	---
9.	Fir	*Abies webbiana*
10.	Ash	*Fraxinus xanphoxyloides*
11.	Birch	*Betula utilis*
12.	Olive	*Olea cuspidate*
13.	Wild almond	*Prunus amygdalis*
14.	Bani	*Quercus ilex*
15.	Kikar	*Robinia psodoacacia*
16.	Seabuck thorn	*Hippophae rhamnoides*
17.	Berberis	*Berberis lycium*
18.	Wild rose	*Rosa webbiana*
19.	Nirco	*Daphne oleoides*

20.	Willow (type 1)	*Salix alba*
21.	Willow (type 2)	*Salix babylonica*
22.	Poplar	*Populus ciliata*
23.	Mulbery	*Morus alba*
24.	Ailanthus	*Ailanthus grandulose*
25.	Apricot	*Prunus arminica*
26.	Peaches	*Prunus persica*
27.	Pomegranate	*Punica granatum*
28.	Artemisia	*Artemisia meritima*
29.	Apple	---
30.	Walnut	---
31.	Pear	---
32.	Grapes	*Vitis vinifera*
33.	Under-growth/bushes	*Dodonia, Rhazya, Reptonia , Carissa, Punica,*
34.	Cherry	*Prunus padus*
35.	Sufaida	*Eucalyptus species*

Source: BACIP/WWF (2001)

For a project of this nature, a key requirement is to demonstrate that the biomass use claimed to be non-renewable is indeed non-renewable. In other words, emissions are not absorbed by the biomass growth in the project area. In order to avoid incentives to enhance deforestation and forest degradation, and in order to meet the conditions of "non-renewable biomass", project proponents must, in addition, demonstrate that the biomass used by the project participants was non-renewable at the time of launching the project.

The Northern Areas of Pakistan have witnessed massive deforestation over the past 20 years. Toady, one can visibly observe the denuded state of most mountain ranges in the region. The causes of this deforestation are numerous but the following are the most important ones:

- illegal cutting of trees
- use of fuel wood for heating, cooking and construction;
- overgrazing of pastures by nomads and locals;
- inability of the Forest Department to protect the scarce forest resources; and
- lack of community mobilization to conserve dwindling forests.

Several studies are available to verify the fact that the wood resource base of the Northern Areas has reached a non-renewable state due the inability of the current supply to meet even present demands. The most important of these studies is the Northern Areas Strategy for Sustainable Development (NASSD) produced jointly by the Northern Areas Administration and IUCN-The World Conservation Union, through a broad based participatory consultative process over a period of several years.

The NASSD devotes a chapter to the natural resources of NAs and warns of natural calamities due to rapid deforestation and increased demand for wood. According to it:

- the land of NAs is limited for forestation due to the presence of many glaciers, lakes, snow cover, alpine meadows and precipitous slopes;
- there is limited rainfall and water is generally not enough to promote large scale forestation;
- most of the forests are on private lands and have been degraded the most due to commercial logging on an unsustainable basis;

- there is very limited administrative arrangement in place to ensure the safety of the remaining forests;
- the Forest Department and the communities have no mechanism to work together thus not allowing any check on unabated logging;
- total area of NAs is 7.25 million hectare (approximately 74,000 sq. km.) out of which only 0.295 million hectare (i.e. around 4%) is under forest cover which is not enough to cater to the needs of a growing population; and
- at the current rate of extraction, the remaining forests will disappear in 10 years depriving the country and the global community of a major carbon sink.

As part of its regular work, most AKDN agencies, including AKPBS and BACIP, also keep visual and anecdotal record of the state of forests in the NAs. This record also shows the non-renewability of wood in the region.

SECTION E. Stakeholders' comments

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

In order to elicit stakeholder comments on the project, as stakeholder's workshop was organized in the project geographical area, in the Central location of Gilgit town. All relevant stakeholders, such as the CDM-DNA in Pakistan Ministry of Environment, concerned local public sector organisations and agencies such as ministry of forest, ministry of health, environment protections agency, local planning and development department, various national and local NGO and INGO involved similar energy efficiency related activities, bi-lateral and multi-lateral donors involved in energy efficiency, local community representatives organisations, various AKDN agencies in northern Pakistan, private sector microfinance bank, local entrepreneurs and artisans, and local communities/ household members were invite to this stakeholder workshop. Stakeholders were invited through formal invitations as well as through personal follow-ups.

The half day stakeholder consultation activities took place on March 28th 2009, where stakeholders were provided detailed information on the project proponents, the intended project design and its activities, and detailed information of the socio-economic and environmental benefits of the projects. There was a free discussion, feedback, and comments segments of the consultation were the stakeholders provided their comments, suggestion, and feedback on the project design and how to improve the project to have a more far reaching benefit system. These discussion and feedback were also minuted by the project team

A complete report of the stakeholder meeting, along with minutes and recommendations etc has been compiled is available with the project for information and reference.

E.2. Summary of the comments received:

Following is a summary of major comments as received during the stakeholder workshop:

- The project to attempt to facilitate poor and ultra poor segments of the society access EE &HI products and technology benefits.

- LSO developed database of poor segments of the society could be used to help identify these poor and ultra poor.

- LSOs to be provided an incentive to get involved in project sales as an income earning means to their own financial subsidy.
- The project to have more collaborative activities between various developmental and public sector organisations involved in similar environmental activities.
- The project to have more research components on energy sources and use.
- The project to look to secure relevant technical personnel from other organisations in conducting specific assessment and studies.
- The project to have direct upfront subsidy in kind (FE product) for local household.
- Yearly rebate option for household for installing EE and technologies in local household to be scrapped as undesired.

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

Following alterations to the project designs have been undertaken based on the comments, and are reflected in the project documents.

- The project will attempt to facilitate poor and ultra poor segments of the society through providing slightly higher subsidy and helping access to loans. LSO developed database of poor segments of the society will be used to help identify these recipients. LSOs would also be provided an incentive to act as sales agents EE products in local villages, communities and household as an income earning means to their own financial subsidy.
- There will be specific activities within the project design to reinforce collaborative activities between various developmental and public sector organisations involved in similar environmental activities to promote energy efficiency in Northern Pakistan.
- A research component to identify alternate energy sources for local communities would be included in the project. There will also be a coordinated effort of technical personnel from various organisations while conducting specific assessment and studies.
- The direct upfront subsidy in kind (FE product) option for local household will be used by the project to help offset EE product costs to local households. The yearly rebate option will be not be promoted by the project design.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

NO PUBLIC FUNDING IS ENVISAGED.

Annex 3

BASELINE INFORMATION

No further information.

Annex 4

MONITORING INFORMATION

No further information.