



Clean Development Mechanism

Sustainable Development co-Benefits Description Report¹

CDM project activity information	
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Host Party	Bangladesh

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Overview of sustainable development co-Benefits

A. The extent of environmental co-Benefits:

		N/A	Partly	Slightly	Highly
Air	Reducing Sox	•			
	Reducing Nox	•			
	Reducing Fly ash		•		
	Reducing suspended particulate matter (SPM)		•		
	Reducing Non Methane Volatile Organic Compounds (NMVOCs)	•			
	Reducing Noise Pollution	•			
	Reducing Odors	•			
	Reducing Dust		•		
	Other air quality improvements	•			
Land	Preventing end of life products/equipment (solid waste)	•			
	Producing/using compost	•			
	Producing/using manure, mineral fertilizer or other soil nutrients	•			
	Irrigation	•			
	Preventing soil erosion	•			
	Minimum tillage	•			
	Other means to improve land quality	•			
Water	Improving management/control of wastewater	•			
	Saving/conserving of water	•			
	Improving reliability/accessibility of water supply	•			
	Purification/cleaner water supply	•			
	Improving ecological state of water bodies	•			
	Other means to improve water	•			
Natural Resources	Protecting mineral resources		•		
	Protecting/enhancing plant life			•	
	Protecting/enhancing species diversity	•			
	Protecting/enhancing forests	•			
	Protecting/enhancing other depletable natural resources	•			

B. The extent of social co-Benefits:

		N/A	Partly	Slightly	Highly
Jobs	New long-term jobs				•
	New short-term jobs	•			
	New sources of income generation	•			
	Other employment opportunities	•			
Health & Safety	Disease prevention	•			
	Reducing accidents	•			
	Reducing crime	•			
	Preserving food	•			
	Reducing health damaging indoor air pollution	•			
	Enhancing health services				•
	Improving sanitation and waste management				•
	Other health and safety improvement				•



Education	Job-related training	•			
	Enhanced educational services	•			
	Project-related knowledge dissemination	•			
	Other educational benefits	•			
Welfare	Improving working conditions				•
	Community or rural advancement	•			
	Poverty alleviation (more people above poverty level)	•			
	Improving wealth distribution/generation of income and assets	•			
	Increased municipal revenues	•			
	Optimized women's empowerment		•		
	Reduced traffic congestion	•			
	Other welfare benefits	•			

C. The extent of economic co-Benefits:

		N/A	Partly	Slightly	Highly
Growth	New investments				•
	New industrial/commercial activities	•			
	New infrastructure	•			
	Enhancement of productivity	•			
	Reduction of production costs (services)	•			
	New business opportunities	•			
	Other economic benefits	•			
Energy	Improvement in supply of energy	•			
	Access to energy	•			
	Affordability and/or reliability of energy	•			
	Other energy improvements	•			
Technology	Introducing/developing/diffusing imported technology				•
	Introducing/developing/diffusing local technology	•			
	Adaptation of new technologies to local circumstances		•		
	Know-how activities for a technology				•
Balance of payments	Other technological benefits	•			
	Reduction of foreign dependency	•			
	Other macro-economic benefits	•			

D. Further information:

	N/A	Partly	Slightly	Highly
	•			



Detailed description

A. Environmental co-Benefits

No co-benefits related to land, water are described.

	Indicator	Specification	Extent
Air	The CDM project activity improves air quality by reducing air pollutants as follows:		
	SOx		N/A
	NOx		N/A
	Fly ash emissions	<i>In Bangladesh, the clay bricks are traditionally manufactured through Fixed Chimney Kilns (FCK). The exhaust gas generated from the kiln is vent into the atmosphere through a chimney and the heating efficiency of brick burning process is low. In contrast, the Hybrid Hoffman Kilns (HHK) present a much more efficient kiln design in which 1) the kiln exhaust gas is re-used for drying the green bricks (instead of being released into the atmosphere); 2) coal particles are mixed with the clay for improved burning of the bricks. This results in reduced fly ash emissions in the brick making process in comparison to the baseline scenario which leads to insufficient combustion and high emissions. The main reasons for this are that the green brick making process traps coal particulates inside of the brick preventing them from becoming air borne and thus reduces the volume of fly ash.</i>	Partly
	SPM	<i>The baseline FCKs release the kiln exhaust gas directly to the atmosphere whereas the HHKs reuses the exhaust gas to dry the green bricks. This process prevents the unburnt coal particles of the kiln from being released into the atmosphere and thus reduces SPM emissions.</i>	Partly
	NMVOCs		N/A
	Noise		N/A
	Odors		N/A
	Dust	<i>The baseline FCKs release the kiln exhaust gas directly to the atmosphere whereas the HHKs reuses the exhaust gas to dry the green bricks. This process prevents the unburnt coal particles of the kiln from being released into the atmosphere and thus reduces level of dust.</i>	Partly
	Other air quality improvements		N/A
Natural Resources	The CDM project activity protects or enhance depletable natural resources as follows:		
	Mineral resources	<i>The HHK technology uses a mix of pulverised coal and clay to ensure improved and proper burning of the brick. In addition the waste heat from the kiln is collected and re-used to dry the green bricks in a drying chamber (before the bricks enter the kiln). The HHK brick making process results in reduced use of coal by 45-50%. HHKs typically require 12-13 tons of coal for every 100,000 bricks produced, whereas traditional FCKs (the baseline)</i>	Partly



		<i>require around 24-25 tons of coal to produce 100,000 bricks. HHKs consume only half of the energy that FCKs need.</i>	
	Plant life	<i>In areas where there are clusters of traditional FCKs, plant life and cultivated crops are seriously affected by the fly ash released into the atmosphere. This is not the case for HHKs, that release less fly ash than traditional kilns.</i>	Slightly
	Species diversity		N/A
	Forests		N/A
	Other depletable natural resources		N/A

B. Social co-Benefits

All available social co-benefits are described.

	Indicator	Specification	Extent
Jobs	The CDM project activity creates new job opportunities including income generation as follows:		
	New long term jobs	<i>In Bangladesh, traditional FCKs are typically operational for 5-6 months throughout the year as a result of monsoon season floods. As a result, the brick making jobs in FCK are seasonal in nature. In contrast, the Hybrid Hoffman Kilns are designed so to be operational year-round while not affected by the monsoon floods. Brick workers have full-time job opportunities as a result.</i>	Highly
		New long-term jobs > 1 year - 100	
	New short term jobs	New short-term jobs < 1 year -	N/A
	Income generation		N/A
Health & safety	Other employment opportunities		N/A
	The CDM results in health and safety improvements as follows:		
	Reduction of diseases, disease prevention		N/A
	Reduction of accidents		N/A
	Reduction of crime		N/A
	Preservation of food		N/A
	Reducing health damaging indoor air pollution		N/A
	Enhancement of health services	<i>The HHK units included under this CDM project provide enhanced health services for the brick workers compared to the industry standard. A doctor, contracted by the HHKs, conducts bi-monthly health checkups for workers onsite. Generic medications are also provided to the workers at the in-house clinic built by the kilns. Brick workers benefit from easy access and regular health check-ups, which is typically not provided by traditional FCK kilns and which is very difficult to access otherwise given their social-economic and rural background in Bangladesh. The enhancement of health services is part of the Community Benefit Plan (CBP) as per the Emission Reduction Purchase Agreement between Industrial and Infrastructure Development Company Ltd. (the PE) and the Community Development Carbon Fund (CDCF),</i>	Highly



		<i>managed by the World Bank. The CBP implementation is funded through the CER revenue.</i>	
	Improved sanitation and waste management	<i>The HHKs constructed separate sanitation and washing facilities on site for men and women workers respectively. In addition the HHKs have built dedicated venues for workers to rest during off-work period. This is a significant improvement relative to traditional FCK sites, where sometimes even the basic sanitation facility is not constructed. In addition, due to their operation on a leased land, the sanitation facilities for FCKs are mostly rough and not up to the standard. The improved sanitation is part of the Community Benefit Plan (CBP) as per the Emission Reduction Purchase Agreement between Industrial and Infrastructure Development Company Ltd. (the PE) and the Community Development Carbon Fund (CDCF), managed by the World Bank. The CBP implementation is funded through the CER revenue.</i>	Highly
	Other health and safety improvements	<i>Worker safety is significantly improved relative to the baseline, thanks to onsite training on Occupational Health and Safety, the deployment of safety signs and instructions, the installation of fencing around dangerous machinery and the provision of task-specific safety gear for workers, including protective footwear, gloves, goggles, masks etc. These labor practices are not the norm in the traditional FCK brick making industry in Bangladesh, exposing brick workers to hazardous working environments. The occupational safety improvements and training is included in the Community Benefit Plan (CBP) as per the Emission Reduction Purchase Agreement between Industrial and Infrastructure Development Company Ltd. (the PE) and the Community Development Carbon Fund (CDCF), managed by the World Bank. The CBP implementation is funded through the CER revenue.</i>	Highly
Education	The CDM project activity facilitates education, dissemination of information, research or increases awareness as follows:		
	Job related training	<i>Onsite training of Occupational Health and Safety is provided for all HHK brick workers. Specific professional skill training such as fire masters is conducted by external experts.</i>	Partly
	Enhanced educational services		N/A
	Project related knowledge dissemination		N/A
	Other educational benefits		N/A
Welfare	The CDM project activity improves local living and working conditions as follows:		
	Improvement of working conditions	<i>The working conditions and livelihoods of brick workers at HHK sites are significantly improved relative to traditional FCK sites. Workers have access to year-round employment and a permanent source of income, access to sanitation and washing facilities on site, bi-monthly doctor check-ups and a medical facilities as well as sheltered areas to rest.</i>	Highly
	Community or rural upliftment		N/A
	Poverty alleviation		N/A
	Changes in distribution and/or generation of income and assets		N/A



	Increased municipal revenues		N/A
	Empowerment of women	<i>In the green brick manufacturing section of the HHKs only women are employed. This is in part thanks to the increased mechanization of the HHK units that enable women workers to be competitive with men in traditionally more labor-intensive sectors such as brick transporting, allowing women to be paid similar wages.</i>	Partly
	Reduced traffic congestion		N/A
	Other welfare benefits		N/A

C. Economic co-Benefits

No co-benefits related to energy, balance of payments are described.

	Indicator	Specification	Extent
New investments	<i>The HHK bundled project is the first of its kind in Bangladesh and the technology is showing clear benefits: all-year brick production, increased capacity, fuel efficiency and stronger, higher quality bricks. Initially, only 8 HHKs were built. The unique features and benefits of the HHK brick making technology is attracting more entrepreneurs and investment. Now, the number of operational HHKs in Bangladesh has increased to around 30, and a few more are under construction. Still more entrepreneurs are also showing interest to start new ones. The wider dissemination of the HHK technology in Bangladesh is expected to reduce the environmental burden of the brick sector, reduce fuel imports, improve labor practices and raise occupational and safety standards in the sector.</i>	Highly	
New industrial/comercial activities		N/A	
New infrastructure		N/A	
Enhancement of productivity		N/A	
Reduction of production costs (services)		N/A	
New business opportunities		N/A	
Other economic benefits		N/A	
Technology transfer	The CDM project activity results in a change in technology as follows:		
	New imported technology	<i>This project is a first of a kind in Bangladesh and has helped introduce the HHK technology into the country. The HHKs brick making</i>	Highly



		<p>technology was originally designed in Germany and adopted by many other countries. The technology employed by this CDM project is imported from China.</p> <p>Traditional Fixed Chimney Kilns (FCK) which are widely used in Bangladesh are similar to the Bull's Trench Kiln technology which is energy-intensive and heavily polluting. Unlike the baseline, the HHK technology is energy efficient (requiring only 45-55% of fuel for the same amount of bricks produced by FCK). These kilns can operate year-round. The produced bricks have better strength and intensity. The most important feature of the HHKs is that it decreases the air pollution remarkably.</p>	
	New local technology		N/A
	Adaptation of new viable technologies	The HHK is mainly a technology	Partly



		<i>imported from China. In the initial phase of technology adoption, the HHKs faced several problems including the difference in clay characteristics, topography of the kiln plant, and differences in climate, which affected HHK plant operation. The kiln owners made great efforts to adapt the HHK technology to the local Bangladeshi circumstances, namely adjust the duration of the drying process to control the moisture level and, heighten the base of the HHK plant to avoid flooding during the monsoon season.</i>	
	Know-how activities for a technology	<i>The fireman in a HHK plays a very vital role for its successful and smooth operation. In the early stage, most of the HHKs depended on fire masters from China. Later on, local fire masters received training from the Chinese</i>	Highly



Balance of payments			<i>fire masters and built up its own capacity. Now most of the kilns are running independently by local fire masters.</i>	
		Other technological benefits		N/A
		The CDM project activity results in improving the country's balance of payments as follows:		