**PROGRAMME DESIGN DOCUMENT FORM FOR CDM PROGRAMMES OF ACTIVITIES (F-CDM-PoA-DD) Version 02.0**

# PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

## PART I. Programme of activities (PoA)

### SECTION A. General description of PoA

### A.1. Title of the PoA

Energy and Water Saving Promotion Programme for Textile Dyeing Process of Bangladesh Textile and Garment Industries

Version: 3.0
Date: 28/11/2012

### A.2. Purpose and general description of the PoA

The purpose of the PoA promotes energy and water saving through optimizing the process from yarn to fabric on textile dyeing process that is the most water and energy consuming process in a textile and garment factory.

The textile and garments industry has been leading Bangladesh economy since early 1990s. Garments are the country's biggest export products making up about three quarters of total exports, and the industry is a symbol of the country's dynamism in the world economy. The number of garment factories has increased steadily and the textile and garment industry also has been increasingly becoming the most energy and water consuming sector. Bangladesh is facing water and energy scarcity; in the capital, the people are suffering serious waters crisis due to frequent load shedding, drastic fall in ground water level and deep tube wells. Therefore, promoting water and energy saving measures in the textile and garment industry is recognized to be important and urgent.

The PoA will reduce energy and water consumption in textile dyeing and finishing process through optimizing dyeing process from yarn to fabric including promoting high quality yarns and introducing direct dyeing, new generation reactive dyeing and other new dyes according to factories and buyers requirements. The technologies and know-hows will be introduced and promoted by Green Project Water Saving Technology (W.S.T), voluntarily as the W.S.T was established with a vision of promoting the water and energy saving technologies in Bangladesh Textile and Garment industry.

The PoA is a voluntary action promoted by the W.S.T. The W.S.T is the coordinating/managing entity (CME) of the PoA and responsible for overall supervising and managing the PoA. PEAR is the PoA developer and CER buyer. The PEAR also supports the W.S.T on their management.

The PoA also aims to contribute environment and resources conservation significantly through water saving and $CO_2$ emission reductions.

The first CPA of the PoA targets the Textile and Garment factory of the Grameen Knitwear, Ltd. which supports and closely works with the CME.

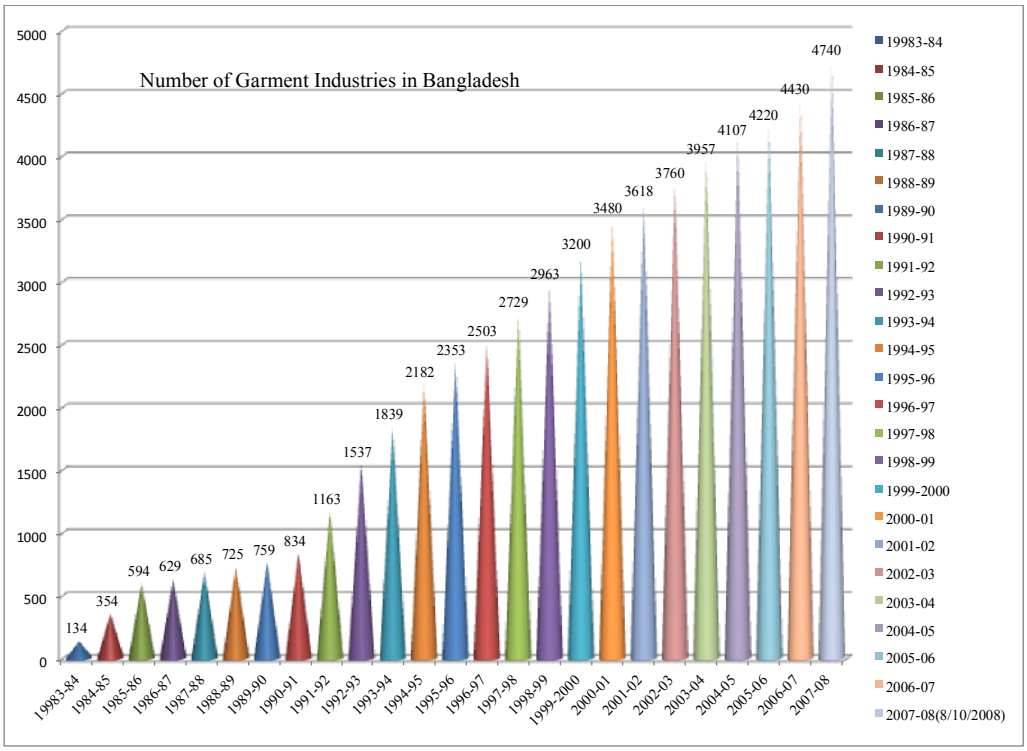


Figure 1. Increasing Trend of the Garment Factories in Bangladesh

## A.3. CMEs and participants of PoA

W.S.T is the CME of the PoA which communicates with the Board.

Textile and Garment factories in Bangladesh are the implementers of CPAs under the PoA and participants of the PoA.

PEAR also is a participant of the PoA as being the CER buyer and the PoA developer.

**A.4. Party (ies)**

| Name of Party involved (host) indicates a host Party | Private and/or public entity (ies) project participants (as applicable) | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| Bangladesh (host) | Green Project W.S.T | No |
| Japan | PEAR Carbon Offset Initiative, Ltd. | No |

**A.5. Physical/ Geographical boundary of the PoA**

The PoA covers nationwide Textile and Garment industries and then targets all Textile and Garment factories in Bangladesh.
Therefore, the geographical boundary of the PoA is the whole Bangladesh shown in the below.


Figure 2. The Boundary of the PoA (whole Bangladesh)

## A.6. Technologies/measures

The CPAs under the PoA promote energy efficiency improvement the dyeing and finishing process of Textile and Garment industry. The energy efficiency improvement will be realized through dyeing process optimization from yarn to fabric by targeting dyeing machines and other machines such as stenters, dryers if necessary in Textile and Garment factories. Thus, type II: Energy efficiency improvement project activities that reduce energy consumption, on the demand side, with a maximum output of 60 GWh per year (or an appropriate equivalent) in any year of the crediting period is applicable

for CPAs under the PoA. Specifically, the AMS-II.D (Energy efficiency and fuel switching measures for industrial facilities, version 12) will be applied for CPAs under the PoA for baseline and monitoring.

The process adopted in textile dyeing and finishing depends upon the fabric processed. The processes vary by different materials (cellulose (mainly cotton), Polyester and CVC (Blended fabrics)), different shades and different dyeing machines.

The process optimization includes inseparable two ways: one is yarn optimization such as using compact yarn with low TPI (twist per inch), super combed spun yarn of long staple fiber or processing yarn singeing and fabric singeing to avoid bio-polishing and improve the quality of fabric that save dyes, chemicals, water and energy through reducing dyeing time.

Another is dyeing process optimization according to existing conditions of factories such as promoting direct dyes, noncarcinogenic GOTS certified Sulphur Dyes, new generation of reactive dyes.

In Bangladesh, current dyeing practice for 100% cotton is classic reactive dyes.

Reactive dye is a dye that can react directly with the fabric. That means that a chemical reaction happens between the dye and the molecules of the fabric, effectively making the dye a part of the fabric. A reactive dye is able to create a bond with cellulose. Reactive dyes are categorized as cold (37 °C), warm (60 °C) and hot (82 °C), which refers to the temperatures required to cause the reaction. Warm reactive dyes are the most common.

The following is the dyeing chart of reactive dyeing for 100% cotton.

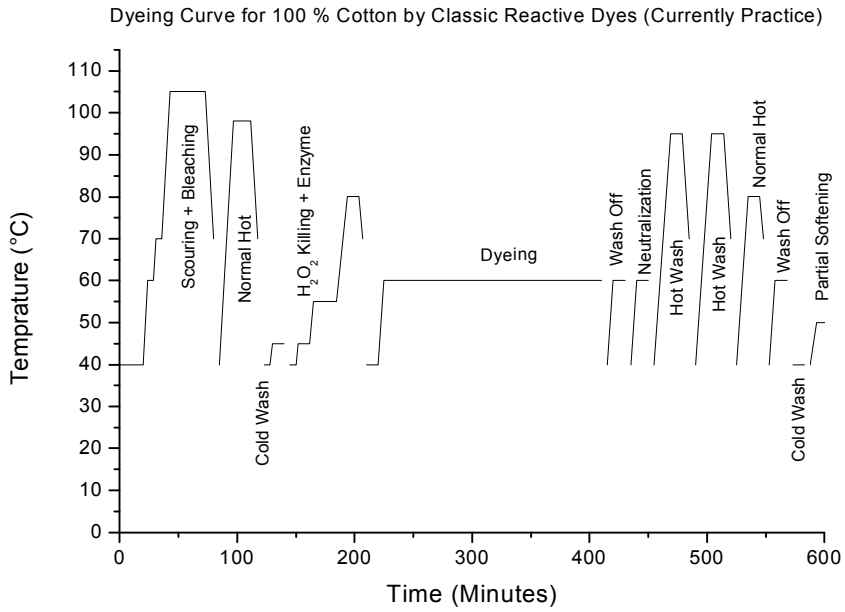


Figure 3. Dyeing Chart for 100% Cotton Classic Reactive Dyes

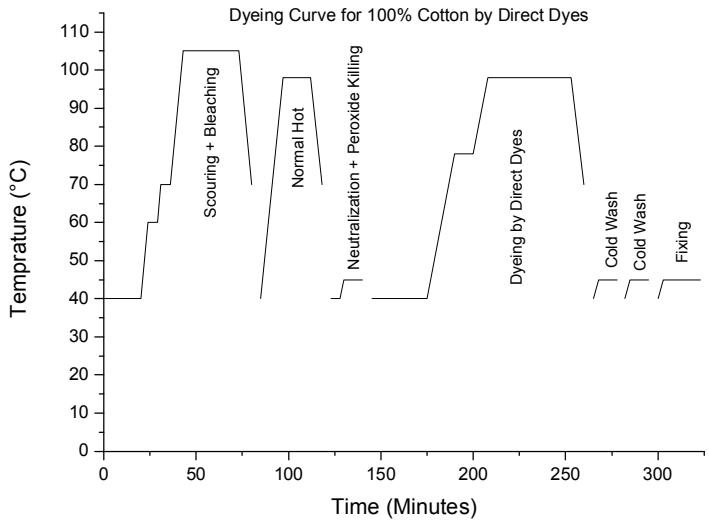


Figure 4. Dyeing Chart for 100% Cotton Direct Dyes

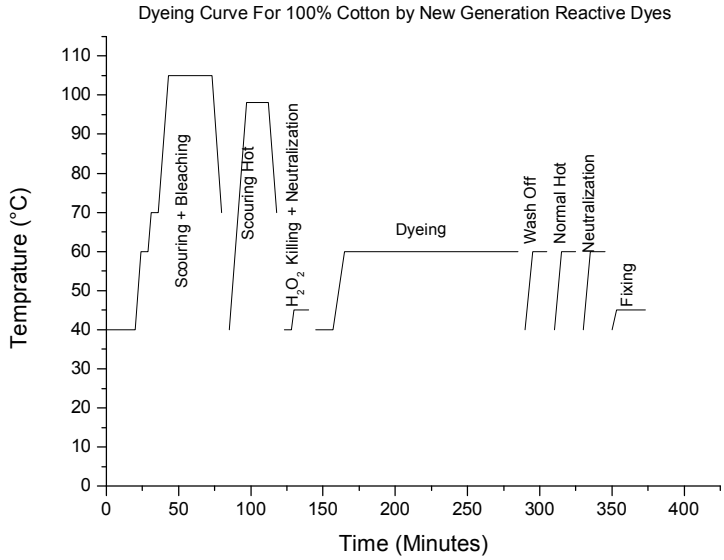


Figure 5. Dyeing Chart for 100% Cotton New Generation Reactive Dyes

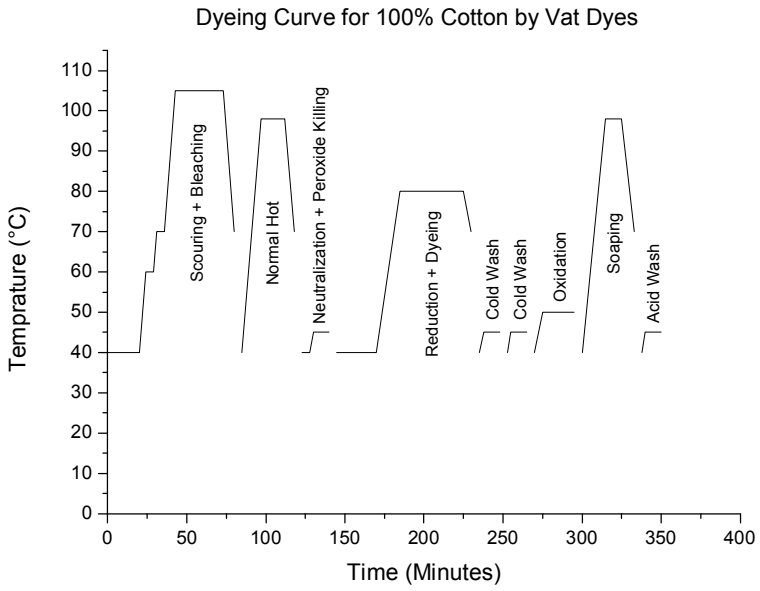


Figure 6. Dyeing Chart for 100% Cotton Vat Dyes

The reactive dyes needs 6–10 hours and that depends on the colour of fabric; generally dark colour needs more time. The CPAs under the PoA propose Directive dyes, new generation Reactive dyes, Vat dyes and Sulfur +Reactive Dyes according to factories requirements. The dyeing time, water and energy consumption of comparison of the dyeing methods is given as follows.

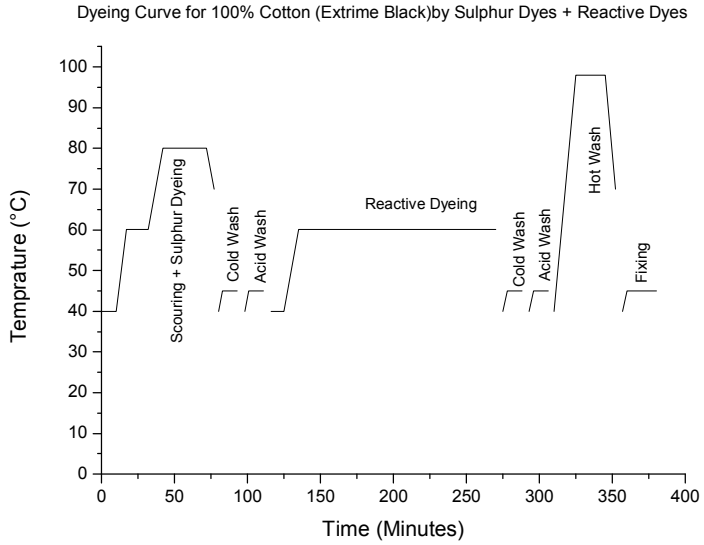


Figure 7. Dyeing Chart for 100% Cotton Sulphur + Reactive Dyes

Table 1 Comparison of Proposed Technologies with Current Technology[1]

| | Existing Reactive Dyes | Direct Dyes | New Generation Reactive Dyes | Vat Dyes | Sulfer+ Reactive Dyes |
|---|---|---|---|---|---|
| Number of Bathes | 10~15 | 5~7 | 6~8 | 6~9 | 8~10 |
| Time consumption (hours) | 6~10 | 3~6 | 4~5 | 5~6 | 6~8 |
| Water consumption (liter/kg fabric) | 80~100 | 30~50 | 50~60 | 50~60 | 55~65 |
| Power consumption (Kwh/kg fabric) | 0.5 | 0.15 | 0.18 | 0.18 | 0.24 |
| Steam consumption (kg-steam/kg fabric) | 7.6 | 3.1 | 3.6 | 3.6 | 4.8 |

When a dye is applied directly to the fabric without the aid of an affixing agent, it is called direct dyeing. In this method, the dyestuff is either fermented (for natural dye) or chemically reduced (for synthetic vat and sulphur dyes) before being applied.

High quality yarns are required to avoid bio-polishing or enzyme washing. It is noted that the technologies are applied to where they fit to keep without deteriorating the quality of fabrics or it does not mean that one can apply for all colours.

As shown in the table above the direct dyeing reduces dyeing time significantly that in turn leads energy and water saving.

For the CVC, the dominant practice is disperse and classic reactive dyes in Bangladesh. The following is the dyeing chart for CVC.

The current disperse and reactive dyes needs 10~14 hours and that depends on the colour of fabric; the case of cotton, generally dark colour needs more time

Against this current dominant practice, the PoA proposes one bath CVC dyes and Scour dyes.

The following are the dyeing charts for the proposed technologies.

[1] This is a simple comparison. All the data given above are not constant; it depends upon the dyeing machine liquor ratio, depth and type of shade, Fabric composition, Fabrications etc.

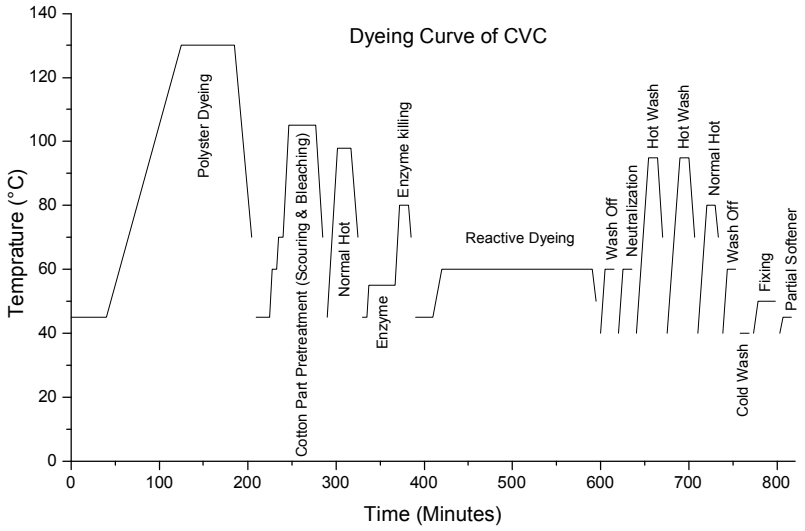


Figure 8. Dyeing Chart for Current CVC Dyes

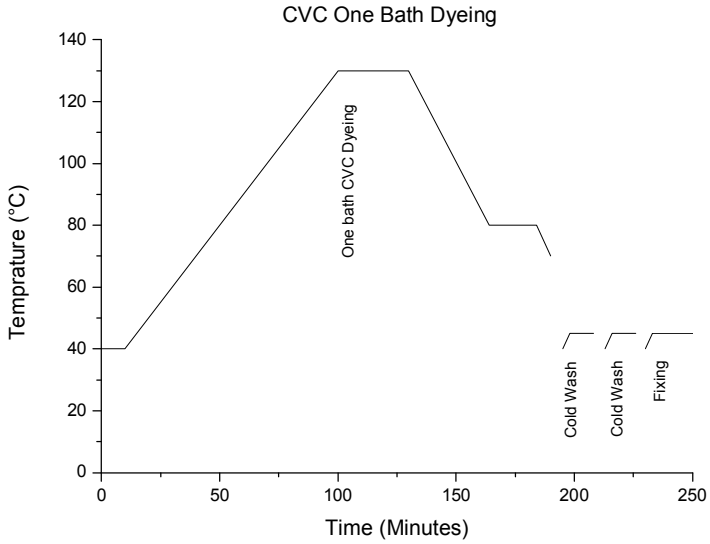


Figure 9. Dyeing Chart for One-Bath Dyes

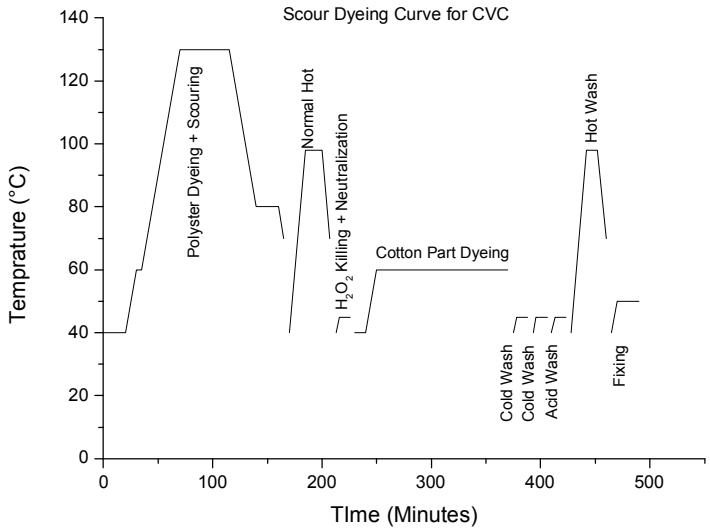


Figure 10. Dyeing Chart for Scour Dyes

Table 2 Comparisons of Proposed Technologies with Current Technology[2]

| | **Current Disperse and Reactive Dyes** | **One Bath Dyes** | **Scour Dyes** |
|---|---|---|---|
| Number of Bathes | 15~18 | 3~5 | 10~12 |
| Time consumption (hours) | 10~14 | 3~5 | 7~10 |
| Water consumption (liter/kg fabric) | 100~130 | 25~35 | 60~100 |
| Power consumption (Kwh/kg fabric) | 0.75 | 0.16 | 0.57 |
| Steam consumption (kg-steam/kg fabric) | 11.2 | 3.7 | 8.9 |

[2] This is a simple comparison. All the data given above are not constant; it depends upon the dyeing machine liquor ratio, depth and type of shade, Fabric composition, Fabrications etc.

For the case of polyesters, current dyeing practice is disperse dyes. The proposed dyes for polyester is cationic dyes.

The technologies explained above are promoted as a package and tailored to factories by the W.S.T through conducting audits towards targeted factories.

### A.7. Public funding of PoA

The PoA does not depend on any public funding given that all of the activities are by private companies. In case any CPA under this PoA avails of public funding, it will be required to provide in its CPA-DD that no official development assistance is diverted to the public funding.

## SECTION B. Demonstration of additionality and development of eligibility criteria

### B.1. Demonstration of additionality for PoA

The proposed PoA is a voluntary coordinated action by the CME as mentioned before the W.S.T was established for promoting the water and energy saving technologies in Bangladesh Textile and Garment industry. The implementation of the PoA and associated CPAs needed technologies initiated/led by W.S.T and commercial incentives to encourage coordinated voluntary participation by each Textile and Garment factory. In general, the commercial incentives for the CPA are expected to be in the forms of energy and water use cost savings and potential CDM revenues. The commercial incentives from technologies under the PoA is instructed and demonstrated by CME to convince factories participating the PoA.

The PoA started with a vision to make it as a CDM PoA and individual CPAs would never be implemented in the absence of the initiative and incentives mentioned above.

As dominant common dyeing practice for cellulose (mainly cotton) in Bangladesh is reactive dyeing with medium quality yarns thus the energy and water saving technologies are hardly disseminated without efforts of the CME. Hence, avoidance of anthropogenic GHG emissions would have not occurred in absence of this PoA; current practices would be used continuously.

The demonstration of additionality for each CPA will be provided in the individual CPA-DD through meeting the eligibility criteria.

### B.2. Eligibility criteria for inclusion of a CPA in the PoA

The CME has established the eligibility criteria in accordance with EB 65, Annex 3, “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” for the implementation of the PoA, as follows:

Table 3. Eligibility Criteria

| No | Requirements for Eligibility Criteria | Eligibility Criteria | Conformity Yes or No |
|---|---|---|---|

| | | | |
|---|---|---|---|
| A | The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA. | A.1 A CPA targets a textile and garment factory in Bangladesh | Each CPA will demonstrate the conformity of the eligibility criteria |
| | | A.2 The name and the address of the factory are defined | Each CPA will demonstrate the conformity of the eligibility criteria |
| B | Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo) | B.1 A CPA is a new project which is not registered large scale CDM or SSC-CPA in the other PoA | Each CPA will demonstrate the conformity of the eligibility criteria |
| | | B.2 There is unique identification of the target factory | Each CPA will demonstrate the conformity of the eligibility criteria |
| C | The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications; | C.1 Is it possible to submit specification of technology/measure when the DOE validates or verify? | Each CPA will demonstrate the conformity of the eligibility criteria |
| D | Conditions to check the start date of the CPA through documentary evidence; | D.1 The start date of a CPA is not, or will not be, prior to the commencement of validation of the PoA. | Each CPA will demonstrate the conformity of the eligibility criteria |
| E | Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs; | E.1 Does a CPA meet the applicability and other requirements of AMS- II.D as described in PoA-DD section B.3. | Each CPA will demonstrate the conformity of the eligibility criteria |
| F | The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality | F.1 The achieved energy saving of a CPA at a scale of no more than 60 $GWh_{th}$ per year | Each CPA will demonstrate the conformity of the eligibility criteria |
| | | F.2 If the achieved energy saving of a CPA is more than 60 $GWh_{th}$ per year, a barrier due to prevailing practice is applied. The prevailing dyeing practice in Bangladesh Textile and Garment industry is reactive | Each CPA will demonstrate the conformity of the eligibility |

| | | | |
|---|---|---|---|
| | | dyes for cellulose; disperse dyes for CVC and polyester. | criteria |
| G | The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis | G.1 A CPA performs local stakeholder consultation before the inclusion of SSC-CPA. | Each CPA will demonstrate the conformity of the eligibility criteria |
| | | G.2 A CPA does not need to performs the environmental impacts analysis according to the regulation of Bangladesh | Each CPA will demonstrate the conformity of the eligibility criteria |
| H | Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance; | H.1 A CPA does not use any fund from Annex I parties | Each CPA will demonstrate the conformity of the eligibility criteria |
| | | H.2 If a CPA uses a fund from Annex I parties then it does not result in a diversion of official development assistance | Each CPA will demonstrate the conformity of the eligibility criteria |
| I | Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation) | I.1 Not applicable | Not applicable |
| J | Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys; | J.1 A CPA-DD applies 95/10 (confidence /precision) for any necessary survey according | Each CPA will demonstrate the conformity of the eligibility criteria |
| K | Where applicable, the conditions that ensure that CPA in aggregate meets the small-scale or micro-scale threshold criteria and remains within those thresholds throughout the crediting period of the CPA | The aggregate energy savings by a CPA does not exceed the equivalent of 180 $GWh_{th}$ per year | Each CPA will demonstrate the conformity of the eligibility criteria |
| L | Any SSC-CPA included in the PoA is not a de- bundled component of another CDM programme activity (CPA) or CDM project activity | L.1 Is a CPA confirmed to a single project, which is not a de-bundled component of another large-scale CPA or CDM project activity as per the latest guidance given in CDM EB? | Each CPA will demonstrate the conformity of the eligibility |

| | | | |
|---|---|---|---|
| | | | criteria |
| M | Crediting period of any CPA does not exceed the end date of the PoA. | M.1 Is the crediting period of a CPA is within the crediting period of the PoA? | Each CPA will demonstrate the conformity of the eligibility criteria |

**B.3. Application of methodologies**

The methodology applied for CPA under the PoA is:

Scope No: 4
Sectoral scope: Energy Demand
Category: AMS-II.D. (Energy efficiency and fuel switching measures for industrial facilities)
Version: 12

The conformity of PoA in line with applicability conditions in the AMS-II.D is described in the following table.

Table 4. Baseline and Monitoring Methodology Applicability Demonstration

| No | Applicable conditions of the Methodology | Conformity of CPAs |
|---|---|---|
| 1 | This category comprises any energy efficiency and fuel switching measures implemented at a single or several industrial or mining and mineral production facility/ies. This category covers project activities aimed primarily at energy efficiency; | Each CPA will target dyeing process of a garment factory to reduce energy and water consumption in the dyeing process through introducing energy and water saving technologies. |
| 2 | This category is applicable to project activities where it is possible to directly measure and record the energy use within the project boundary (e.g., electricity and/or fossil fuel consumption). | The electricity and fossil fuel consumption for textile dyeing process can be measured directly through meters installed at corresponding points of energy an water supply lines. |
| 3 | This category is applicable to project activities where the impact of the measures implemented (improvements in energy efficiency) by the project activity can be clearly distinguished from changes in energy use due to other variables not influenced by the project activity (signal to noise ratio). | Each CPA under the PoA focuses on optimizing or changing textile dyeing process on dyeing machines and other machines. Then the target of the measures is clear; the impacts of the measures are controllable, distinguishable and visible from the dyeing machines performance charts and/or other meters. |
| 4 | The aggregate energy savings of a single project (inclusive of a single facility or several facilities) may not exceed the equivalent of 60 $GWh_e$ per year. A total saving of 60 $GWh_e$ per year is equivalent to a maximal saving of 180 $GWh_{th}$ per year in fuel input. | The aggregate energy savings of each CPA under the PoA is up to 60 $GWh_e$ per year. Any overages happened would not be claimed for emission reduction. |

**SECTION C. Management system**

(1) Generic description of the operation and management system:

W.S.T is responsible for collection of all necessary information from target factories directly and responsible for defining and inclusion of each CPA supported by PEAR.

Textile and Garment factories who voluntarily participate in the PoA have responsibility to provide necessary information for management of the PoA.

The factories will sign agreements (using a specific format) with the W.S.T to promise providing all the relevant information and undertaking the monitoring.

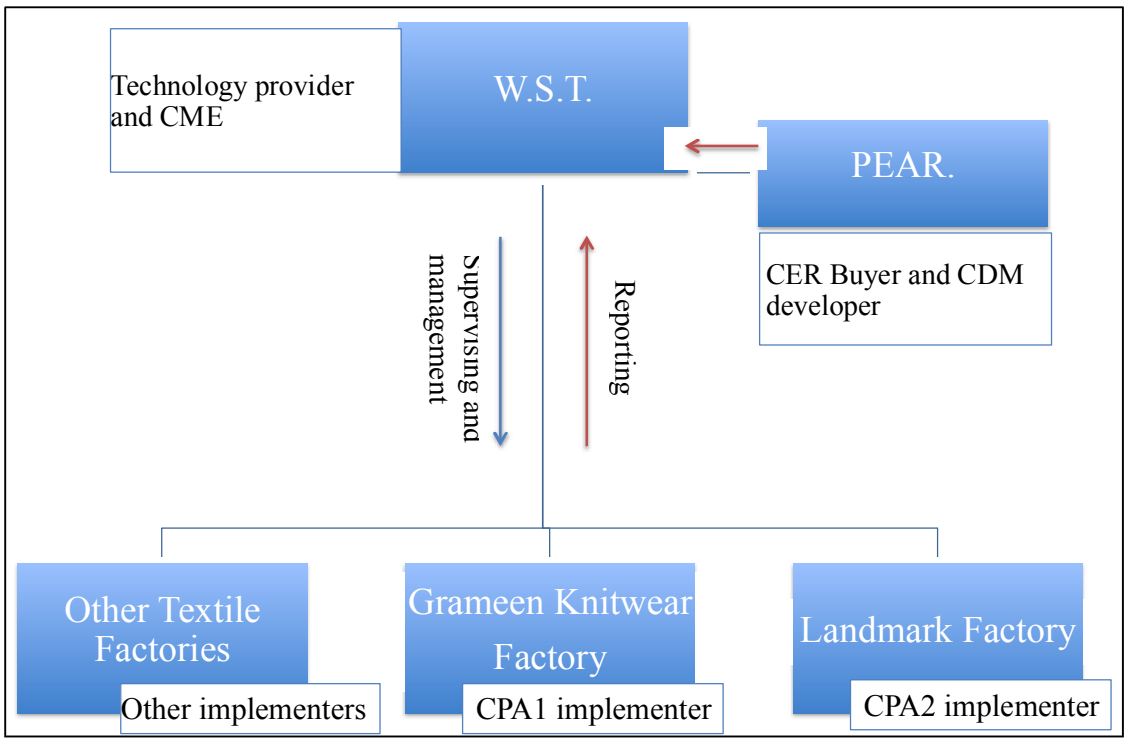


Figure 11. Managing and Reporting Structure of the PoA

(2) A record keeping system for each CPA under the PoA:

The record keeping system includes the method of data collection, the duty and roles of each player and the database including but not limited to schedule and ID number for each CPA, all necessary information/data of each factory in each CPA including but not limited to:

-- Names of factories and their addresses
-- ID numbers of the CPAs
-- Starting dates of projects operation
-- Number of dyeing machines and their capacity in each factory

-- Batch wise baseline electricity consumption for targeted dyeing machines
-- Batch wise baseline steam consumption for targeted dyeing machines
-- Batch wise baseline water consumption for targeted dyeing machines
-- Number of batches for machines for different dyeing process in the project
-- Batch wise electricity consumption for targeted machines
-- Batch wise steam consumption for targeted dyeing machines
-- Batch wise water consumption for targeted dyeing machines
-- Electricity consumption for targeted machines other dyeing machines
-- Steam consumption for targeted dyeing machines other than dyeing machines
-- Water consumption for targeted dyeing machines other than dyeing machines

It is noted that the management system does include other information than the required ones for CDM PoA. The W.S.T will consider which information/data are to be reported in addition to the ones needed for CDM.

Related responsibilities and tasks of participants under the record keeping system are described in the Table below.

It is noted that the process of definition and inclusion of each CPA is to be undertaken W.S.T supported by PEAR using the information of above-mentioned management system.

Table 5. Responsibilities and tasks of players involved in the PoA

| | Players | Personnel | Processes |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Coordination of the PoA including the process if inclusion of CPAs | W.S.T | CDM managing team supported by PEAR | • Supervise implementers and receives the relevant information provided by implementers.<br>• Apply the registration of the PoA with UNFCCC CDM Executive Board as a focal point.<br>• Develop a PoA management system and making continuous improvements of the system.<br>• Carry out the management and coordination of PoA in accordance with the management system.<br>• Select and contract CPA implementers; Make decision on whether to implement a specific CPA based on the proposal submitted by the CPA implementer.<br>• Develop and update eligibility criteria for inclusion of CPAs.<br>• Improve the PoA management system according to the latest methodology and standards. If there are new problems during the random check, the PoA management system should be improved. |
| | | CDM technical advisory team | • Provide training and capacity development for personnel in the whole process of CPA implementers.<br>• Carry out the technical review and control of inclusion of CPAs.<br>• Review of the competencies of personnel involved in the process of inclusion of CPAs. |
| | Each CPA implementer | CDM managing team | • Submit a proposal about CPA implementation to CME for making decision.<br>• Collect the initial information using standardized formats and transfer them into an electronic database.<br>• Maintain all the records, documents and database in the process of CPA implementing, and make them available to CME for checking randomly and DOE for validation or verification.<br>• Carry out monitoring action in accordance with monitoring plan. |

| | | | |
|---|---|---|---|
| Ex ante and ex post data collection | W.S.T | CDM technical advisory team | • Specify the required data/ information to be collected before start and/or during implementation of each CPA. |
| | Each CPA implementer | | • Conduct data collection from its own factory. |
| Data storage and management | W.S.T | CDM technical advisory team | • Develop database format for CPAs.<br>• Check the reported data from CPA each implementer.<br>• Calculate emission reductions based on the data reported by implementers.<br>• Implement data management of covered CPAs.<br>• Compile and store data as a database. |
| | Each CPA implementer | CDM managing team | • Collect and compile data/information as electronic file.<br>• Store the electronic and hard copy of the data and information.<br>• Provide the electronic file to CME. |
| Communication and reporting | W.S.T | CDM managing team | • Coordinate between implementers and communicating with DOE and CDM EB |
| | Each CPA implementer | CDM managing team | • Report collected information to the W.S.T. |
| Training and capacity building | W.S.T | CDM technical advisory team | • Develop and establish training program for the implementers.<br>• Implement seminars for implementers to meet the needs of the monitoring plan. |
| Quality assurance and verification | W.S.T | CDM technical advisory team | • Establish and maintain quality assurance system with a view to ensuring transparency and allowing for verification.<br>• Prepare for, facilitate and co-ordinate verification process. |
| | Each CPA implementer | CDM managing team | • Implementers undertake regular check of meters and conduct calibration in accordance with the specifications and requirements.<br>• Prepare backup ways to get data and information for the cases of data loss |

(3) A system/procedure to avoid double accounting e.g., to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA:

The W.S.T technically reviews at the time of CPA inclusion that any biogas digester system under the CPA does not belong to another CPA under this PoA or another registered CDM project activity or another CDM PoA.
It is also checked whether there is any other CDM activity that targeted the same factory covered by the CPA proposed.

(4) The SSC-CPA included in the PoA is not a de-bundled component of another CPA or CDM project activity:

The W.S.T will follow the latest version of guidance provided by the Executive Board on "Occurrence of De-bundling under Programme of Activity" to identify whether a proposed CPA is a de- bundled component of a large scale activity.

(5) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA:

Any CPA under the PoA is recommended and planned by the W.S.T and PEAR. Moreover, as explained in table above, under the record keeping system, the implementers are to have a contract to undertake any project activities under the PoA—under supervision by the W.S.T—are well aware of and have agreed to their activity under the PoA.

**SECTION D. Duration of PoA**
**D.1. Start date of PoA**

The start date of the PoA is the date in which the PoA-DD published for global stakeholder consultation.

**D.2. Duration of the PoA**

The duration of the PoA is 28 years 0 month

**SECTION E. Environmental impacts**
**E.1. Level at which environmental analysis is undertaken**

The dyeing process energy and water saving PoA is believed to have no any negative impacts on the environment.
The impact of each CAP under the PoA on the environment is identical in most extension regardless of location; therefore, Environmental Analysis is done at the PoA level.

**E.2. Analysis of the environmental impacts**

As the PoA focuses on process change or process optimization in the existing textile and garment factories that have had environmental clearance certificates and the PoA is seen as no any negative environmental impacts then an additional environmental impact assessments for PoA is not required. The impact of the PoA on the environment in the whole process is believed to be positive, which is manifested in the following aspects:

(1) The project will contribute to ensure future water security in Bangladesh.
The underground water is the main source of drinking water in Bangladesh. However, for textile dyeing in Bangladesh garment industry, underground water also has been used dominantly. It has been figured out that the heavy lifting of underground water on a regular basis in so many places including Dhaka city is causing the underground water levels to dry up faster than is normal. The project promises to reduce underground water consumption for textile dyeing process significantly.

(2) The project will contribute to ease land subsidence having occurred.
It is reported that there are too many places in the country where the heavy withdrawal of underground waters have disturbed the soil layers and caused land subsidence. Even in the capital city and other cities of the country that depend disproportionately in the lifting of underground water for household and other uses, land subsidence is noted to be a serious consequence of the practice. Thus, from the preventing the disfigurement of land and its calamitous effects, a reducing consumption of underground water is an indispensable way.

**SECTION F. Local stakeholder comments**
**F.1. Solicitation of comments from local stakeholders**

The Local stakeholder consultation meeting was conducted at the PoA level as social and environmental impacts of the CPAs are seen to be identical regardless of target factories.

The PoA level Local Stakeholder Consultation Meeting was held at Uttara Club (Lotus Hall), Dhaka on 5th of November 2012 for having comments and opinions from local stakeholder from various sectors. Around 50 participants including Mr. Faruque Hassan, Vice President, BGMEA, delegates from Textile and Garment Factory and experts from Machinery Manufacturer were present in the meeting.

**F.2. Summary of comments received**

The comments were received during the meeting is summarized in the table as below.

Table 6. Questions and Comments Received

| Stakeholder comment | Was comment taken into account (Yes/ No)? | Explanation (Why? How?) |
|---|---|---|
| Is this project can reduce the use of chemical & if yes how? (Mr. Mohammad Roqibul Islam from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH) | Clarification was given | This project can reduce the use of chemical for textile wet processing. Because in textile wet processing the chemicals are dozing in g/liter, so according to our proposed technology (in which 30-40 liters of water are used for each kg cotton fabric processing) we are using less amount of water then the existing system (100 liters of water for each kg fabric processing) that's how we are saving chemicals. |
| Does the concentration of chemical increase in ETP (Effluent Treatment Plant) after the implementation of the project? If increase then how you will control this? (Mr. Mohammad Roqibul Islam from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH) | Clarification was given | No our project does not increase the concentration of chemical in the ETP. So we don't need to control this matter in ETP. |
| Why you are working only on two-model factories? (Mr. Zaman from Jamuna Group) | Clarification was given | At present, we are actively working with the two factories (Grameen Knitwear Ltd. & Landmark Fabrics Limited) to register the programmatic CDM (PoA) as a CDM project. After registration the entire interested factory can be included to the programme. |

| | | |
|---|---|---|
| How other factories can be a part of this Project and what are the criteria for this?<br>(Mr. Zaman from Jamuna Group) | Clarification was given | Other factories also can be a part of this project as a CPA (Component Project Activity) after the PoA registered to be CDM project. Any textile and garment factory in Bangladesh can apply participation of the PoA through implementing water and energy technologies proposed by W.S.T. So please contact with W.S.T which will advise you on what kind of technologies will appropriate for your factory. |
| Does your technology can overcome the fastness problem of red and dark black?<br>(Mr. Zaman from Jamuna Group) | Clarification was given | Our proposed technology can overcome this problem. By choosing the appropriate process of dyeing from our proposed options this problem can easily solved. |
| If we invite you, are you interested to come to our factory?<br>(Mr. Zaman from Jamuna Group) | Yes | We are interested to work with factories who are believing and willing to apply our idea |
| May we take back the sustainable development matrix and return it by e-mail with full completion?<br>(Mr. Sohag Miah from NIAGARA TEXTILES LTD) | Yes | You can complete the table after the meeting and send it back us with e-mail. And kind of continues inputs are welcome by e-mail and telephone. |

**F.3. Report on consideration of comments received**

All questions and comments are responded to increase stakeholders understanding of the project.

Some factories' requirements of conducting audits on their factories for joining the project are accepted.

Some stakeholder's requests to complete the sustainable development matrix after the meeting are accepted also. Please refer to the table above for detailed responds for corresponding questions and comments.

**SECTION G. Approval and authorization**

The Letter of Approval from both host country (Bangladesh) and Japan will be received in due time.

## PART II. Generic component project activity (CPA)

### SECTION A. General description of a generic CPA

### A.1. Purpose and general description of generic CPAs

The proposed small-scale Component Project Activity (CPA) would consist of introducing energy and water saving technology toward dyeing process of the Garment factories. The aim of the CPA is to contribute to the sustainable development of Bangladesh. The proposed SSC-CPA will reduce greenhouse gas emissions through the increase in energy efficiency as well as saving water consumption of the targeted garment factories in textile dyeing process.

### SECTION B. Application of a baseline and monitoring methodology

### B.1. Reference of the approved baseline and monitoring methodology (ies) selected

| | | |
|---|---|---|
| Baseline and Monitoring Methodology | Version 12<br>Sectoral Scope: 04<br>EB 51 | AMS-II.D;<br>Energy efficiency and fuel switching measures for industrial facilities |
| Tools and Guidelines | EB 65 Report, Annex 3, Version 01.0 | Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities |
| | EB 65 Report, Annex 2, Version 2.0 | Standard for sampling and surveys for CDM project activities and Programme of Activities |
| | EB 63 Report, Annex 24, Version 8 | Attachment A to Appendix B of the simplified modalities and procedures for CDM small-scale project activities. |
| | EB 54 Report, Annex 13, Version 3 | Guidelines on assessment of de-bundling for SSC project activities |
| | EB 67 Report, Annex 30, Version 02.0 | GUIDELINES FOR COMPLETING THE PROGRAMME DESIGN DOCUMENT FORM FOR SMALL-SCALE CDM PROGRAMMES OF ACTIVITIES |
| | EB 66 Report, Annex 17, Version 01.0 | GUIDELINES FOR COMPLETING THE COMPONENT PROJECT DESIGN DOCUMENT FORM FOR SMALL-SCALE COMPONENT PROJECT ACTIVITIES |

| | | |
|---|---|---|
| | EB 68 Report, Annex 27,Version 09.0<br><br>EB 68 Report, Annex 26,Version 04.0 | GUIDELINES ON THE DEMONSTRATION OF ADDITIONALITY OF SMALL-SCALE PROJECT ACTIVITIES<br>GUIDELINES FOR DEMONSTRATING ADDITIONALITY OF MICROSCALE PROJECT ACTIVITIES |

**B.2. Application of methodology (ies)**

The methodology of AMS-II.D (Energy efficiency and fuel switching measures for industrial facilities) is applied for CPAs under the PoA and a justification of applicability of the methodology is given in the table 7 below. CPA-specific conformity or compliance with the eligibility criteria will be assessed at the time of its inclusion.

Table 7. Baseline and Monitoring Methodology Applicability

| No | Applicable conditions of the Methodology | Conformity of CPAs |
|---|---|---|
| 1 | This category comprises any energy efficiency and fuel switching measures implemented at a single or several industrial or mining and mineral production facility/ies. This category covers project activities aimed primarily at energy efficiency; | Each CPA will promote energy efficiency improvement for textile dyeing and finishing process of a textile and garment factory by targeting dyeing machine and other machines. |
| 2 | This category is applicable to project activities where it is possible to directly measure and record the energy use within the project boundary (e.g., electricity and/or fossil fuel consumption). | The electricity and fossil fuel consumption for textile dyeing process can be measured or calculated through directly measured value by meters installed at corresponding points of energy an water supply lines. |
| 3 | This category is applicable to project activities where the impact of the measures implemented (improvements in energy efficiency) by the project activity can be clearly distinguished from changes in energy use due to other variables not influenced by the project activity (signal to noise ratio). | Each CPA under the PoA focuses on optimizing or changing textile dyeing process in dyeing machines or other machines. Then the target of the measures is clear; the impacts of the measures are controllable, distinguishable. |

| | | |
|---|---|---|
| 4 | The aggregate energy savings of a single project (inclusive of a single facility or several facilities) may not exceed the equivalent of 60 $GWh_e$ per year. A total saving of 60 $GWh_e$ per year is equivalent to a maximal saving of 180 $GWh_{th}$ per year in fuel input. | For every year during the crediting period, the aggregate energy savings of each CPA under the PoA will not exceed 180 $GWh_{th}$ per year. If during implementation and monitoring of each CPA goes beyond 180 $GWh_{th}$ in any year of the crediting period, the GHG emission reductions that can be claimed during this particular year shall be capped at the maximal saving of 180 $GWh_{th}$ estimated in the registered CPA-PDD for that year during the crediting period. |

**B.3. Sources and GHGs**

The figure 12 below depicts related equipment, systems and flows of mass and energy in each CPA under the PoA. The project boundary of each CPA covers:

- The dyeing machines (pretreatment and dyeing)
- The other machines for finishing (Stenters, dryers)
- The water supply system
- The effluent treatment plant
- The geographical area covering energy sources such as boilers and captive generators at factories.

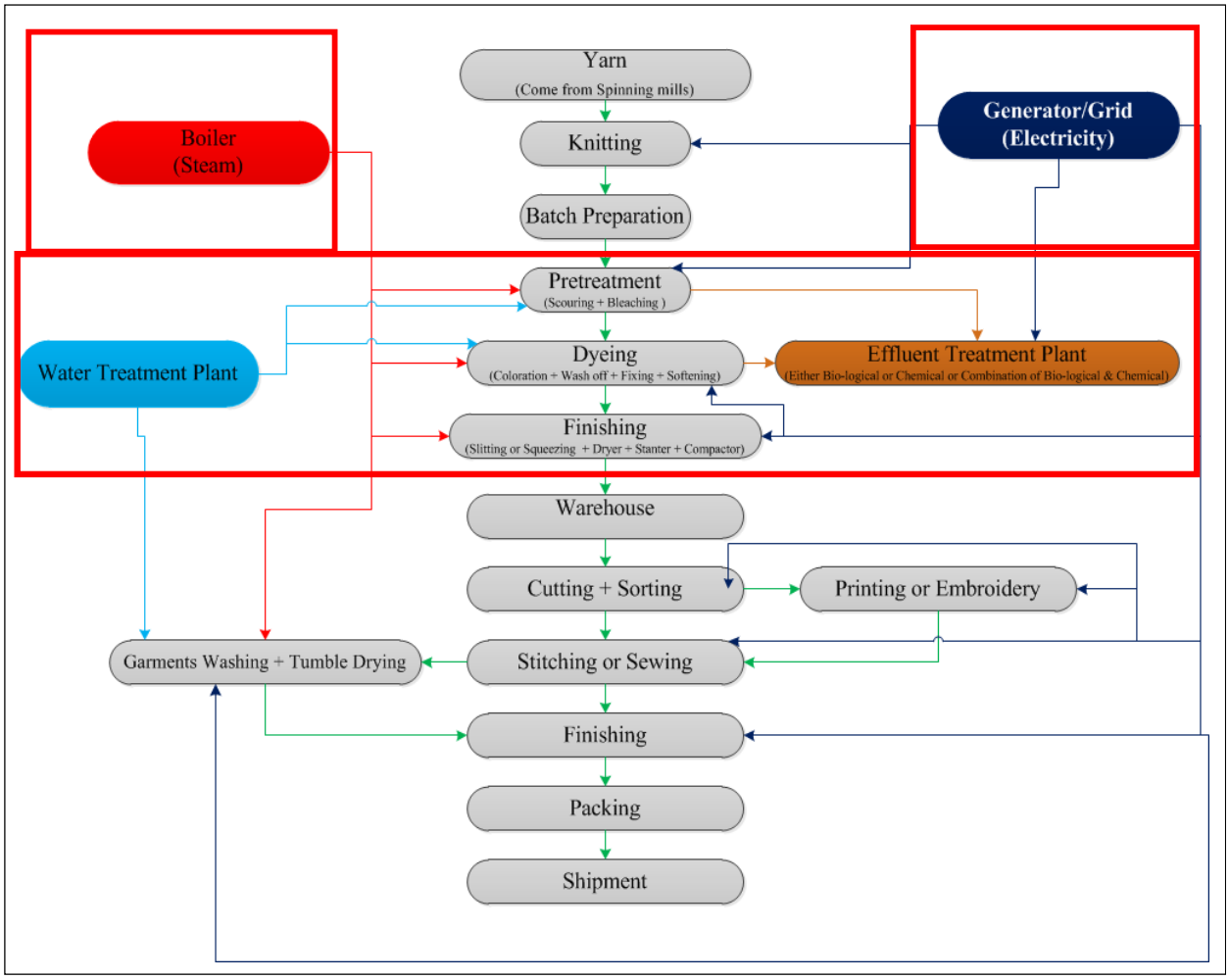


Figure 12. The Physically Delineation of Each CPA

As per the methodology, the sources of GHGs and GHGs considered in CPAs under the PoA are explained in the table below.

| Source | | GHGs | Included? | Justification/Explanation |
|---|---|---|---|---|
| Baseline | Electricity consumption of dyeing machines and other targeted machines in the dyeing processes (if any) for textile dyeing | $CO_2$ | Yes | Major Source of emissions |
| | | $CH_4$ | No | Minor Source and thereby neglected |
| | | $N_2O$ | No | Minor Source and thereby neglected |
| | Steam consumption of dyeing machines and other targeted machines in the dyeing processes (if any) for textile dyeing | $CO_2$ | Yes | Major Source of emissions |
| | | $CH_4$ | No | Minor Source and thereby neglected |
| | | $N_2O$ | No | Minor Source and thereby neglected |
| | Electricity consumption for pumping up water that used in dyeing processes for textile dyeing and pumping up waste water from a tank to tank in effluent treatment process | $CO_2$ | Yes | Major Source of emissions |
| | | $CH_4$ | No | Minor Source and thereby neglected |
| | | $N_2O$ | No | Minor Source and thereby neglected |
| Project | Electricity consumption of dyeing machines and other targeted machines in the dyeing processes (if any) for textile dyeing | $CO_2$ | Yes | Major Source of emissions |
| | | $CH_4$ | No | Minor Source and thereby neglected |
| | | $N_2O$ | No | Minor Source and thereby neglected |
| | Steam consumption of dyeing machines and other targeted machines in the dyeing processes (if any) for textile dyeing | $CO_2$ | Yes | Major Source of emissions |
| | | $CH_4$ | No | Minor Source and thereby neglected |
| | | $N_2O$ | No | Minor Source and thereby neglected |
| | Electricity consumption for pumping up water that used in dyeing processes for textile dyeing and pumping up waste water from a tank to tank in effluent treatment process | $CO_2$ | Yes | Major Source of emissions |
| | | $CH_4$ | No | Minor Source and thereby neglected |
| | | $N_2O$ | No | Minor Source and thereby neglected |

**B.4. Description of baseline scenario**

As per the methodology AMS II.D./version 12, the baseline scenario for the PoA is demonstrated as follows.

In the absence of the CDM project activity, the factories would continue to apply the current conventional dyeing practices to consume energy at historical average levels, until the time at which the dyeing practices would be likely to be replaced by the energy and water saving technologies in the absence of the CDM project activity.

**B.5. Demonstration of eligibility for a generic CPA**

All CPAs are eligible under the PoA, if the CPA complies with the following criteria:

| No | Eligibility Criteria | Conformity Yes or No |
|---|---|---|
| 1 | A CPA targets a textile and garment factory in Bangladesh | Each CPA will demonstrate the conformity of the eligibility criteria |
| 2 | The name and the address of the factory are defined | Each CPA will demonstrate the conformity of the eligibility criteria |
| 3 | A CPA is a new project which is not registered large scale CDM or SSC-CPA in the other PoA | Each CPA will demonstrate the conformity of the eligibility criteria |
| 4 | There is unique identification of the target factory | Each CPA will demonstrate the conformity of the eligibility criteria |
| 5 | Is it possible to submit specification of technology/measure when the DOE validates or verify? | Each CPA will demonstrate the conformity of the eligibility criteria |
| 5 | The start date of a CPA is not, or will not be, prior to the commencement of validation of the PoA. | Each CPA will demonstrate the conformity of the eligibility criteria |
| 7 | Does a CPA meet the applicability and other requirements of AMS- II.D as described in PoA-DD section B.3. | Each CPA will demonstrate the conformity of the eligibility criteria |
| 8 | The achieved energy saving of a CPA at a scale of no more than 60 $GWh_{th}$ per year | Each CPA will demonstrate the conformity of the eligibility criteria |
| 9 | If the above condition is not satisfied, a barrier due to prevailing practice in Bangladesh Textile and Garment industry that is reactive dyes for cellulose; disperse dyes for CVC and polyester would prevent occurrence of CPAs. | Each CPA will demonstrate the conformity of the eligibility criteria |
| 10 | A CPA performs local stakeholder consultation before the inclusion of SSC-CPA. | Each CPA will demonstrate the conformity of the eligibility criteria |
| 11 | A CPA does not need to performs the environmental impacts analysis according to the regulation of Bangladesh | Each CPA will demonstrate the conformity of the eligibility criteria |
| 12 | A CPA does not use any fund from Annex I parties | Each CPA will demonstrate the conformity of the eligibility criteria |
| 13 | If a CPA uses a fund from Annex I parties then it does not result in a diversion of official development assistance | Each CPA will demonstrate the conformity of the eligibility criteria |
| 14 | A CPA-DD applies 95/10 (confidence /precision) for any necessary survey according | Each CPA will demonstrate the conformity of the eligibility criteria |
| 15 | The aggregate energy savings by a CPA does not exceed the equivalent of 180 $GWh_{th}$ per year | Each CPA will demonstrate the conformity of the eligibility criteria |
| 16 | Is a CPA confirmed to a single project, which is not a de-bundled component of another large-scale CPA or CDM project activity as | Each CPA will demonstrate the conformity of the |

| | | |
|---|---|---|
| | per the latest guidance given in CDM EB? | eligibility criteria |
| 17 | Is the crediting period of a CPA is within the crediting period of the PoA? | Each CPA will demonstrate the conformity of the eligibility criteria |

## B.6. Estimation of emission reductions of a generic CPA

### B.6.1. Explanation of methodological choices

Baseline Emissions

As mentioned before, the baseline scenario for the project is the continuation of current dyeing process (mainly conventional reactive dyeing) in garment factories.

According to the methodology ASM-II-D, the baseline emission can be calculated based on the following equation.

$$BE_y = (EC^{BL}_{Dyeing,y} + EC^{BL}_{Water,y}) \times EF^{BL,elec}_{CO2} + SC^{BL}_y \times EF^{BL,steam}_{CO2} \quad (1)$$

Where:

| | |
|---|---|
| $BE_y$ | Baseline emissions in a year *y* ($CO_2$ ton/year) |
| $EC^{BL}_{Dyeing,y}$ | Baseline electricity consumption by dyeing machines and other machines to which new/additional measure are introduced in the dyeing processes by the CPA in year *y* (kWh/year) |
| $EC^{BL}_{Water,y}$ | Baseline electricity consumption by pumping of clean water that used in dyeing machines and pumping of waste water from tank to tank at effluent treatment plants in year *y* (kWh/year) |
| $SC^{BL}_y$ | Baseline steam consumption by dyeing machines and other machines to which new/additional measure are introduced in the dyeing process by the CPA in year *y* (ton-steam/year) |
| $EF^{BL,elec}_{CO2}$ | $CO_2$ emission factor of electricity used (a grid emission factor or an emission factor of captive generator being used) (ton $CO_2$/MWh) |
| $EF^{BL,steam}_{CO2}$ | $CO_2$ emission factor for steam generation at factories (ton $CO_2$/ton) |

$$EC^{BL}_{Dyeing,y} = \sum_i \sum_j \sum_k \sum_l EC^{BL,Batch,dyeing}_{i,j,k,l} \times NB^{PJ}_{i,j,k,l,y} + \sum_m EC^{BL}_{m,y} \quad (2)$$

Where:

| | |
|---|---|
| $EC^{BL}_{Dyeing,y}$ | Baseline electricity consumption by dyeing processes in year *y* (kWh/year) |
| $EC^{BL,Batch,dyeing}_{i,j,k,l}$ | Historical average electricity consumption of a dyeing machine *i* for a batch in the baseline dyeing process for brightness of colour *j* material *k* at a load-type of *l* (kWh/batch) |

| | |
|---|---|
| $NB_{i,j,k,l,y}^{PJ}$ | Number of batches on a dyeing machine *i* in the project dyeing for brightness of color *j* material *k* at a load-type of *l* in a year *y* |
| *i* | Type of dyeing machines in the factory |
| *j* | Brightness of color of textile being dyed in the factory (*j*: light, medium, dark) |
| *k* | Type of textile being dyeing in the factory (*k*: cellulose, CVC and polyester) |
| *l* | Type of load for dyeing machine in a factory |
| $EC_m^{BL}$ | Historical average electricity consumption of a targeted machine *m* in the factory by the project other than dyeing machine in a year *y* (kWh/year), if any |
| *m* | Targeted machine other than dying machines in a dyeing processes of the factory by the project, if any |

$$EC_{Water,y}^{BL} = \sum_i \sum_j \sum_k \sum_l WC_{i,j,k,l}^{BL,Batch} \times NB_{i,j,k,l,y}^{PJ} \times EC_{fresh,water}^{BL,pumping} + \sum_i \sum_j \sum_k \sum_l WC_{i,j,k,l}^{BL,Batch} \times NB_{i,j,k,l,y}^{PJ} \times EC_{waste,water}^{BL,pumping} \times (N-1) + \sum_m WC_{m,y}^{BL} \times EC_{fresh,water}^{BL,pumping} + \sum_m WC_{m,y}^{BL} \times EC_{waste,water}^{BL,pumping} \times (N-1) \quad (3)$$

Where:

| | |
|---|---|
| $EC_{Water,y}^{BL}$ | Baseline electricity consumption by pumping of water that used in dyeing machines in year *y* (kWh/year) |
| $WC_{i,j,k,l}^{BL,Batch}$ | Historical average water consumption in machine *i* for a batch in the baseline dyeing process for colour *j* material *k* at a load of *l* (Litre/batch) |
| $NB_{i,j,k,l,y}^{PJ}$ | Number of batches on a machine *i* in the project dyeing for color *j* material *k* at a load of *l* in a year y |
| $EC_{freash,water}^{BL,pumping}$ | Historical average electricity consumption for pumping underground water (kWh/liter) |
| *i* | Type of dyeing machines in a factory |
| *j* | Color of textile being dyed in a factory (*j*: light, medium, dark) |
| *k* | Type of textile being dyeing in a factory (*k*: cellulose, CVC and polyester) |
| *l* | Different load for dyeing a machine in a factory |
| $WC_{m,y}^{BL}$ | Historical average water consumption of a targeted machine *m* in the factory by the project other than dyeing machine in a year *y* (Litre/year) |
| *m* | Targeted machine other than dying machines in a dyeing processes of the factory by the project, if any |
| $EC_{waste,water}^{BL,pumping}$ | Historical average electricity consumption for pumping waste water from tank to tank (kWh/liter) |
| *N* | Number of tanks at effluent treatment plant (ETP) |

$$SC_y^{BL} = \sum_i \sum_j \sum_k \sum_l SC_{i,j,k,l}^{BL,Batch} \times NB_{i,j,k,l,y}^{PJ} + \sum_m SC_{m,y}^{BL} \quad (4)$$

Where:

| | |
|---|---|
| $SC_y^{BL}$ | Baseline steam consumption by dyeing processes in year *y* (ton/year) |
| $SC_{i,j,k,l}^{BL,Batch}$ | Historical average steam consumption of a dyeing machine *i* for a batch in the baseline dyeing process for colour *j* material *k* at a load-type of *l* (ton-steam/batch) |
| $NB_{i,j,k,l,y}^{PJ}$ | Number of batches on a machine *i* in the project dyeing for color *j* material *k* at a load- |

| | |
|---|---|
| | type of *l* in a year *y* |
| *i* | Type of dyeing machines in the factory |
| *j* | Brightness of color of textile being dyed in the factory (*j*: light, medium, dark) |
| *k* | Type of textile being dyeing in the factory (*k*: cellulose, CVC and polyester) |
| *l* | Type of load for dyeing machine in a factory |
| $SC_m^{BL}$ | Historical average steam consumption of a targeted machine *m* in the factory by the project other than dyeing machine in a year *y* (kWh/year), if any |
| *m* | Targeted machine other than dying machine in a dyeing processes of the factory by the project, if any |

$$EF_{CO2}^{BL,elec} = 0.584\ (Bangladesh\ grid\ emission\ factor)$$

*or*

$$= \frac{FC_{gen}^{BL,fuel} \times De_{gen}^{fuel} \times NCV_{gen}^{fuel} \times EF_{CO2}^{fuel,gen}}{EG_{gen}^{BL,fuel}} \quad (5)$$

Where:

| | |
|---|---|
| $EF_{CO2}^{BL,elec}$ | $CO_2$ emission factor of electricity used (a grid emission factor or process or an emission factor of captive generator being used) (ton $CO_2$/MWh) |
| $EG_{gen}^{BL,fuel}$ | Historical average of electricity generated from generators (kWh/year). Data for the past three years is preferable; at least one-year vintage data is necessary. |
| $FC_{gen}^{BL.fuel}$ | Historical fuel consumption average of generators ($m^3$/year). Data for the past three years is preferable; at least one-year vintage data is necessary. |
| $NCV_{gen}^{fuel}$ | Net caloric value of the fuel used for generators (TJ/Gg) |
| $De_{gen}^{fuel}$ | Density of the fuel for generators (kg/$m^3$) |
| $EF_{CO2}^{fuel,gen}$ | $CO_2$ emission factor of the fuel for generators (kg-ton $CO_2$/TJ) |

$$EF_{CO2}^{BL,steam}$$

$$= \frac{FC_{boiler}^{BL,fuel} \times De_{boiler}^{fuel} \times NCV_{boiler}^{fuel} \times EF_{CO2}^{fuel,boiler}}{SP_{boiler}^{BL,fuel}} \quad (6)$$

Where:

| | |
|---|---|
| $EF_{CO2}^{BL,steam}$ | $CO_2$ emission factor for the steam generation (ton $CO_2$/ton steam) |
| $SP_{steam}^{BL,fuel}$ | Historical amount of steam produced from boilers (ton-steam/year). Data for the past three years is preferable; at least one-year vintage data is necessary. |
| $FC_{steam}^{BL,fuel}$ | Historical fuel consumption of boilers ($m^3$/year). Data for the past three years is preferable; at least one-year vintage data is necessary. |
| $NCV_{steam}^{fuel}$ | Net caloric value of the fuel used for boilers (TJ/Gg) |
| $De_{steam}^{fuel}$ | Density of the fuel for boilers (kg/$m^3$) |
| $EF_{CO2}^{fuel,boiler}$ | $CO_2$ emission factor of the fuel for boilers (kg-ton $CO_2$/TJ) |

Project Emissions

$$PE_y = (EC^{PJ}_{Dyeing,y} + EC^{PJ}_{Water,y}) \times EF^{PJ,elec}_{CO2} + SC^{PJ}_y \times EF^{PJ,steam}_{CO2} \quad (7)$$

Where:

| | |
|---|---|
| $PE_y$ | Project emission in a year y ($CO_2$ ton/year) |
| $EC^{PJ}_{Dyeing,y}$ | Project electricity consumption by dyeing machines and other machines which introduce new/additional measure in the dyeing processes by the CPA in year *y* (kWh/year) |
| $EC^{PJ}_{Water,y}$ | Project electricity consumption by pumping of water that used in dyeing machines in year y (kWh/year) |
| $SC^{PJ}_y$ | Project steam consumption by dyeing machines and other machines which introduce new/additional measure in the dyeing processes by the CPA in year (ton-steam /year) |
| $EF^{PJ,elec}_{CO2}$ | $CO_2$ emission factor of electricity used (a grid emission factor or process or an emission factor of captive generator being used) (ton $CO_2$/MWh) |
| $EF^{steam}_{CO2}$ | $CO_2$ emission factor for the steam generation (ton $CO_2$/ton) |

$$EC^{PJ}_{Dyeing,y} = \sum_i \sum_j \sum_k \sum_l EC^{PJ,Batch,dyeing}_{i,j,k,l} \times NB^{PJ}_{i,j,k,l,y} + \sum_m EC^{PJ}_{m,y} \quad (8)$$

Where:

| | |
|---|---|
| $EC^{PJ}_{Dyeing,y}$ | Project electricity consumption by dyeing processes in year *y* (kWh/year) |
| $EC^{PJ,Batch,dyeing}_{i,j,k,l}$ | Electricity consumption of a machine *i* for a batch in the project dyeing process for brightness of colour *j* material *k* at a load-type of *l* (kWh/batch) |
| $NB^{PJ}_{i,j,k,l,y}$ | Number of batches on a machine *i* in the project dyeing for brightness of color *j* material *k* at a load-type of *l* in a year y |
| *i* | Type of dyeing machines in a factory |
| *j* | Brightness of color of textile being dyed in a factory (*j*: light, medium, dark) |
| *k* | Type of textile being dyeing in a factory (*k*: cellulose, CVC and polyester) |
| *l* | Type of load for dyeing machine in a factory |
| $EC^{PJ}_m$ | Project electricity consumption of a targeted machine *m* in the factory by the project other than dyeing machine in a year *y* (kWh/year), if any |
| *m* | Targeted machine other than dying machine in a dyeing processes of the factory by the project, if any |

$$EC^{PJ}_{Water,y} = \sum_i \sum_j \sum_k \sum_l WC^{PJ,Batch}_{i,j,k,l} \times NB^{PJ}_{i,j,k,l,y} \times EC^{PJ,pumping}_{fresh,water} + \sum_i \sum_j \sum_k \sum_l WC^{PJ,Batch}_{i,j,k,l} \times NB^{PJ}_{i,j,k,l,y} \times EC^{PJ,pumping}_{waste,water} \times (N-1) + \sum_m WC^{PJ}_{m,y} \times EC^{PJ,pumping}_{fresh,water} + \sum_m WC^{PJ}_{m,y} \times EC^{PJ,pumping}_{waste,water} \times (N-1) \quad (9)$$

Where:

| | |
|---|---|
| $EC_{Water,y}^{PJ}$ | Project electricity consumption by pumping of water that used in dyeing machines in year y (kWh/year) |
| $WC_{i,j,k,l}^{PJ,Batch}$ | Water consumption in machine *i* for a batch in the baseline dyeing process for colour *j* material *k* at a load of *l* (Litre/batch) |
| $NB_{i,j,k,l,y}^{PJ}$ | Number of batches on a machine *i* in the project dyeing for color *j* material *k* at a load of *l* in a year y |
| $EC_{fresh,water}^{PJ,pumping}$ | Average electricity consumption for pumping underground water in the project in year y (kWh/liter) |
| *i* | Type of dyeing machines in a factory |
| *j* | Color of textile being dyed in a factory (*j*: light, medium, dark) |
| *k* | Type of textile being dyeing in a factory (*k*: cellulose, CVC and polyester) |
| *l* | Different load for dyeing a machine in a factory |
| $WC_{m,y}^{PJ}$ | Project water consumption of a targeted machine *m* in the factory by the project other than dyeing machine in a year *y* (Litre/year), if any |
| *m* | Targeted machine other than dying machine in a dyeing processes of the factory by the project, if any |
| $EC_{waste,water}^{PJ,pumping}$ | Electricity consumption for pumping waste water from tank to tank in the project in year y (kWh/liter) |
| *N* | Number of tanks at effluent treatment plant (ETP) |

$$SC_y^{PJ} = \sum_i \sum_j \sum_k \sum_l SC_{i,j,k,l}^{PJ,Batch} \times NB_{i,j,k,l,y}^{PJ} + \sum_m SC_{m,y}^{PJ} \quad (10)$$

Where:

| | |
|---|---|
| $SC_y^{BL}$ | Project steam consumption by dyeing processes in year *y* (ton-steam /year) |
| $SC_{i,j,k,l}^{BL,Batch}$ | Steam consumption of a machine *i* for a batch in the baseline dyeing process for brightness of colour *j,* material *k* at a load-type of *l* (ton-steam /batch) |
| $NB_{i,j,k,l,y}^{PJ}$ | Number of batches on a machine *i* in the project dyeing for brightness of color *j* material *k* at a load-type of *l* in a year *y* |
| *i* | Type of dyeing machines in a factory |
| *j* | Brightness of color of textile being dyed in a factory (*j*: light, medium, dark) |
| *k* | Type of textile being dyeing in a factory (*k*: cellulose, CVC and polyester) |
| *l* | Type of load for dyeing a machine in a factory |
| $SC_m^{PJ}$ | Project steam consumption of a targeted machine *m* in the factory by the project other than dyeing machine in a year *y* (kWh/year), if any |
| *m* | Targeted machine other than dying machine in a dyeing processes of the factory by the project, if any |

$$EF_{CO2}^{PJ,elec} = 0.584\ (Bangladesh\ grid\ emission\ factor)$$

*or*

$$= \frac{FC_{gen}^{PJ,fuel} \times De_{gen}^{fuel} \times NCV_{gen}^{fuel} \times EF_{CO2}^{fuel,gen}}{EG_{gen}^{PJ,fuel}} \quad (11)$$

Where:

| | |
|---|---|
| $EF_{CO2}^{PJ,elec}$ | $CO_2$ emission factor of electricity used (a grid emission factor or process or an emission factor of captive generator being used) (ton $CO_2$/MWh) |
| $EG_{gen}^{PJ,fuel}$ | Amount of electricity generated from generators (kWh/year) in year y. |
| $FC_{gen}^{PJ.fuel}$ | Amount fuel consumption of generators ($m^3$/year) in a year y. |
| $NCV_{gen}^{fuel}$ | Net caloric value of the fuel used for generators (TJ/Gg) |
| $De_{gen}^{fuel}$ | Density of the fuel for generators (kg/$m^3$) |
| $EF_{CO2}^{fuel,gen}$ | $CO_2$ emission factor of the fuel for generators (kg-ton $CO_2$/TJ) |

$$EF_{CO2}^{PJ,steam} = \frac{FC_{boiler}^{PJ,fuel} \times De_{boiler}^{fuel} \times NCV_{boiler}^{fuel} \times EF_{CO2}^{fuel,boiler}}{SP_{boiler}^{PJ,fuel}} \quad (12)$$

Where:

| | |
|---|---|
| $EF_{CO2}^{PJ,steam}$ | $CO_2$ emission factor for the steam generation (ton $CO_2$/ton steam) |
| $SP_{steam}^{PJ,fuel}$ | Amount of steam produced from boilers (ton-steam/year) in a year y. |
| $FC_{steam}^{PJ,fuel}$ | Amount of fuel consumption of boilers ($m^3$/year) in a year y. |
| $NCV_{steam}^{fuel}$ | Net caloric value of the fuel used for boilers (TJ/Gg) |
| $De_{steam}^{fuel}$ | Density of the fuel for boilers (kg/$m^3$) |
| $EF_{CO2}^{fuel,boiler}$ | $CO_2$ emission factor of the fuel for boilers (kg-ton $CO_2$/TJ) |

Leakage

There are no leakage emissions identified for this type of project.
Therefore:

$$L = 0 \quad (13)$$

Emission Reduction

$$ER_y = BE_y - PE_y \quad (14)$$

Where:

| | |
|---|---|
| $ER_y$ | Emission reduction in year y (ton/year) |
| $BE_y$ | Baseline emission in a year y ($CO_2$ ton/year) |
| $PE_y$ | Project emission in a year y ($CO_2$ ton/year) |

**B.6.2. Data and parameters that are to be reported ex-ante**

| | |
|---|---|
| **Data / Parameter** | $EC_{i,j,k,l}^{BL,Batch,dyeing}$ |
| **Unit** | kWh/batch |
| **Description** | Historical average electricity consumption of a machine *i* for a batch in the baseline dyeing process for colour *j* material *k* at a load of *l* |
| **Source of data** | Project participants |
| **Value(s) applied** | Dependent on each CPA |
| **Choice of data or Measurement methods and procedures** | Measured and calculated through baseline measurement campaign |
| **Purpose of data** | Used to calculate the baseline emissions |
| **Additional comment** | - |

| | |
|---|---|
| **Data / Parameter** | $WC_{i,j,k,l}^{BL,Batch}$ |
| **Unit** | Litre/batch |
| **Description** | Historical average water consumption of a machine *i* for a batch in the baseline dyeing process for colour *j* material *k* at a load of *l* |
| **Source of data** | Project participants |
| **Value(s) applied** | Dependent on each CPA |
| **Choice of data or Measurement methods and procedures** | Measured and calculated through baseline measurement campaign |
| **Purpose of data** | Used to calculate the baseline emissions |
| **Additional comment** | - |

| | |
|---|---|
| **Data / Parameter** | $EC_{fresh,water}^{BL,pumping}$ |
| **Unit** | kWh/liter |
| **Description** | Historical average electricity consumption for pumping underground water |
| **Source of data** | Project participants |
| **Value(s) applied** | Dependent on each CPA |
| **Choice of data or Measurement methods and procedures** | Measured and calculated through baseline measurement campaign |
| **Purpose of data** | Used to calculate the baseline emissions |
| **Additional comment** | - |

| Data / Parameter | $EC_{waste,water}^{BL,pumping}$ |
|---|---|
| Unit | kWh/liter |
| Description | Historical average electricity consumption for pumping waste water from tank to tank |
| Source of data | Project participants |
| Value(s) applied | Dependent on each CPA |
| Choice of data or Measurement methods and procedures | Measured and calculated through baseline measurement campaign |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| Data / Parameter | $SC_{i,j,k,l}^{BL,Batch}$ |
|---|---|
| Unit | Ton-steam/batch |
| Description | Historical average steam consumption of a machine *i* for a batch in the baseline dyeing process for colour *j* material *k* at a load of *l* |
| Source of data | Project participants |
| Value(s) applied | Dependent on each CPA |
| Choice of data or Measurement methods and procedures | Measured and calculated through baseline measurement campaign |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| Data / Parameter | $FC_{gen}^{BL,fuel}$ |
|---|---|
| Unit | $m^3$/year |
| Description | Historical average amount of fuel consumption of generators for electricity generation. Data for the past three years is preferable; at least one-year vintage data is necessary. |
| Source of data | Project participants |
| Value(s) applied | Dependent on each CPA |
| Choice of data or Measurement methods and procedures | Measured and calculated through baseline measurement campaign |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| Data / Parameter | $EG_{gen}^{BL,fuel}$ |
|---|---|
| Unit | KWh/year |
| Description | Historical average of electricity generated from generators (kWh/year). Data for the past three years is preferable; at least one-year vintage data is necessary. |
| Source of data | Project participants |
| Value(s) applied | Dependent on each CPA |
| Choice of data or Measurement methods and procedures | Measured and calculated through baseline measurement campaign |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| Data / Parameter | $NCV_{gen}^{fuel}$ |
|---|---|
| Unit | TJ/Gg |
| Description | Net caloric value of the fuel used for generators |
| Source of data | 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| Value(s) applied | 46.5 for natural gas<br>41.4 for diesel |
| Choice of data or Measurement methods and procedures | Default value |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| Data / Parameter | $De_{gen}^{fuel}$ |
|---|---|
| Unit | $Kg/m^3$ |
| Description | Density of the fuel for generators |
| Source of data | FINAL REPORT ON EMISSION INVENTORY, BANGLADESH COUNTRY STUDY, ASIA LEAST-COST GREENHOUSE GAS ABATEMENT STRATEGY (ALGAS) |
| Value(s) applied | 0.717 for natural gas<br>0.84 for diesel |
| Choice of data or Measurement methods and procedures | Local data or default value |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| Data / Parameter | $EF_{CO2}^{fuel,gen}$ |
|---|---|
| Unit | Kg-$CO_2$/TJ |
| Description | $CO_2$ emission factor of the fuel for generators |
| Source of data | 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| Value(s) applied | 56,100 for natural gas<br>74,100 for diesel |
| Choice of data or Measurement methods and procedures | Default value |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| Data / Parameter | $SP_{steam}^{BL,fuel}$ |
|---|---|
| Unit | Ton-steam/year |
| Description | Historical amount of steam produced from boilers. Data for the past three years is preferable; at least one-year vintage data is necessary. |
| Source of data | Project participants |
| Value(s) applied | Dependent on each CPA |
| Choice of data or Measurement methods and procedures | Measured and calculated through baseline measurement campaign |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| Data / Parameter | $FC_{steam}^{BL,fuel}$ |
|---|---|
| Unit | $m^3$/year |
| Description | Historical fuel consumption of boilers. Data for the past three years is preferable; at least one-year vintage data is necessary. |
| Source of data | Project participants |
| Value(s) applied | Dependent on each CPA |
| Choice of data or Measurement methods and procedures | Measured and calculated through baseline measurement campaign |
| Purpose of data | Used to calculate the baseline emissions |
| Additional comment | - |

| | |
|---|---|
| **Data / Parameter** | $NCV_{boiler}^{fuel}$ |
| **Unit** | TJ/Gg |
| **Description** | Net caloric value of the fuel used for boilers |
| **Source of data** | 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| **Value(s) applied** | 46.5 for natural gas<br>41.4 for diesel |
| **Choice of data or Measurement methods and procedures** | Default value |
| **Purpose of data** | Used to calculate the baseline emissions |
| **Additional comment** | - |

| | |
|---|---|
| **Data / Parameter** | $De_{gen}^{fuel}$ |
| **Unit** | kg/m$^3$ |
| **Description** | Density of the fuel for boilers |
| **Source of data** | FINAL REPORT ON EMISSION INVENTORY, BANGLADESH COUNTRY STUDY, ASIA LEAST-COST GREENHOUSE GAS ABATEMENT STRATEGY (ALGAS) |
| **Value(s) applied** | 0.72 for natural gas<br>0.84 for diesel |
| **Choice of data or Measurement methods and procedures** | Local data |
| **Purpose of data** | Used to calculate the baseline emissions |
| **Additional comment** | - |

| | |
|---|---|
| **Data / Parameter** | $EF_{CO2}^{fuel,boiler}$ |
| **Unit** | Kg-$CO_2$/TJ |
| **Description** | $CO_2$ emission factor of the fuel for boilers |
| **Source of data** | 2006 IPCC Guidelines for National Greenhouse Gas Inventories |
| **Value(s) applied** | 56,100 for natural gas<br>74,100 for diesel |
| **Choice of data or Measurement methods and procedures** | Default value |
| **Purpose of data** | Used to calculate the baseline emissions |
| **Additional comment** | - |

**B.6.3. Ex-ante calculations of emission reductions**

As per the formulae given in this PDD Part II Section B 6.2, the ex-ante calculations of the water and energy savings and emission reductions are explained on each CPA.

**B.7. Application of the monitoring methodology and description of the monitoring plan**

**B.7.1. Data and parameters to be monitored by each generic CPA**

| **Data / Parameter** | $NB_{i,j,k,l,y}^{PJ}$ |
|---|---|
| **Unit** | Number |
| **Description** | Number of batches on a machine *i* in the project dyeing for color *j* material *k* at a load of *l* in a year y |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Aggregation of daily records in factories |
| **Monitoring frequency** | Project participants collect daily-recorded data in factories monthly |
| **QA/QC procedures** | |
| **Purpose of data** | For calculating project electricity and water consumption |
| **Additional comments** | - |

| **Data / Parameter** | $EC_{i,j,k,l}^{PJ,Batch,dyeing}$ |
|---|---|
| **Unit** | KWh/batch |
| **Description** | Electricity consumption of a machine *i* for a batch in the project dyeing process for color *j* material *k* at a load of *l* in a year y |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Measuring through power meters installed at factories. |
| **Monitoring frequency** | Collect the data monthly from factories where the data recorded daily basis |
| **QA/QC procedures** | Aggregation of daily records. Calibrations of power meters will be conducted as per related guidelines and instructions. |
| **Purpose of data** | For calculating project emission from electricity consumption |
| **Additional comments** | - |

| | |
|---|---|
| **Data / Parameter** | $WC_{i,j,k,l}^{PJ,Batch}$ |
| **Unit** | Litre/batch |
| **Description** | Water consumption of a machine *i* for a batch in the project dyeing process for colour *j* material *k* at a load of *l* |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Measuring through dyeing machines' water tanks with scales |
| **Monitoring frequency** | Collect the data monthly from factories where the data recorded daily basis |
| **QA/QC procedures** | Aggregation of daily records and cross checks will be done through dye bath water ratio of dyeing processes. |
| **Purpose of data** | For calculating project emission from water consumption |
| **Additional comments** | - |

| | |
|---|---|
| **Data / Parameter** | $SC_{i,j,k,l}^{PJ,Batch}$ |
| **Unit** | To-steam/batch |
| **Description** | Steam consumption of a machine *i* for a batch in the project dyeing process for colour *j* material *k* at a load of *l* (ton-steam /batch) |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Measuring and calculating by project implementers as per dyeing charts programmed for dyeing machines. |
| **Monitoring frequency** | Collect the data monthly from factories where the data recorded daily basis |
| **QA/QC procedures** | Comparison of measured data and calculated data will be conducted to justify the calculation as per dyeing charts.<br>Steam meters will be calibrated as per related guidelines and instructions. |
| **Purpose of data** | For calculating project emission from steam consumption |
| **Additional comments** | - |

| Data / Parameter | $EC_{m,y}^{PJ}$ |
|---|---|
| Unit | kWh/year |
| Description | Electricity consumption of a machine *m* other than a dyeing machine in the project dyeing process in a year y |
| Source of data | Project implementers |
| Value(s) applied | Depend on each CPA |
| Measurement methods and procedures | Measuring through power meters installed at factories. |
| Monitoring frequency | Collect the data monthly from factories where the data recorded daily basis |
| QA/QC procedures | Aggregation of daily records. Calibrations of power meters will be conducted as per related guidelines and instructions. |
| Purpose of data | For calculating project emission from electricity consumption |
| Additional comments | - |

| Data / Parameter | $WC_{m,y}^{PJ}$ |
|---|---|
| Unit | Litre/year |
| Description | Water consumption of a machine *m* other than a dyeing machine in the project dyeing process in a year *y* |
| Source of data | Project implementers |
| Value(s) applied | Depend on each CPA |
| Measurement methods and procedures | Measuring through machines' water tanks with scales |
| Monitoring frequency | Collect the data monthly from factories where the data recorded daily basis |
| QA/QC procedures | Aggregation of daily records and cross checks will be done through dye bath water ratio of dyeing processes. |
| Purpose of data | For calculating project emission from water consumption |
| Additional comments | - |

| | |
|---|---|
| **Data / Parameter** | $SC_{m,y}^{PJ}$ |
| **Unit** | To-steam/year |
| **Description** | Steam consumption of a machine *m* other than a dyeing machine in the project dyeing process in a year y (ton-steam /year) |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Measuring and calculating by project implementers as per dyeing related programs for machines. |
| **Monitoring frequency** | Collect the data monthly from factories where the data recorded daily basis |
| **QA/QC procedures** | Comparison of measured data and calculated data will be conducted to justify the calculation as per programs<br>Steam meters will be calibrated as per related guidelines and instructions. |
| **Purpose of data** | For calculating project emission from steam consumption |
| **Additional comments** | - |

| | |
|---|---|
| **Data / Parameter** | $N$ |
| **Unit** | Number |
| **Description** | Number of tanks at ETP in a factory |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Site checking |
| **Monitoring frequency** | Collect the data monthly from factories |
| **QA/QC procedures** | Conduct site check regularly |
| **Purpose of data** | For calculating project emission from water consumption and waste water treatment |
| **Additional comments** | - |

| | |
|---|---|
| **Data / Parameter** | $EC_{fresh,water}^{PJ,pumping}$ |
| **Unit** | KWh/litre |
| **Description** | Electricity consumption for pumping underground water in a factory in a year y. |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Measured and calculated by project implementers |
| **Monitoring frequency** | Collect the data monthly from factories |
| **QA/QC procedures** | Aggregation of daily records. Calibrations of power meters will be conducted as per related guidelines and instructions. |
| **Purpose of data** | For calculating project emission from water consumption |
| **Additional comments** | - |

| | |
|---|---|
| **Data / Parameter** | $EC_{waste,water}^{PJ,pumping}$ |
| **Unit** | KWh/litre |
| **Description** | Electricity consumption for pumping waste water from tank to tank at ETP in a factory in a year y. |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Measured and calculated by project implementers |
| **Monitoring frequency** | Collect the data monthly from factories |
| **QA/QC procedures** | Aggregation of daily records. Calibrations of power meters will be conducted as per related guidelines and instructions. |
| **Purpose of data** | For calculating project emission from water consumption |
| **Additional comments** | - |

| | |
|---|---|
| **Data / Parameter** | $EG_{gen}^{PJ,fuel}$ |
| **Unit** | KWh/year |
| **Description** | Amount of electricity generated from generators in a year y |
| **Source of data** | Project implementers |
| **Value(s) applied** | Depend on each CPA |
| **Measurement methods and procedures** | Measured or collected by project implementers |
| **Monitoring frequency** | Collect the data monthly from factories |
| **QA/QC procedures** | Aggregation of monthly records. |
| **Purpose of data** | For calculating $CO_2$ emission factor for electricity generation |
| **Additional comments** | - |

| Data / Parameter | $FC_{gen}^{PJ.fuel}$ |
|---|---|
| Unit | $m^3$/year |
| Description | Amount of fuel consumed by generators for electricity generation in a year y |
| Source of data | Project implementers |
| Value(s) applied | Depend on each CPA |
| Measurement methods and procedures | Measured or collected by project implementers |
| Monitoring frequency | Collect the data monthly from factories |
| QA/QC procedures | Aggregation of monthly records. |
| Purpose of data | For calculating $CO_2$ emission factor for electricity generation |
| Additional comments | - |

| Data / Parameter | $SP_{steam}^{PJ,fuel}$ |
|---|---|
| Unit | Ton-steam/year |
| Description | Amount of steam produced by boilers in a year y |
| Source of data | Project implementers |
| Value(s) applied | Depend on each CPA |
| Measurement methods and procedures | Measured or collected by project implementers |
| Monitoring frequency | Collect the data monthly from factories |
| QA/QC procedures | Aggregation of monthly records. |
| Purpose of data | For calculating $CO_2$ emission factor for steam generation |
| Additional comments | - |

| Data / Parameter | $FC_{steam}^{PJ,fuel}$ |
|---|---|
| Unit | $m^3$/year |
| Description | Amount of fuel consumed by boilers for steam generation in a year y |
| Source of data | Project implementers |
| Value(s) applied | Depend on each CPA |
| Measurement methods and procedures | Measured or collected by project implementers |
| Monitoring frequency | Collect the data monthly from factories |
| QA/QC procedures | Aggregation of monthly records. |
| Purpose of data | For calculating $CO_2$ emission factor for steam generation |
| Additional comments | - |

**B.7.2. Description of the monitoring plan for a generic CPA**

**(1) Monitoring Framework**

The monitoring management system is integrated part of the implementation management system as shown in section C.
The W.S.T will act as the overall supervisor and prepare a monitoring report periodically (typically annually) to the DOE by using the reports by factories.
The CPA implementers will undertake the monitoring (especially preparing the monthly and annual status report) based on the operation and monitoring manual prepared by The W.S.T. The WST has the responsibility to manage and operate all of the CPA.

**(2) The Function of CME and CPA Implementers**

The following table shows the roles of the CME and implementers for the monitoring.

| | CME (Supported by PEAR) | Implementers (Textile and Garment Factories) |
|---|---|---|
| Monitoring management | - Develop the operation and monitoring manual for activities.<br>- Develop and establish data collection and reporting system for parameters monitored in every CPAs.<br>- Implement and manage monitoring of CPAs. | - Implement and manage monitoring of activities |
| Data collection | - Establish and maintain data collection systems for parameters monitored.<br>- Check data quality and collection procedures regularly. | - Implement data collection; especially after the operation start.<br>- Check internal data quality and collection procedures regularly |
| Data storage and management | - Develop database format of CPA.<br>- Check the reported data from each CPAs.<br>- Calculate emission reductions based on the data reported by the implementers.<br>- Implement data management of CPAs.<br>- Store and maintain records. | - Enter collected data to a computer database.<br>- Implement data management of the activities.<br>- Store and maintain records. |
| Communication and reporting | - Analyse data and compare project performances.<br>- Prepare and forward monthly or annual reports. | - Report electronic data to the CME |
| CDM training and capacity building | - Develop and establish training program for implementers | - Implement simple internal training for staffs |
| Quality assurance and verification | - Establish and maintain quality assurance system with a view to ensuring transparency and | - Undertake regular check internal of data collection<br>- All of information are recorded and |

| | | |
|---|---|---|
| | allowing for verification.<br>- Prepare for, facilitate and coordinate verification process. | reported to CME. |

**(3) Monitored Data**

The data to be monitored are described in section B.7.1.

**(4) Data Collection**

Implementers will mainly carry out data collection. The role of CME in data collection is checking the quality of the data collected by implementers.

**(5) Data Management**

Data management is the most important step in the monitoring process to ensure transparent and credible emission reduction calculations.
Each implementer shall collect data described in section B.7.1 and archive these electronically using the common template developed by the CME. The electronic files and the hard copy shall be sent to CME.
The CME will develop an appropriate electronic template for archiving all data of every activity.
After reporting data from implementers, the CME shall check the data. If there are any errors found, they will be checked against original data.
The CME will calculate emission reductions for each CPA supported by PEAR, and store the outputs in hard disks as well as hard copy printouts.

- - - - -

**Appendix 1: Contact information on entity/individual responsible for the PoA**

| | |
|---|---|
| **Organization** | Green Project W.S.T |
| **Street/P.O. Box** | Sonargaon Janapath Road |
| **Building** | KC Tower |
| **City** | Dhaka |
| **State/Region** | Uttara |
| **Postcode** | 1230 |
| **Country** | Bangladesh |
| **Telephone** | 880-2-8054034 |
| **Fax** | 880-2-8050395 |
| **E-mail** | info@greenproject-wst.com |
| **Website** | www.greenproject-wst.com |
| **Contact person** | Wolfram Engel |
| **Title** | President and CEO |
| **Salutation** | Dr. |
| **Last name** | Engel |
| **Middle name** | |
| **First name** | Wolfram |
| **Department** | |
| **Mobile** | |
| **Direct fax** | |
| **Direct tel.** | |
| **Personal e-mail** | engel.consulting.hk@gmail.com |

| | |
|---|---|
| **Organization** | PEAR Carbon Offset Initiative, Ltd. |
| **Street/P.O. Box** | 1-10-11 Tsukuji |
| **Building** | 1002 RATIO |
| **City** | Chuo-ku |
| **State/Region** | Tokyo |
| **Postcode** | 104-0045 |
| **Country** | Japan |
| **Telephone** | +81-3-3248-0557 |
| **Fax** | +81-3-3248-0557 |
| **E-mail** | n_matsuo@pear-carbon-offset.org |
| **Website** | www.pear-carbon-offset.org |
| **Contact person** | Naoki Matsuo |
| **Title** | CEO |
| **Salutation** | Dr. |
| **Last name** | Matsuo |
| **Middle name** | |
| **First name** | Naoki |
| **Department** | |
| **Mobile** | +81-90-9806-0723 |
| **Direct fax** | |
| **Direct tel.** | |
| **Personal e-mail** | n_matsuo@pear-carbon-offset.org |

## Appendix 2: Affirmation regarding public funding

The PoA does not depend on any public funding. In case any CPA under this PoA avails of public funding, it will be required to provide in its CPA-DD that no official development assistance is diverted to the public funding.

## Appendix 3: Application of methodology (ies)

The applicability conditions are demonstrated in section B.2 of this PoA-DD

## Appendix 4: Further background information on ex ante calculation of emission reductions

Ex-ante calculation of emission reductions is done separately for each CPA.

## Appendix 5: Further background information on the monitoring plan

Please refer to B.7.2 of the PoA-DD.

- - - -

**History of the document**

| Version | Date | Nature of revision(s) |
|---|---|---|
| 02.0 | EB 66<br>13 March 2012 | Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, Annex 12). |
| 01 | EB33, Annex 41<br>27 July 2007 | Initial adoption. |
| **Decision Class:** Regulatory<br>**Document Type:** Form<br>**Business Function:** Registration | | |