CDM-MP81-A02

Draft Small-scale Methodology

SSC-III.XX: Emission reduction by shore-side electricity supply system

Version 01.0

Sectoral scope(s): 07

DRAFT

United Nations
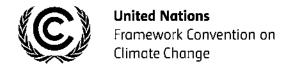Framework Convention on
Climate Change

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

COVER NOTE

1. Procedural background

1. A request for new methodology (SSC-NM104) "Emission reduction by shore-side electricity supply system", (hereinafter referred as NM104) was submitted on 5 July 2019 by Shanghai Zhixin Carbon Asset Management Co., Ltd.

2. Purpose

2. To present a new methodology in the transport sector aiming to reduce emissions from electricity consumed by ships when docked at berths.

3. Key issues and proposed solutions

3.1. Applicability

3. This new methodology applies to project activities introducing shore-side electricity supply to ships docked at berths, displacing the electricity produced from fossil-fuel auxiliary power generators from the ships.

4. This methodology is applicable for ships ferrying on domestic/inland waterways. Ships ferrying in international waters or travels beyond their territorial seas/national boundaries are not eligible.

3.2. Baseline scenario, baseline emissions and project emissions

5. The baseline scenario is the consumption of electricity of ships docked at berths from the fossil fuel auxiliary power generator(s) from the ships.

6. Baseline Emission are calculated for each ship as the product of (i) the consumption rate of the different fossil fuels of the different auxiliary power generators from each ship, (ii) the shore-side electricity consumed by each ship docked at the berths, and (iii) the NCV and the CO_2 emission factor of the fuel consumed by the auxiliary power generator.

7. Project emission are determined as the product of (i) the shore-side electricity consumed by the ship, and (ii) the CO_2 emission factor of the shore-side electricity supply source that could be a national/regional grid, a captive fossil-fuel fired power plant, a combination of both, a mini-grid or a renewable energy captive power plant.

4. Impacts

8. The new methodology, if approved, is expected to allow for development of new CDM projects in the transport sector.

5. Subsequent work and timelines

9. The proposed new methodology is recommended by the MP for consideration by the Board at its 106th meeting. No further work is envisaged.

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

6.   Recommendations to the Board

10.   The MP recommends that the Board adopt this new methodology, to be effective from the time of the Board's approval.

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

TABLE OF CONTENTS **Page**

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

1. Introduction

1. The following table describes the key elements of the methodology:

Table 1.   Methodology key elements

Typical project(s)	Introduction of shore-side electricity supply to ships docked at berths, displacing electricity produced from ships' fossil-fuel auxiliary power generator(s).
Type of GHG emissions mitigation action	Fuel switch: Displacement of more-GHG-intensive power

2. Scope, applicability, and entry into force

2.1. Scope

2. This methodology applies to project activities introducing shore-side electricity supply to ships docked at berths, displacing electricity produced from ships' fossil-fuel auxiliary power generator(s).

2.2. Applicability

3. This methodology is applicable for ships ferrying on domestic/inland waterways. Ships ferrying in international waters are not eligible under this methodology.

4. The project activity displaces only the electricity consumption of ships docked at berths. In the absence of the project activity, electricity would have been supplied by the ships' fossil fuel auxiliary power generators.

5. Switching from fossil fuel to electricity for heat production (e.g. replacing heat generation from a fossil fuel boiler in the baseline ship by the shore-side electricity in the project) is not allowed under this methodology.

6. The project participant shall demonstrate that double counting of emission reductions will not occur, e.g. via a contractual agreement with shipowners, unique identification of ships. The steps undertaken to avoid double counting shall be documented in the PDD or in the PoA-DD.

7. Shore-side electricity supply sources in the project scenario include:

    (a)   A regional/national grid;

    (b)   A mini-grid;

    (c)   A captive fossil-fuel fired power plant;

    (d)   A captive renewable energy power plant;

    (e)   A combination of any of the options above.

8. Measures are limited to those that result in emission reductions of less than or equal to 60 $ktCO_2$ equivalent annually.

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

2.3. Entry into force

9.   The date of entry into force is the date of the publication of the <mark>EB ##</mark> meeting report on <mark>DD month YYYY</mark>.

2.4. Applicability of sectoral scopes

10.   For validation and verification of CDM projects and programme of activities by a designated operational entity (DOE) using this methodology, application of sectoral scope 07 is mandatory.

3.   Normative references

11.   This methodology is based on the proposed small-scale methodology "SSC-NM104: Emission reduction by shore-side electricity supply system" submitted by Shanghai Zhixin Carbon Asset Management Co., Ltd.

12.   Project participants shall apply the "General guidelines for SSC CDM methodologies", "TOOL21 Demonstration of additionality of small-scale project activities" (hereinafter referred as TOOL21) available at: <http://cdm.unfccc.int/Reference/Guidclarif/index.html#meth> mutatis mutandis.

13.   This methodology refers to the latest approved versions of the following methodologies and tool(s):

   (a)   "AMS-I.F.: Renewable electricity generation for captive use and mini-grid";

   (b)   "TOOL03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (hereinafter referred as TOOL03);

   (c)   "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (hereinafter referred as TOOL05);

   (d)   TOOL09: Determining the baseline efficiency of thermal or electric energy generation systems (hereinafter referred as TOOL09).

4.   Definitions

14.   The definitions contained in the Glossary of CDM terms shall apply.

15.   For the purpose of this methodology, the following definition apply:

   (a)   **Shore-side electricity supply system** – is a set of facilities supplying electricity from shore side for operation of ships docked at berths.

5.   Baseline methodology

5.1. Project boundary

16.   The project boundary is comprised of:

   (a)   Ships docked at berths consuming the electricity from the shore-side electricity supply system;

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

(b)   Shore-side electricity supply system;

(c)   Shore-side-electricity supply sources (e.g. a grid and/or renewable energy generation source connected by a dedicated line to the charging stations) and other ancillary facilities.

5.2. Baseline scenario

17.   The baseline scenario is the electricity consumption of ships docked at berths that would otherwise have been supplied by the ships' fossil fuel auxiliary power generator(s).

18.   The baseline scenario shall be in compliance with all mandatory applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution (the assessment of the compliance does not consider national and local policies that do not have legally-binding status).

5.3. Additionality

19.   Additionality shall be demonstrated based on the latest version of TOOL21. The barrier(s) shall be demonstrated for the project participant that is responsible for implementing the shore-side electricity supply system (e.g. berth owners[1]).

5.4. Baseline emissions:

20.   The baseline emissions in year y (BE_y) shall be calculated as follows:

$$BE_y = \sum_i \sum_m \sum_j \left(EC_{PJ,i,y} \times R_{BL,i,m,j} \times NCV_j \times EF_{CO2,j} \right)$$

Equation (1)

Where:

BE_y	=	Baseline emissions in year y (t CO_2e)
$EC_{PJ,i,y}$	=	Electricity consumed by the ship i docked at the project berth during year y (MWh)
$R_{BL,i,m,j}$	=	Consumption rate of fossil fuel j of auxiliary power generator m of ship i in the baseline scenario (mass or volume units/MWh)
NCV_j	=	Net calorific value of fuel j (GJ/mass or volume unit)
$EF_{CO2,j}$	=	CO_2 emission factor of fossil fuel j (t CO_2/GJ)
i	=	Different ships
m	=	Different auxiliary power generators
j	=	Different types of fossil fuels

---

[1] Berth is the term used in ports and harbours for a designated location where a vessel may be moored, usually for the purposes of loading and unloading.

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

5.5. Project emissions

21. The project emissions in year y (PE_y) shall be calculated as follows:

$$PE_y = \sum_i \sum_k EF_{EL,i,k,y} \times \frac{EC_{PJ,i,k,y}}{(1 - TDL_{k,y})}$$

Equation (2)

Where:

PE_y	=	Project emissions in year y (t CO_2e)
$EC_{PJ,i,k,y}$	=	The shore-side electricity consumed by the ship i from the source k at the project berth in year y (MWh)
$EF_{EL,i,k,y}$	=	CO_2 emission factor of the shore-side electricity source k supplying electricity for the ship i in year y (t CO_2/MWh)
$TDL_{k,y}$	=	Average technical transmission and distribution losses for providing electricity from source k in year y
i	=	Different ships
k	=	Different sources of electricity

5.6. Leakage

22. No leakage calculation is required.

5.7. Emission reductions

23. The emission reductions in year y (ER_y) shall be calculated as follows:

$$ER_y = BE_y - PE_y$$

Equation (3)

Where:

ER_y	=	Emission reductions in year y (t CO_2e)
BE_y	=	Baseline emissions in year y (t CO_2e)
PE_y	=	Project emissions in year y (t CO_2e)

6. Monitoring methodology

6.1. Data and parameters not monitored

Data / Parameter table 1.

Data / Parameter:	$R_{BL,i,m,j}$
Data unit:	Mass or volume unit/MWh
Description:	Consumption rate of fossil fuel j of auxiliary power generator m of ship i in the baseline scenario

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

Source of data:	The following data sources may be used if the relevant conditions apply:

Data source	Conditions for using the data source
(a) At least 3 years average fuel consumed ratio of project ships at berths	This is the preferred source
(b) At least three comparable ships, at least 1 year's average fuel consumed ratio	If (a) is not available
(c) The fuel consumed ratio provided by the generator manufacturer	If (a) or(b) are not available
(d) Default efficiency based on Appendix of TOOL09 that results in the most conservative baseline emissions	If options (a) to (c) are not available

Measurement procedures (if any):	For options (a) and (b), the fuel consumed, and electricity generated by each auxiliary power generator of each ship shall be measured following the provisions of TOOL03 and TOOL05, respectively. For option (c), the technical specifications shall be documented for each auxiliary power generator
Any comment:	Parameter shall be determined by each ship that docks at the berth and consumes the shore-side electricity. To apply options (a) and (b), the project participant shall have access to the information on fuel consumed and electricity generated by each auxiliary power consumption of each ship. To apply option (c), the project participant shall have access to the technical specifications of each of the auxiliary generators of each ship

Data / Parameter table 2.

Data / Parameter:	NCV_j
Data unit:	GJ/mass or volume unit
Description:	Net calorific value of fuel j
Source of data:	As per the provisions from TOOL03
Measurement procedures (if any):	As per the provisions from TOOL03
Any comment:	For baseline emissions calculation

Data / Parameter table 3.

Data / Parameter:	$EF_{CO2,j}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor of fossil fuel j
Source of data:	As per the TOOL03

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

Measurement procedures (if any):	As per the provisions from the TOOL03
Any comment:	For baseline emissions calculation

6.2. Data and parameters monitored

Data / Parameter table 4.

Data / Parameter:	$EC_{PJ,i,y}$ / $EC_{PJ,i,k,y}$
Data unit:	MWh
Description:	$EC_{PJ,i,y}$: Electricity consumed by the ship i docked at the project berth during year y. $EC_{PJ,i,k,y}$: The shore-side electricity consumed by the ship i from the source k at the project berth in year y
Source of data:	As per the provisions of the latest version of TOOL05. When applying the tool, requirements for $EC_{PJ,j,y}$ specified in the tool shall apply to both parameters
Measurement procedures (if any):	As per the provisions of the latest version of TOOL05
Monitoring frequency:	As per the provisions of the latest version of TOOL05
QA/QC procedures:	As per the provisions of the latest version of TOOL05
Any comment:	If the electricity is consumed from a single source, $EC_{PJ,i,y} = EC_{PJ,i,k,y}$. If the electricity is consumed from more than one source, $EC_{PJ,i,y}$ is determined as the sum of the electricity consumed from the different sources: $$EC_{PJ,i,y} = \sum_k EC_{PJ,i,k,y}$$

Data / Parameter table 5.

Data / Parameter:	$EF_{EL,i,k,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor of the shore-side electricity source k supplying electricity for the ship i in year y.
Source of data:	If the shore-side electricity supply source k is a regional/national electric grid, a fossil-fuel captive fired power plant or a combination of both, apply the provisions of the latest version of TOOL05. If the shore-side electricity supply source k is a mini-grid, apply the provisions of the latest version of "AMS-I.F: Renewable electricity generation for captive use and mini-grid". If the shore-side electricity supply source k is a renewable energy captive power plant, a value of 0 tCO_2/MWh shall be applied

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

Measurement procedures (if any):	If the shore-side electricity supply source *k* is a regional/national electric grid, a fossil-fuel captive fired power plant or a combination of both, apply the provisions of the latest version of TOOL05. If the shore-side electricity supply source *k* is a mini-grid, apply the provisions of the latest version of "AMS-I.F.: Renewable electricity generation for captive use and mini-grid". If the shore-side electricity supply source *k* is a renewable energy captive power plant, a value of 0 tCO$_2$/MWh shall be applied
Monitoring frequency:	If the shore-side electricity supply source *k* is a regional/national electric grid, a fossil-fuel captive fired power plant or a combination of both, apply the provisions of the latest version of TOOL05. If the shore-side electricity supply source *k* is a mini-grid, apply the provisions of the latest version of "AMS-I.F: Renewable electricity generation for captive use and mini-grid". If the shore-side electricity supply source *k* is a renewable energy captive power plant, a value of 0 tCO$_2$/MWh shall be applied
QA/QC procedures:	-
Any comment:	If the shore-side electricity supply source *k* is a regional/national electric grid and the combined margin emission factor is determined based on option A1 of TOOL05, $EF_{EL,i,k,y}$ shall be monitored based on the approach selected to update the operating margin, i.e. yearly for ex-post, or at the renewal of the crediting period for ex-ante

Data / Parameter table 6.

DRAFT

Data / Parameter:	$TDL_{k,y}$
Data unit:	%
Description:	Average technical transmission and distribution losses for providing electricity to source *k* in year *y*
Source of data:	As per TOOL05
Measurement procedures (if any):	As per TOOL05
Monitoring frequency:	As per TOOL05
QA/QC procedures:	As per TOOL05
Any comment:	As per TOOL05

- - - - -

CDM-MP81-A02
Draft Small-scale Methodology: SSC-III.XX: Emission reduction by shore-side electricity supply system
Version 01.0
Sectoral scope(s): 07

Document information

Version	Date	Description
01.0	2 March 2020	MP 81, Annex 2 To be considered by the Board at EB 106.

Decision Class: Regulatory
Document Type: Standard
Business Function: Methodology
Keywords: fuel switching, grid emission factors, simplified methodologies, transport, type (iii) projects

DRAFT