# M0186 ELECTRICITY SUPPLY FOR SHIPS

# DRAFT

Document Prepared by Maersk and Carbonomics LLC

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# CONTENTS

# 1 SOURCES

This methodology revision is based on the CDM methodology *AMS-III.BP Emission Reduction by Shore-Side Electricity Supply System*. It refers to the following CDM tools and methodology:

- *TOOL03 Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion*
- *TOOL05 Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation*
- *TOOL09 Determining the baseline efficiency of thermal or electric energy generation systems*
- *AMS-I.F. Renewable electricity generation for captive use and mini-grid*

# 2 SUMMARY DESCRIPTION OF THE METHODOLOGY

| Additionality and Crediting Method | |
|---|---|
| Additionality | Activity Method |
| Crediting Baseline | Project Method |

The original CDM methodology *AMS-III.BP Emission Reduction by Shore-Side Electricity Supply System* applies to shore-side electricity supply to ships docked at berths, displacing electricity produced from ships' fossil fuel auxiliary power generator(s). Only the electricity consumption of ships docked at berths is covered by AMS-III.BP.

This methodology revision expands the scope of AMS-III.BP to include off-shore electricity supply systems such as power buoys that provide electricity to ships waiting off-shore to dock.

Given congestion at ports, many ships must sit idle off-shore, running their generators for extended periods. With an off-shore electricity supply, ships are able to reduce their use of fossil fuels.

# 3 DEFINITIONS

In addition to the definitions in AMS-III.BP, the following definition applies.

**Off-shore electricity supply system**
A specialized device located off-shore or in a harbor connected to an electricity source (either shore-side or off-shore) that provides electricity to ships that are not quayside

# 4 APPLICABILITY CONDITIONS

The scope of AMS-III.BP is expanded to include off-shore electricity supply as follows:

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

Further, Applicability Conditions 6 and 7 of AMS-III.BP must be replaced as follows:

6) The project participant must demonstrate that double counting of emission reductions does not occur following the rules and requirements in the latest version of the *VCS Standard*. Provisions to avoid double counting , may include contractual agreements with electricity supplies (e.g., offshore wind power plant) and shipowners, and unique identification of ships.

7) Shore-side or off-shore electricity supply systems in the project scenario include:

   (a) A regional/national grid;

   (b) A mini-grid;

   (c) A captive renewable energy power plant; or

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

Applicability Condition 3 of AMS-III.BP is removed when applying this revision:

~~*This methodology is only applicable to ships for which the incoming and the outgoing route is domestic (i.e., the departure and arrival locations of the route of the ship are in the same country).*~~

# 5 PROJECT BOUNDARY

The spatial extent of the project boundary encompasses the same area as that outlined in AMS-III.BP. However, the term “shore-side” should be read as “shore-side or off-shore” in this section.

# 6 BASELINE SCENARIO

The baseline scenario should be read as follows (paragraph 17 of AMS-III.BP).

The baseline scenario is the electricity consumption from ships docked at berths or anchored off-shore supplied by the ships’ fossil fuel auxiliary power generator(s).

# 7 ADDITIONALITY

For project activities with off-shore supply, the positive list below applies the activity method to demonstrate additionality. Additional information is provided in Appendix 1.

**Step 1: Regulatory surplus**

Project proponents must demonstrate regulatory surplus in accordance with the rules and requirements regarding regulatory surplus set out in the latest version of the *VCS Methodology Requirements*.

**Step 2a: Additionality test for project activities with shore-side supply**

For project activities with shore-side electricity supply, additionality must be assessed following the approach in AMS-III.BP.

**Step 2b: Positive list for project activities with off-shore supply**

For project activities with off-shore supply, the applicability conditions of this methodology represent the positive list. Where the project activity meets all applicability conditions relevant to off-shore supply, it is deemed additional.

The positive list is based on the Activity Method - Option A: Activity Penetration described in *VCS Methodology Requirements*. Appendix 1 provides further information on the establishment of the positive list.

# 8 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

## 8.1 Baseline Emissions

The quantification of baseline emissions follows the same approach as in AMS-III.BP. The only change is that the term "shore-side" is replaced by "shore-side or off-shore."

## 8.2 Project Emissions

The quantification of project emissions in year *y* follows the same approach as in AMS-III.BP. The only change is that the term "shore-side" is replaced by "shore-side or off-shore."

## 8.3 Leakage

No change from AMS-III.BP.

## 8.4 Net GHG Emission Reductions and Removals

No change from AMS-III.BP.

# 9 MONITORING

## 9.1 Data and Parameters Available at Validation

The monitoring tables in the revised methodology are the same as in AMS-III.BP with the following underlined phrases added:

- Electricity consumed by the ship *i* docked at the project berth or anchored off-shore during year *y.*
- The shore-side electricity or off-shore source consumed by the ship *i* from the source *k* at the project berth in year *y*
- Shore-side or off-shore electricity supply source *k*

## 9.2 Description of the Monitoring Plan

No change from AMS-III.BP.

# 10 REFERENCES

No change from AMS-III.BP.

# APPENDIX 1: ACTIVITY METHOD

The positive list was established using the Activity Method - Option A: Activity Penetration described in the *VCS Methodology Requirements.* The activity penetration option requires that less than 5 percent of ships use off-shore power buoys in one calendar year.

The activity penetration is equal to:

$$AP_y = OA_y / MAP_y \quad (1)$$

Where:

| | | |
|---|---|---|
| $AP_y$ | = | Activity penetration of project activity in year *y* (percent) |
| $OA_y$ | = | Observed adoption of project activity in year *y* (e.g., total number of instances installed at a given date in year *y*, or amount of energy supplied in year *y*) |
| $MAP_y$ | = | Maximum adoption potential of the project activity in year *y* (e.g., total number of instances that could have been installed at a given date in year *y*, or the amount of energy that could have been supplied in year *y*) |

At the time of assessing the activity penetration level, there have been no instances of off-shore electricity supply to ships while they are not at a dock. The off-shore electricity supply system concept is a completely new technology; thus, *OA* is zero.

The total *MAP* is determined by looking at the total number of large ships (greater than 1000 Gt), which includes container vessels, tankers and other large vessels. According to Infomaritime.eu, the total number of vessels that fit into this category in 2021 was 53 973.[1] Off-shore electrification projects will remain on the positive list until 2700 ships (5 percent of the total) use a power buoy at least once in a calendar year, at which point the 5 percent activity penetration rate will have been reached. The total number of ships using power buoys compared to the total global fleet of ships is an appropriate way to determine the activity penetration rate.

Another way to approach the penetration rate is the percentage of idle time by all ships globally relative to the time these ships are connected to an off-shore electrification source. However, off-shore idling times are typically not published. Given that there are no off-shore electrification sources at the time of determining the activity penetration level, it may be assumed that the duration for which ships are connected to such a source is less than 5 percent of the total idling hours (*MAP*).

[1] infomaritime.eu (2021) *World merchant fleet and top 15 shipowning countries*. http://infomaritime.eu/index.php/2021/08/22/top-15-shipowning-countries/