A Study of Project Baselines
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1. Basic Understanding

With regard to the Clean Development Mechanism (CDM) stipulated in the Kyoto Protocol, baseline setting methods will be the key issue to be addressed in the coming years. Baselines will be the basis for calculating greenhouse gas (GHG) emission reductions (or absorbed amount). For promoting implementation of CDM, it is necessary to minimize transaction costs and simplify preparations for project implementation. At the same time, it is important to check calculated values against actual reduction values in order to be as accurate as possible.
Viewed in this light, standardization of baseline setting methods for different project types and standardization of calculation methods for GHG emission reductions will be proposed as follows.

2. Some Project Types and Baselines

(Hereafter, a typical project of a project type will be described as the "Project.")

2.-1 Scrapping of Old Existing Power Stations and Construction of New Ones (with the amount of power generation being the same)

(1) Baseline Determination
- GHG emissions in the absence of the Project, that is, in the case of existing power stations continuing operation, will be the Baseline.

(2) GHG Baseline Emissions [BE] = GHG Emissions of Existing Power Stations
- In this case, concerning GHG emissions of existing power stations, the issue is whether to set the Baseline at the present level (static), or to anticipate a decline in emissions through improvement of facilities, etc. and higher emissions due to aging of facilities (forward dynamic).

(3) Actual GHG Emissions with the Project [PE] = GHG Emissions of New Power Stations

(4) GHG Emission Reductions (Annual) = BE-PE

2.-2 Construction of New Power Stations by Renewable Energy to Meet Increased Demand (eg. Photovoltaic Power Generation)

(1) Baseline Determination
- Even in the absence of the Project, it is necessary to meet expanding electricity demand. It is reasonable to assume that this will be supplied through expansion of existing power stations of the country (or region) concerned.
- In this case, the following Baseline options could be considered:

(a) Simple average of GHG emissions from all power stations of the country (or region) concerned
(b) Average GHG emissions of the most common-type power stations of the country (or region) concerned
(c) Average of 25% of power stations with the lowest GHG emissions

(to compare with new stations as much as possible)

(d) Average of 25% of power stations with the highest GHG emissions
(older stations will be scrapped in turn)

- Regarding (a) to (d) given above: should they be static or forward dynamic?

(2) GHG Baseline Emissions (BE) = (Annual power generation of new power stations)×(GHG emissions per unit amount of power generation of the Baseline)

(3) Due to power generation through renewable energy, GHG emissions with the Project will be zero.

(4) GHG Emission Reductions (Annual) = BE

2.-3 Waste Heat Recovery and Utilization

This type of projects aim to recover waste heat as energy such as steam, electricity, etc., which used to be disposed in existing production processes, and to effectively utilize it.

If energy is recovered as electricity:

(1) Baseline Determination

- If existing private electric generators are no longer needed because of use of the electricity recovered by the Project, the Baseline will be determined as in 2.-1 above.
- If the electricity recovered by the Project is to be used to meet increasing demand, the Baseline will be basically determined as in 2.-2 above. However, there also may be a method to consider only private electric generators of the country (or region) concerned in 2.-2.
- The issue is whether the Baseline should be static or forward dynamic.

(2) GHG Baseline Emissions (BE) = (Annual power generation through waste heat recovery) × (GHG emissions per unit amount of power generation of the Baseline)

(3) Due to power generation through waste heat recovery, GHG emissions with the Project will be zero.

(4) GHG Emission Reductions (Annual) = BE

2.-4 Recovery of Waste Heat From Incineration of Waste Derived From Biomass Raw Materials

This type of projects aim to recover waste heat from incineration of waste derived from biomass raw materials, including paper sludge, municipal waste, etc., and to effectively utilize it as energy such as steam, electricity, etc.
There are two aspects to this type of projects: (1) production of energy from waste; and (2) reduction of methane emissions from landfilling waste through implementation of this type of projects.

The Baseline related to energy production from waste heat and GHG emissions reductions is determined as in 2.-3 above.

Methane Emissions Reduction

(1) Baseline Determination

- In the absence of the Project, waste that was supposed to be incinerated will be landfilled and produce methane emissions through anaerobic fermetation.
- In this case, should methane emissions per unit waste be calculated from waste composition of the Project implementation site or should it be the average level of the country (or region) concerned?
- The issue is whether the Baseline should be static or forward dynamic.

(2) Methane Baseline Emissions (BE) = (Amount of waste to be incinerated) ×(Methane emissions per unit waste of the Baseline)

(3) Due to incineration, methane emissions with the Project will be zero.

(4) Methane Emission Reductions (Annual) = BE

2.-5 Energy Conservation Through Change of Production Processes, Etc.

This type of projects aim to reduce consumption of fossil fuel per unit production by improving and modifying production facilities and processes, and switching raw materials.

(1) Baseline Determination

- GHG emissions from production processes before modification or improvement will be the Baseline. GHG emissions will be calculated based on consumption of fossil fuel per unit production.
- The issue is whether the Baseline should be static or forward dynamic.

(2) GHG Baseline Emissions (BE) = (Annual production after modification or improvement) × (GHG emissions per unit production of the Baseline)

(3) Actual GHG Emissions with the Project [PE] = Annual GHG emissions from new processes

(4) GHG Emission Reductions (Annual) = BE-PE