



CDM: Recommendation Form for Small Scale Methodologies (version 01)
(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	15–18 March 2011, SSC WG 30
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Clarification on the applicability of an intuitive energy saving device under AMS-II.C
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-II.C “Demand-side energy efficiency activities for specific technologies”
Name of the authors of the query:	Ben Cirulis Institution: Sigma Global ben@sigmaglobalcompany.com

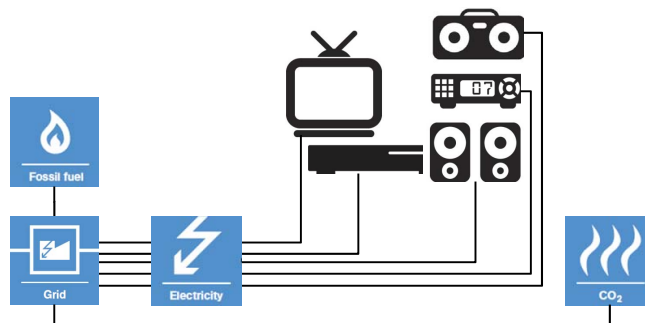
Summary of the query:

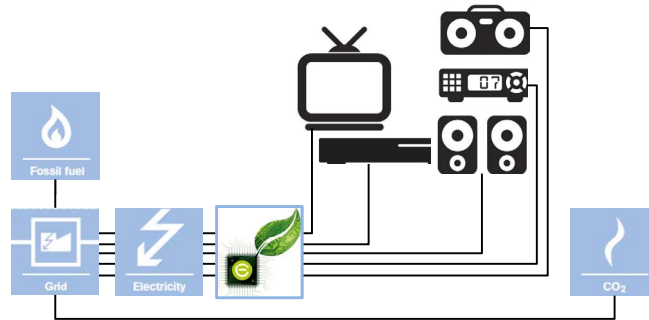
Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

Original text from PP:

The project participants are proposing to use a new intuitive energy saving device which reduces idle/active mode power wastage in addition to removing passive standby energy wastage in household audio visual (AV) and personal computer (PC) environments. The intuitive energy saving device is installed in each AV or PC environment between the AV or PC devices to be controlled and the general power outlet. In an AV environment, the intuitive energy saving device reduces the electricity usage of the controlled AV devices through advanced electronic circuitry that monitors the energy use of the devices and the degree of user interaction, and switches off devices when not in use. In PC environments, the intuitive energy saving device reduces the electricity usage of peripheral PC devices through advanced electronic circuitry that monitors the energy use of the laptop or desktop PC and switches off peripheral PC devices when not in use.

A schematic diagram of the use of the device is shown below.





Project scenario:

Greenhouse gas emission reductions are achieved through reducing the consumption of grid-sourced electricity. Baseline emissions will be calculated according to option 1 in paragraph 6:

$$BE_y = E_{BL,y} * EF_{CO2,ELEC,y}$$

$$E_{BL,y} = \sum_i (n_i * \rho_{BL,i} * o_{BL,i}) / (1 - l_y)$$

Where:

BE_y	Baseline emissions in year y (tCO ₂ e)
$E_{BL,y}$	Energy consumption in the baseline in year y (kWh)
$EF_{CO2,ELEC,y}$	Emission factor in year y calculated in accordance with the provisions in AMS-I.D (tCO ₂ /MWh)
\sum_i	Sum over the group of “ i ” devices replaced, for which the project energy efficient equipment is operating during the year, implemented as part of the project activity
n_i	Number of devices of the group of “ i ” devices replaced, for which the project energy efficient equipment is operating during the year
$\rho_{BL,i}$	Weighted average power of the devices of the group of “ i ” baseline devices.
$o_{BL,i}$	Average annual operating hours of the devices of the group of “ i ” baseline devices.
l_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction.

Project activity emissions will be determined according to paragraph 8:

$$PE_y = E_{PJ,y} * EF_{CO2,ELEC,y}$$

$$E_{PJ,y} = \sum_i (n_i * \rho_{PJ,i} * o_{PJ,i}) / (1 - l_y)$$

Where:

PE_y	Project emissions in year y (tCO ₂ e)
$E_{PJ,y}$	Energy consumption in project activity in year y . This shall be determined <i>ex post</i> based on monitored values
$\rho_{PJ,i}$	Weighted average power of the devices of the group of “ i ” devices in the project.
$o_{PJ,i}$	Average annual operating hours of the devices of the group of “ i ” devices in the project.

It is recognised that the AV or PC devices controlled by the intuitive energy saving device have variable current characteristics and that monitoring of the energy use (average power and operating hours) of an appropriate sample of installed devices is required (as per paragraph 15) to calculate estimates of

parameters used in the baseline and project emission calculations.

The statistically significant estimates of the values of $\square_{BL,i}$ and $o_{BL,i}$ in the baseline calculation and $\square_{PJ,i}$ and $o_{PJ,i}$ in the project activity calculation will be determined through data recorded by a sample of specially modified intuitive energy saving devices distributed to selected households in the project. These devices have the capability for real time monitoring and recording of power consumption of the controlled AV or PC devices. However, these devices will be intentionally configured to not turn off the controlled devices, but to record events when it would have isolated power to the controlled devices.

This sampling methodology will allow monitoring of the actual power consumption trends throughout the project crediting period without distorting the AV or PC equipment usage characteristics of the household by the intuitive energy saving device itself, and allow calculation of the values of $\square_{BL,i}$ and $o_{BL,i}$ in the baseline calculation and $\square_{PJ,i}$ and $o_{PJ,i}$ in the project activity calculation from one sample of specially modified intuitive energy saving devices. The sample size will be chosen to give the confidence/precision required by the methodology.

A separate monitoring program will also perform annual checks of a sample of non-metered devices to ensure that they are still operating, and adjust emission reduction calculations accordingly.

The project participants would like clarification that the supply and installation of the intuitive energy saving device is an eligible small scale demand side energy efficiency activity under AMS II.C. Paragraph 1. The intuitive energy saving device meets the definition of an energy-efficient equipment/appliance as it enables significant electricity savings in household AV and PC environments through reducing idle/active mode power wastage in addition to removing passive standby energy wastage of existing consumer devices.

The project participants would also like clarification that applicability requirements in Paragraph 2 of the methodology, which refers to limitations on the output or level of service, will not hinder energy efficiency projects that install intuitive energy saving devices. Intuitive energy saving devices achieve significant energy savings without requiring changes to user behaviour, and do not affect the users experience or interaction with the devices.

Responses from PP to additional queries submitted 25 Feb 2011:

Please provide more details on your project activity (location of your project activity, the project status, the number of devices installed by the project activity, a product catalogue or some additional information for the device, the type of AV or PC devices to be controlled by the project devices, etc);

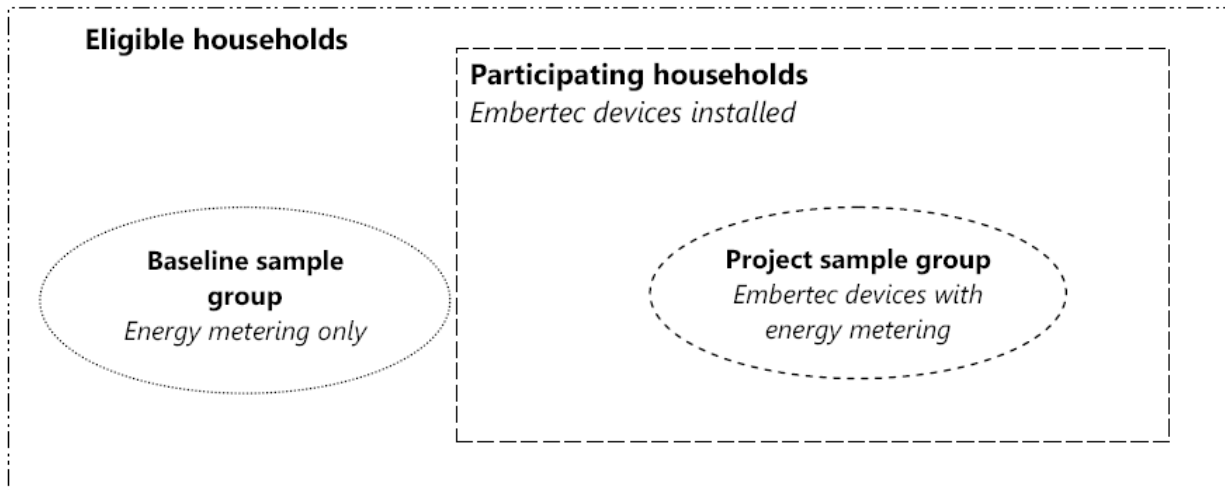
Sigma Global and Embertec are conducting early stage pre-feasibility work on potential projects using the Embertec technology in a number of locations, including South Africa and India. It is envisaged that these projects will be small scale projects under AMS-II.C. The number of households involved in each project will be determined by a number of factors, including the small scale project size limit, typical AV and PC device ownership and usage in the household demographics targeted, number of Embertec devices per household, electricity grid emission factors, grid loss factors etc. Typical household numbers in each project are estimated to be in the range 30,000 to 50,000.

Brochures for the AV and PC Embertec devices have been attached. Typical devices that are controlled by the AV device include: televisions, VCRs, digital set-top boxes, stereos, amplifiers, tuners, DVD players, gaming consoles etc. Typical devices that are controlled by the PC device include: printers, scanners, multi-function devices, powered speakers, monitors, desk lamps etc.

Please elaborate how it is proposed to determine baseline energy consumption for ex-ante;

The monitoring methodology for the proposed projects is still under development, but it is envisaged that the baseline energy consumption in year y (BEy) (used for calculating emission reductions in year y) will be determined ex-post through data recorded by a sample of specially modified Embertec devices distributed to a random sample of households eligible to participate in the project (the baseline sample group). These modified devices will have the capability for real time monitoring and recording of energy consumption of the controlled AV or PC devices. However, these devices will be intentionally configured to not turn off the controlled devices, and will therefore act as energy meters only.

In addition, the project energy consumption in year y (PE_y) will also be determined ex-post through data recorded by a sample of specially modified Embertec devices distributed to a random sample of households participating in the project (the project sample group). These modified devices will have the capability for real time monitoring and recording of energy consumption of the controlled AV or PC devices. These devices will monitor the actual energy consumption of the AV and PC devices as they are being controlled by the Embertec device.



The baseline energy consumption and project energy consumption will also be estimated ex-ante for the purposes of preparing emission reduction estimates for the Project Design Document. This will be achieved by following the same monitoring methodology proposed for the project to conduct a fixed duration trial in an area similar to the proposed project location or in the actual project location.

Please provide your preliminary calculation of emission reductions, using an actual example. What % of energy use of the appliances would you expect to save?

Estimates of baseline energy consumption and project energy consumption are not yet available for the proposed project locations. Data from monitoring in Australia has determined that average annual savings for the AV and PC Embertec devices are in the order of 737 kWh/yr and 352 kWh/yr respectively, representing savings of 54% and 41% of energy consumption of the controlled devices.

If the same level of energy savings as the Australian case was assumed, a preliminary calculation of emission reductions for a project in year y would be as follows:

Baseline emissions are calculated as;

$$E_{BL,y} = \sum_i (n_i * \rho_i * o_i) / (1 - l_y)$$

$n_i = 88,000$, assuming 44,000 households, each to be supplied with one AV Embertec device and one PC Embertec device.

$\rho_i * o_i = \frac{1370 + 853}{2} \text{ kWh}$, as an average energy use of the controlled AV and PC devices in the baseline scenario.

$$l_y = 0.1$$

$$E_{BL,y} = 108,680 \text{ MWh}$$

$$BE_y = E_{BL,y} * EF_{CO2,ELEC,y}$$

$$EF_{CO2,ELEC,y} = 0.8 \text{ tCO}_2\text{e/MWh}$$

$$BE_y = 86,944 \text{ tCO}_2\text{e}$$

$$E_{PJ,y} = \sum_i (n_i * \rho_i * o_i) / (1 - l_y)$$

$n_i = 88,000$, assuming 44,000 households, each with one AV Embertec device and one PC Embertec device installed.

$\rho_i * o_i = \frac{633 + 501}{2} \text{ kWh}$, as an average energy use of the controlled AV and PC devices in the project scenario.

$$l_y = 0.1$$

$$E_{PJ,y} = 55,440 \text{ MWh}$$

$$PE_y = E_{PJ,y} * EF_{CO2,y}$$

$$PE_y = 44,352 \text{ tCO}_2\text{e}$$

$$ER_y = (BE_y - PE_y) - LE_y$$

If leakage emissions are assumed to be 5% for the purposes of this calculation, then:

$$ER_y = 40,462 \text{ tCO}_2\text{e}$$

Please explain how often devices are switched off anyway. Does having the device affect behaviour? For example, people may switch off the TV/stereo anyway in the baseline, but knowing that the device will do it for them anyway, they would not do it anymore in the project scenario. This would affect the measurements done as part of the project monitoring;

The number of times that the devices are switched off and on will vary depending on user behaviour. Devices are switched off when the Embertec device determines that they are all in standby mode, and when the Embertec device determines that they have been left on but are no longer being used. The user is able to set the default period of time that is used by the Embertec device in determining when the devices are no longer being used.

It is possible that the presence of the device could alter user behaviour in encouraging users to utilise the energy savings features of the device and result in reduced energy savings. However, this behaviour would also be undertaken by households in the project sample group, and result in increased project energy use, and therefore lower emission reductions.

Please elaborate how it is proposed to monitor and store the energy use data in the project activity.

The Embertec devices used in the sample groups will have internal memory for automatic storage of the energy use data. This will be collected by project participants through either automatic wireless transmission (e.g. using GPRS technology), or through data download during household survey visits.

Recommendation by the SSC WG:

Please use the space below to provide amendments/change (in your expert view, if necessary).

Please refer to paragraph 30 of the meeting report of the SSC WG 30
<http://cdm.unfccc.int/Panels/ssc_wg>.

Answer to authors of query by the SSC WG:

Please use the space below to provide answer to the authors of the above query.

The small-scale working group of the CDM Executive Board would like to thank the author for the submission.

The small-scale working group would like to clarify that the proposed project activity cannot apply AMS-II.C. In its current form, AMS-II.C aims at project activities that replace certain equipment by more energy efficient equipment, it does not aim at control systems such as the intuitive energy device that controls the operating conditions of other equipment.

The small-scale working group would welcome a submission for a new methodology aiming specifically at energy efficiency control systems. Preferably, such a methodology would have a broad applicability and also include e.g. installation of occupancy sensors for lighting controls.

The methodology should take into account the following concerns:

- Changes in behavior during the crediting period, e.g. via a control group. Such a control group would have to be sufficiently large to take into account the differences in the various appliances (TVs, computers) in the household;
- Any efficiency changes of new appliances that consumers buy during the crediting period. How to identify when old appliances are replaced with new ones and how to determine the baseline energy consumption for new equipments;
- Project proponents shall check whether both the intuitive energy saving device and equipment/appliances are still in use;
- Rigorous sampling requirements to take into account various types of equipments/appliance (TVs, DVD players, stereos, etc.), socio-economic conditions of households, etc. should be included. Since power consumption varies depending on the type of different appliances, sample group should be set up for each appliance, i.e. sample group for TV, sample group for DVD player, sample group for Video, etc.

Signed by the Chair, Ms. Fatou Gaye

Date: 18/03/2011

Signed by the Vice-Chair, Mr. Peer Stiansen

Date: 18/03/2011

Information to be completed by the secretariat

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