IEC TR 62726

Edition 1.0 2014-08

TECHNICAL REPORT

colour inside

Guidance on quantifying greenhouse gas emission reductions from the baseline for electrical and electronic products and systems

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GUIDANCE ON QUANTIFYING GREENHOUSE GAS EMISSION REDUCTIONS FROM THE BASELINE FOR ELECTRICAL AND ELECTRONIC PRODUCTS AND SYSTEMS

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IEC TR 62726, which is a technical report, has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
111/335/DTR	111/345/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

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INTRODUCTION

Electrical and electronic products and systems (hereinafter referred to as EE products) are widely used in our society, hence raising awareness of their environmental impacts. Consequently customers in the market and other stakeholders are requiring, or requesting that the electronics sector takes action to address the quantification and reduction of environmental impacts through environmental conscious design during the product development phase.

Among those environmental impacts, climate change is an important issue. A number of initiatives at local, national, regional, and international levels are being developed and implemented, aiming to curb the concentration of greenhouse gas (GHG) emissions which is understood to be a major causative factor.

All industry sectors are trying to reduce GHG emissions in order to meet the national, regional and global reduction targets for the future in order to stabilize atmospheric concentration below the level of triggering catastrophic climate change. For the EE sector, developing and supplying new products that achieve GHG reductions in society compared to other products offers significant opportunities for achieving large scale GHG reductions.

Among methodologies to quantify products' impacts on climate change is carbon footprint of products (CFP), which only covers GHG emissions that occur during the life cycle of the product. Although EE products consume energy, the EE industry is enabling other sectors to reduce large amounts of GHG emission. There are different opportunities for GHG reduction when the EE industry provides the same or similar function as existing products in the marketplace but with significantly less GHG emissions. For example, a manufacturer of renewable energy technologies can be interested not only in tracking the emissions and reductions that occur during the life cycle of its products, but also in assessing the reduction in society's GHG emissions as a result of using renewable energy technologies compared to generating electricity by combusting fossil fuels.

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Examples of such products and solutions include:

- wind turbines or solar panels, compared to fossil fuel power plants;
- LED bulbs, compared to incandescent bulbs;
- online meeting (including software), compared to business travel.

For assessing this enabling effect, two scenarios are compared: the situation "with the technology" and "without or with old technology". Because the enabling effect is not included in CFP, quantification of such reductions requires a different methodology. Actually many companies are already quantifying or communicating future environmental contribution by this enabling effect through their businesses with numeric target values, such as "*help society to reduce XX million tons by 2025 through our high energy-efficient products*". Currently, various quantifications and claims for such GHG reduction are carried out mainly on a voluntary basis. However, there is no internationally recognized methodology to validate such numerical targets specifically for EE products. There is a business value in establishing an internationally recognized methodology at this time.

A basic generic and relevant methodology is provided by ISO 14064-2[1]. This ISO standard also incorporates the idea of "product-related GHG projects" and allows GHG projects to be performed as a result of product development.

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1 Numbers in square brackets refer to the Bibliography

The idea is related to EE products contributing to GHG emissions reduction such as high energy efficient EE equipment. The necessity of a sector-specific guidance applicable to the EE sector is recognized by considering specific characteristics of EE. These include their complex and dynamic supply chain, their varying lifespan, sometimes extending over many years, and associated energy consumption. Such characteristics underline the significance of the use stage of many EE products.

In accordance with ISO 14064-2, this report addresses “EE product-related GHG projects” as activity or activities performed as a result of the development and supply of EE products into the market alter the conditions identified in the baseline scenario which cause greenhouse gas emissions reduction, as well as the methodology associated with it.

In particular, the objectives of this report are as follows:

- enable organizations in the EE sector to quantify their contribution to society in reducing GHG emissions through their products and systems;
- allow EE product-related GHG projects to be evaluated in terms of their GHG emission reductions amount compared to a baseline.

In addition to the above purposes, the additional benefits below are also expected:

- facilitate incorporation of a GHG related target into design and development strategy of EE products;
- establish consistency and bridging between different product areas in the EE sector;
- help product-specific technical committees (TCs) with limited amount of expertise or resources to develop their own methodology.

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The features of this report are as follows:

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- This report contains the study and review of relevant standards, regional initiatives and practices to clarify and compare the differences and similarities in multiple existing methodologies for GHG reduction studies.
- This report is based on relevant International Standards, especially ISO 14064-2, and other forum/industry standards, and therefore gives a comprehensive guidance which enable readers to carry out GHG reduction study for EE products.

It should be also emphasized that GHG emission reduction addresses the single impact category of climate change and does not assess other potential social, economic or environmental impacts arising from the provision of products. Therefore GHG emission reductions do not provide an indicator of the overall environmental impact of products.

NOTE This report may be used as quantification guidance for GHG emission reductions as a part of the environmental impact categories in a multi-criteria environmental assessment.

The information in this report is entirely informative in nature, and does not establish or is intended to imply any normative requirements.

GUIDANCE ON QUANTIFYING GREENHOUSE GAS EMISSION REDUCTIONS FROM THE BASELINE FOR ELECTRICAL AND ELECTRONIC PRODUCTS AND SYSTEMS

1 Scope

IEC TR 62726, which is a technical report (hereinafter referred to as "report") describes principles and guidance on quantifying greenhouse gas emission (CO_2e) reductions compared to a baseline (which includes “business as usual”) for electrical and electronic products and systems (hereinafter referred as EE products).

This report addresses GHG reduction through an EE product-related GHG project, not just the difference between GHG emissions of two EE products.

This report is applicable to any type of EE product-related GHG projects which are introducing low-carbon technologies or highly energy-efficient products, etc., including both final products and intermediate products.

This report is based on the result of a comparative study on existing methodologies published or under discussion in international organizations.

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This report is intended to be used by those involved in design, development and use of EE products, and their supply chains regardless of industry sectors, regions, types, activities and sizes of organizations.

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Table 1 illustrates an example of an EE product-related GHG project and its relation with an EE product (also see Figure 2):

Table 1 – An example of EE product-related GHG projects

EE product-related GHG project	Target product	Baseline scenario
Introduction of 500 000 units of high-performance (energy-efficient) UPS in city A	High-performance (energy-efficient) UPS	1 million units of conventional UPS in city A

In this report, ISO 14064-2, ITU-T L.1410 [2] and GHG Protocol for Project Accounting, are studied and compared since these documents and initiatives are regarded as the most influential ones worldwide at the moment.

This report refers to requirements relevant to EE product-related GHG projects in the existing documents, e.g. ISO 14064-2 and GHG Protocol for Project Accounting and quotes them with boxes. The boxes are followed by guidance applicable to EE product-related GHG projects. It is to be noted that these boxes do not capture the full text of the referred standards therefore readers are encouraged to read the standards to fully understand their requirements.

This report is programme-neutral. If an organization applies for a specific programme (e.g. a greenhouse gas programme, such as certification and recognition of GHG reduction units under clean development mechanism (CDM) of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), or another climate change mitigation programme) some requirements of that programme may apply in addition to the descriptions given in this report.

NOTE 1 Under the Kyoto Protocol's CDM, a key provision is that CDM projects contribute to local sustainable development goals in addition to generating greenhouse gas emissions reduction. Sustainable development criteria may also be important to other climate change mitigation programmes. Because sustainability is not directly related to greenhouse gas emissions quantification, this report does not address such provisions or criteria.

2 Normative references

There are no normative references. Informative references are noted in the bibliography.

NOTE This clause is included so as to respect IEC clause numbering.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
assessed product
product whose related GHG emissions are assessed for a product-related GHG project

3.2
baseline scenario
hypothetical reference case that best represents the conditions most likely to occur in the absence of a proposed greenhouse gas project

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Note 1 to entry: The baseline scenario concurs with the GHG project timeline.

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[SOURCE: ISO 14064-2:2006, 2.19]

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3.3
carbon dioxide equivalent
CO_2 equivalent
CO_2e
unit for comparing the radiative forcing of a greenhouse gas to that of carbon dioxide

Note 1 to entry: The carbon dioxide equivalent is calculated by multiplying the mass of a given greenhouse gas by its global warming potential.

[SOURCE: ISO 14064-2:2006, 2.21]

3.4
EE product-related greenhouse gas project
EE product-related GHG project
activity or activities performed as a result of the development and supply of electrical and electronic products into the market that alter the conditions identified in the baseline scenario which cause greenhouse gas emissions reduction

Note 1 to entry: This definition was created in accordance with ISO 14064-2:2006, 2.12 and A.3.2.4.

[SOURCE: ISO 14064-2:2006, 2.12, modified]

3.5
functional unit
quantified performance of a product system for use as a reference unit

Note 1 to entry: As the CFP treats information on a product, the functional unit can be a product unit, sales unit or service unit.

[SOURCE: ISO TS 14067:2013, 3.1.4.8] [3]

3.6
global warming potential
GWP
characterization factor (ISO 14040:2006, 3.37) [4] describing the radiative forcing impact of one mass unit of a given greenhouse gas relative to that of carbon dioxide over a given period of time

[SOURCE: ISO TS 14067:2013, 3.1.3.4]

3.7
greenhouse gas
GHG
gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, the atmosphere, and clouds

Note 1 to entry: Greenhouse gases include, among others, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

[SOURCE: ISO 14064-1:2006, 2.1] [5]

3.8
greenhouse gas emission
GHG emission
total mass of a greenhouse gas released to the atmosphere over a specified period of time

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[SOURCE: ISO 14064-1:2006, 2.5]

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3.9
greenhouse gas project
GHG project
activity or activities that alter the conditions identified in the baseline scenario which cause greenhouse gas emissions reduction

[SOURCE: ISO 14064-2:2006, 2.12 , modified – omission of " .. or greenhouse gas removal enhancements"]

3.10
greenhouse gas reduction
GHG reduction
calculated decrease of GHG emissions between a baseline scenario and the project

[SOURCE: ISO 14064-2:2006, 2.7, modified – original term is "greenhouse gas emission reduction"]

3.11
greenhouse gas reduction study
GHG reduction study
study that quantifies the greenhouse gas reduction

3.12
greenhouse gas removal
GHG removal
total mass of a greenhouse gas removed from the atmosphere over a specified period of time

[SOURCE: ISO 14064-1:2006, 2.6]

3.13
greenhouse gas reservoir
physical unit or component of the biosphere, geosphere or hydrosphere with the capability to store or accumulate a GHG removed from the atmosphere by a greenhouse gas sink or a GHG captured from a greenhouse gas source

Note 1 to entry: The total mass of carbon contained in a GHG reservoir at a specified point in time could be referred to as the carbon stock of the reservoir.

Note 2 to entry: A GHG reservoir can transfer greenhouse gases to another GHG reservoir.

Note 3 to entry: The collection of a GHG from a GHG source before it enters the atmosphere and storage of the collected GHG in a GHG reservoir could be referred to as GHG capture and storage.

[SOURCE: ISO 14064-2:2006, 2.4]

3.14
greenhouse gas sink
physical unit or process that removes a GHG from the atmosphere

[SOURCE: ISO 14064-2:2006, 2.3]

3.15
greenhouse gas source
physical unit or process that releases a GHG into the atmosphere

[SOURCE: ISO 14064-2:2006, 2.2]

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3.16
intermediate product
output from a unit process that is input to other unit processes that require further transformation within the system

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[SOURCE: ISO 14040:2006, 3.23]

3.17
life cycle
consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to the final disposal

[SOURCE: ISO 14040:2006, 3.1]

3.18
monitoring
continuous or periodic assessment of GHG emissions and removals or other GHG-related data

[SOURCE: ISO 14064-2:2006, 2.25]

3.19
organization
group of people and facilities with an arrangement of responsibilities, authorities and relationships

[SOURCE: ISO 9000:2005, 3.3.1 [5], modified – omission of the EXAMPLE and the 3 Notes to entry]

3.20
primary effect
intended change caused by a project activity in GHG emissions, removals, or storage associated with a GHG source or sink

[SOURCE: The Greenhouse Gas Protocol for Project Accounting: 2005, subclause 2.4][6]

3.21
product
any goods or service

Note 1 to entry: This includes interconnected and/or interrelated goods or services.

[SOURCE: IEC 62430:2009, 3.14]

3.22
product category
group of technologically or functionally similar products where the environmental aspects can reasonably be expected to be similar

[SOURCE: IEC 62430:2009, 3.15] [7]

3.23
reference function
set of performance characteristics (including a combination of conventional products or human activities) having equivalent function with an assessed product

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3.24
reference product
product whose related GHG emissions are assessed for a baseline scenario

3.25
secondary effect
unintended change caused by a project activity in GHG emissions, removals, or storage associated with a GHG source or sink

[SOURCE: The Greenhouse Gas Protocol for Project Accounting:2005, subclause 2.4]

3.26
target product
product which enables a GHG reduction

Note 1 to entry: The target product is different from the assessed product when the target product is an intermediate product (e.g. inverter driver circuit) to be integrated into the assessed product (e.g. an air conditioner) and enable the assessed product to reduce GHG emissions.

3.27
uncertainty
parameter associated with the result of quantification which characterizes the dispersion of the values that could be reasonably attributed to the quantified amount

Note 1 to entry: Uncertainty information typically specifies quantitative estimates of the likely dispersion of values and a qualitative description of the likely causes of the dispersion.

[SOURCE: ISO 14064-2:2006, 2.30]

3.28
validation
systematic, independent and documented process for the evaluation of a GHG assertion in a GHG project plan against agreed validation criteria

[SOURCE: ISO 14064-2:2006, 2.26, modified – omission of the two NOTES to entry]

3.29
verification
systematic, independent and documented process for the evaluation of a greenhouse gas assertion against agreed validation criteria

[SOURCE: ISO 14064-2:2006, 2.28, modified – Omission of the NOTE to entry]

4 Principles

4.1 Provisions in existing standards

Existing standards describe "principles" as follows:

3.1 General

The application of principles is fundamental to ensure that GHG-related information is a true and fair account. The principles are the basis for, and will guide the application of, requirements in this part of ISO 14064.

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3.2 Relevance

Select the GHG sources, GHG sinks, GHG reservoirs, data and methodologies appropriate to the needs of the intended user.

3.3 Completeness

Include all relevant GHG emissions and removals. Include all relevant information to support criteria and procedures.

3.4 Consistency

Enable meaningful comparisons in GHG-related information.

3.5 Accuracy

Reduce bias and uncertainties as far as is practical.

3.6 Transparency

Disclose sufficient and appropriate GHG-related information to allow intended users to make decisions with reasonable confidence.

3.7 Conservativeness

Use conservative assumptions, values and procedures to ensure that GHG emission reductions or removal enhancements are not over-estimated.

[Source: ISO 14064-2:2006]