GHG Protocol – Software Factsheet

How do I use this methodology? Ask for support!

Please note that the factsheet below is part of the GHG Protocol ICT Sector Guidance, which contains six chapters. The first chapter is an introduction to the general principles of life cycle accounting and reporting in the ICT sector; the following five chapters are divided into five separate factsheets, for better readability – and are available on the map of methodologies of the project. Although no specific factsheet was developed for the introduction chapter, relevant content is included in the factsheet below on Software.

	GHG Protocol ICT Sector Guidance – Software
Name of Initiative/Methodology	ICT Sector Guidance built on the GHG Protocol Product Life Cycle Accounting and Reporting Standard – Chapter 6 – Guide for assessing GHG emissions of Software
Link to the latest published version	GHG Protocol ICT Sector Guidance (07/2017): Final version www.ghgprotocol.org/sites/default/files/ghgp/GHGP-ICTSG%20-%20ALL%20Chapters.pdf
Developed by	Carbon Trust, Global e-Sustainability Initiative (GeSI)
History and Status	• Work started in 2011, issued as drafts in two rounds of public consultation • Published in July 2017
Involved companies / parties	**Steering Committee**: Alcatel Lucent, BT, Carbon Trust, CDP, Cisco, Deutsche Telekom, European Commission, Ericsson, Fujitsu, Gartner, GeSI, HP, ITU, Massachusetts Institute of Technology, World Business Council for Sustainable Development, World Resources Institute, WSP

Scope	✖ **Organisation env. accounting** ✖ Scope 1 ✖ Scope 2 ✖ Scope 3	✔ **Product env. assessment** ✔ Life cycle approach ✔ Use phase only
	✔ GWP ✔ Energy (focus on secondary energy)	✖ Other environmental impacts ✖ KPIs

System(s) covered by the methodology	Any software, with a particular focus on the use stage for the following software: • Operating system (OS) (at consumer level devices) • Applications (at consumer level devices) • Virtual machines (focus on devices within a data centre environment)
Goals	• Assessing the life cycle GHG impact of a software as a product (e.g. where the software forms part of a larger ICT service or system, or comparing electronic software distribution with distribution using physical media) • Measuring in detail the energy consumption and corresponding GHG impact of a software at the use stage (e.g. to understand changes in the design or operations of the software or hardware)

Generic features	• All stages other than the use stage may be grouped together (embodied emissions)
	• Critical review by a first or third party is required
	• Offsets, avoided and delayed emissions are not to be included in the inventory results
	• Functional unit:
	  ◦ For all final products, the unit of analysis is defined as a functional unit
	  ◦ For intermediate products where the eventual function is unknown, the unit of analysis is defined as the reference flow
	• Cradle-to-gate and gate-to-gate inventory results should be reported separately (if not limited by confidentiality)
	• Companies shall disclose and justify any exclusions of attributable processes in the inventory report
	• Companies shall collect primary data for all processes under their ownership / control
	• Companies shall assess the data quality of activity data, emission factors, and/or direct emissions data

ICT-specific features	• The functional unit should define the software's magnitude or quantity, its duration or life, and its quality
	• A screening assessment is recommended in order to determine if a detailed assessment of the embodied emissions (all stages but 'Use') is necessary:
	  ◦ 'Material acquisition and pre-processing': considers the use of existing software libraries or modules as 'raw materials'
	  ◦ 'Production': includes the energy required for the buildings and equipment, office supplies, and potential business travel related to the development and testing procedures of the software
	  ◦ 'Distribution and storage': service delivery (electronic or by physical media)
	  ◦ 'End of life': for software distributed by physical media, the emissions associated with the end of life of the media should be considered
	• Assessment of energy consumption in order to calculate the related GHG emissions during the use stage of a software is detailed
	• Power consumption value should reflect software utilisation and design features through power measurement (i.e. integrate power management of the device). A 'typical' device should be defined
	• Measured data is preferred over secondary data. Methodologies on how to set up and perform benchmark tests (or assess the power consumption) are provided for OS and application software (or virtual machines).
	• The results reported should include a description of the chosen methodology

Examples of implementation / experience feedback	Williams and Tang (2012) Methodology To Model the Energy and Greenhouse Gas Emissions of Electronic Software Distributions
Interaction with other methodologies	• [IEC TR 62725] Analysis of quantification methodologies of greenhouse gas emissions for electrical and electronic products and systems • [ISO/TS 14067] Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification and communication • [ISO 14040] Environmental management - Life cycle assessment - Principles and framework • [ISO 14044] Environmental management - Life cycle assessment - Requirements and guidelines • [GHG Protocol] Product Life Cycle Accounting and Reporting Standard • [ETSI TS 103 199] Life Cycle Assessment (LCA) of ICT equipment, networks and services; General methodology and common requirements • [ETSI ES 203 199/ITU-T L.1410] Methodology for environmental life cycle assessments of information and communication technology goods, networks and services • [PAS 2050] Specification for the assessment of the life cycle greenhouse gas emissions of goods and services • [EU Energy Star] • [IEC 62301] Household electrical appliances - Measurement of standby power • [IEC 62087] Methods of measurement for the power consumption of audio, video and related equipment