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COMMISSION STAFF WORKING DOCUMENT

EU GPP Criteria for Computers and Monitors

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EU GPP criteria aim at facilitating public authorities the purchase of products, services and works with reduced environmental impacts. The use of the criteria is voluntary. The criteria are formulated in such a way that they can be, if deemed appropriate by the individual authority, integrated into its tender documents. Green Public Procurement (GPP) is a voluntary instrument. This document provides the EU GPP criteria developed for the Computers and Monitors product group. The accompanying Technical Background Report provides full rationales supporting the selection of these criteria and references for further information.

The criteria are split into Selection Criteria, Technical Specifications, Award Criteria and Contract Performance Clauses. For each criteria area two sets of criteria are presented:

- *The Core criteria are designed to allow for easy application of GPP, focussing on the key area(s) of environmental performance of a product and aimed at keeping administrative costs for companies to a minimum.*
- *The Comprehensive criteria take into account more aspects or higher levels of environmental performance, for use by authorities that want to go further in supporting environmental and innovation goals.*

1. INTRODUCTION

1.1 Definition and Scope

The criteria for Computers and Monitors encompass computers and display devices. For the purpose of these GPP criteria the following scope shall apply, which reflects the Agreement between the USA and the EU ¹ as amended by Energy Star v6.1 for Computers and v6.0 for Displays:

Stationary computers

¹ Regulation (EC) No 106/2008 of 15 January 2008 on a Community energy-efficiency labelling programme for office equipment

- Desktop Computers (incl. Integrated Desktop Computers and Thin Clients)
- Small-scale servers
- Workstations

Display devices

- Computer monitors

Portable computers

- Notebook Computers (including subnotebooks)
- Two-In-One Notebook
- Tablet Computers
- Portable All-In-One Computer
- Mobile Thin Client

Note on requirements for Central Government procurement

Article 6 and Annex III of the Energy Efficiency Directive (2012/27/EU), which had to be transposed into national law by June 2014, set out specific obligations for public authorities to procure certain energy efficient equipment. This includes the obligation to purchase only those products that:

'Comply with energy efficiency requirements not less demanding than those listed in Annex C of the Agreement between the Government of the United States of America and the European Community on the coordination of energy-efficiency labelling programmes for office equipment ('Energy Star')²

This obligation is limited to central government and for purchases above the thresholds set out in the procurement directives. Moreover, the requirements have to be consistent with cost-effectiveness, economic feasibility, wider sustainability, technical suitability and sufficient competition. These factors can differ between public authorities and markets. For more guidance on the interpretation of this aspect of Article 6 and Annex III of the EED regarding procurement of energy-efficient products, services and buildings by central government authorities, please see points 33-42 of the Commission guidance document³.

² OJ L 63, 6.3.2013, p. 5.

³ COM/2013/0762 final, Communication from the Commission to the European Parliament and the Council, *Implementing the Energy Efficiency Directive – Commission Guidance*

1.2 Procurement options and contract types

The procurement process may take a number of different forms depending on the circumstances of the specific case. The three typical forms of contract that can be seen in the market are as follows:

1. One-off supply contract: The winning bidder has to supply the specified number of items of IT equipment to the required performance specifications;
2. Longer-term framework contract: The contract lays down performance specifications for which either a single or multiple bidders are selected to supply items of IT equipment on a 'call down' basis during a specified period of time. The bidders may be selected on the basis of either:
 - a. Their ability to supply specific models of IT equipment that meet the stipulated performance specifications;
 - b. Their capability to supply IT equipment that meets the minimum performance specifications. The IT equipment shall be specified in ensuing competitions during the framework contract;
3. Service contract: The contract lays down the IT functional performance requirements that shall be provided by the selected service provider(s). It is then the responsibility of the contracted service provider(s) to determine the best way of providing the stipulated functional performance. The IT equipment is leased to the contracting authority.

In cases 1. and 2., the successful bidder(s) will also be responsible for warranting that the IT equipment supplied is in conformity with the contracting authority's specifications. In case 3, the successful bidder will be responsible for guaranteeing that the equipment used to fulfil the service, as well as any associated IT support, meets the contracting authority's performance requirements. The service contract would tend to encompass the whole service life cycle of the IT equipment provided for use by the contracting authority, including repairs and upgrades, as well as retirement and preparation for re-use or recycling. The criteria in Section 4.1 of this document can be adapted for use in all three cases, although the timing of the verification may need to differ (see Section 3 for further information).

A further type of contract that specifically addresses the end-of-life management of IT equipment is covered in Section 4.2 of this criteria document. This can potentially take two forms:

- Renewal of old IT equipment: A contract to take away old IT equipment may be let in parallel with, or in combination with, a contract for the supply of new IT equipment. For example, some suppliers remanufacture their own brand products and/or can certify data erasure and proper treatment of collected equipment from any brand, or;
- End of life management services: A separate contract may be let with the specific intention of attracting bidders that are specialised in the re-use and recycling of used IT equipment. In many EU countries, social enterprises are bidding to manage end-of-life IT equipment.

2. KEY ENVIRONMENTAL IMPACTS

The criteria for Computers and Monitors focus on the most significant environmental impacts during the life cycle of the products, which have been divided into four distinct categories:

- Energy consumption;
- Hazardous substances;
- Product lifetime extensions;
- End of life management.

Evidence from life cycle assessments suggest that environmental criteria for Computers and Monitors should make a distinction based on the form factor of the computer (e.g. desktop, notebook, tablet) and the use pattern of computers and displays:

- *Those that are more energy-intensive to run:* For desktop computers and displays the most significant environmental impacts are associated with electricity consumed during their use.
- *Those using less energy to run:* For notebooks and tablets, which use proportionally less electricity and consist of more advanced miniaturised components, the most significant environmental impacts relate to the manufacturing of their sub-assemblies such as motherboards, hard drives, batteries and display units.
- *Those that are portable:* The conditions and stresses which portable products are exposed to in the workplace or in the outside environment will influence their lifespan.

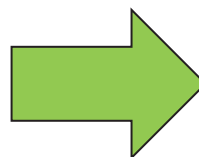
Whilst criteria addressing energy use are familiar to procurers and have a direct influence on performance, the potential for EU GPP criteria to directly influence the production of single computer components is considered to be limited. This is in part because of the difficulty in identifying the potential for improvements because of issues such as confidentiality, for example, in the case of CPU and motherboard production. A different focus is therefore required. By improving product design life (e.g. design for durability and upgrading), thereby indirectly extending the lifetime of products by facilitating re-use and by enabling metals and Critical Raw Materials⁴ that are associated with significant environmental impacts along the products life cycle to be easily extracted and recovered from products at the end of their life, the impacts of the manufacturing phase can be reduced as impacts associated with primary production stages and resource extraction can be avoided.

⁴ There is a list of critical raw materials to the EU. For further information, see http://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical/index_en.htm

Product lifetime extension through improved durability, upgradeability and repairability has, as a result of Life Cycle Assessment (LCA) evidence and market analysis, been given specific attention in the criteria. Evidence relating to the reasons for early failure or replacement of products, together with common improvement specifications brought forward by manufacturers, inform the criteria. The potential to extend the life of a product during and after its service life with the public authority has also been addressed through opportunities for upgrading and repairing products, and also through the potential for the equipment to be re-used and therefore given a second life.

The extraction and recovery of metals and Critical Raw Materials from computer and display products at the end of their life has the potential to increase the EU's resource efficiency and reduce the impact of making new IT products. The criteria therefore reflect the state of the art for encouraging the selective dismantling and disassembly of equipment.

Key Environmental Aspects	GPP Approach
<ul style="list-style-type: none"> • Energy consumption and resulting Greenhouse Gas emissions from production and use. • Air, soil and water pollution, bioaccumulation and effects on aquatic organisms due to raw material extraction and processing, and hazardous substances used in products. • Consumption of finite resources and critical raw materials to produce IT products. • Generation of potentially hazardous waste electronic equipment upon its final disposal 	<ul style="list-style-type: none"> • Purchase energy efficient models • Purchase products with a restricted amount of hazardous constituents and with a reduced potential for hazardous emissions upon disposal • Design for durability, upgradeability and repairability • Product life extension upon the end of its service life • Design for dismantling and End-of-life management to maximise the recovery of resources



Please note that the order of environmental aspects does not necessarily translate to the order of their importance.

3. GENERAL NOTE ON VERIFICATION

For a number of criteria, the proposed means of verification is the provision of test reports. For each of the criteria, the relevant test methods are indicated. It is up to the public authority to decide at which stage such test results should be provided. In general, it does not seem necessary to require all tenderers to provide test results from the outset. To reduce the burden on tenderers and public authorities, a self-declaration could be considered as sufficient when submitting bids. Then, there are different options for if and when these tests could be required:

- a) At tendering stage:

For one-off supply contracts, the bidder with the most economically advantageous tender could be required to provide this proof. If the proof is deemed to be sufficient, the contract can be awarded. If the proof is deemed insufficient or non-compliant then:

- (i) in the case of a technical specification the proof would be requested from the next highest-scoring bidder who would then be considered for contract award;
- (ii) in the case of an award criterion the additional points awarded would be removed from this tender and the tender ranking would be recalculated with all the ensuing consequences applying.

This is however only ensuring that a sample model has been tested for these requirements, not the equipment actually delivered under the contract. For framework contracts the situation may be different, and this is covered further in the next point relating to contract execution and in the additional explanations below.

- b) During contract execution: The test results could be requested for one or several items delivered under the contract, either in general, or if there are any doubts of false declarations. This is particularly important for framework contracts which do not stipulate an initial order of equipment.

It is recommended to explicitly include in the contract clauses on performance. These should stipulate that the contracting authority is entitled to execute random verification tests (by themselves or a specialised body) at any time during the term of the contract. In the case that the results of such tests show that the delivered products do not meet the criteria, the contracting authority shall then be entitled to apply penalties in proportion to the failure and has the possibility to terminate the contract. Some public authorities include conditions that if, following the tests, the product is meeting their requirements, the testing costs have to be borne by the public authority; but if the requirements are not met, the costs have to be borne by the supplier.

For *framework agreements*, it will depend on the specific set-up of the contract when to ask for the provision of proof:

- For framework agreements with a single operator where the individual models to be delivered are identified when awarding the framework agreement, and it is just a question of how many units will be needed, the same considerations apply as for one-off supply contracts above.
- For framework agreements pre-selecting several potential suppliers with ensuing competitions among those pre-selected, at this initial preselection stage tenderers may only need to show their capability to deliver products meeting the minimum performance requirements of the framework agreement. For ensuing call-down contracts (or orders) that are awarded following the competition among the pre-selected suppliers, in principle the same considerations as under a) and b) above apply, if additional requirements have to be proven under the competition. If the competition is only about price, then a check at the contract execution stage should be considered.

It is also important to highlight the potential for bidders to provide verification based on equipment holding the EU Ecolabel or another relevant Type I Eco-label I (according to ISO 14024) fulfilling the same specified requirements. This equipment shall also be deemed to comply with the relevant criteria, and verification would be requested following the same approach as has been set out for test results.

Please also note that, according to Art. 44 (2) of Directive 2014/24/EU contracting authorities shall accept other appropriate means of proof. This could include a technical dossier of the manufacturer where the economic operator concerned had no access to test reports, or no possibility of obtaining them within the relevant time limits. This is under the condition that the lack of access was not attributable to the economic operator concerned and that the economic operator concerned thereby proves that the works, supplies or services provided by it meet the requirements or criteria set out in the technical specifications, the award criteria or the contract performance conditions. In case a reference to a certificate/test report drawn up by a specific conformity assessment body is made, for the execution of the tests contracting authorities shall also accept certificates/test reports issued by other equivalent assessment bodies.

4. EU GPP CRITERIA FOR COMPUTERS AND MONITORS

4.1 Procurement of Computers and Monitors

Subject matter	
Purchase of computers and/or displays with low environmental impacts throughout their lifecycle.	
4.1.1 Core criteria <i>4.1.1.1 Technical specifications</i>	
Energy criteria	
TS1. Minimum Energy performance for computers Rationale: Computers compliant with Energy Star requirements are expected to demonstrate significantly reduced energy consumption in the stand-by and idle modes, which represent a significant proportion of the energy use of computers and laptops.	<p>The energy efficiency performance of computers shall meet the energy efficiency requirements of the latest version of the Energy Star standard.</p> <p><i>The version in force at the time of publication is 6.1 and updates can be followed at this weblink:</i></p> <p><i>http://www.eu-energystar.org/specifications.htm</i></p> <p><i>Annex III of Directive 2012/27/EU on energy efficiency, requires that computers purchased by central government shall meet the latest EU version of Energy Star.</i></p> <p>Verification: The tenderer shall provide test reports carried out according to the test methods laid down in the latest version of the Energy Star. These shall be provided upon award of the contract or prior to that upon request.</p> <p>Models that have qualified for EU Energy Star and are registered on the programme's database shall be deemed to comply. Energy Star registrations under the latest version in the USA shall also be accepted provided that testing according to European input power requirements has been carried out.</p> <p>Products holding the EU Ecolabel for personal, notebook and tablet computers or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>

<p>TS2. Minimum energy performance of monitors</p> <p>Rationale:</p> <p>Computer monitors compliant with Energy Star requirements are expected to demonstrate significantly reduced energy consumption in the active mode.</p>	<p>The energy efficiency performance of monitors shall meet the energy efficiency requirements of the latest version of the Energy Star standard.</p> <p><i>The version in force at the time of publication is 6.0 and updates can be followed at this weblink:</i></p> <p>http://www.eu-energystar.org/specifications.htm</p> <p><i>Annex III of Directive 2012/27/EU on energy efficiency, requires that office equipment purchased by central government shall meet the latest version of Energy Star.</i></p> <p>Verification:</p> <p>The tenderer shall provide test reports carried out according to the test methods laid down in the latest version of Energy Star. These shall be provided upon request <i>prior to or following [to be specified]</i> award of the contract.</p> <p>Models that have qualified for EU Energy Star and are registered on the programme's database shall be deemed to comply. Energy Star registrations in the USA shall also be accepted provided that testing according to European input power requirements has been carried out.</p> <p>Products holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
Hazardous Substances criteria	
<p>TS3. Declaration for REACH Candidate List substances</p> <p>Rationale:</p> <p>The European Chemicals Agency (ECHA) publishes a list of substances classified as Substances of Very High Concern (SVHC). These may be Carcinogenic, Mutagenic of toxic for Reproduction (CMR), and/or Persistent, Bioaccumulative and Toxic in the environment (PBT). These substances are entered onto a Candidate List for restriction in the EU. The disclosure of their presence in IT equipment increases transparency and thus the potential for control of their use.</p>	<p>The tenderer shall declare the presence of any REACH Candidate List substances at a concentration of greater than 0.1% (weight by weight) in the whole product and in each of the following sub-assemblies</p> <ul style="list-style-type: none"> - Populated motherboard (including CPU, RAM, graphics units); - Display unit (including backlighting); - Casings and bezels; - External keyboard, mouse and/or trackpad; - External AC and DC power cords (including adapters and power packs) <p>Verification:</p> <p>The tenderer shall provide a declaration identifying specific substances that are present.</p>
Product lifetime extension	
<p>TS4. Warranty and service agreements</p>	<p>The tenderer shall provide a minimum two-year warranty effective from delivery of the product. This warranty shall cover repair or</p>

<p>Rationale:</p> <p>Defective equipment or components can be a cause for premature replacement. The existence of a warranty and service agreement can both provide an incentive for suppliers to ensure increased longevity of their products and to assure that they will take responsibility for repairing any defects.</p>	<p>replacement and include a service agreement with options for pick-up and return or on-site repairs.</p> <p>The warranty shall guarantee that the products are in conformity with the contract specifications at no additional cost. This shall cover battery defects ⁵.</p> <p>Verification:</p> <p>The tenderer shall provide a written declaration that the products supplied will be warranted in conformity with the contract specifications and service requirements.</p>
<p>TS5 Repairability and replacement of components and parts</p> <p>Rationale:</p> <p>The criteria aim to assure that repairable defects, mainly caused by the failure of replaceable components, will not result in the early retirement of the equipment.</p>	<p>TS5(a) Continued availability of spare parts</p> <p>The tenderer shall guarantee the availability of spare parts, including as a minimum those identified in criterion TS5(b), for at least three years from the date of purchase.</p> <p>Verification:</p> <p>The tenderer shall provide a declaration that compatible spare parts, including rechargeable batteries (if applicable), will be made available to the contracting authority or through a service provider.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p> <hr/> <p>TS5(b) Design for repairability</p> <p>The following parts, if applicable, shall be easily accessible and replaceable by the use of universally available tools (i.e. screwdriver, spatula, plier or tweezers):</p> <p>Computers</p> <ul style="list-style-type: none"> (i) HDD/SSD, (ii) Memory, (iii) Rechargeable battery, <p>Displays</p> <ul style="list-style-type: none"> (i) Screen assembly and LCD backlight (ii) Power and control circuit boards (iii) Stands (excluding those integrated with the enclosure)

⁵ Defects shall be considered to include failure to charge as well as detection of the battery's connection. A progressive drop in battery capacity due to usage shall not be considered to be a defect unless it is covered by a specific warranty provision (see criterion C6).

	<p>Tablets and two-in-one notebooks shall be exempt for computer parts (i) and (ii). <i>For these products award criterion C7 shall be used to encourage better design.</i></p> <p>The tenderer shall provide clear disassembly and repair instructions (e.g. hard or electronic copy, video) to enable a non-destructive disassembly of products for the purpose of replacing key components or parts for upgrades or repairs. This shall be made available in hard copy or via the manufacturer's webpage.</p> <p>Verification:</p> <p>A manual shall be provided by the tenderer, which shall include an exploded diagram of the device illustrating the parts that can be accessed and replaced, and the tools required. It shall also be confirmed which parts are covered by service agreements under the warranty.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p> <hr/> <p>TS5(c) Ease of replacement for rechargeable batteries</p> <p>Rechargeable batteries shall not be glued or soldered into portable products. It shall be possible for a professional user or repair service provider to replace the rechargeable battery.</p> <p>Instructions on how the rechargeable battery packs are to be removed shall be provided in the user instructions or via the manufacturer's webpage.</p> <p>Verification:</p> <p>The tenderer shall illustrate how the battery is installed in the product, the steps required to remove and cover markings. A copy of relevant user instructions shall also be provided.</p> <p>The Contracting Authority reserves the right to request a visual inspection of a random selection of the supplied products. Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
<p>End-of-life management</p>	

<p>TS6. Marking of plastic casings, enclosures and bezels</p> <p>Rationale:</p> <p>The marking of plastic parts facilitates their recycling, as it allows the recycling operator to separate more efficiently the different plastic pieces by material type.</p>	<p>External plastic casings, enclosures and bezels with a weight greater than 100 grams and a surface area greater than 50 cm² shall be marked in accordance with ISO 11469 and ISO 1043-1.</p> <p>Verification:</p> <p>The tenderer shall identify the plastic parts by their weight, their polymer composition, and their ISO 11469 and ISO 1043 markings. The dimension and position of the marking shall be visually illustrated.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
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4.1.1.2 Award criteria

Energy criteria	
<p>AC1. Improvement in the energy consumption upon the specified Energy Star standard</p> <p>Rationale:</p> <p>Increased energy efficiency over and above the minimum requirements laid down by Energy Star is to be encouraged and rewarded for all product types – particularly for more energy intensive desktop computers in combination with displays.</p>	<p><i>It is recommended to use this criterion in conjunction with TS1 for desktop computers if the products specified are for graphics intensive uses.</i></p> <p>Points will be awarded if the product is more energy efficient than the E_{TEC_MAX} value⁶ for computers and the P_{ON_MAX} value for monitors⁷. These shall be calculated in comparison with the minimum performance required under Energy Star (see Criterion TS1 and TS2).</p> <p>A maximum of x points [<i>to be specified</i>] may be awarded. Points shall be awarded in proportion to the improvement in energy efficiency in comparison to the E_{TEC_MAX} or P_{ON_MAX} value:</p> <ul style="list-style-type: none"> • over 80% lower: x points • 60-79% lower: 0.8x points • 40-59% lower: 0.6x points • 20-39% lower: 0.4x points

⁶ E_{TEC_MAX} is the maximum power consumption that a computer shall consume upon testing in order to be awarded the Energy Star label. This maximum threshold is calculated for a computer in accordance with Equation 2 in Decision (EU) 2015/1402 which implements Energy Star 6.1 in the EU,

⁷ P_{ON_MAX} is the maximum on-mode power consumption that a computer monitor shall consume upon testing in order to be awarded the Energy Star label. This maximum threshold is calculated for a computer monitor in accordance with Table 1 in Decision 2014/202/EU which implements Energy Star 6.0 in the EU,

	<ul style="list-style-type: none"> • 10-19% lower: 0.2x points <p><i>Alternatively, instead of using the E_{TEC_MAX} value for computers or the P_{ON_MAX} value for monitors a Life Cycle Costing calculation could be requested, whereby the offered improvement potential would lead to a relative decrease in the overall running costs of a product compared to a less energy efficient model.</i></p> <p>Verification:</p> <p>The tenderer shall provide test reports carried out according to the test methods laid down in the latest version of the Energy Star. The E_{TEC} value or the P_{ON} value from a test report or for qualified models as entered on the EU Energy Star database shall be accepted. These shall be provided upon award of the contract or prior to that upon request.</p>
Product lifetime extension ⁸	
<p>AC2. Cost competitiveness of spare parts</p> <p>Rationale:</p> <p>This criterion aims to assure that repair operations are economically attractive when compared with equipment replacement, therefore avoiding premature retirement due to economic considerations.</p>	<p>The tenderer shall provide a price list for, as a minimum, the following component parts:</p> <p><i>[the parts list to be provided here, with the TS5(b) list to be provided as a minimum]</i></p> <p>For the component parts listed above indicative labour costs for replacements carried out by the tenderer's authorised service providers shall be provided. Points shall be awarded according to the most cost-competitive offers.</p> <p><i>Additional component parts, if considered important to the price comparison, should be added to the list provided.</i></p> <p>Verification:</p> <p>The tenderer shall provide a price list for original or compatible spare parts and indicative labour costs for their replacement, including rechargeable batteries (if applicable).</p>
<p>AC3. Longer warranties and services agreements</p> <p>Rationale:</p> <p>Longer warranties and service agreements are to be encouraged and rewarded as they provide an incentive for suppliers both to ensure increased longevity for their products and that repairable defects will</p>	<p>Additional points shall be awarded to each additional year of warranty and service agreement offered that is more than the minimum technical specification. This shall be awarded</p> <p>A maximum of x points <i>[to be specified]</i> may be awarded.</p> <ul style="list-style-type: none"> • +4 years or more: x points

⁸ Instead of setting two separate award criteria on spare parts and warranties, this could be merged into one criterion, evaluating the overall offer including the length of the warranty, its comprehensiveness and the spare parts offer.

<p>not result in the early retirement of the equipment.</p>	<ul style="list-style-type: none"> • +3 years: 0.75x points • +2 years: 0.5x points • +1 year: 0.25x points <p>Verification:</p> <p>A copy of the warranty and service agreement shall be provided by the tenderer. They shall provide a declaration that they cover the conformity of the goods with the contract specifications.</p>
<p>AC4. Tablet and all-in-one notebook memory and storage</p> <p>Rationale:</p> <p>This criterion aims to assure that the equipment will not be prematurely retired due to insufficient memory capacity and upgrade potential, both of which may restrict future potential to run new software and improved operating systems.</p>	<p>Points shall be awarded for products that incorporate the following features:</p> <p>(i) RAM memory</p> <ul style="list-style-type: none"> - Soldered RAM with a minimum capacity of 4GB, or; - The potential to replace and upgrade the RAM (socketed design). <p>(ii) Mass storage</p> <ul style="list-style-type: none"> - The potential to expand the storage by using slots supporting mass storage media, or - Additional mass storage incorporated into the keyboard (<i>for all-in-one notebooks</i>). <p><i>The RAM memory sub-criteria are not suitable for devices designed to run their main applications from the cloud. This criterion should not be used to compare bids that offer differing solutions i.e. integrated or cloud storage.</i></p> <p>Verification:</p> <p>The tenderer shall provide details of the physical design of the memory and/or storage capacity of the model(s) to be supplied.</p>
<p>AC5. Rechargeable battery life and endurance</p> <p>Rationale:</p> <p>This criterion aims to reward increased</p>	<p>Points shall be awarded for improved endurance greater than 300 cycles (with 80% capacity retention) respectively. A maximum of x points <i>[to be specified]</i> may be awarded.</p> <ul style="list-style-type: none"> • 1000 cycles or more: x points • 800 cycles or more : 0.75x points

<p>battery lifetimes, thus reducing the environmental impacts associated with new battery production and potentially extending the life of battery powered products.</p>	<ul style="list-style-type: none"> • 500 cycles or more: 0.5x points • Up to 499 cycles: 0.25x points <p><i>The minimum battery life in hours shall be set according to the Contracting Authority's requirements.</i></p> <p>Verification:</p> <p>The tenderer shall provide a test report for the battery cells or packs showing compliance according to the IEC EN 61960 'endurance in cycles' test carried out at 25°C and at a rate of either 0.2 I_t A or 0.5 I_t A (accelerated test procedure).</p> <p>Partial charging may be used to comply as long as the software is factory-installed as the default setting and the tender requirements on battery life are met at the partial charging level complying with the cycle requirement.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
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4.1.2 Comprehensive criteria

4.1.2.1 Selection criteria

Hazardous Substances criteria	
<p>SC1. Restricted substance controls</p> <p>Rationale:</p> <p>Some substances used in the manufacture of computers and monitors are known to be particularly harmful to the environment or human health. These substances can be released to the environment either during:</p> <ul style="list-style-type: none"> - the manufacturing process (potentially exposing the workforce and the environment); - the use of equipment (potentially exposing the user); - or when equipment is recycled or disposed of (potentially exposing whole local communities and the food chain). <p>By having controls for the presence of such substances at the design and production stage, these different life cycle impacts can be minimised.</p>	<p>The tenderer shall demonstrate implementation of a framework for the operation of Restricted Substance Controls (RSCs) along the supply chain for the products to be supplied. Product evaluations according to the RSCs should, as a minimum, cover the following areas:</p> <ul style="list-style-type: none"> - Product planning/design; - Supplier conformity; - Analytical testing. <p>The RSCs shall apply, as a minimum, to REACH Candidate List substances and RoHS restricted substances. The IEC 62474 material declaration database ⁹ shall be used as the basis for identifying tracking and declaring specific information about the composition of the products to be supplied. The RSCs shall be used to ensure that the tenderer is aware of the presence or non-presence of substances that are listed in the IEC 62474 database.</p> <p>Supplier declarations of conformity with the RCSs shall be collected and maintained up-to-date for relevant materials, parts and sub-assemblies of the products to be supplied. These may be supported, where appropriate, by supplier audits and analytical testing. The RSCs procedures shall ensure that product and supplier compliance is re-evaluated when:</p> <ul style="list-style-type: none"> - restricted substance requirements change; - supplied materials, parts and sub-assemblies change; - manufacturing and assembly operations change. <p>Implementation of the RCSs shall be with reference to the guidance in IEC 62476 or equivalent and the IEC 62474 material declaration database..</p> <p>Verification:</p>

⁹ International Electrotechnical Commission (IEC), *IEC 62474: Material declaration for products of and for the electrotechnical industry*, <http://std.iec.ch/iec62474>

	The tenderer shall provide documentation, which describes the system, its procedures and proof of its implementation.
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4.1.2.2 *Technical specifications*

Energy criteria	
<p>TS1. Minimum Energy performance for computers</p> <p>Rationale: Computers compliant with Energy Star requirements are expected to demonstrate significantly reduced energy consumption in the stand-by and idle modes, which represent a significant proportion of the energy use of computers and monitors.</p>	<p>The energy efficiency performance of computers shall meet the energy efficiency requirements of the latest version of the Energy Star standard.</p> <p><i>The version in force at the time of publication is 6.1 and updates can be followed at this weblink:</i></p> <p>http://www.eu-energystar.org/specifications.htm</p> <p><i>Annex III of Directive 2012/27/EU on energy efficiency, requires that computers purchased by central government shall meet the latest EU version of Energy Star.</i></p> <p>Verification: The tenderer shall provide test reports carried out according to the test methods laid down in the latest version of the Energy Star. These shall be provided upon award of the contract or prior to that upon request.</p> <p>Models that have qualified for EU Energy Star and are registered on the programme's database shall be deemed to comply. Energy Star registrations under the latest version in the USA shall also be accepted provided that testing according to European input power requirements has been carried out.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
<p>TS2. Minimum energy performance of monitors</p> <p>Rationale: Computer monitors compliant with Energy Star requirements are expected to demonstrate significantly reduced energy consumption in the active mode.</p>	<p>The energy efficiency performance of monitors shall meet the energy efficiency requirements of the latest version of the Energy Star standard.</p> <p><i>The version in force at the time of publication is 6.0 and updates can be followed at this weblink:</i></p> <p>http://www.eu-energystar.org/specifications.htm</p> <p><i>Annex III of Directive 2012/27/EU on energy efficiency, requires that computers purchased by central government shall meet the latest version of Energy Star.</i></p> <p>Verification:</p> <p>The tenderer shall provide test reports carried out according to the test methods laid down in the latest version of Energy Star.</p>

	<p>These shall be provided upon request <i>prior to or following [to be specified]</i> award of the contract.</p> <p>Models that have qualified for EU Energy Star and are registered on the programme's database shall be deemed to comply. Energy Star registrations in the USA shall also be accepted provided that testing according to European input power requirements has been carried out.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
Hazardous Substances criteria	
<p>TS3. Declaration for REACH Candidate List substances</p> <p>Rationale:</p> <p>The European Chemicals Agency (ECHA) publishes a list of substances classified as Substances of Very High Concern (SVHC). These may be Carcinogenic, Mutagenic of toxic for Reproduction (CMR), and/or Persistent, Bioaccumulative and Toxic in the environment (PBT). These substances are entered onto a Candidate List for restriction in the EU. The disclosure of their presence in IT equipment increases transparency and thus the potential for control of their use.</p>	<p>The tenderer shall declare the presence of any REACH Candidate List substances at a concentration of greater than 0.1% (weight by weight) in the whole product and in each of the following sub-assemblies:</p> <ul style="list-style-type: none"> - Populated motherboard (including CPU, RAM, graphics units); - Display unit (including backlighting); - Casings and bezels; - External keyboard, mouse and/or trackpad; - External AC and DC power cords (including adapters and power packs) <p>Verification:</p> <p>The tenderer shall provide a declaration identifying specific substances that are present. Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
<p>TS4. Plasticisers in external cables</p> <p>Rationale:</p> <p>This criterion aims to test for the non-presence of hazardous phthalates in power cords that will be restricted from 2019 under an amendment to the RoHS Directive, some of which are already Candidate List SVHCs, and for Medium Chain Chlorinated Paraffins (MCCPs), which are already being restricted by</p>	<p>The following plasticisers shall not be present in external AC and DC power cords.</p> <p>(i) Phthalate plasticisers: DEHP, BBP, DBP, DIBP</p> <p><i>Maximum allowable concentration limit:</i> 0.1% by weight of the polymer cable sheath per phthalate</p> <p>(ii) Medium Chained Chlorinated Paraffins (MCCP's) Alkanes C14-17</p> <p><i>Maximum allowable concentration limit:</i> 0.1% by weight of the polymer cable sheath.</p> <p>Verification:</p> <p>Verification shall be according to the specified test method and control concentration limits:</p>

<p>leading manufacturers because they are toxic for reproduction and harmful to the aquatic environment.</p>	<p>(a) Phthalate plasticisers: DEHP, BBP, DBP, DIBP <i>Test method:</i> EN 14372, EPA 8270D or equivalent¹⁰.</p> <p>(b) Medium Chained Chlorinated Paraffins (MCCP's) Alkanes C14-17 <i>Test method:</i> EPA 8270D, EPA 3550C or equivalent</p> <p>The tenderer shall provide upon award a test report for the power cords of each distinct product family supplied.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
Product lifetime extension	
<p>TS5. Warranty and service agreements</p> <p>Rationale:</p> <p>Defective equipment or components can be a cause for premature replacement. The existence of a warranty and service agreement can both provide an incentive for suppliers to ensure increased longevity of their products and to assure that they will take responsibility for repairing any defects.</p>	<p>The tenderer shall provide a minimum three-year warranty effective from delivery of the product. This warranty shall cover repair or replacement and include a service agreement with options for pick-up and return or on-site repairs.</p> <p>The warranty shall guarantee that the products are in conformity with the contract specifications at no additional cost. This shall cover battery defects⁷.</p> <p>Verification:</p> <p>The tenderer shall provide a written declaration that the products supplied will be warranted in conformity with the contract specifications and service requirements.</p>
<p>TS6. Repairability and replacement of component parts</p> <p>Rationale:</p> <p>The criteria aim to assure that repairable defects, mainly caused by the failure of replaceable components, will not result in the early retirement of the equipment.</p>	<p>TS6(a) Continued availability of spare parts</p> <p>The tenderer shall guarantee the availability of spare parts, including as a minimum those identified in criterion TS6(b), for at least five years from the date of purchase. Compatible parts with improved capacity or performance, where relevant, shall be made available.</p> <p>Verification:</p> <p>The tenderer shall provide a declaration that compatible spare parts, including rechargeable batteries (if applicable), will be made available to the contracting authority or through a service provider.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>

¹⁰ A new standard is under development to support implementation of Commission Delegated Directive (EU) 2015/863 of 31 March 2015. IEC 62321-8 *Determination of specific phthalates in polymer materials by mass spectrometry* will provide a harmonised test method and should be referred to in place of the listed standards once published (anticipated June 2017).

TS6(b) Design and support for repairability

The following parts, if applicable, shall be easily accessible and replaceable using universally available tools (i.e. screwdriver, spatula, plier or tweezers):

Computers

- (i) HDD/SSD,
- (ii) Memory,
- (iii) Rechargeable battery,
- (iv) Screen assembly and LCD backlight,
- (v) Keyboard and mouse pad,

Displays

- (i) Screen assembly and LCD backlight
- (ii) Power and control circuit boards
- (iii) Stands (excluding those integrated with the enclosure)

Tablets and two-in-one notebooks shall be exempt for computer parts (i) and (ii). Award criterion C7 shall be used to encourage better design.

The tenderer shall provide clear disassembly and repair instructions (e.g. hard or electronic copy, video) to enable a non-destructive disassembly of products for the purpose of replacing key components or parts for upgrades or repairs. This shall be made available in hard copy or the manufacturer's webpage.

Verification:

A manual shall be provided by the tenderer which shall include an exploded diagram of the device illustrating the parts that can be accessed and replaced, and the tools required. It shall also be confirmed which parts are covered by service agreements under the warranty.

Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.

TS6(c) Ease of replacement for rechargeable batteries

Rechargeable batteries shall not be glued or soldered into portable products. It shall be possible for a professional user or repair service provider to replace the rechargeable battery.

If the rechargeable battery has a performance of less than 800 endurance cycles when tested according to IEC EN 61960, it shall be possible to extract it from the product according to the following requirements :

- For notebooks and portable all-in-one computers manually without tools;

	<ul style="list-style-type: none"> • For sub-notebooks in a maximum of three steps¹¹ using a screwdriver; • For tablets and two-in-one notebooks in a maximum of four steps using a screwdriver and spudger; <p>Instructions on how the rechargeable battery packs are to be removed shall be provided in the user instructions or via the manufacturer's webpage.</p> <p>Verification:</p> <p>The tenderer shall illustrate how the battery is installed in the product, the steps required to remove it and cover markings. A copy of relevant user instructions shall also be provided. The Contracting Authority reserves the right to request a visual inspection of a random selection of the supplied products.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
End-of-life management	
<p>TS7. Recyclability of parts</p> <p>Rationale:</p> <p>The criteria aim to address the problem that certain combinations of polymers, coatings, metal inlays and alloys may present recycling problems. The criteria focus the recyclability requirements on metal insets, coatings and flame retardants, as these have been identified as specific barriers to recycling.</p>	<p>TS7(a) Recyclability of plastics casings, enclosures and bezels</p> <p>Parts shall not contain moulded-in or glued-on metal inserts unless they can be removed with commonly available tools. Disassembly instructions shall show how to remove them.</p> <p>Verification:</p> <p>The tenderer shall detail the tools required to remove any plastic parts containing metal inserts. Visual evidence shall be provided to support compliance. Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p> <hr/> <p>TS7(b) Recyclability of plastic casings, enclosures and bezels</p> <p>The presence of paints and coatings shall not significantly impact upon the resilience of plastic recycle produced from these components upon recycling and when tested according to ISO 180¹² or equivalent.</p> <p>Verification:</p> <p>The tenderer shall provide valid mechanical/physical test reports carried out according to ISO 180 or equivalent. Third party test reports obtained from plastics recyclers, resin manufacturers or independent pilot tests shall be accepted. Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>

¹¹ A step consists of an operation that finishes with the removal of a component or part and/or with a change of tool.

¹² For the purposes of this criterion a significant impact is defined as a >25% reduction in the notched izod impact of a recycled resin as measured using ISO 180.

<p>TS8. Marking of plastic casings, enclosures and bezels</p> <p>Rationale:</p> <p>The marking of plastic parts facilitates their recycling, as it allows recycling operators to separate more efficiently the different plastic pieces by material type.</p>	<p>External plastic casings, enclosures and bezels with a weight greater than 25 grams for tablet and portable all-in-one notebooks and 100 grams for computers and monitors and in all cases a surface area greater than 50 cm² shall be marked in accordance with ISO 11469 and ISO 1043, sections 1 and 4.</p> <p>Verification:</p> <p>The tenderer shall identify the plastic parts by their weight, their polymer composition, and their ISO 11469 and ISO 1043 markings. The dimension and position of the marking shall be visually illustrated. Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
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4.1.2.3 Award criteria

Energy criteria	
<p>AC1. Improvement in the energy consumption upon the specified Energy Star standard</p> <p>Rationale:</p> <p>Increased energy efficiency over and above the minimum requirements laid down by Energy Star is to be encouraged and rewarded for all product types – particularly for more energy intensive desktop computers in combination with displays.</p>	<p><i>It is recommended to use this criterion in conjunction with TS1 for desktop computers if the products specified are for graphics intensive uses.</i></p> <p>Points will be awarded if the product is more energy efficient than the E_{TEC_MAX} value¹³ for computers and the P_{ON_MAX} value¹⁴ for monitors. These shall be calculated in comparison with the minimum performance required under Energy Star (see Criterion TS1 and TS2).</p> <p>A maximum of x points [<i>to be specified</i>] may be awarded. Points shall be awarded in proportion to the improvement in energy efficiency in comparison to the E_{TEC_MAX} or P_{ON_MAX} value::</p> <ul style="list-style-type: none"> • over 80% lower: x points • 60-79% lower: 0.8x points • 40-59% lower: 0.6x points • 20-39% lower: 0.4x points • 10-19% lower: 0.2x points <p>For computers with discrete graphic display units the overall points available for criterion A3 shall be awarded in the proportion 60:40.</p> <p><i>Alternatively, instead of using the E_{TEC_MAX} value for computers or the P_{ON_MAX} value for monitors a Life Cycle Costing calculation could be requested, whereby the offered improvement potential would lead to a relative decrease in the overall running costs of a</i></p>

¹³ E_{TEC_MAX} is the maximum power consumption that a computer shall consume upon testing in order to be awarded the Energy Star label. This maximum threshold is calculated for a computer in accordance with Equation 2 in Decision (EU) 215/1402 which implements Energy Star 6.1 in the EU,

¹⁴ P_{ON_MAX} is the maximum on-mode power consumption that a computer monitor shall consume upon testing in order to be awarded the Energy Star label. This maximum threshold is calculated for a computer monitor in accordance with Table 1 in Decision 2014/202/EU which implements Energy Star 6.0 in the EU,

	<p><i>product compared to a less energy efficient model.</i></p> <p>Verification:</p> <p>The tenderer shall provide test reports carried out according to the test methods laid down in the latest version of the Energy Star. The E_{TEC} value or the P_{ON} value from a test report or for qualified models as entered on the EU Energy Star database shall be accepted. These shall be provided upon award of the contract or prior to that upon request.</p>
Hazardous Substances criteria	
<p>AC2. Hazardous end-of-life emissions from components</p> <p>Rationale:</p> <p>These criteria recognise the potential for toxic emissions from the improper disposal of circuit boards and cables outside of the EU, where they may be burnt or pyrolysed to recover metals and critical raw materials. The criteria encourage manufacturers to use materials and chemistries that minimise the most hazardous potential end-of-life emissions.</p>	<p>AC2(a) The main Printed Circuit Board (motherboard)</p> <p><i>This criterion shall not apply to monitors.</i></p> <p>Points shall be awarded where the main Printed Circuit Board is '<i>halogen free</i>' in conformance with IEC 61249-2-21 and a fire test simulating improper WEEE disposal shows carcinogenic Polycyclic Aromatic Hydrocarbon (PAHs) emissions to be <input type="checkbox"/> <input type="checkbox"/> TEQ /g.</p> <p>Verification:</p> <p>Test reports for the board composition and emissions shall be provided upon award for the ready-to-install motherboard.</p> <p>The fire test shall be carried out according to ISO 5660 in oxidative pyrolysis conditions (IEC 60695-7-1 fire type 1b with a heat flux of 50 kW/m²). Quantification of the PAHs emissions shall be made according to ISO 11338 (PAHs).</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p> <hr/> <p>AC2(b) External power cables</p> <p>Points shall be awarded where the external power cables are '<i>halogen free low smoke</i>' in conformance with IEC 62821 whereby a fire test of the power cord polymer shows halogen acid gas emissions to be less than 5.0 mg/g.</p> <p>Verification:</p> <p>A fire test report with the emissions results shall be provided upon award for the power cables. The fire test shall be carried out according to IEC 60754-1 in under-ventilated conditions (IEC 60695-7-1 fire type 3a with a heat flux of 50 kW/m²).</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>

Product lifetime extension ¹⁵	
<p>AC3. Cost competitiveness of spare parts</p> <p>Rationale:</p> <p>This criterion aims to assure that repair operations are economically attractive when compared with equipment replacement, therefore avoiding premature retirement due to economic considerations.</p>	<p>The tenderer shall provide a price list for, as a minimum, the following component parts:</p> <p><i>[the parts list to be provided here, with the TS6(b) list to be provided as a minimum]</i></p> <p>For the component parts listed above indicative labour costs for replacements carried out by the tenderer's authorised service providers shall be provided. Points shall be awarded according to the most cost-competitive offers.</p> <p><i>Additional component parts, if considered important to the price comparison, should be added to the list provided.</i></p> <p>Verification:</p> <p>The tenderer shall provide a price list for original or compatible spare parts and indicative labour costs for their replacement, including rechargeable batteries (if applicable).</p>
<p>AC4. Longer warranties and service agreements</p> <p>Rationale:</p> <p>Longer warranties and service agreements are to be encouraged as they provide an incentive for suppliers both to ensure increased longevity of their products and to assure that repairable defects will not result in the early retirement of the equipment.</p>	<p>Additional points shall be awarded to each additional year of warranty and service agreement offered that is more than the minimum technical specification. This shall be awarded</p> <p>A maximum of x points <i>[to be specified]</i> may be awarded.</p> <ul style="list-style-type: none"> • +3 years or more: x points • +2 years : 0.6x points • +1 year: 0.3x points <p>For portable devices 0.3x additional points shall also be awarded where during the first three years of the warranty, rechargeable battery replacement is provided free of charge in the case of a capacity loss of more than 50%.</p> <p><i>The contracting authority may wish to specify the battery life benchmarking software that shall be used to evaluate the loss of battery life.</i></p> <p>Verification:</p> <p>A copy of the warranty and service agreement shall be provided by the tenderer. They shall provide a declaration that they cover the conformity of the goods with the contract specifications. Details of the battery capacity loss software shall additionally be provided.</p>
<p>AC5. Tablet and all-in-one notebook memory and storage</p>	<p>Points shall be awarded for products that incorporate the following features:</p> <p>(i) RAM memory</p>

¹⁵ Instead of setting two separate award criteria on spare parts and warranties, this could be merged into one criterion, evaluating the overall offer including the length of the warranty, its comprehensiveness and the spare parts offer.

<p>Rationale:</p> <p>This criterion aims to assure that the equipment will not be prematurely retired due to insufficient memory capacity and upgrade potential, both of which may restrict future potential to run new software and improved operating systems.</p>	<ul style="list-style-type: none"> - Soldered RAM with a minimum capacity of 8GB, or; - The potential to replace and upgrade the RAM (socketed design). <p>(ii) Mass storage</p> <ul style="list-style-type: none"> - The potential to expand the storage by using slots supporting mass storage media, or - Additional mass storage incorporated into the keyboard (<i>for all-in-one notebooks</i>) . . . <p><i>The RAM memory sub-criteria are not suitable for devices designed to run their main applications from the cloud. This criterion should not be used to compare bids that offer differing solutions i.e. integrated or cloud storage.</i></p> <p>Verification:</p> <p>The tenderer shall provide details of the physical design of the memory and/or storage capacity of the model(s) to be supplied.</p>
<p>AC6. Rechargeable battery life and endurance</p> <p>Rationale:</p> <p>This criterion aims to reward increased battery lifetimes, thus reducing the environmental impacts associated with new battery production.</p>	<p>Points shall be awarded for improved endurance greater than 500 cycles (with 80% capacity retention) respectively¹⁶. A maximum of x points [<i>to be specified</i>] may be awarded.</p> <ul style="list-style-type: none"> • 1000 cycles or more: x points • 800 cycles or more : 0.6x points • Up to 799 cycles: 0.3x points <p><i>The minimum battery life in hours shall be set according to the Contracting Authority's requirements.</i></p> <p>Verification:</p> <p>The tenderer shall provide a test report for the battery cells or packs showing compliance according to the IEC EN 61960 ‘endurance in cycles’ test carried out at 25°C and at a rate of either 0.2 I_t A or 0.5 I_t A (accelerated test procedure).</p> <p>Partial charging may be used to comply as long as the software is factory-installed as the default setting and the tender requirements on battery life are met at the partial charging level complying with the cycle requirement.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
<p>AC7. Notebook computer drives</p> <p>Rationale:</p> <p>This criterion aims to reward data storage</p>	<p>Points shall be awarded where the primary data storage drive used in notebooks is tested and verified to meet at least one of the following requirements:</p> <p>(i) The HDD drive shall withstand a half sine wave shock of 400 G (operating) and 900 G (non-operating) for 2 milliseconds</p>

¹⁶ The cycle performance may be achieved using software which partially charges the battery. In this case the tenderer shall pre-install the software as the default charging routine.

<p>drives that are more durable and robust, enabling them to better resist day-to-day shocks and accidents, thereby protecting valuable data and potentially extending the life span of equipment.</p>	<p>without damage to data or operation of the drive.</p> <ul style="list-style-type: none"> (ii) The HDD drive head should retract from the disc surface in less than or equal to 300 milliseconds upon detection of the notebook having been dropped from desk height (76cm) and regardless of its orientation. (iii) A solid state storage drive technology such as SSD or eMMC is used. <p>Verification:</p> <p>The tenderer shall provide a specification for the drive or drives integrated into the product. This shall be obtained from the drive manufacturer and for option (i) shall be supported by a test report according to IEC 62131 or equivalent and for option (ii) IEC 60068, Part 2-31: Ec (Freefall, procedure 1) in combination with IEEE 1293 or equivalent.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
<p>AC8. Notebook durability testing</p> <p>Rationale:</p> <p>This criterion aims to reward notebooks that are more durable and robust in their design and manufacturer, enabling them to better resist day-to-day stresses and accidents, with the potential to reduce repair costs and extend the life span of equipment.</p>	<p>Points shall be awarded for products that have passed durability tests carried out according to IEC 60068, US MIL810G or equivalent.</p> <p>A maximum of x points [<i>to be specified</i>] may be awarded:</p> <ul style="list-style-type: none"> • Accidental drop (x/4 points) • Resistance to shock (x/4 points) • Resistance to vibration (x/4 points) • Screen resilience (x/8 points) • Temperature stress (x/8 points) <p>Functional performance requirements and test specifications are provided in Annex I of the criteria document. In-house tests with a stricter specification shall be accepted without the need to retest.</p> <p><i>The tests applicable shall be specified in the ITT in order to reflect the conditions of use defined for the product.</i></p> <p>Verification:</p> <p>The tenderer shall provide test reports showing that the model has been tested and has met the functional performance requirements. Test results shall be third-party verified. Existing tests for the same model, carried out to the same or a stricter specification, shall be accepted without the need to retest.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
<p>AC9. Tablet durability testing</p> <p>Rationale:</p> <p>This criterion aims to reward tablets that</p>	<p>Points shall be awarded for products that have passed durability tests carried out according to IEC 60068, US MIL 810G or equivalent.</p> <p>A maximum of x points [<i>to be specified</i>] may be awarded:</p>

<p>are more durable and robust in their design and manufacturer, enabling them to better resist day-to-day stresses and accidents, with the potential to reduce repair costs and extend the life span of equipment.</p>	<ul style="list-style-type: none"> • Accidental drop (x/2 points): • Screen resilience (x/2 points): <p>Functional performance requirements and test specifications are provided in Annex I of the criteria document. In-house tests with a stricter specification shall be accepted without the need to retest.</p> <p>Verification:</p> <p>The tenderer shall provide test reports showing that the model has been tested and has met the functional performance tests. Test results shall be third-party verified. Existing tests for the same model, carried out to the same or a stricter specification, shall be accepted without the need to retest.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
<p>End-of-life management</p>	
<p>AC10. Product dismantling potential</p> <p>Rationale:</p> <p>The criterion aims to encourage the design of equipment that can be easily dismantled in just a few minutes. The time and complexity of disassembling an IT product at the end of its life is a proxy for the cost effectiveness of extracting components that are valuable from both a cost and environmental perspective.</p>	<p>Points shall be awarded for the time efficient manual dismantling and extraction of the following components from products ¹⁷, <i>excluding tablets, subnotebooks¹⁸ and two-in-one notebooks:</i></p> <p>All products</p> <ul style="list-style-type: none"> (i) Printed Circuit Boards relating to computing functions >10 cm² <p>Stationary computer products e.g. desktops</p> <ul style="list-style-type: none"> (ii) Internal Power Supply Unit (iii) HDD drives <p>Portable computer products e.g. notebooks</p> <ul style="list-style-type: none"> (iv) Rechargeable battery (v) HDD and optical drives (excluding SSD) <p>Computer monitors</p> <ul style="list-style-type: none"> (vi) Display panel >100 cm² (the Thin Film Transistor unit and film conductors)

¹⁷ Where multiple models with the same product family architecture are to be supplied, only a representative product shall be required to be tested.

¹⁸ A Subnotebook is defined for the purposes of these criteria as a form of notebook that is less than 21mm thick and that weighs less than 1.8kg. Two-in-one notebooks (see the separate definition in Article 2(5)) with a subnotebook form are less than 23mm thick. Subnotebooks incorporate low power processors and solid state drives. Optical disk drives are generally not incorporated. Subnotebooks provide longer rechargeable battery life than notebooks, usually more than 8 hours.

	<p>(vii) LED backlight units</p> <p>Extraction of the relevant components shall be possible using universally available tools ¹⁹. The maximum time required to extract them shall not exceed the following thresholds:</p> <p><i>Computers:</i></p> <ul style="list-style-type: none"> - 600 seconds <p><i>Monitors:</i></p> <ul style="list-style-type: none"> - 400 seconds for screen sizes smaller than 25 inches; - 500 seconds for screen sizes greater than or equal to 25 inches and smaller than 40 inches; - 600 seconds for screen sizes greater than or equal to 40 inches and smaller than 55 inches. <p>Points shall be awarded in proportion to reduction in the time required compared to the stated thresholds. A maximum of x points [to be specified] shall be awarded:</p> <ul style="list-style-type: none"> (i) over 60% lower: x points (ii) 31-60% lower: 0.6x points (iii) 10-30% lower: 0.3x points <p>Verification:</p> <p>The tenderer shall upon award provide a 'dismantling test report' according to the protocol in Annex II. The dismantling test shall be carried out by a specialised WEEE recycling firm that is a permitted electrical waste treatment operation in accordance with Article 23 of the Waste Framework Directive or that are certified under equivalent national or international WEEE regulations or standards. Third party verification of the timing shall be accepted as an alternative to providing a recording.</p> <p>Equipment holding the EU Ecolabel or another relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.</p>
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¹⁹ Examples include pliers, nippers, screw-drivers, cutters and hammers as defined by ISO 5742, ISO 1174, ISO 15601, or equivalent).

4.2 End of life management of Computers and Monitors

Subject matter

Subject matter
Procurement of end-of-life management services for Computers and Monitors

4.2.1 Core criteria

4.2.1.1 Technical specifications

<p>TS1. Secure computer collection, sanitisation, re-use and recycling</p> <p>Rationale:</p> <p>The criterion requires the provision of collection services for end-of-service life equipment that can maximise its re-use and recycling. This can be achieved through a combination of collection and sorting of equipment, followed by effective data deletion and sanitation, and then by testing, servicing and upgrading. Any recycling or disposal that is necessary shall be carried out in order to recover resources and to the highest environmental standards.</p>	<p>Tenderers shall provide a re-use and recycling service for a specified inventory of equipment that has reached the end of its service life. They shall report on the proportion of equipment re-used or recycled. The tenderer shall demonstrate how they will carry out the following aspects of the overall service (<i>according to the type, the state and amount of the equipment, the public authority needs to detail the following points. It may also consider in addition an award criterion rewarding tenderers offering e.g. higher levels of reuse or recycling</i>) :</p> <ul style="list-style-type: none"> - Collection - Confidential handling and secure data erasure (<i>Unless carried out in-house</i>); - Testing, servicing and upgrading²⁰; - Remarketing for re-use in the EU; - Dismantling for recycling and disposal. <p>Preparation of items for re-use, as well as recycling and disposal operations shall be carried out in full compliance with the requirements in Article 8 and Annexes VII and VIII of the (recast) WEEE Directive 2012/19/EU²¹.</p>
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²⁰ Some Member States have developed standards and/or schemes that public authorities may wish to refer to in order to provide greater detail on how equipment shall be made suitable for reuse and resale.

²¹ If the public authority is aware that there are no recycling facilities within a reasonable radius then it may be more appropriate to ask for the equipment to be delivered to an official WEEE collection point.

	<p>Verification:</p> <p>The tenderer shall provide details of the arrangements for collection, data security, testing, remarketing for re-use and recycling and disposal. This shall include, during the contract, valid certifications of compliance for the WEEE handling facilities to be used. According to the location of the handling operations, the following means of proof shall be accepted:</p> <ul style="list-style-type: none"> - EU operators: A valid permit issued by the national competent authority according to Article 23 of the Directive 2008/98/EC or a third party certification of compliance with the technical requirements of EN 50625-1; - non-EU operators: A third party certification of compliance with the minimum WEEE requirements laid down in the criterion, the technical requirements of EN 50625-1 or another well-established compliance scheme ²².
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4.2.1.2 *Contract performance clauses*

<p>CPC1. Reporting on equipment status</p> <p>Rationale:</p> <p>The criterion is intended to ensure that the collected equipment is in fact being re-used or recycled as intended.</p>	<p>The successful tenderer shall provide a report on the status of the equipment in the inventory once all items have been processed for re-use or recycling/disposal. The report shall identify the proportion of items re-used or recycled, whether they remained in the EU or were exported.</p>
<p>CPC2. Operation of re-use and recycling facilities</p> <p>Rationale:</p> <p>The criterion is intended to ensure that recycling facilities that meet high environmental standards are used during the execution of the contract.</p>	<p>The successful tenderer shall provide valid certificates verifying the permitting for the re-use and recycling facilities used to fulfil the contract.</p>

²² The following compliance schemes are considered, at the time of writing, to meet these requirements: WEEELABEX:2011 standard on 'Treatment of WEEE'; 'Responsible Recycling' (R2:2013) standard for electronics recyclers; e-Stewards standard 2.0 for Responsible Recycling and Reuse of Electronic Equipment; Australian/New Zealand standard AS/NZS 5377:2013 on 'Collection, storage, transport and treatment of end-of-life electrical and electronic equipment'

4.2.2 Comprehensive criteria

4.2.2.1 Technical specifications

<p>TS1. Secure computer collection, sanitisation, re-use and recycling</p> <p>Rationale:</p> <p>The criterion requires the provision of collection services for end of service life equipment that can maximise its re-use and recycling. This can be achieved through a combination of collection and sorting of equipment, followed by effective data deletion and sanitation, and then by testing, servicing and upgrading. Any recycling or disposal that is necessary shall be carried out in order to recover resources and to the highest environmental standards.</p>	<p>Tenderers shall provide a re-use and recycling service for a specified inventory of equipment that has reached the end of its service life. They shall report on the proportion of equipment re-used or recycled. The tenderer shall demonstrate how they will carry out the following aspects of the overall service (according to the type, the state and amount of the equipment, the public authority needs to detail the following points. It may also consider in addition an award criterion rewarding tenderers offering e.g. higher levels of reuse or recycling)::</p> <ul style="list-style-type: none">- Collection;- Confidential handling and secure data erasure (<i>Unless carried out in-house. The requirements to be specified by the contracting authority</i>);,- Testing, servicing and upgrading²³;- Remarketing for re-use in the EU;- Dismantling for recycling and/or disposal. <p>Preparation of items for re-use, as well as recycling and disposal operations shall be carried out in full compliance with the requirements in Article 8 and Annexes VII and V III of the (recast) WEEE Directive ²¹. Verification:</p> <p>The tenderer shall provide details of the arrangements for collection, data security, testing, remarketing for re-use and recycling/disposal. This shall include, during the contract, valid certifications of compliance for the WEEE handling facilities to be used. According to the location of the handling operations, the following means of proof shall be accepted:</p> <ul style="list-style-type: none">- EU operators: A valid permit issued by the national competent authority according to Article 23 of the Directive 2008/98/EC or a third party certification of compliance with the technical requirements of EN 50625-1;- non-EU operators: A third party certification of compliance with the minimum WEEE requirements laid down in the criterion, the technical requirements of EN 50625-1 or another well-established compliance scheme ²⁴.
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²³ Some Member States have developed standards and/or schemes that public authorities may wish to refer to in order to provide greater detail on how equipment shall be made suitable for reuse and resale.

²⁴ The following schemes are considered, at the time of writing, as well-established: WEEELABEX:2011 standard on 'Treatment of WEEE'; 'Responsible Recycling' (R2:2013) standard for electronics recyclers; e-Stewards standard 2.0 for Responsible Recycling and Reuse of Electronic Equipment; Australian/New Zealand standard AS/NZS 5377:2013 on 'Collection, storage, transport and treatment of end-of-life electrical and electronic equipment'

4.2.2.2 *Award criteria*

<p>AC1. Inventory tracking system</p> <p>Rationale:</p> <p>The criterion is intended to encourage the operation of tracking systems that allow contracting authorities to verify the fate of their collected equipment.</p>	<p>Points shall be awarded to tenderers operating a tracking system with a unique identifier for each item of equipment in the Contracting Authority's equipment inventory. The system shall enable the proportion of items re-used or recycled, and whether they remained in the EU or were exported.</p> <p>Verification:</p> <p>The tenderer shall provide details of the tracking system that they operate.</p>
<p>AC2. Dismantling to facilitate recycling</p> <p>Rationale:</p> <p>The criterion is intended to encourage the selective dismantling of equipment in order to maximise the recovery of valuable resources and in order to minimise environmental impacts associated with disposal.</p>	<p>Points shall be awarded to tenderers that dismantle equipment and extract (before any treatment) relevant components for recycling in accordance with Annexes A2 through to A6 of EN 50625-1</p> <p>Verification:</p> <p>The tenderer shall provide verification of compliance for the dismantling facilities that will be used to fulfil the contract.</p>

4.2.2.3 *Contract performance clauses*

<p>CPC1. Reporting on equipment status</p> <p>Rationale:</p> <p>The criterion is intended to ensure that the collected equipment is in fact being re-used or recycled as intended.</p>	<p>The successful tenderer shall provide a report on the status of the equipment in the inventory once all items have been processed for re-use, recycling or disposal. The report shall identify the proportion of items re-used or recycled.</p>
<p>CPC2. Operation of re-use and recycling facilities</p> <p>Rationale:</p> <p>The criterion is intended to ensure that recycling facilities that meet high environmental standards are used during the fulfilment of the contract.</p>	<p>The successful tenderer shall provide valid certificates verifying the permitting for the re-use and recycling facilities used to fulfil the contract.</p> <p>Valid certification that dismantling has been carried out prior to treatment and in accordance with Annexes A2 through to A6 of EN 50625-1 shall also be provided.</p>

5. LIFE CYCLE COSTING

Life Cycle Costing (LCC) is a technique that can be used to estimate the total cost of ownership for IT equipment (and possibly some of the environmental externalities). It is a method for making effective, long-term investment decisions since some cost aspects may not be immediately apparent to the decision maker, *e.g. a higher initial investment may be required to achieve lower life-cycle costs, more durable portable equipment, and lower repair and upgrading costs*. When externalities are taken into consideration LCC is particularly relevant to achieving an improved environmental performance.

Decisions taken at the procurement stage can have a significant influence on running costs. It has been estimated that the typical running costs of IT equipment – comprising electricity bills, equipment repairs and hardware upgrades – can be in the range of 8-13% (displays) and 56-83% (computers) of the life cycle costs. Life Cycle Costs therefore are an important consideration in the purchase of IT equipment.

An important component of these running costs is electricity use in the active mode (displays and computers), together with the idle and sleep modes (computers). Electricity costs generally account for the majority of running costs – typically 2-15% of the life cycle costs. The most significant users of electricity are desktop computers in combination with their displays. For desktop computers the active mode is particularly important, but is not fully accounted for by Energy Star, so strategies that are not only focussed on the equipment, such as staff education to turn off computers at the end of the working day and software management to optimise the running of computer operating systems can, as a result, be just as important as hardware improvements.

The EU GPP criteria for Computers and Monitors will have a positive influence on some of the key cost centres that should be considered along the life cycle of a 'fleet' of computers and monitors. These are briefly highlighted below, noting that the potential benefits will always depend on the specifics of the organisations IT needs (*e.g. stationary or portable equipment, the end-users, intended operating environment*):

- Hardware (indicatively 17-44% of life cycle costs for desktops and notebooks²⁵ and 87-92% for displays)
 - The award criteria can be used to encourage competitive pricing for more robust portable equipment, as well as longer lasting components such as batteries.
- Operation (indicatively 8-15% of life cycle costs)

²⁵ For computers the cost of the equipment becomes a smaller proportion of the life cycle costs as its life span is extended. However, the potential to reduce long term hardware costs is to some extent offset by increased support and upgrading costs as the life span is extended.

- Technical specifications can be used to purchase Energy Star compliant equipment. This will ensure a minimum level of electricity savings in the range of 47% to 64% for desktop computers, dependant on capability, and 32% to 75% for displays, dependant on screen size (based on calculations for the replacement of Energy Star v5.0 equipment with v6.0 compliant equipment).
- The award criteria can be used to encourage further electricity savings of up to 80% in the basic running costs of equipment ²⁶
- Support and upgrading (indicatively 54-70% of life cycle costs for desktops and laptops)
 - The criteria on upgradeability, replaceability and repairability encourage the market to respond with longer warranty periods and service agreements;
 - The award criteria on notebook and tablet durability testing are intended to encourage more robust portable product designs. This has the potential to extend product lifespan, for example for notebooks by at least one year, and to reduce costs associated with repairing accidental damage and product failure.
 - The criteria on upgradeability, replaceability and repairability encourage the market to respond with the cost competitive future availability of parts, as well as product designs that facilitate easier repairs and upgrades. The latter encourages portable equipment designs that allow for battery replacement and memory upgrades.
 - The award criterion on battery life and endurance encourage the market to respond with batteries that can last over three times as long as standard batteries;
- End of service life
 - The criteria on end of life management can be used to encourage manufacturers and specialist WEEE handlers to bid for end of life equipment inventories. This may allow for recovery of some of the equipment's residual value, indicatively up to 7% of original cost for re-use and up to 2% of the original cost for recycling, depending on the type of equipment, its age and condition ²⁷.

²⁶ It may also be possible to calculate the value of avoided electrical cooling to air condition office spaces. In summer, computers and monitors are a major contributor to the overheating of office spaces, which may result in comfort cooling being installed.

²⁷ The residual resale value of equipment can only be recovered by investing in the preparation of the equipment for resale – typically involving data erasure, testing, upgrading and software installation.

Nevertheless, the potential for cost savings need to be seen within the context of the overall management of IT equipment. Maintaining productivity requires the optimisation of both hardware and software, with both playing a role in determining a product's useful service life. So even though a computer can be upgraded and its memory expanded, evidence suggests that software issues can, over time, still significantly increase annual support costs.

Annex I: Notebook and Tablet durability test specifications

Test	Test conditions and functional performance requirements	Test method
Accidental drop <i>(Notebooks and tablets)</i>	<p><i>Minimum specification:</i></p> <p>The notebook or tablet shall be dropped from a minimum of 76 cm (30 inches²⁸) of height onto a non-yielding surface. A minimum of one drop shall be made on each bottom side and each bottom corner.</p> <p><i>Functional requirement:</i></p> <p>The notebook or tablet shall be switched off during the test and shall successfully boot up following each drop. The casing shall remain integral and the screen undamaged following each test.</p>	IEC 60068 Part 2-31: Ec (Freefall, procedure 1)
Screen resilience <i>(Notebooks and tablets)</i>	<p><i>Minimum specification:</i></p> <p>With the product placed on a flat surface two loading tests shall be carried out:</p> <ol style="list-style-type: none"> 1. A minimum load of 50kg shall be evenly applied to the screen lid (for notebooks) or screen (for tablets). 2. A minimum load of 25kg shall be applied to a point at the centre of screen with a diameter of approximately 3cm. <p><i>Functional requirement:</i></p> <p>The screen surface and pixels shall be inspected for the absence of lines, spots and cracks after application of each loading.</p>	The test equipment and setup used shall be confirmed by the tenderer.
Resistance to shock	<p><i>Minimum specification:</i></p> <p>A minimum of a 40G peak half-sine wave pulse shall be applied three times for a duration of a minimum of 6 ms to the top, bottom, right, left, front and rear side of the product.</p> <p><i>Functional requirement:</i></p> <p>The notebook shall be switched on and running a software application during the test. It shall continue to function following the test.</p>	IEC 60068 Part 2-27: Ea Part 2-47
Resistance to vibration	<p><i>Minimum specification:</i></p> <p>Randomised sinusoidal vibrations in the frequency range 5Hz up to a minimum of 250Hz shall be applied for a minimum of 1 sweep cycle to the end of each axis of the top, bottom, right, left, front and back of the product.</p> <p><i>Functional requirement:</i></p> <p>The notebook shall be switched on and running a software application during the test. It shall continue to function following the test.</p>	IEC 60068 Part 2-6: Fc Part 2-47
Temperature stress	<p><i>Minimum specification:</i></p> <p>The notebook shall be subjected to a minimum of four 24 hour exposure cycles in a test chamber. The notebook shall be operational during a cold cycle at -25°C and a dry heat cycle at +40°C. The notebook shall be non-operational during a cold cycle at -50°C and dry heat cycling between +35°C and +60°C.</p>	IEC 60068 Part 2-1: Ab/e Part 2-2: B

²⁸ US Department of Defence standard MIL-STD-810G Method 516.6 Specification VI 'Transit drop test'

	<p><i>Functional requirement:</i></p> <p>The notebook shall be checked that it functions following each of the four exposure cycles.</p>	
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Annex II: Protocol for the dismantling test

(a) Terms and definitions

- (i) Target parts and components: Parts and/or components that are targeted for the extraction process.
- (ii) Disassembly step: An operation that finishes with the removal of a part or with a change of tool.

(b) Operating conditions for the extraction

- (i) Personnel: The test shall be carried out by one person.
- (ii) Test sample: The sample product to be used for the test shall be undamaged.
- (iii) Tools for extraction: The extraction operations shall be performed using manual or power-driven standard commercially available tools (i.e. pliers, screw-drivers, cutters and hammers as defined by ISO 5742, ISO 1174, ISO 15601).
- (iv) Extraction sequence: The extraction sequence shall be documented and, where the test is to be carried out by a third party, information provided to those carrying out the extraction. The sequence shall be defined as a series of steps that shall be followed by the third party.
- (v) Measurement: The extraction time measurement consists of the measurement with an instrument of the time elapsed between the starting of the first step listed in the extraction sequence documentation and the end of the last one.

(c) Recording of the test conditions and steps

- (i) Documentation of steps: The individual steps in the extraction sequence shall be documented and the tools associated with each step shall be specified.
- (ii) Recording media: Photos shall be taken and a video recorded of the extraction of the components with a time code displayed recording the elapsed time during the recording. The video and photos shall enable clear identification of the steps in the extraction sequence.