Preparatory study on the Review of Ecodesign Regulation 617/2013 (Lot 3) - Computers and Computer servers

Organization:	Name:	Date:
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1	1.3.3	52	California Rulemaking Process	The comment about the state of play of the Californian process is outdated.	Mention that the California Energy Commission adopted final standards on 14th December 2016.	
2	2.3	33	Stick computers	It is said that stick computers do not need to be covered because of their low energy use and material impact. But what about their life-cycle impact, especially the production phase? How much energy is required to produce computing chips of very small sizes?	Investigate the life-cycle environmental impacts of stick computers	
3	3.5	90	Conclusions on usage patterns	The conclusion does not mention clearly what average usage pattern is recommended, and how it will be used in the rest of the study (e.g. for LCC calculations).	Add a table summarising the usage patterns to be used in the rest of the study	
4	4.1.3	29	BAT	In order to better inform the discussion of policy options and new Ecodesign tiers, BATs should be presented by product category and not only product type.	Present BAT per Energy Star product category (as is done in the current Regulation)	
5-6	5.1	10	Definition of base cases	It is unclear how the base cases are defined. In the introduction, it is mentioned that the data will be '*analysed at product-category level according to the categories of ENERGY STAR*'. But then the life-cycle cost calculations are only carried out and presented on product averages.	Clearly define base cases for each Energy Star category, and stick to that choice all along the chapter (notably for LCC calculations)	
5-6	5.2.6	25	Table 23 too aggregate	Table 23 is too aggregated to be useful, and should be split by Energy Star categories (see previous comment). Purchase prices in the table are so much aggregated that	Disaggregate LCC calculations per product category and B2B/B2C usage.	

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			d	the averages do not look representative of real world products, such as usual consumer products on the market (many standard consumer PCs are sold at around € 600/800.) The table should also distinguish between B2B and B2C products, because the numbers presented for repair, maintenance, and upgrade costs are strange and irrelevant for most consumer products.		
5 - 6	5.2. 6	25	Comment on use-phase costs	The comment '*costs during the use phase are very small or insignificant*' is inadequate, because it is too generic and only based on a very broad averaging with particularly high purchase and maintenance costs. In the case of a B2C computer at standard market price and for which there is no repair or maintenance cost, the distribution of LCC is very different and the conclusion as well.	We recommend a formulation such as: '*costs during the use phase represent a small share in the product LCC when purchase and repair costs are high (mostly office products). For standard B2C products, the use-phase costs can represent a significantly higher share'*.	
5 - 6	5.3	26	Conclusio n to the section	It is shown that the manufacturing phase of computers is becoming the dominant environmental issue for these products, but no conclusion and recommendation is drawn from this (beyond options to address repairability and dismantling). Ecodesign Regulations are meant to reduce the most significant environmental impacts of products, thus options to address the manufacturing phase should be investigated in the study. Although this is obviously difficult, and Member States will not send inspectors in Chinese factories, there could be other creative ways to stimulate good practices and push manufacturers to report on the production aspects.	State the importance of addressing the production phase, and investigate options such as: starting to request reporting of carbon footprint data – if not precise numbers, it could be ranges to start with (with the methodology indicated); encourage lightweighting by providing e.g. a bonus on the ETEC calculation for the most compact configurations; introduce the possibility for manufacturers to show on the energy label established certifications and awards they receive for greener production practices; etc.	
5 - 6	5.4	30	Design options	Paragraph 5.4 on design options is incomplete. Several energy saving options are not presented, and cost quantification is lacking. The recent reference "**Slashing Energy Use in Computers and Monitors**" (NRDC, 2016) should be used as inspiration. Design options for resource efficiency are also missing here. Benchmarks or current best practices would be useful.	Beef up the section with more design options, as well as cost estimates using learning curves. Add design options for resource efficiency (including benchmarks or examples of best practices that can be spread).	

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5 - 6	5.4.4	31	Design Option 3	The comment about smaller, less expensive SSD used to store a computer's operating system and commonly available files needs clarification.	Clarify that this option also requires a secondary, larger HDD, to complement the small SSD. This is essentially a hybrid SSD-HDD approach.	
5 - 6	5.4.4	31	Design Option 3	There are other design options for reducing HDD energy use, such as reducing friction for the rotating platter, reducing rotating speeds, more aggressive power management of the disk depending on the computer state (for example putting the disk in a lower power state after a certain time in short or long idle).	Add these other options in the text.	
5 - 6	5.4.5	31	Design Option 4	There are many other options for improvements in integrated displays, such as: - Higher efficiency LEDs: Using more recent LEDs vs. older ones can yield significant savings - Improvements in LCD panel transmissivity through enhanced manufacturing processes - Enhanced light filtering films, e.g. DBEF and Prism films - OLED: this technology is rapidly evolving, already used in phones and some TVs & displays - Dynamic dimming (adjusting light source power to the brightness of the content) - Auto-brightness control, to adjust brightness to viewing conditions - Shipping monitors with optimal settings instead of overly bright - Ensuring computers are tested as shipped to incentivize manufacturers to ship them configured with optimal brightness settings. (Testing in California showed that differences in brightness settings could be responsible for a large difference in ETEC).	Add these other options in the text. Also add a generic Ecodesign requirement proposal for integrated desktops specifying that products should be shipped with medium light and brightness settings (e.g. at no more than 50% of the maximum light and brightness levels).	
5 - 6	5.4.6	32	Design Option 5	The option of better and wider implementation of SI0x states across CPUs and SoC designs merits further elaboration, because it is a key, low- or no-cost strategy to significantly reduce energy use. As part of research for the 2016 California rulemaking,	Further highlight the importance and benefits of this option.	

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				NRDC and Aggios found that deep CPU power management is not fully implemented on most commercial desktop computers. Activating deep CPU power management (C7-state or above) at the package level, not just core-level, can yield substantial power reductions at no cost and no impact on user experience.		
5 - 6	5.4.7	32	Design Option 6	Two additional efficiency options worth including: - Graphics switching or 'hybrid' graphics: the ability to switch between integrated and discrete graphics, depending on the task - Panel self-refresh: use of dedicated memory in the display to refresh the screen when nothing changes, allowing the GPU to reduce its power demand. Already implemented in the integrated monitors of many laptops, it could have an even larger benefit in desktops and laptops with external monitors.	Add these other options in the text.	
5 - 6	5.4	32	Options on motherboard	Motherboards are one of the components with the highest power demand in many computers, and are often not designed to minimize energy use when the computer isn't working hard. Components like video and audio ports continue to draw higher levels of power than necessary even when no device is plugged into them. Some models, like the B150M ECO, offer advanced power optimization features that can significantly reduce the power demand in idle mode. This type of capability should be added to the motherboards of all computers. This would cost less than € 0.10 per computer and would result in significant energy reductions. See e.g. this document and this other one.	Add this option in the text.	
5 - 6	5.4	32	Software efficiency	Computers are sold with pre-loaded software such as a browser, anti-virus, media player, etc, which have a large impact on the efficiency of the computer in idle mode. While the efficiency of software is not captured by the test method, it is a large opportunity for computer energy efficiency and merits including as a design option for reference and future use when an active mode test is	Add a reference to this aspect in the text.	

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				included.		
7	7.1.1	11	Measurement standard	The timeline in table 1 misses a step 0, which is the process of mandating CENELEC to develop the test procedure within horizontal mandate M/495	Include some clarification about the steps to be taken to mandate CLC to develop the new test method	
7	**7.1.2**	**12**	**Reporting of computer active state energy use**	**This is a strong proposal that is very much welcome and required. Idle state is increasingly becoming not representative of real-world energy use. This not only significantly underestimates actual computer energy use, but also potential savings from regulatory requirements. Measuring active state consumption is indispensable to better inform and design policies, as well as set future more adequate requirements.**	**The text could highlight more strongly the many reasons and benefits of this option, and push for a measurement method to be quickly designed, either by CENELEC or any international cooperation that can deliver in a short timeframe.**	
7	7.2.1	16	Scope of new efficiency tiers	Current Ecodesign Regulation includes an exemption for certain high-end PCs. It is unclear how this exemption is considered in the proposed new tiers.	An investigation on the current market penetration rate of exempted PCs would be useful. The study should clarify whether an exemption for certain configurations is still recommended (and why) or not.	
7	7.2.1	16	Sleep/off mode tiers	Table 2 (p. 13) suggests setting requirements on low power modes (point 2.b), but then in table 4 there is no suggestions for these modes.	The proposal in table 4 should include new limits for sleep and off modes.	
7	7.2	15	Storage allowance	The additional storage allowance may be insufficiently precise, depending on how '*main*' is defined. This is because the main storage device could be a SSD (such as in hybrid SSD-HDD machines where the OS is installed on a small primary SSD, and data located on a large secondary HDD). The problem is that an HDD allowance is already included in the base allowance. So giving an allowance to the secondary HDD in an SSD-HDD configuration would in effect give the allowance twice: once in the base allowance and once in the additional storage allowance.	There are several options: - (Ideal) Remove HDD allowance from the base allowance, and give storage allowances from the first drive based on type (SSD, HDD, 2.5/3.5") - (Next best): only give the HDD allowance to the second HDD in the system (would not be given if the main is an SSD) - (As in CEC Regulation): define 'Main storage' as the largest capacity non-volatile storage device present in the system.	

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7	7.2.1	17	Requirements for IPS	It is very important to set a 10% load requirement, as this is one of the most important load points (typical computers spend most of their time around that point). It is arguably even more important than the 100% load point as computers typically spend little time above 50% load. However, the 10% load requirement at 84% for ≥ 600W is way too lenient if it means that 96% of products are already compliant.	The 10% load requirement for ≥ 600W should be tightened to reach around 50% compliance, in line with the other compliance targets.	
7	7.2.2	20	Energy label	The proposed energy label in table 10 is quite rudimentary and theoretical. It would be useful to give a better sense of what it means concretely.	Provide an analysis of how many product models would populate the different classes, what the ETEC gaps would be between classes, etc.	
7	7.3	21	Material efficiency requirements	Other requirements should be included in the list: - Indication of the warranty duration on the energy label. The requirement may be phrased this way: *'If the commercial warranty offered by the supplier meets certain minimum requirements (to be specified), the warranty duration can be displayed on the energy label of the product.'* - mandatory information requirement about SVHC content and WEEE data (required by Art. 15 of WEEE Directive) to be included in the technical product fiche (to optimise and rationalise data collection) - A mandatory requirement to ensure all products placed on the market are compliant with certain levels of standard MIL-STD810G (or IEC 60068/60529) relating to shocks and other damages, or alternatively that products meeting the standard can claim it on the energy label. Inspiration can be found in the JRC technical report for the Ecolabel of computers (2015).	Add these requirements as possible options to address durability and material efficiency.	
7	7.3.1.2	24	Material efficiency requirements / **Disassem**	The wording of the requirements contains an inaccuracy in the phrasing: *"manufacturers shall ensure that the following components of computers (if present) can be disassembled, replaced and re-assembled"* The disassembly and reassembly should apply to the	*"…components of computers (if present) can be replaced via reversible disassembly of the product"*	

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			blability of key compone nts	product not the component.		
7	7.3. 1.2	24	Material efficiency requirem ents / **Disassem blability of key compone nts**	It is suggested that the list of components covered by the requirement is brought closer to that of the EU Ecolabel for personal, notebook and tablet computers[1] as follows: i) Terminology: For example, data storage (HDD, SSD or eMMC) rather than mass storage systems. ii) Addition of "cooling fan assemblies". iii) Availability of repair instructions for a period of at least five years (in line with the EU Ecolabel requirements). (plus a small clarification in the English)	"…batteries, internal power supply units, **screen assembly and backlight units, data storage (HDD, SSD or eMMC),** memor**y**, keyboard, track pad, network interface board, wireless LAN board, **cooling fan assemblies**;" "Repair instructions shall be provided to professional repairers and made available in free-access website **for a period of at least five years.** Manufacturers shall also provide in the user's manual the contact details **for** servicing of the computer and authorised repairs.	
7	7.3. 1.2	26	Material efficiency requirem ents / **Disassem blability of key compone nts**	The proposals for a label on ease of battery replacement are useful to consumers. However, two refinements are suggested: i) Expansion of the term "tools" to ensure reference to tools that are readily available to a user. The list of tools for inclusion in the Annex can be drawn from Annex B of the 2016. Environmental Footprint and Material efficiency report by JRC[2] ii) An additional clause to phase out label 3 batteries for notebook computers.	From xx xx 20xx manufacturers shall label portable computers that use one or more battery packs according to the following labels. i. Label 1: identifies that the batteries of the portable computer can be manually disassembled and replaced by the user, without the need of tools. Instructions on how to disassemble and replace the battery is provided in the user manual; ii. Label 2: identifies that the batteries of the portable computer can be disassembled and replaced by the user, with the use of **manual or power- driven standard tools as described in**	

[1] "COMMISSION DECISION (EU) 2016/1371 of 10 August 2016 establishing the ecological criteria for the award of the EU Ecolabel for personal, notebook and tablet computers THE EUROPEAN COMMISSION (notified under document C(2016) 5010)

[2] Recchioni, M., Ardente, F., Mathieux, F., 2016. Environmental Footprint and Material efficiency support for product policy. Feasibility study for a standardised method to measure the time taken to extract certain parts from Electrical and Electronic Equipment. European Commission, Joint Research Centre (JRC), Institute for Environment and Sustainability, Ispra. doi:10.2788/29866

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					Annex XX. Instructions on how to disassemble and replace the battery is provided in the user manual; iii. Label 3: identifies that the batteries of the portable computer cannot be disassembled and replaced by the user but it requires assistance. The user manual shall mention "The battery contained in this product cannot be replaced by the end-user, but by professionals". Instructions on how to contact the customer service is provided in the user manual. From XX.XX.20XX **rechargeable batteries shall meet one of the following disassembly requirements:** 1) batteries of the portable computer can be manually disassembled and replaced by the user, without the need of tools. 2) batteries of the portable computer can be disassembled and replaced by the user, with the use of **manual or power-driven standard tools as described in Annex XX**.	
7	7.3. 2.2	30	Material efficiency requirements / **Dismantability of key components**	With reference to the design for dismantling requirements, two additional refinements are suggested: i) Refinement of the exemption for adhesive tape to include pull-off (tensile) force required to separate adhered components, measured as a pressure, in N/cm^2 or kPa. Consultation with a tape manufacturer such as 3M could provide a suitable threshold value for ease of dismantling. ii) Expansion of the list of components in line with the EU Ecolabel requirements on design for disassembly and recycling as follows: • Clarification of display components (Printed Circuit Boards > 10 cm^2, Thin Film Transistor unit and film conductors in display units >	"From xx xx 20xx manufacturers shall ensure that welding or glueing (other than through the use of adhesive tape for batteries **up to a maximum pull-off force of XX N/cm^2**) are not used as joining or sealing techniques for the following components (if present): • batteries; • PCB assemblies larger than 0.1 dm^2; • LCDs panels larger than 1 dm^2 **(Printed Circuit Boards > 10 cm^2, Thin Film Transistor unit and film conductors in display units > 100 cm^2, LED backlight units)**	

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				100 cm^2, LED backlight units) • Addition of Internal power supply unit iii) Availability of information for a period of at least five years (in line with the EU Ecolabel requirements).	• **internal power supply units** • any mercury containing component; • capacitors containing electrolyte or polychlorinated biphenyls; and in addition, • PMMA boards, storage systems (Solid state drives - SSDs – and Hard disk drives – HDDs) and optical disk drives (ODDs) "This information shall be available in a **free-access** website **for a period of at least five years."**	
7	7.3. 4.2	34	Material efficiency requirements / Marking of plastic parts	Whilst the inclusion of requirements on plastics marking is commendable, it is important that it is supported by market surveillance. The recent JRC report on the personal computers group[3] found that plastics marking was not always reliable, and that improper marking could result in contamination of recycling materials. Therefore, we suggest that the preparatory study includes a recognition of the role of market surveillance activities in securing material efficiency improvements.	General comment	
7	7.3. 4.2	34	Material efficiency requirements / Marking of plastic parts	Further to the requirement on marking of plastic parts, a requirement to limit the variety of materials used would improve recycling yields. Such an approach is already taken in the Imaging equipment voluntary agreement[4]	"Marking **and composition** of plastic parts in computers. Plastic parts heavier than 100 g, 1. Shall be marked by specifying the type of plastic using standardised symbols. The marking shall be legible. **2. Shall consist of one single polymer or a polymer blend.** **3. Shall avoid the use of coatings.** **4. Shall be designed in a way that the plastic content can be used for the production of**	

[3] Marwede M., Clemm C., Dimitrova G., Tecchio P., Ardente F., Mathieux F. (2017); Analysis of material efficiency aspects of personal computers product group - Technical support for Environmental Footprinting, material efficiency in product policy and the European Platform on LCA; EUR 28394 EN; doi 10.2788/89220

[4] Industry Voluntary Agreement To Improve The Environmental Performance Of Imaging Equipment Placed On The European Market Va V.5.2, April 2015, https://ec.europa.eu/energy/sites/ener/files/documents/VA%20Imaging%20Self-Regulatory%20Initiative-V-4-0.pdf

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					high-quality durable products by applying available recycling techniques. …"	
7	7.3. 5.2	36	Material efficiency requirements / Declaration of flame retardants	Further to the requirement on declaration of flame retardants, a requirement to limit the content of flame retardants could be included, in line with the requirements of the EU Ecolabel, at a date to be determined. In addition, availability of information should be a period of at least five years (in line with the EU Ecolabel requirements).	**"Maximum flame retardant content in plastic parts in personal computers.** If plastic parts (other than PCB assemblies and cables) containing flame retardants are used: **1. The content shall not be present at or above a concentration limit of 0,10 % (weight by weight).** 2. Manufacturers shall provide in a **free-access** website **for a period of at least five years,** documentation in the format of the following table."	
7	7.3. 7.2	41	Material efficiency requirements / Battery durability for notebooks and tablets/slates	Battery lifetime is a key durability consideration for users. and a common point of failure (JRC report). The JRC report and the EU Ecolabel highlight a number of approaches to addressing battery durability that should be integrated in the study recommendations, including : **1) Durability requirement**: Potential for a requirement on the battery durability. The EU Ecolabel sets requirements of 80% of initial capacity at 750 charging cycles. The JRC report stated that degradation to 80 % of original capacity for consumer products is *"between 300 and 500 cycles (Battery University, 2016a) and up to 1000 cycles (Apple, 2016)."* Therefore, for a minimum performance standard, an appropriate requirement would be 80% at 300 charging cycles (with information on performance at the 500 cycle level to inform the next tier of requirements). **2) Extended durability information:** The provision of more detailed information on battery life: - The definition of a charging cycle; - The capacity threshold at which the battery is considered wasted;	"From XX.XX.20XX **manufacturers shall test the durability of rechargeable batteries using standardised methods and batteries shall meet the following performance requirements:** **—maintain 80 % of their declared minimum initial capacity after 300 charging cycles;** --**communicate** in the user's manual and on a free-access website the following: • **The definition of a charging cycle and the measurement methodology used for test.** • **The capacity threshold at which the battery is considered wasted;** • The remaining full charge capacity of the battery compared to the initial charge capacity, after 500 charge/discharge cycles. • **Details regarding how ambient temperature and battery state of charge (SoC) can impact battery lifespan.** • Availability of battery optimisation	

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				- The measurement methodology (e.g. a testing standard). **3) Optimisation software:** The JRC report highlights the potential of pre-installed battery optimisation software to extend the battery lifetime by up to 17-50 % through allowing the user to limit the state of charge (SoC) of the battery to a defined value when the device is used stationary (i.e. in grid operation).	software, which allows extension of battery lifetime, and corresponding use instructions.	
7	7.3	n/a	Material efficiency requirements / Durability	To be awarded the EU Ecolabel, products must pass some mandatory tests for durability (specified in IEC 60068, e.g. resistance to shock tests, resistance to vibration, drop tests, etc plus additional durability tests of temperature stress, screen resilience, water spill ingress, etc.) These tests could also be included within Ecodesign requirements.	**Product durability for personal computers:** **From XX.XX.20XX manufacturers shall provide the following information:** **1. Design features that enhance product durability in relation to shock, vibration, accidental drop, temperature stress or screen resilience, water spill ingress, keyboard lifespan, screen hinge lifespan** **2. Results of any durability tests including shock, vibration, accidental drop, temperature stress or screen resilience, water spill ingress, keyboard lifespan, screen hinge lifespan.** **Information, including the test method used and test conditions met, will be provided in technical documentation and made publicly available on free-access websites for a at least five years.**	