Submission by Zero Waste Alliance Ireland to the European Commission in Response to the Commission's Public Consultation on proposed Ecodesign and Ecolabelling Requirements for Computers

18 July 2024

Zero Waste Alliance Ireland is a member of

EEB European Environmental Bureau and IEN Irish Environmental Network

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ZERO WASTE ALLIANCE IRELAND

Towards Sustainable Resource Management

Submission by Zero Waste Alliance Ireland to the European Commission in Response to the Commission's Public Consultation Initiative on Ecodesign and Energy Labelling Requirements for Computers

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1. INTRODUCTION

The European Commission's concern about the quantities of electronic waste derived from end-of-life computers and peripherals is based on good evidence, which also supports an urgent need to reduce the growth of such waste, and preferably to reach a point where waste can be reduced to near-zero, or even eliminated completely.

It is only when we take a quick look back at how personal, business and state-owned computers have penetrated, in a relatively few decades, into every corner of human society, can we see the rapidity of this process. Starting only two centuries ago, computers have revolutionised commerce and industry and have transformed the way we live and work.

The history of computing is usually considered to have begun with the invention by the English mathematician Charles Babbage of the first mechanical computer in the 1820s. His first "*Difference Engine"* was a mechanical counting machine comprised of wheels, gears, and cranks that could perform the mathematical operations of addition, subtraction, and multiplication, together with some other limited mathematical functions. It was followed by a more advanced machine known as the "*Analytical Engine"*, also proposed by Babbage, though he never lived to see it constructed.

Babbage's ideas, along with the development of Boolean logic in the mid-nineteenth century by the logician and mathematician George Boole, who was Professor of Mathematics at what was then Queen's College, Cork, now University College Cork, Ireland, helped to ensure the development of today's logical coding systems and languages.

Electro-mechanical computers emerged in the 1930s, utilising relays and vacuum tubes as logical gates and switches, while the 1940s marked the development of programmable electronic computers (ENIAC, for example), and the 1950s saw the introduction of the first commercially available computers, including LEO and UNIVAC. In the 1960s, the invention and large-scale production of microchips and microprocessors, together with the development of integrated circuits, revolutionised computer technology, enabling computers to become much smaller, and laying the foundation for the modern digital age.

One of the contributors to this submission remembers the first computer used in the university where he worked in the early 1970s – this was a large machine, in a dedicated room, attended by specialists, and communication was by means of punched cards. Also in the 1970s, personal computers (PCs) such as the *Commodore*, the *Apple II* and the *Tandy TRS-80* came on the market at affordable prices, marking a significant milestone in the evolution of computing; and this contributor purchased his first PC (an IBM machine) in 1984 !

In the 1980s and 1990s, portable computers opened a new era of personal computing, leading towards today's much more powerful notebooks and laptops. Mobile computing, smartphones and tablets are now an integral part of many peoples' daily lives, providing immediate access to information, serving the purposes of communication and entertainment, such as checking emails, gaming or watching videos. The performance of nearly every type of computer has also increased rapidly; according to the well-known "*Moore's Law",* which states that processing power, memory (RAM) capacity and data transmission speeds have approximately doubled every 1.5 years.

However, this revolution has also been accompanied by (and enabled by) mass production, facilitating an exponential growth in the number of computers made and utilised world-wide. According to the International Telecommunications Union (ITU), personal computers numbered 808 million in 2005, and are estimated at 1,294 million in 2024. According to the ITU forecast model, the total number of personal computers might reach a saturation volume of 1.3 billion, equivalent to about 1 PC for every 4 adults (15 year and older), by 2027. Growth was exponential until 2002-2003, but after this inflexion point, the growth decelerated, approaching a plateau by 2020 (see Figure 1 below).[1]

It is this exponential growth which, even though it may be decelerating, which brings us directly to the problems identified by the Commission: how to manage the ever-growing amounts of energy required to maintain the Internet, by the increasing quantities of electronic waste, how to avoid or even eliminate such waste, and how the ecodesign and energy labelling of computers (the subject of this public consultation) can help mitigate these associated problems. Clearly, ecodesign and energy labelling have a role to play, but must be embedded in a wider understanding of the problems which they are intended to solve.

[1] https://stats.areppim.com/stats/stats_pcxfcst.htm

1.1 Background – Ecodesign, Energy Labelling and this Public Consultation

Legislation on ecodesign, including EU Regulations, has been reasonably effective in improving the environmental performance of products. Ecodesign ensures that minimum requirements are met by any product placed on the EU market. The worst-performing products should progressively disappear from the market when the regulation comes into effect, resulting in lower costs for consumers and businesses over the longer term as more energy efficient and better products become available at equivalent or lower costs.

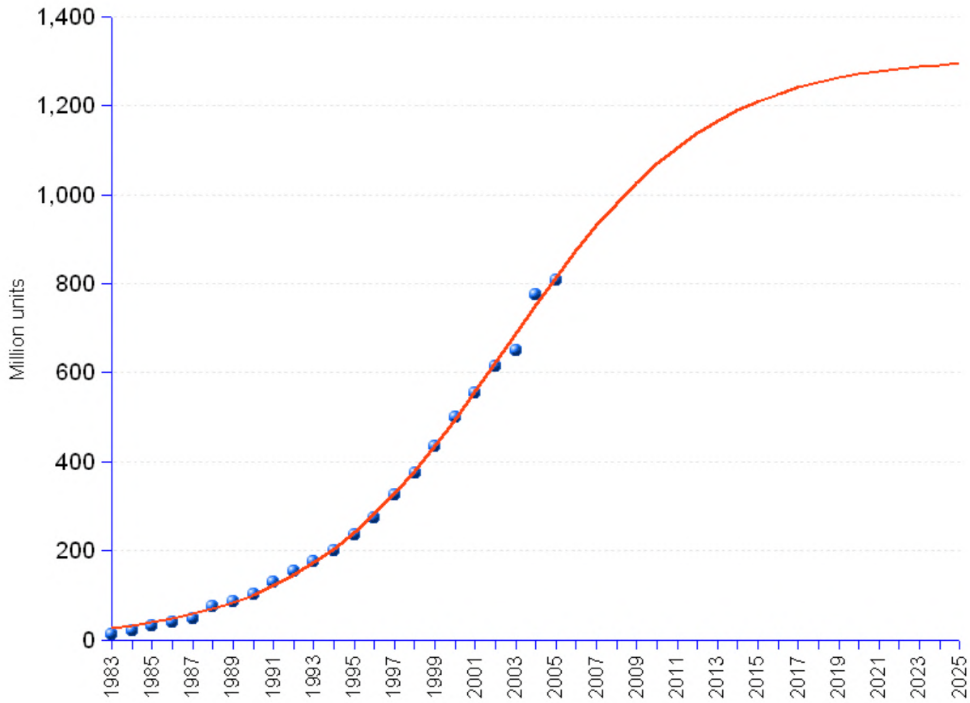

Figure 1: **The number of personal computers (PCs) in the world, both historical data (blue dots) from the ITU (International Telecommunications Union), and *areppim* forecast until 2025 (red S-shaped line). From** https://stats.areppim.com/stats/stats_pcxfcst.htm (areppim AG is based in Switzerland)

Energy labelling is a well-known and effective way to inform consumers about the energy efficiency, durability and repairability of products, enabling them to make informed purchase decisions. Labelling also provides a suitable mechanism for encouraging competition among manufacturers to produce and sell their newest models, preferably labelled as the best class of product.

Because energy labelling covers the entire product lifecycle, including requirements to facilitate recycling, this legislation can also contribute to lower CO_2 emissions as it reduces material use, extraction of precious metals and rare earth elements, often used in computers, and related imports. Energy labelling can also strengthen security of supply, and can contribute to meeting the EU's energy and climate targets to reach climate-neutrality by 2050.

The EU set the initial requirements for computer equipment in the first Ecodesign Regulation 617/2013 in 2013, and this was amended 6 years later by Regulation (EU) 2019/424 on servers; and a review of the Ecodesign Regulation is now ongoing, for which this public consultation will provide an input.

In. 2026, the Commission embarked on a preparatory review of Regulation (EU) no. 617/2013 on Computers and Computer Servers, with the intention that this study would provide the European Commission with the technical, economic, environmental, market and societal analyses relevant for the review of the current Regulations. The review team completed its work in July 2018, producing a final report on proposed policy measures and scenario analyses,[2] and a report was also prepared by the Joint Research Centre, on the analysis of the material efficiency of personal computers.[3]

The European Commission's Directive on Ecodesign requirements for computers is an important step towards integrating sustainability into the lifecycle of technology products. This initiative has the potential to be part of a broader effort to reduce environmental impacts and encourage sustainable consumer practices across the European Union. As technology consumption continues to rise, the need for robust frameworks which promote energy efficiency, resource conservation, and waste reduction becomes increasingly critical.

In our submission, we will firstly identify a number of gaps in the current EU ecodesign and labelling regulations, following which we will propose a number of possible improvements which can be made to them, by drawing on global best practices and innovative approaches. By examining these practices, our aim is to propose actionable strategies that could strengthen the EU's regulations, ensuring that they not only meet the best global standards, but set new standards for environmental responsibility in the information technology sector. Our submission also indicates the challenges to be overcome, and suggests some ways in which these challenges can be met.

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2 https://computerregulationreview.eu/sites/computerregulationreview.eu /files/Preparatory%20study%20on%20review%20computer%20regulation%20-%20Task%207%20VM%2019072018.pdf

3 Tecchio, P., Ardente, F., Marwede, M., Christian, C., Dimitrova, G. and Mathieux, F., Analysis of material efficiency aspects of personal computers product group, EUR 28394 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-64943-1, doi:10.2788/89220, JRC105156. https://computerregulationreview.eu/sites/computerregulationreview.eu /files/JRC%20Technical%20Report%20Analysis%20of%20material%20efficiency%20aspects %20of%20personal%20computers_2018-02-06.pdf

2. Zero Waste Alliance Ireland (ZWAI)

At this point we consider that it is appropriate to mention briefly our background, especially the aims, activities, policies and strategy of ZWAI, and some of our previous submissions to the European Commission and to Irish Government departments.

2.1 Origin and Early Activities of ZWAI

Zero Waste Alliance Ireland (ZWAI), established in 1999, and registered as a company limited by guarantee in 2004, is a Non-Government Environmental Organisation (eNGO) and a registered charity. ZWAI has prepared and submitted to the European Commission, the Irish Government and to Irish State Agencies many policy documents on waste management and waste elimination, and continues to lobby the Irish Government and the European Commission on using resources more sustainably, on promoting re-use, repair and recycling, and on development and implementation of the Circular Economy.

One of our basic guiding principles is that human societies must behave like natural ecosystems, living within the sustainable flow of energy from the sun and plants, producing no materials or objects which cannot be recycled back into the earth's systems, or reused or recycled into our technical systems, and should be guided by economic systems and practices which are in harmony with personal and ecological values.

Our principal objectives are:

i) sharing information, ideas and contacts,

ii) finding and recommending environmentally sustainable and practical solutions for domestic, municipal, industrial and agricultural waste management, and for more efficient and ecologically appropriate uses of natural resources such as scarce minerals, water and soil;

iii) lobbying Government and local authorities to implement environmentally sustainable waste management practices, including clean production, elimination of toxic substances from products, re-use, repairing, recycling, segregation of discarded materials at source, and other environmentally and socially beneficial practices;

iv) lobbying Government to follow the best international practice and EU recommendations by introducing fiscal and economic measures designed to penalise the manufacturers of products which cannot be re-used, recycled or composted at the end of their useful lives, and to financially support companies making products which can be re-used, repaired, recycled or are made from recycled materials;

v) raising public awareness about the long-term damaging human and animal health and economic consequences of landfilling and destruction by mass burning or incineration of potentially recyclable or re-usable materials;

vi) investigating, raising public awareness and lobbying Irish Government departments and agencies about our country's failure to take adequate care of vulnerable and essential natural resources, including clean water and air, biodiversity, and soil;

vii) advocating changes in domestic and EU legislation to provide for more ecologically appropriate, environmentally sustainable and efficient uses of natural resources; and,

viii) maintaining contact and exchanging information with similar NGOs and national networks in the European Union and in other countries, and with international zero waste organisations.

2.2 Our Basic Principles

Human communities must behave like natural ones, living comfortably within the natural flow of energy from the sun and plants, producing no wastes which cannot be recycled back into the earth's systems, and guided by new economic values which are in harmony with personal and ecological values.

In nature, the waste products of every living organism serve as raw materials to be transformed by other living creatures, or benefit the planet in other ways. Instead of organising systems that efficiently dispose of or recycle our waste, we need to design systems of production that have little or no waste to begin with.

There are no technical barriers to achieving a "*zero waste society*", only our habits, our greed as a society, and the current economic structures and policies which have led to the present multiple environmental, social and economic crises.

"*Zero Waste*" is a realistic whole-system approach to addressing the problem of society's unsustainable resource flows – it encompasses waste elimination at source through product design and producer responsibility, together with waste reduction strategies further down the supply chain, such as cleaner production, product repairing, dismantling, recycling, re-use and composting.

ZWAI strongly believes that Ireland and other Member States, and the EU as a whole, should have a policy of not sending to other countries our discarded materials for further treatment or recycling, particularly to developing countries where local populations are being exposed to dioxins and other very toxic POPs. Relying on other countries' infrastructure to achieve our "recycling" targets is not acceptable from a global ecological and societal perspective.

2.3 What We are Doing

Our principal objective is to ensure that government agencies, local authorities and other organisations will develop and implement environmentally sustainable resources and waste management policies, especially resource efficiency, waste reduction and elimination, the promotion of re-use, repair and recycling, and the development and implementation of the Circular Economy.

As an environmental NGO, and a not-for-profit company with charitable status since 2005, ZWAI also campaigns for the implementation of the **UN Sustainable Development Goals**, including (but not limited to) Goal 12, Responsible Consumption and Production; Goal 6, Clean Water and Sanitation (having particular regard to the need to avoid wasting water, and to wasting nutrients contained in our wastewater); and Goal 15, to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, to halt and reverse land degradation and to halt biodiversity loss.

In responding to many public consultations, members of ZWAI have made submissions and given presentations on:

- how Ireland and the European Union should address the problem of plastic waste (March 2019);
- addressing the problem of single-use plastic packaging by the Irish food industry (November 2019);
- transforming the construction industry so that it could become climate-neutral (instead of being a major emitter of greenhouse gases & toxicants);
- Observations on the general scheme of the Irish Government's Circular Economy Bill (October 2021);
- Several observations and submissions addressing the need for recovery and reuse of the phosphorus and nitrogen content of wastewater (2019 to 2023);
- Observations to the European Commission on a proposed revision of the EU Regulation on Shipments of Waste (January 2022);
- Feedback to the European Commission on a proposed Directive on Soil Health – Protecting, Sustainably Managing and Restoring EU Soils (March 2022);[4]

[4] https://www.zwai.ie/resources/2022/protecting-sustainably-managing-and-restoring-eu-soils/

- Submission in response to a public consultation on the review of Ireland's security of energy supplies (October 2022);[5]
- Submission in response to a public consultation on Ireland's Fourth National Biodiversity Action Plan (November 2022);[6]
- Submission in response to a public consultation on Ireland's National Bioeconomy Action Plan 2023-2025 (January 2023);[7]
- Submission in response to a public consultation on Ireland's draft Waste Management Plan for a Circular Economy (July 2023);[8]
- Submission in response to a public consultation on the problem of disposable vaping devices (July 2023);[9]
- Observations and recommendations on the rapidly increasing European and global problem of waste electronic and electric equipment (WEEE, September 2023);[10]
- Observations to the European Commission on a Proposed EU Directive on Soil Monitoring and Resilience (November 2023);[11]

[5] Submission to the Department of the Environment, Climate and Communications in Response to the Public Consultation on a Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems; https://www.zwai.ie/resources/2022/public-consultation-on-a-review-of-the-security-of-energy-supply-of-irelands-electricity-and-natural-gas-systems/

[6] https://www.zwai.ie/resources/2022/submission-to-the-department-of-housing-local-government-and-heritage-in-response-to-the-public-consultation-on-irelands-fourth-national-biodiversity-action-plan-nbap/

[7] https://www.zwai.ie/resources/2023/zwai-submission-on-irelands-national-bioeconomy-action-plan-2023-2025/

[8] Submission to the Regional Waste Management Planning Offices on the draft Waste Management Plan for a Circular Economy; ZWAI, 05 July 2023: https://www.zwai.ie/resources/2023/submission-on-the-draft-waste-management-plan-for-a-circular-economy/

[9] Submission to the Department of the Environment, Climate and Communications in Response to the Department's Public Consultation on Disposable Vaping Devices; ZWAI, 27 July 2023: https://www.zwai.ie/resources/2023/submission-to-the-decc-on-disposable-vapes-and-why-they-should-be-banned/

[10] Submission by ZWAI to the European Commission on Waste from Electrical and Electronic Equipment — Evaluating the EU Rules; ZWAI, 22 September 2023. https://www.zwai.ie/resources/2023/waste-from-electrical-and-electronic-equipment-weee-evaluating-eu-rules/

[11] Observations and Feedback to the European Commission on the Proposed EU Directive on Soil Monitoring and Resilience; ZWAI, 03 November 2023. https://www.zwai.ie/resources/2023/submission-on-the-proposed-eu-directive-on-soil-monitoring-and-resilience/

- Observations on the Irish Government's draft Green Public Procurement Strategy & Plan (November 2023);[12]

- Observations and feedback to the European Commission on the proposed revision of the EU Waste Framework Directive (November 2023);[13]

- Observations and feedback to the European Commission on revision of Directives 2000/53/EC & 2005/64/EC on End-of-Life Vehicles (December 2023);[14]

- Submission by ZWAI to the Department of the Environment, Climate and Communications in response to the Department's public consultation on proposed amendments to the Access to Information on the Environment (AIE) Regulations 2007-2018 (January 2024);[15]

- Response to the first Public Consultation by the Department of the Environment, Climate and Communications on Ireland's draft National Energy and Climate Plan (March 2024);[16]

- Submission by ZWAI to the European Commission in response to the Commission's public consultation on the evaluation of the Nitrates Directive (91 / 676 / EEC) on Protection of Waters against Pollution caused by Nitrates from Agricultural Sources (March 2024);[17] and,

- Response to the second Public Consultation by the Department of the Environment, Climate and Communications on Ireland's updated draft National Energy and Climate Plan (June 2024).[18]

It will be clear that ZWAI is primarily concerned with the very serious issues of discarded substances, materials, water and energy, whether from domestic, commercial or industrial sources, how these become "waste", and how such "waste" may be prevented by re-design along ecological principles. ZWAI is also

[12] https://www.zwai.ie/resources/2023/submission-to-the-decc-on-the-draft-green-public-procurement-strategy-and-action-plan/

[13] https://www.zwai.ie/resources/2023/observations-and-feedback-to-the-european-commission-on-the-proposed-revision-of-the-eu-waste-framework/

[14] https://www.zwai.ie/resources/2023/end-of-life-vehicles-observations-and-feedback-to-the-european-commission/

[15] https://www.zwai.ie/resources/2024/submission-to-the-decc-on-the-proposed-amendments-to-the-access-to-information-on-the-environment-aie-regulations-2007-2018/

[16] https://www.zwai.ie/resources/2024/submission-by-zwai-to-decc-on-irelands-national-energy-climate-plan-necp/

[17] https://www.zwai.ie/resources/2024/submission-by-zwai-to-the-eu-public-consultation-on-the-evaluation-of-the-nitrates-directive/

[18] https://www.zwai.ie/resources/2024/draft-update-of-irelands-national-energy-and-climateplan-necp-submission-by-zwai-to-decc/

very concerned about the effectiveness and appropriateness of Irish and EU policies, legislation, programmes and plans which are the principal determinants of how these "wastes" are managed, controlled and monitored for environmental and societal benefits; and, while we have welcome many such initiatives, we have also considered that it was necessary to evaluate them critically and forensically in the context of what is best for the environment and society.

ZWAI is represented on the Irish Government's Waste Forum and Water Forum (An Fóram Uisce), is a member of the Irish Environmental Network and the Environmental Pillar, and is funded by the Department of Communications, Climate Action and the Environment through the **Irish Environmental Network**.

ZWAI is also an Irish-registered not-for-profit company limited by guarantee (Company registration number **394205**), and a registered charity (CRN number **20057244**). Membership is less than 50 individuals, and the company's affairs and activities are supervised by a 6-person Board of Management (Directors), some of whom are regular contributors to submissions, or make presentations at conferences.

In 2019 ZWAI became a full member of the **European Environment Bureau** (EEB); and a member of the **Waste Working Group** of the EEB. Through the EEB, we contribute to the development of European Union policy on waste and the Circular Economy. In November 2021, the EEB established a **Task Force on the Built Environment**; ZWAI is a member of this group, and we contribute to continuing discussions on the sustainability of construction materials, buildings and on the built environment.

3. Preliminary Overview of the Existing Legislation on Ecodesign and Energy Labelling Requirements for Computers

When considering a review of Ecodesign Regulations 617/2013 and 2019/424, the European Commission drew attention to the widespread and increasing use of computers, particularly because of hybrid working patterns since the COVID-19 pandemic; and these changes are giving rise to a number of new challenges, for example:

- technologies used for manufacturing computers have significantly changed in the last 10 years;
- energy consumption of products on the market are very different and have changed substantially;
- component and chip integration is steadily increasing and has moved from, e.g., 16 nanometres in 2013 to 3 nanometres in the most advanced chips today;
- although present in very small quantities in each computer some materials raise global concerns because of their social economic and geopolitical impacts and their scarcity and/or availability (e.g., critical raw materials such as cobalt, tantalum, neodymium, tungsten, etc);
- lack of circularity at the end of their useful life: computers and their materials can, with the right processes (e.g., recycling or recovery), be reused and these aspects need to be improved; and,
- both the energy used for their fabrication and consumers money can be put to better use by extending product life.

The European Commission has suggested that both the energy efficiency and the material efficiency of computers could be improved; and the areas identified include:

✓ energy efficiency of computers when in use and performing specific tasks;

✓ product durability and sturdiness, thereby decreasing the probability or risk of damage;

✓ suitability of computers for disassembly and repair;

✓ availability of priority spare parts;

✓ availability of appropriate information for users, repairers and recyclers;

- ✓ availability of software / firmware / operating system updates;
- ✓ noise emissions; and,
- ✓ battery durability or accessibility.

3.1 Some Apparent Deficiencies or Gaps In The EU Ecodesign and Ecolabelling Regulations

3.1.1 Need to Include Responsible Production, Critical Raw Materials, and Sources of Materials in Revised or New Regulations

The original Ecodesign Regulations focused primarily on energy efficiency and on reducing the environmental impact during the use of products. While it did include some considerations on the overall environmental impact of products, it did not extensively cover the specific issues related to the sourcing and use of critical raw materials. The emphasis was largely on improving operational energy efficiency and promoting better design to reduce energy consumption during the product's lifecycle.

Given the evolving environmental and ethical considerations, there is now a recognised need to expand the scope of the Ecodesign legislative framework to include a more comprehensive approach that addresses the sourcing, usage, and end-of-life management of critical raw materials (section 5 below). This approach aligns with an increasing consumer awareness and demand for sustainable and ethically produced technology.

When the original Ecodesign legislative framework was introduced, consumer awareness of the issues surrounding critical raw materials was relatively low. However, with growing awareness of the environmental and ethical implications of raw material sourcing, there is now a stronger emphasis on sustainable and responsible production practices.

Today, consumers are more informed and concerned about the origins of the materials used in their devices. This shift in awareness has pressured manufacturers to adopt more transparent and ethical sourcing practices. Additionally, regulatory bodies are increasingly considering the broader environmental and social impacts of electronic products, prompting a re-evaluation of existing legislation to comprehensively address these contemporary concerns.

3.1.2 Narrow Scope of Products Covered

The EU Ecodesign Regulations currently cover a wide range of energy-related products but could benefit from including newer, hybrid devices that merge functionalities, such as smart home devices that combine computing, communication, and connectivity features.

Expanding the scope would prevent these hybrid products from avoiding energy efficiency standards. Additionally, considering the rapid evolution in technology, particularly with Internet of Things (IoT) devices, the regulation could integrate a dynamic mechanism for regularly updating the product categories covered, similar to the approach suggested by the European Environmental Bureau (EEB) for continuous adaptation to market developments.

3.1.3 Lack of Adaptability to Technological Advances

Technology progresses at a swift pace, and the ecodesign standards almost always lag behind these advancements, making some regulations obsolete by the time they are implemented.

We suggest that a more adaptive approach, as seen in Japan's Top Runner Program (see section 6.3 below), which continually adjusts its standards based on the best available technology, could be a model for the EU. This would involve setting provisional standards that are regularly reviewed and updated in a set timeline, ensuring that the regulation evolves in alignment with technological innovations and market trends.

3.1.4 Need for Harmonization with International Standards

Although the EU Regulations aim to align with international standards to ease compliance for global manufacturers, there remains a gap in fully integrating these standards into its framework, often leading to different compliance requirements in different markets.

We suggest that strengthening collaborations with international standard-setting bodies like the International Electrotechnical Commission (IEC) could enhance consistency. Additionally, developing mutual recognition agreements with other countries on product standards could reduce barriers to trade, a strategy supported by the World Trade Organization (WTO).

3.1.5 Incentives for Repair and Longevity

The current EU Regulations focus predominantly on energy efficiency during the use phase but they do not sufficiently address the product's entire lifecycle, particularly its repairability and longevity.

We suggest that introducing requirements similar to those in the French anti-waste law, which mandates manufacturers to provide a repairability index (see section 6.1.3 below), could encourage designs that are easier to repair and maintain. Furthermore, incentives such as reduced VAT rates for repair services (section 4.1 below) or subsidies for companies designing durable products could promote longer product lifespans, effectively reducing electronic waste and supporting the EU's circular economy objectives.

3.1.6 Implementation and Compliance

Ensuring compliance with the Regulations remains a challenge, with significant discrepancies in how regulations are enforced across EU member states.

We would suggest that strengthening enforcement mechanisms through more rigorous auditing processes and increasing the capacity of national authorities to monitor compliance are important steps which could be taken. Implementing real-time monitoring systems and employing digital tools to track product compliance could offer more efficient oversight. Additionally, setting clearer guidelines for penalties and ensuring they are proportionate and dissuasive could reinforce the regulation's effectiveness.

Each of these recommendations involves a layered approach to policy enhancement, calling for legislative updates, increased international cooperation, and stronger enforcement mechanisms to ensure that updated or new Ecodesign Regulations fully capture the potential environmental benefits and would keep pace with global technological and market developments.

4. Suggestions for Improvement of the Existing Legislation on Ecodesign and Energy Labelling Requirements for Computers

Given the apparent (and in some cases very real) deficiencies in the existing Regulations described above, together with our preliminary comments, we propose that the European Commission should take the following suggestions into consideration.

4.1 Incentivising Innovation in Product Design

To foster innovation in product design, the EU could implement a more robust incentive scheme for manufacturers who design products for longevity, reparability, and recyclability. Financial incentives, such as reduced VAT rates or tax credits for sustainable products, can drive significant changes in manufacturer behaviour.

Additionally, the EU could support research and development initiatives focused on sustainable electronics. Programmes similar to Horizon Europe could fund projects that explore new materials and technologies to reduce the environmental impact of electronics.

Horizon Europe, the EU’s key funding program for research and innovation, includes projects that focus on sustainable electronics. For instance, a project funded under Horizon 2020 developed a novel biodegradable circuit board, which significantly reduces the environmental impact of electronic waste. This project not only illustrates innovative material use but also aligns with the EU's goals of reducing electronic waste and promoting sustainability in tech industries.[19]

4.2 Incorporating Circular Economy Principles into Design and Manufacturing

Circular Economy Principles: The revised or new Regulations should require the integration of circular economy principles into the design and manufacturing processes of electronic devices. This would involve designing products for longevity, repairability, and recyclability, thereby reducing the need for newly mined raw materials.

Recycling and Reuse Targets: Setting specific targets for the recycling and reuse of critical raw materials within the technology industry can help ensure that a significant portion of these materials is recovered and reintegrated into the

[19] Horizon Europe, Research and innovation. Available at: https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en (Accessed: 10 July 2024).

production cycle. For example, manufacturers could be required to achieve a minimum recycling rate for cobalt and neodymium from end-of-life products.

4.3 Improving Supply Chain Transparency

Ethical Sourcing Standards: Implementing stricter regulations for the ethical sourcing of raw materials can help address social and environmental issues associated with raw material mining practices. The framework could require manufacturers to source materials from certified, conflict-free suppliers and provide transparency reports on their supply chains.

Traceability Systems: Requiring the use of blockchain or other traceability systems can ensure the provenance of critical raw materials is documented, promoting accountability and reducing the risk of sourcing from unethical or environmentally harmful operations.

4.4 Incentives for Sustainable Practices in Manufacture

Tax Breaks and Subsidies: Offering tax incentives or subsidies to companies that adopt sustainable practices in their use of materials, especially critical raw materials, can encourage the tech industry to prioritise more environmentally friendly approaches.

Research and Development Grants: Providing grants for R&D in alternative materials and advanced recycling technologies can spur innovation and reduce reliance on traditional critical raw materials.

4.5 Lifecycle Impact Assessments

Comprehensive Impact Assessments: Updating the Ecodesign Regulation and legislative framework to include comprehensive lifecycle impact assessments for all products can ensure that environmental and social impacts are considered from extraction to end-of-life. These assessments should evaluate the total energy consumption, material usage, and potential environmental harm associated with each product.

Standardised Metrics: Establishing standardised metrics for assessing the lifecycle impacts of raw materials, especially critical raw materials, can help create a consistent basis for comparison and regulation across the industry, and between Member States.

4.6 Encouraging Collaborative Industry Initiatives

Industry Consortia: Encouraging the formation of industry consortia to address common challenges in sourcing, recycling, and innovating critical raw materials can lead to more effective solutions. These consortia can share best practices, develop industry standards (see 4.7 below), and pool resources for large-scale projects.

Public-Private Partnerships: Developing suitable public-private partnerships can leverage governmental support and industry expertise to drive sustainable practices in the technology sector. These partnerships can focus on areas such as research, regulatory development, and infrastructure improvements.

4.7 Standardization and Harmonization

The revised, amended or new Ecodesign Regulations could benefit significantly from increased standardisation and harmonization with international norms. Aligning more closely with global standards such as those developed by the Institute of Electrical and Electronics Engineers (IEEE) and the International Electrotechnical Commission (IEC) could facilitate compliance by multinational corporations, and would be more likely to ensure that products sold in the EU meet high environmental standards.

This alignment would not only simplify regulatory compliance but also enhance the global competitiveness of EU-based firms. Harmonisation efforts could extend to sharing data and best practices through international collaboration, such as UNEP's International Resource Panel,[20] which could provide strategic guidance and support for resource efficiency in electronic products.

A practical example of standardisation is the alignment between European standards and those of the International Electrotechnical Commission (IEC). The IEC 62040 series, which covers the performance and safety of uninterruptible power supplies, was adopted by European countries and led to harmonised product specifications across markets, facilitating easier compliance by manufacturers and enhancing product safety and reliability across borders.[21]

4.8 Extending the Life Span of Computers

Designing for Durability: The revised, amended or new Ecodesign Regulations should require computer manufacturers to design products with a minimum expected lifespan. This might necessitate using high-quality materials and robust construction methods to ensure that devices can withstand wear and tear over an extended operational life; but a higher purchase cost would be most likely offset by reduced annual operation cost during the life-time of the equipment.

[20] https://www.unep.org/explore-topics/resource-efficiency/what-we-do/international-resource-panel

[21] IEC 62040-1:2017 (2017) IEC. Available at: https://webstore.iec.ch/en/publication/31983 (Accessed: 12 July 2024).

The lifespan of a computer significantly impacts its overall environmental footprint. Extending the use of a computer helps distribute the emissions and resource usage associated with its manufacturing over a longer period, thus reducing the average annual environmental impact.

If the operational life of a computer can be extended, this will reduce the recurring need for new devices, thereby lowering the total emissions over the product's lifetime. This approach can enhance sustainability by reducing electronic waste and conserving resources. In essence, a longer lifespan for computers not only delays the environmental impact of manufacturing but also optimises the use of embedded resources.

Extended Warranties: Requiring manufacturers to offer longer duration warranties can incentivise the production of more durable products and assure consumers of the longer operational life of their purchases.

4.9 Reducing the Frequency of the Most Common Types of Computer Failure

4.9.1 Historic Failures

Fifteen to twenty years ago, common computer failures were largely the result of mechanical hard drive malfunctions, power supply issues, and physical wear and tear on moving parts such as fans and CD/DVD drives. At that time, the modular design of computers made it easier to replace faulty components. For instance, a malfunctioning hard drive could be swapped out without needing to replace the entire computer.

4.9.2 Current Common Failures

Modern computers often fail due to issues such as battery degradation, hard drive failures, software corruption, and overheating.[22] The increased complexity and integration of components in newer models make some failures more challenging to repair. For example, the shift towards soldered components instead of modular ones has made it difficult to replace faulty parts without professional intervention.

4.9.3 Comparative Analysis

The reasons for computer failure have evolved, with contemporary issues focusing more on component integration and software problems rather than mechanical failures. This shift reflects technological advancements but also indicates a trend towards less repairable designs. While older computers often

[22] https://www.makeuseof.com/why-laptop-parts-soldered-instead-of-replaceable/

had user-serviceable parts, modern designs tend to prioritise fashionable designs and compactness over repairability.

4.10 Addressing the Effects of Trends in the Use of Computers; New Models, Technological Advancement and Consumer Behaviour

Over the past two decades, the demand for computers and their performance capabilities has surged, driven by the rapid advance of various technologies.[23] The technology industry, particularly production of computers, has experienced significant growth as a result of the increasing need for high-performance computing, data processing, and AI-driven applications.[24]

Despite modern computers being more energy-efficient, these environmental benefits are often negated by excessive consumerism driven by the constant release of new models. For instance, advancements such as AI-driven personal computers encourage consumers to replace their devices more frequently to stay up-to-date with the latest technology. This cycle of rapid obsolescence leads to a significant amount of electronic waste.

A comparison can be drawn with the automotive industry, where in Ireland, total new car registrations increased significantly when dual registration plates were introduced in 2013.[25] Similarly, in the technology industry, if new computers did not have consistently updated model names (e.g., "Model 2023," "Model 2024"), consumers might feel less pressure to upgrade, thereby extending the lifespan of their existing devices. This approach could reduce the turnover of operationally sound computers, decreasing electronic waste and the demand for new raw materials.

Our suggestions for improving the new Regulations, so as to help address these problems are:

1. **Restricting New Model Naming Conventions**

   Similar to removing the year from car license plates, restricting frequent model name updates could reduce the pressure on consumers to upgrade to the latest version. For instance, instead of naming new models sequentially (e.g., "Model 2023", "Model 2024"), using more neutral naming conventions could help curb consumerism.

[23] https://www.researchgate.net/publication/376645132 The_Impact_of_Computers_on_Society_Unveiling_the_Multifaceted_Advantages

[24] https://ourworldindata.org/brief-history-of-ai

[25] https://www.simi.ie/en/motoring-info/number-plate-system

2. Regulating the Marketing of Computers

Legislative regulation and control of marketing practices could aim to prevent the creation of a false sense of obsolescence, and could help consumers to feel less compelled to buy new models unnecessarily.

3. Incentivising Upgrades Over Replacements:

Giving encouragement to manufacturers' and retailers' programmes for trade-in and refurbishment should be a component of the amended or new Regulations. This approach would require offering incentives to consumers to trade in their old devices for refurbished models, which would have the added advantage of promoting the circular economy. Refurbished products can be resold, reducing the demand for new devices. At least one computer manufacturer (Apple) has such a programme, and "*factory refurbished*" computers are sold at around 15% discount on the price of a new model, together with a 6-month guarantee (Warranty).

Another approach would be giving subsidies for upgrading components rather than replacing entire devices, thereby encouraging consumers to enhance the performance of their existing computers.

4.11 Strengthening Consumer Awareness and Involvement

No matter how good the new or revised EU Regulations become, their effectiveness will depend not only on manufacturers, distributors and retailers, but on the awareness of people who purchase computers, for commercial, business, home or educational use; for themselves or on behalf of others. Increasing or strengthening consumer awareness about the environmental impact and the sustainability (or lack of sustainability) of electronic devices will influence purchases and can drive market changes.

It is therefore our suggestion that the EU should expand its education and public awareness campaigns, similar to the successful New Zealand's "Love Food Hate Waste" campaign (section 6.4 below), which effectively engages consumers on sustainability issues and could be adapted to address electronic waste.[26]

The introduction of mandatory sustainability labelling on electronic products, akin to the EU energy label, could help consumers make informed choices about their purchases based on environmental impact; and we suggest that this could be complemented by digital platforms which provide consumers with easy access to product sustainability data.

[26] Love food hate waste New Zealand (2024) Love Food Hate Waste. Available at: https://lovefoodhatewaste.co.nz/ (Accessed: 12 July 2024).

4.12 Incentivising Repairability

In addition to making computers more robust and less liable to failure, introducing standardisation of components, incentivising upgrades over replacements, and ensuring that computers are more easily repairable, the further step of incentivising repairability would be a positive move to reducing electronic waste derived from end-of-life computers.

Our suggestions for improving the new Regulations, so as to help increase the repairability, and the actual repairing, of computers are:

1. **Repair Vouchers**

   Governments could introduce schemes similar to repair vouchers, offering consumers financial support to cover repair costs. For example, Sweden has implemented a tax reduction on repairs for household appliances, including computers.[27]

2. **Tax Credits for Circular Repairs**

   We suggest that implementing tax credits for businesses that provide repair services or refurbish old devices can stimulate the repair economy and reduce electronic waste.

   We also advocate that following the example of the French Circular Economy Act (as described in section 6.1 below) would provide a significant improvement in the repairability of computers, and the actual repair or refurbishment, instead of replacement.

4.13 Improving End-of-Life Management

Improving end-of-life management for computers within the EU's ecodesign framework can significantly mitigate environmental impacts. Current practices often fall short in ensuring the efficient reuse and recycling of electronic components. By adopting a more comprehensive approach similar to Japan's Home Appliance Recycling Law (see section 6.3 below), the EU can greatly improve its recycling rates. Japan's law mandates consumers and manufacturers to participate in the recycling process, which has significantly increased the recycling rates of electronic goods.[28]

[27] https://knowledge-hub.circle-economy.com/article/3624?n=Government-tax-break-program-for-repair

[28] Laws: waste & recycling. Ministry of the Environment, Government of Japan. Available at: https://www.env.go.jp/en/laws/recycle/index.html (Accessed: 02 July 2024).

Additionally, implementing policies to extend the lifespan of electronics, akin to France's anti-waste law which includes measures like mandatory repairability scores for electronics, could be beneficial.

This initiative has not only reduced waste but has also spurred growth in the repair industry, thereby supporting local economies and reducing the carbon footprint associated with manufacturing new devices.[29]

Furthermore, the EU could establish more stringent disposal regulations. For instance, Sweden's tax break on repairs encourages consumers to repair rather than discard electronics, which complements broader environmental goals.[30]

[29] Dila (no date) Anti-waste Circular Economy Act: Measures in place and coming, Public.fr. Available at: https://www.service-public.fr/particuliers/actualites/A16390?lang=en (Accessed: 02 July 2024).

[30] Sutherland, A. and Borsi, A. Swedish government tax break programme for repair: Knowledge hub: Circle economy foundation, Knowledge Hub. Available at: https://knowledge-hub.circle-economy.com/article/3624?n=Government-tax-break-program-for-repair (Accessed: 02 July 2024).

5. Critical Raw Materials

5.1 Overview

Computer manufacturing relies heavily on several critical raw materials, including cobalt, tantalum, neodymium, and tungsten. These materials are essential for producing various computer components, such as processors, memory chips, and power supplies.

Critical raw materials like cobalt, tantalum, neodymium, and tungsten are indispensable in the tech industry due to their unique properties. Cobalt is crucial for lithium-ion batteries, which power laptops and other portable devices. Tantalum is used in capacitors that store and regulate electrical energy in electronic circuits. Neodymium is a key component of strong permanent magnets found in hard drives and cooling systems. Tungsten is used for its hardness and high melting point in various electronic components.

These materials enable the development of advanced technologies, contributing to modern computers' miniaturisation, efficiency, and performance. Reliance on these materials underscores their criticality in maintaining the functionality and advancement of the tech industry.

5.2 Social, Economic, and Geopolitical Implications

Over the past decade, global concerns regarding the use and sourcing of these materials have intensified, driven by increased consumer awareness and the socio-economic, environmental, and geopolitical implications associated with their extraction and use:

1) **Social Implications:** Mining activities for these materials often take place in regions with poor labour conditions and inadequate environmental regulations. For example, cobalt mining in the Democratic Republic of the Congo (DRC) has been associated with child labour and severe health risks for miners due to unsafe working conditions.[31]

2) **Economic Implications**: The demand for critical raw materials has driven their prices up, affecting the cost of electronic devices. Market volatility and monopolistic control of supply can lead to economic instability for dependent industries.[32]

[31] https://www.cecc.gov/events/hearings/from-cobalt-to-cars-how-china-exploits-child-and-forced-labor-in-the-congo

[32] https://www.researchgate.net/publication/377528818_Reducing_supply_risks_for_critical_raw_materials_Evidence_and_policy_options

3) **Geopolitical Implications**: The concentration of these materials in politically unstable regions creates supply chain vulnerabilities. Countries rich in these resources, such as China (which dominates the production of neodymium and tungsten), can leverage their control over these materials to exert geopolitical influence.[33]

5.3 Challenges in Sourcing and Impact on Supply Chains

Sourcing critical raw materials poses significant challenges that impact global supply chains:

1) **Environmental Degradation:** The extraction of these materials often leads to significant environmental degradation, including deforestation, soil erosion, and water contamination.[34]

2) **Supply Chain Disruptions:** Political instability, regulatory changes, and trade restrictions in resource-rich countries can disrupt supply chains, leading to shortages and increased costs for manufacturers.[35]

3) **Ethical Concerns:** The ethical implications of sourcing materials from conflict zones and regions with poor labour practices have led to increased scrutiny and calls for more responsible sourcing practices. schemes by retailers, enabling collection infrastructure to expand and become more accessible to consumers.[36]

5.4 Trends in the Use of Critical Raw Materials

Over the past two decades, the demand for critical raw materials such as cobalt, tantalum, neodymium, and tungsten has surged, driven by the rapid advancement of various technologies.[37] The tech industry, particularly the production of computers and smartphones, has been a significant consumer of these materials. For instance, the use of neodymium in hard drives and cooling systems has increased dramatically due to the growing need for high-performance computing.[38]

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[33] https://www.irena.org/News/pressreleases/2023/Jul/Diversifying-Critical-Material-Supply-Chains-Minimises-Geopolitical-Risks

[34] https://earth.org/lithium-and-cobalt-mining/

[35] https://www.researchgate.net/publication/371950693 _Factors_disrupting_supply_chain_management_in_manufacturing_industries

[36] https://www.sciencedirect.com/science/article/pii/S0301420721000325

[37] https://www.euromines.org/files/what-we-do/sustainable-development-issues/2010-report-critical-raw-materials-eu.pdf

[38] https://blog.shp.law/index.php/2023/05/10/critical-raw-materials-and-quantum-technology/

In recent years, other technologies, such as electric vehicles (EVs), have begun to compete with computers for these resources. EV batteries require substantial amounts of cobalt and other rare earth elements, adding to the strain on global supply chains.[39] This competition highlights the need for a sustainable approach to managing critical raw materials to ensure the availability of these resources for future technological advancements.

5.5 Impact of Sulphuric Acid Shortage on Raw Material Extraction for Green Technologies

The transition towards a sustainable and low-carbon economy, while essential for mitigating climate change, has introduced several unintended consequences. One such consequence is the emerging shortage of sulphuric acid, a critical component in various industrial processes, including the extraction of raw materials necessary for the production of green technologies such as computers and electric vehicles.

5.5.1 The Role of Sulphuric Acid in Raw Material Extraction

Sulphuric acid is indispensable in the industrial extraction of metals from ores, particularly those used in high-performance batteries and lightweight motors for vehicles. Essential metals like cobalt, nickel, and neodymium, which are crucial for the manufacturing of computers and other green technologies, usually require sulphuric acid for their extraction. The demand for these metals is expected to surge significantly, with cobalt demand potentially increasing by 460%, nickel by 99%, and neodymium by 37% by 2050. This anticipated growth places an even greater strain on the already short supply of sulphuric acid.

5.5.2 Impact of Fossil Fuel Reduction Legislation

The European Union's legislation aimed at reducing fossil fuel consumption inadvertently reduces the production of sulphuric acid. Key regulations such as the European Green Deal, the Fit for 55 package, and the RePowerEU Plan play significant roles in this reduction. The European Green Deal sets out ambitious goals to make Europe the first climate-neutral continent by 2050. The Fit for 55 package aims to reduce net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels. The RePowerEU initiative promotes renewable energy and efficiency improvements across the EU.

[39] https://www.researchgate.net/publication/339934072_Global_Electrification_of_Electric_Vehicles_and_Intertwined_Material_Supply_Chains_of_Cobalt_Copper_and_Nickel

Sulphur, primarily a byproduct of fossil fuel refining, is integral in producing sulphuric acid. With fossil fuel usage projected to decline sharply to meet these targets, the supply of sulphuric acid is anticipated to fall dramatically, potentially resulting in a shortfall as large as 320 million tonnes by 2040. This is a significant deficit, amounting to 130% of current production levels.[40]

5.5.3 Consequences for Green Technology and Raw Material Extraction

The reduction in sulphuric acid supply presents a critical challenge for the raw materials extraction sector. As the demand for metals used in green technologies increases, the scarcity of sulphuric acid could slow the growth of industries dependent on these metals, particularly those involved in the production of computers. Not only is sulphuric acid very important in the recovery and refining of rare earth metals as a leaching agent and purification agent, it is also vital to the circular economy aspect of rare metal recovery: sulphuric acid is used in the hydrometallurgical process to extract valuable metal from electronic waste, and also in the refining and purification steps.[41]

The increased competition for sulphuric acid could also drive up prices, making raw material extraction more costly and potentially less sustainable. The shortage of sulphuric acid could significantly impact the Ecodesign framework, necessitating revisions to ensure the sustainability and availability of critical raw materials for green technologies, and this needs to be accounted for in amendments to the Ecodesign Legislative framework.

5.5.4 A Proposed Solution for Addressing Sulphuric Acid Shortage

Promoting the adoption of **sustainable industrial processes** can mitigate the industry dependence on the availability of sulphuric acid. For example, if it became possible to recover large quantities of phosphorus from sewage and wastewater, this could reduce the need for sulphuric acid in the production of phosphatic fertilisers. On the other hand, the development of new battery technologies which rely less on rare metals would reduce the demand for sulphuric acid in metal extraction.

[40] https://www.ucl.ac.uk/news/2022/aug/analysis-sulfuric-acid-resource-crisis-could-stifle-green-tech-threaten-food-security

[41] https://link.springer.com/article/10.1007/s11837-023-06235-1

5.6 Addressing the Problem of Critical Raw Materials – A Summary

To address the growing concerns related to the use of critical raw materials in computer manufacturing, the Ecodesign legislative framework must evolve. By incorporating circular economy principles, enhancing supply chain transparency, incentivising sustainable practices, conducting comprehensive lifecycle impact assessments, and promoting collaborative industry initiatives, the framework can mitigate the environmental and social impacts of these materials. Such updates will not only ensure the sustainability of the tech industry but also align with increasing consumer awareness and demand for ethical and environmentally friendly products.

6. CASE STUDIES AND EXAMPLES

6.1 The Legislation and Practice in France

6.1.1 Overview

As a comparative of legislation already in effect in the European Union we have chosen to look at the second largest economy in the EU, France. With the Republic's environment code and the *loi AGEC* it is in a position where legislative drivers are in force to tackle the growing demand of electronic goods and the waste they produce. A cultural penchant towards conscientious disposal of waste, including and municipal waste, to allow for ease of use across most of the territory ensures that France can be a leader in the campaign against all forms of waste, not just electronic.

6.1.2 Code de l'Environement

In recent years the implementation of the country's "Code de l'Environnement" has required the sale of electronic goods to be complemented by the existence of a contingency plan for the particular electronic product. This contingency plan is required by law to allow for repairability and the provision of spare parts[42] for most electronic goods.

In line with what is proposed in the European Regulations addressed in thus public consultation, this law has facilitated the disposal and repair of e-waste for the population of France. Why is this important? We suggest that it is important, and a good example to follow, as France is both the EU's second largest economy and second largest population and thus produces an astonishing amount of e-waste. For example, in 2022, some 994,805 tonnes of e-waste were collected in France.[43]

The "Code de l'Environnement" also mandates that third party organisms must be responsible for the logistics involved in lifting and treating discarded objects. As we will discuss in the following sections, these laws have made for a system in which the production of e-waste is disincentivised and the removal of e-waste is facilitated.

[42] Article L541-10-12 - Code de l'environnement - Légifrance (2020). https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000041569472, accessed 10/07/2024

[43] Electrical and Electronic Equipment : data 2021 - La librairie ADEME (2022). https://librairie.ademe.fr/dechets-economie-circulaire/6662-electrical-and-electronic-equipment-data-2021.html., accessed 10/07/2024

6.1.3 La Loi AGEC

The AGEC law, literally translated as the "*Anti Waste For A Circular Economy Act"*, re-enforces the Code de l'Environnement in that it makes planned obsolescence in goods sold in the French economy illegal. Thus, for a computer or smartphone company to sell their goods in France they must be repairable or capable of being reconditioned. In conjunction with this Act, a mandatory reparability index for goods sold in France was introduced; the criteria for getting a repairability index are as follows,

1. **Documentation**: If the manufacturer has provided technical documents that would aid with repairing a product.
2. **Ease of dismantling and access to tools**: How easy the product is to take apart, the availability of tools required for repair
3. **Availability of spare parts**: Score is determined by the availability of spare parts for a product through its usable life and the time required to have them in use.
4. **Price of spare parts**: Score determined by the price of spare parts in relation to the unit in its entirety
5. **Specifics**: Specific requirements for goods, batteries for example.[44]

To put this into context the iPhone 15 (released in 2023) obtained a ***repairability score*** of 7.5/10. This repairability score is set to be renamed this year to become "indice de durabilité" (durabilité can be interpreted as "sustainability" or "durability"), and in either case it is set to further open the amount and scope of scrutiny on a product's environmental performance.

6.1.4 REP- Responsabilité enlargie du producteur – Extended responsibility of producers

Since the implementation of the AGEC Act and the Environmental code, manufacturers of goods have been made responsible for the life cycle of their goods. In order for this to be monitored, as above mentioned, organisations have been established in order to facilitate the monitoring of the entire life cycle of any particular product, including electric goods which come into scope of the REP legislation. Companies producing these goods are obligated to join an authorised eco-organisation and pay them to provide oversight. This means that in practice

[44] Tout savoir sur l'indice de réparabilité (2024). https://www.economie.gouv.fr/particuliers/tout-savoir-indice-reparabilite#comment-est-calcul-l-indice-de-r_2. accessed 10/07/2023

there is now an independent oversight of manufacturers of goods which may potentially pollute the environment.[45]

It is therefore our submission that these legislative steps which have been taken in France could serve as a benchmark for further action in the EU on both the member state level and on the level of the Union as a whole.

6.2 Adopting India's Computer Repair and Reuse Strategy in the EU

India's approach to managing electronic waste (e-waste) through repair and reuse initiatives offers valuable lessons for improving the European Commission's ecodesign and ecolabelling requirements for computers. This strategy could address some of the significant challenges currently faced in the EU regarding e-waste management.

6.2.1 Background and Context

India has witnessed a rapid increase in e-waste due to heightened consumer electronics consumption, driven by improved living standards and high demand for technology products such as smartphones. The burgeoning issue of e-waste management has prompted several strategic measures aimed at promoting sustainability within the electronics market.

6.2.2 The Right to Repair Movement

A pivotal aspect of India's strategy is the 'Right to Repair' movement, which has gained considerable traction. This initiative underscores the importance of allowing consumers to repair their electronic devices instead of replacing them. It advocates for manufacturers to provide necessary manuals, parts, and tools to facilitate repairs, thus extending the life cycle of products and reducing waste.

6.2.3 Challenges and Considerations

While adopting India's strategies, the EU must consider the differences in market dynamics and regulatory environments. The feasibility of integrating such practices within the existing legal and economic frameworks of EU member states is crucial. Additionally, the EU faces unique challenges such as the diverse policies of its Member States, which may require a more tailored approach to implementation.

45 Les filières à Responsabilité Élargie du Producteur | Filières à Responsabilité Élargie du Producteur (no date). https://filieres-rep.ademe.fr/.

6.2.4 Potential Benefits

Widespread adoption of the type of repair and reuse strategies implemented in India could significantly reduce the e-waste generated within the EU, enhance sustainability in electronics consumption, and align with global environmental goals. It would also promote economic opportunities within the repair industry and contribute to a more robust circular economy.

By considering India's model, the EU could lead a transformative shift in how electronic products are consumed and disposed of, setting a global benchmark for sustainable electronics management.

6.2.5 Current EU Scenario

As pointed out earlier in our submission, the EU's Ecodesign Regulation primarily focuses on reducing environmental impact through stringent manufacturing standards, but does not robustly address the repair and reuse aspects that are increasingly vital due to the rapid obsolescence of electronic devices.

It is therefore our suggestion that adopting a model similar to that operating in India, could shift the focus from not only designing eco-friendly products but also ensuring they have a prolonged operational lifespan.

6.3 An Example from Japan

Japan's "*Home Appliance Recycling Law"* is a robust model for effective e-waste management. For example, the law requires consumers to return used appliances to designated collection centres or to retailers, who then forward these to certified recyclers. A case study by the National Institute for Environmental Studies, Japan, illustrates how this approach has led to a recycling rate of over 80% for major appliances, effectively reducing landfill waste and recovering valuable materials like metals and plastics.

6.4 Other Best Practices from Around the World

Global best practices provide a valuable benchmark for the EU. For example, South Korea's Extended Producer Responsibility (EPR) policy requires manufacturers to be accountable for the entire lifecycle of their products, including disposal. This policy has significantly improved the country's recycling rates and reduced the environmental impact of electronic wastes.[46]

In New Zealand, the "*Environmental Choice"* label, which certifies products and services that have a lower environmental impact, has generated increasing trust from consumers. A government survey indicated that products bearing this label

[46] Extended Producer Responsibility. Korea Environment Corporation. Available at: https://www.keco.or.kr/en/lay1/S295T386C400/contents.do (Accessed: 02 July 2024).

were perceived as significantly more sustainable compared to non-labelled products, highlighting the power of reliable sustainability labels in guiding consumer choices.

Also in New Zealand, the successful "*Love Food Hate Waste"* campaign, which effectively engages consumers on sustainability issues, could easily be adapted to address electronic waste in the EU.[47]

In addition to regulatory measures, voluntary initiatives such as the U.S. Electronic Product Environmental Assessment Tool (EPEAT), which evaluates electronic products according to their environmental attributes, could be promoted within the EU market. This could help raise standards and guide consumers towards more sustainable choices.[48]

The United Nations Environment Programme (UNEP) facilitates the Global Partnership on Waste Management, a multi-stakeholder forum that focuses on improving holistic waste management practices globally. One focus area has been the standardization of e-waste management practices, which includes sharing best practices and technological innovations like the use of blockchain for tracking and managing e-waste more effectively. This collaborative effort illustrates how international cooperation can enhance the enforcement of environmental regulations and foster technological advancements in waste management.

[47] Love food hate waste New Zealand (2024) Love Food Hate Waste. Available at: https://lovefoodhatewaste.co.nz/ (Accessed: 12 July 2024).

[48] EPEAT® is the premier Global Ecolabel for electronics and Technology Products. (no date) EPEAT Registry. Available at: https://www.epeat.net/ (Accessed: 10 July 2024).

7. Some Final Observations on the Scope of the Proposed Amended or New Regulations

7.1 Overview

This proposed Regulation is likely to be large and far-reaching. There are arguments to be made about its merits and its drawbacks. On the side of the merits, the most significant is that it is being discussed as a reality. After decades of inaction it is refreshing to see that the EU is beginning to require its Member States to examine their public and private sectors' impacts on the environment through institutional advocacy. The measures proposed in this proposed Directive for smaller items are welcome, it is essential for the individual to know that, in an inflationary economic era, that they are being protected by the EU with regard to the electronic goods they purchase.

On the side of the drawbacks, the proposed Directive does not go far enough to mitigate the potential environmental ramifications of larger units that account for a significant portion of the EU CO_2e budget, in comparison to their number relative to day to day items such as telephones, computers, dishwashers etc.

7.2 Individual consumers

The Initiative for a proposed Regulation (or a Directive), despite being presented as a near-final piece of legislation ready to be implemented across the EU, should be considered as a further stepping stone in a European journey to sustainable consumption. In the case of the individual consumer there is much to be applauded here; a sharp focus on planned obsolescence, repairability through the useful life of the product, energy consumption in normal and elevated use, ecolabelling of electronic goods, etc.

In summary, much like recently implemented data protection legislation in the European Union, this Regulation or Directive provides further protection and rights to consumers across the EU. This is a welcome step. Further repairability will lead to more sustainable consumer habits and the development of further enterprise in the repair, recovery and research into sustainable production of goods thus leading to so-called "Green Jobs'".[49] These advances are essential in our journey to a sustainable future and our circular economy goals.

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[49] Jenks (2024) *The circular economy and job creation in the green sector*. https://green.org/2024/01/30/the-circular-economy-and-job-creation-in-the-green-sector/.

7.3 Exports and Ethics

According to a report written by Reporterre, between 7 and 20% of Europe's current electronic waste is sent to the African continent. In their reporting they concentrated on the Senegalese capital city of Dakar in which a cottage industry of telephone and computer repairs has developed. In its conception this is a positive step; however, it is in our view that these cottage industries are damaging to the health and human well-being of the region, and an ethical black mark on the European economies that send their waste to such locations, despite laws existing to prevent this.[50]

The responsibility for the dealing with the waste produced should logically fall on those who created the waste in the first place, not on those who endeavour to recover materials from electronic waste as a source of income. The reason for this seemingly harmless industry having a net negative impact on the region is due to the working conditions in cities such as Dakar.

When a telephone or computer is dismantled it poses the risk of hazardous material release. Materials such as arsenic, mercury and lead are components of modern electronic goods, the results of exposure to these materials are detrimental to the human body, and their mass deposition post-extraction into uncontrolled landfills is an environmental disaster. These human and environmental considerations must be taken into account when discussing the fate of electronic goods when their useful life is over. Does this take the form of enhanced recycling on the European continent or the possible creation of grants in order to create safer work environments in countries that handle the waste of the European Union?

7.4 Corporate Actors

For manufacturers and corporations involved primarily in Big Data there is scope for expansion of this proposed Directive. In Commission Regulation (EU) 2019/424,[51] the principal focus was on servers. At present, servers and data storage consume huge amounts of energy, and the total energy consumption of all these facilities globally amounted to 460 TWH in 2022.[52]

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[50] Carlos, C.C.E.J. (2023) *'Au* Sénégal, le fructueux business des déchets électroniques occidentaux,' *Reporterre, Le Média De L'écologie - Indépendant Et En Accès Libre*, 2 May. https://reporterre.net/Au-Senegal-le-fructueux-business-des-dechets-electroniques-occidentaux. [accessed 13 jul. 2024]

[51] *Regulation* - 2019*/424 - EN - EUR-LEX* (2019). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0424.

[52] Cam, E. and Hungford, Z. (2024). *Electricity 2024 - Analysis and forecast to2026*.[online]*https://iea.blob.core.windows.net/assets/6b2fd954-2017-408e-bf08-952fdd62118a/Electricity2024-Analysisandforecastto2026.pdf*, International Energy Agency,

Ireland's national broadcaster RTÉ stated that "*We have 82 data centres in Ireland, with a further 14 under construction and planning approved for 40 more, meaning a 65% growth in coming years*".[53] With this projected growth of 65% we can expect that data centres in Ireland will increase their energy use by a factor of 3.225 TWh in the coming years (the notion of "coming years" is needlessly vague) bringing us to a total of 8.535 TWh of electricity required to power data centres alone.[54] Despite the technology industry being able to claim that their data centres are powered on renewable energy, the net gain of this must be weighed against the reality that Ireland can produce only 11.224 TWh of renewable energy per annum at present.[55] If this trend were to continue it would undermine the country's net zero plans, as set out in the Paris accord.

The expansion of the proposed amended or new Regulation or Directive to include large scale servers and data storage units is vital, so that we do not create a situation allowing this industry to simply replace old units instead of repairing them, given that they already absorb 76.04% of Ireland's renewable energy. If these units were to come under the scope of this proposed Directive, the legislative pressure of the EU would oblige the manufacturers of these facilities to provide spare parts, and incentivise their operators to maintain their existing equipment in lieu of replacement. This would naturally reduce the gross tonnage of e-waste in this industry.

It is in the interests of the companies that produce and buy large servers to make them as energy efficient as possible, as it naturally reduces their running costs and mitigates the risk their to companies in times of increased energy costs and their burden on critical material supply chains. As has been discussed in this submission, the critical raw materials used in the production of these units represent enormous producers of "***Scope 3***" CO_2e emissions. For them to be out of scope is unacceptable.

Data centres aside, the European Union could do much to create an obligatory eco-labelling, in line with that of France's AGEC Act system, in order for public concerns about e-waste and energy used by computers and servers to become more pressing on manufacturers and consumers. Regulation and ecolabelling would provide incentives for innovation in electronic manufacturing in the EU,

pp.15–36. Available at: https://iea.blob.core.windows.net/assets/6b2fd954-2017-408e-bf08-952fdd62118a/Electricity2024-Analysisandforecastto2026.pdf [Accessed 11 Jul. 2024].

53 Ryan-Christensen, A. (2024) 'What is a data centre - and what does it actually do?,' *RTE.ie*, 11 April. https://www.rte.ie/brainstorm/2024/0411/1442289-ireland-date-centres-energy-electricity-climate-policy/.[Accessed 11 Jul. 2024]

54 https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-GHG-Projections-2022-2040_Finalv2.pdf

55 *Wind energy in Ireland* (no date). https://iea-wind.org/about-iea-wind-tcp/members/ireland/. [Accessed: 13 jul. 2024]

while ensuring a just transition. Ecolabelling could take the form of an A to E scoring with A being the most environmentally friendly or repairable. This kind of system has been proposed in the food industry by ECO-SCORE.[56]

Introducing transparency in the design process is essential if we are going to control our e-waste problem. The French agency for ecological transition, ADEME, estimates that 80% of an electrical product's CO_2e emissions come from its production, or "Scope 3" emissions,[57] and if we were able to reduce the amount in gross tonnage of goods produced by allowing for repairability of goods, it follows that the net amount of electronic waste produced (given current production patterns are unchanged) the net tonnage of waste would be diminished relative to current levels.

As the primary factor affecting the amount of waste is the amount produced, and this being determined by market factors, it is of the utmost importance that consumers are provided with reliable information they need in order to come to a decision on what they buy, or ideally what they decide not to buy. The responsibility for this must fall on the producers with legislative drivers forcing them to do so. Furthermore, in order for transparency to be effective and to avoid greenwashing, the assessment of a company's eco-design process cannot be an in-house process.[58] [59] It must be conducted on behalf of the producer by a certified third party. The provision of such certification bodies could potentially fall into scope of this directive.

7.5 Concluding Note on Servers and Data Centres

Despite the proposed directive being a welcome step forward for the circular economy, we feel that there is space for wider scope with regards to large servers and data storage units. This is for the simple reason that we are entering an age of Artificial Intelligence (AI) that requires large data sets to function. Such important infrastructure should be included in environmental risk mitigation legislation covering its entire life cycle from design to disposal.

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[56] *Présentation* | *Eco-Score* (2024). https://docs.score-environnemental.com/.

[57] Leprovost, J (2024) *Les déchets électroniques prolifèrent plus vite que prévu*. https://www.goodplanet.info/2024/03/20/les-dechets-electroniques-proliferent-plus-vite-que-prevu/.[Accessed 11 Jul. 2024]

[58] Albin-Lackey, C. (2020) 'Corporate Self-Regulation is a global crisis,' *Human Rights Watch*, 28 October. https://www.hrw.org/news/2017/11/14/corporate-self-regulation-global-crisis.[Accessed 11 Jul. 2024]

[59] Johnson, L. (2023) 'Greenwashing growing in frequency and complexity: report,' *ESG Dive*, 11 October. https://www.esgdive.com/news/greenwashing-rising-report-rep-risk-social-washing-sustainability/696289/.[Accessed 11 Jul. 2024]

8. Some Remarks on Policy Implementation In The EU

Policy Adoption: The EU could integrate the Right to Repair into its existing Ecodesign framework, making it mandatory for manufacturers to facilitate repairs. This would involve providing access to manuals, affordable spare parts, and repair services, similar to the policies promoted in India.

*Incentivizing Repair over Replacemen*t: Financial incentives such as reduced VAT on repair services or subsidies for local repair shops could encourage consumers to opt for repairs instead of replacements, mirroring initiatives seen in some Indian regions.

*Consumer Awareness and Engagemen*t: Increased awareness campaigns could educate consumers about the benefits of repair and reuse, which has been a significant focus in India to combat the throwaway culture. This could also involve training programmes to skill individuals in electronics repairs, creating jobs and supporting the circular economy.

*Regulatory Framework*s: India's approach includes stringent regulations that prevent the export of e-waste and promote certified recycling practices. The EU could strengthen its regulations regarding the export of e-waste and improve the enforcement of existing waste management protocols.

9. CONCLUSION

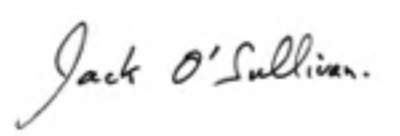
The Ecodesign legislative framework must evolve to address the growing concerns related to the rapid turnover and environmental impact of computer devices. By incorporating strategies to enhance product longevity, improve reparability, limit model turnover, incentivise upgrades over replacements, offer tax incentives for repair services, conduct comprehensive lifecycle impact assessments, and promote collaborative industry initiatives, the framework can mitigate these devices' environmental and social impacts.

Such updates will not only ensure the sustainability of the computer technology industry but will also align with increasing consumer awareness and demand for ethical and environmentally friendly products.

The European Union's initiative on Ecodesign requirements for computers also presents a valuable opportunity to align with broader global sustainability goals, enhancing environmental stewardship and promoting circular economy practices within the technology industry. By examining and incorporating international best practices, such as the emphasis on repair and reuse as practiced in France, India and other leading countries, the EU can strengthen its Ecodesign framework, making it more comprehensive and impactful. This approach not only addresses the immediate challenges of e-waste but also sets a precedent for future regulatory enhancements that could drive significant environmental benefits.

Furthermore, integrating these innovative strategies will help ensure that the Ecodesign and Ecolabelling Regulations or proposed Directive not only mitigates environmental impact but also fosters economic growth and consumer trust in sustainable technology. Ultimately, by embracing a more holistic view of product lifecycle management, the EU can enhance its leadership in global environmental governance and contribute to a more sustainable future.

Jack O'Sullivan 18 July 2024



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