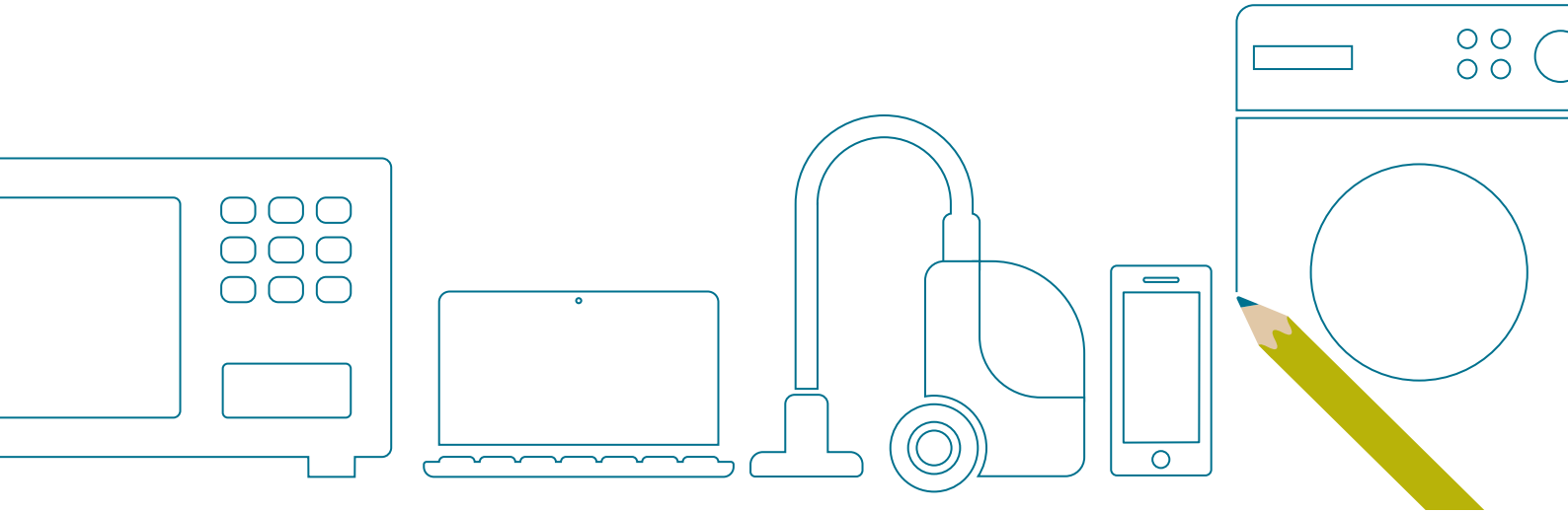
Green Alliance policy insight
November 2020

green alliance...

Design for a circular economy

Reducing the impacts of the products we use



Summary

"Ecodesign standards and energy labelling are an undisputed environmental success story."

Ecodesign standards and energy labelling, which have been focused mainly on improving the energy efficiency of household appliances and other products, are an undisputed environmental success story. Ecodesign standards have pushed the least efficient, shoddiest products off the market, while energy labelling has 'pulled' consumers towards better products. The most conservative estimate suggests that these measures are preventing eight million metric tonnes of CO_2 equivalent ($MtCO_2e$) from being emitted in the UK a year. They have also benefited consumers, with higher quality goods that save the average UK household at least £100 on their annual energy bills.

Despite these impressive achievements, there is considerable untapped potential in terms of ecodesign's further application and scope. We report here on in-depth stakeholder interviews we held to evaluate the legislation's impacts to date and consider what more it could do in future.

At an EU level, attention is shifting to the efficiency of resource use as well as energy. As the UK completes its transition out of the EU, the government has promised to match or exceed what the EU does on ecodesign. This approach is right and, for the government to make the most of it, we recommend the following:

Properly enforce standards

Inadequate market surveillance means that between a tenth and a quarter of products on the market in the UK still do not meet the minimum requirements of ecodesign regulations. Not only does this mean the country is unnecessarily emitting around 800,000 tonnes of CO_2e a year (equivalent to the emissions from over 600,000 average cars), it also means that consumers are being exposed to bad products, and law abiding businesses are being undercut by those selling substandard goods. To address this, the government should ensure adequate funding for surveillance, better engagement with companies and marketplaces, and greater deterrence for offenders.

Improve energy labelling

Even energy efficient large products will tend to use more energy than their smaller counterparts, but this is not reflected in

"The UK generates more e-waste per person than any country in the world, with the exception of Norway."

energy ratings, which are not based on overall energy use. This is a problem exacerbated by the trend towards larger products in some areas. We found, for instance, that some A+ rated televisions use more than ten times as much energy as others rated at the same level. The cost of this might also not be apparent to consumers: for instance, for A+ rated televisions, we found the running cost could vary between £3.88 and £39.52 a year. To help consumers, these facts should be made clear on labels, as part of a drive to provide better information.

Tackle the e-waste mountain

Most importantly, there is an urgent need to address resource use as well as energy efficiency, given the rapid and unsustainable accumulation of energy efficient products as waste. The UK generates more e-waste per person than any country in the world, with the exception of Norway. The fact that we are getting through products so quickly is particularly problematic for items like smartphones, where the bulk of environmental impacts happen in the production phase. Research PwC carried out for us found that producing 75g of metals for a typical smartphone requires at least 6.5kg of ore to be mined. According to previous research, production also generates 60kg of CO_2e, which is more than 300 times the weight of the phone itself.

The quality and environmental impact of electronic products would be significantly improved by setting specific standards targeted at slowing down the churn. Criteria should include durability, repairability, upgradeabilty and component reuse, as well as recycled and critical raw material content. New 'product passports' could be used to record this information, along with repair details, chemical composition and social and environmental information. These digital records of products would be very popular with the public, meeting the desire for clearer information and longer lasting products. They would help businesses to create a more circular economy, where high quality, responsibly designed products are kept in use for as long as possible.

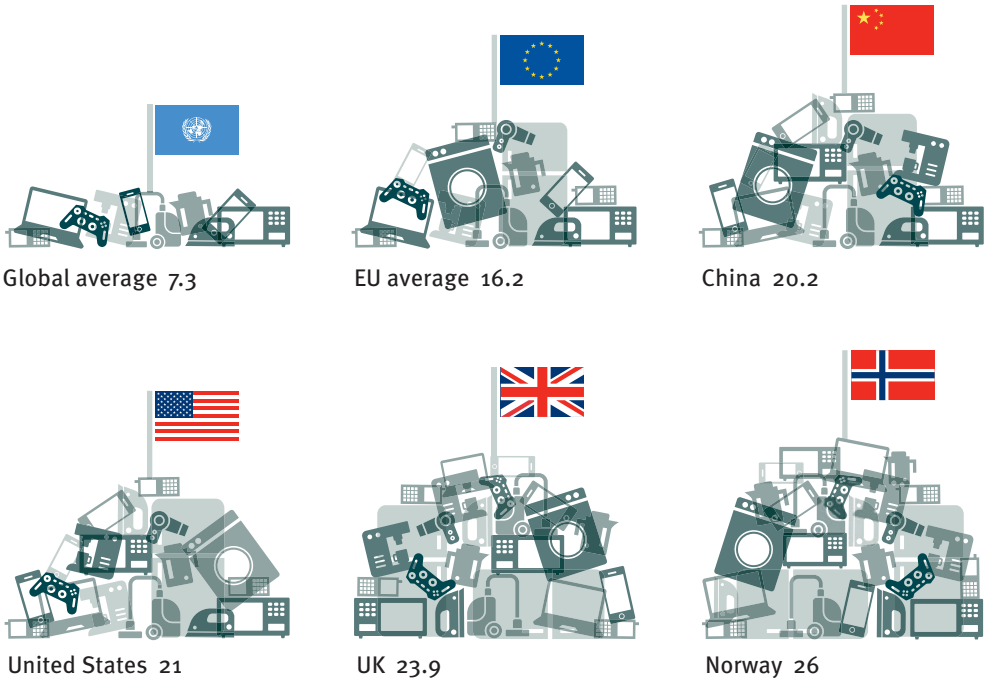
Introduction

"Existing ecodesign rules and energy labelling will save the average UK household £100 on their energy bill in 2020."

Electronic products we use in the UK are getting more and more efficient.[1] This is good news for consumers and the environment. By the most conservative estimate, existing ecodesign rules and energy labelling, for home appliances and other energy using products, will save the average UK household £100 on their energy bill and prevent eight million tonnes of CO_2 equivalent ($MtCO_2e$) being emitted in the UK in 2020.[2]

Rather less good news, though, is that we are getting through these products at an alarming rate. According to the UN's *Global e-waste monitor 2020*, 53.6Mt of e-waste was generated worldwide in 2019. It has increased 21 per cent in just five years. After Norway, the UK generates the most electronic waste per person in the world.

E-waste generated in 2019 (kg per person)[3]

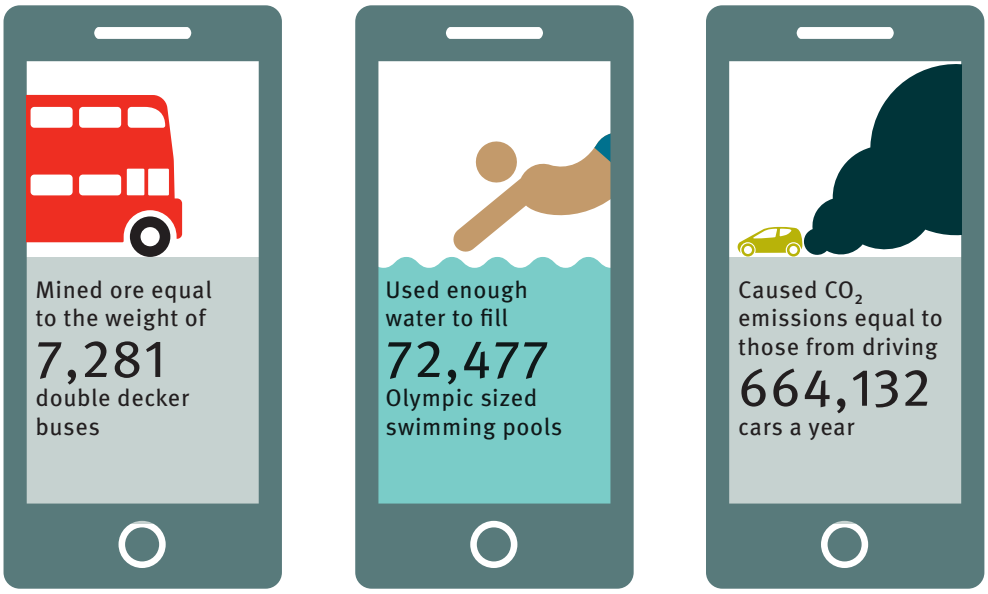


The per capita figures in the illustration above mask the full extent of the problem in the UK. As our population is more than ten times that of Norway's and the UK recycling rate for e-waste is lower (a reported 55 per cent is collected in the UK, compared to 71 per cent in Norway), the UK's mountain of untreated e-waste is considerably larger at 727 kilotonnes, compared to 40 kilotonnes in Norway.[4] Even when products are recycled, they are normally shredded, which destroys large quantities of valuable material.

"Some products are responsible for more emissions during their manufacture than their use."

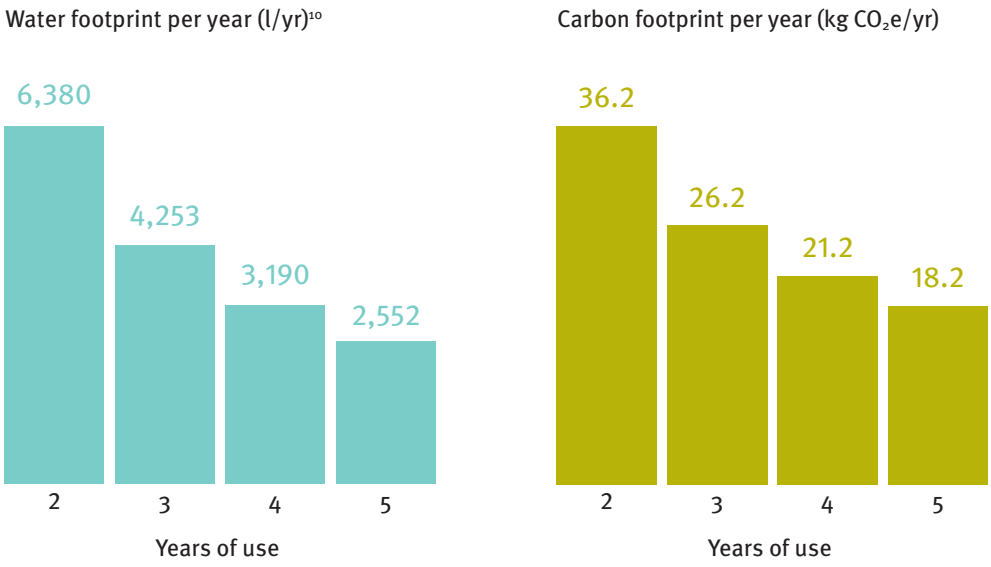
And the waste of electronic products themselves is just one small part of the story. Producing each one of them requires considerable amounts of energy, water and other resources. Each item will have left behind a trail of waste and emissions before it even gets to market. Some products – notably IT equipment – are responsible for more emissions during their manufacture than their use. And there is more waste generated in production than at the end of life. For instance, during the production of a typical smartphone 12,760 litres of water (equal to 160 baths) are used and, according to PwC research for this report, at least 6.5kg of mined ore is required to produce the 75g of metal it contains. Previous research has shown that producing a smartphone emits 60kg of CO_2, which is over 300 times the weight of the phone itself.[5]

The impacts of producing phones for the UK market in 2019[6]



To avoid significant impacts caused during the production phase, it is important to use electronics for as long as possible. Each year they are used, and production of a replacement is avoided, reduces the impact of owning and using that product. If a phone is kept in use as long as people say they want it to be (ie at least five years), as opposed to as long as it usually lasts in practice (two to three years), the carbon impact per year of use could be cut by 50 per cent and the water impact could be more than halved.[7,8]

Keeping phones in use longer decreases their annual impact



Extending the life of electronics also ensures that the materials they contain, which are often of high value, are preserved for longer. These include precious metals like copper, iron, gold, silver and platinum, and critical raw materials like cobalt and rare earth elements. According to the UN, the precious metals and critical materials contained in the world's mountain of e-waste in 2019 were worth an estimated $57 billion, and most of these resources are never retrieved to be used again.[10]

In this report, we evaluate the legislation that has helped to drive greater energy efficiency and we recommend how to enhance it. This includes ways to cut more energy and address resource efficiency to stop the UK getting through electronics at such an unsustainable rate. This, in turn, will limit significant production impacts like waste, pollution and habitat loss.

Legislation has driven improvement

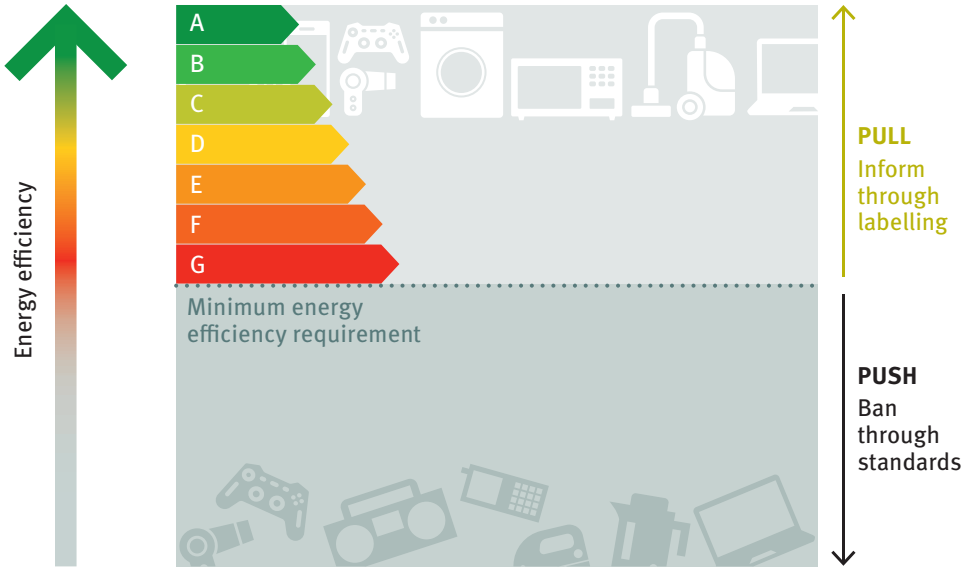
Push and pull measures

Two legislative frameworks developed with the EU, the Energy Labelling Regulation and the Ecodesign Directive, have led to significant cost savings for consumers and emissions reductions in the UK.

Energy labelling legislation was introduced in 1992 with the aim of 'pulling' the market towards products with improved environmental performance, through informed consumer choices. These rules are responsible for the now familiar traffic light ratings on labels for household white goods, like washing machines and fridges, and a wide range of other consumer, commercial and industrial goods.

The Ecodesign Directive was then introduced in 2005, which created a framework for establishing minimum requirements for products sold in the EU, 'pushing' the worst performing products off the market.

Ecodesign and energy labelling work to push the worst products off the market and pull consumers towards the best[11]



Over 30 product categories are currently included under this framework, from household appliances and lighting to heating and commercial refrigeration, and new categories are considered for inclusion every three years.

Decisions are based on three criteria: a product group's volume of sales and trade, environmental impact and the potential for cost effective improvement. Requirements and accompanying test standards are set following product prioritisation, detailed market and technological studies, and multi-year consultation between officials and stakeholders. Usually, requirements are specific to a product group, though the framework allows for 'horizontal' measures which apply to multiple product groups, such as limiting power use in standby mode.

Until recently, ecodesign requirements were entirely focused on energy efficiency, but the latest round of standards, covering ten product groups, began the

"After the Brexit transition period, at the end of 2020, the future of ecodesign and energy labelling in the UK will be uncertain."

process of introducing resource efficiency measures, including around the recycled material content of products and the availability of spare parts.[12]

Energy labels, meanwhile, have undergone several revisions since their introduction. Originally operating with a scale of A (most efficient) to G (least efficient), they were expanded in 2004 to include additional categories to reflect progress: A+++, A++ and A+. This has led to consumer confusion and difficulty in identifying the most energy efficient products. From 2021, a rescale will see the label revert to the simpler A-G system, initially just for five product groups.[13] At the same time, a new mandatory European product database for energy labelling (EPREL) will be launched for products sold on the EU market, allowing consumers to search for labels and information documents.

After the Brexit transition period, at the beginning of 2021, the future of ecodesign and energy labelling in the UK will be uncertain, although the government has promised to "match or where economically practicable exceed the ambition of the EU's Ecodesign standards".[14]

Assessing success

Between May and August 2020, we conducted extensive stakeholder interviews with organisations involved or interested in the ecodesign standard and energy labelling processes, to understand the strengths and weaknesses of the current approach, as well as how it could be developed in the future, both in the UK and the EU. We spoke to representatives from environmental NGOs, standard setting bodies, trade associations, compliance schemes and manufacturers, among others.

There was universal support among our respondents for the legislation, as well as agreement that it has been highly effective at improving the energy efficiency of electronics, driving innovation and removing the worst products from the market.

Ecodesign evaluated

Strengths to build on	Weaknesses to address
Substantial energy, carbon and consumer costs savings	High rates of non-compliance, and poor market surveillance
Removes the worst products from the market	Length of process, particularly the avoidable delays
High levels of stakeholder engagement and understanding	The ‘package’ approach (developing several regulations simultaneously) leaves some draft regulations in limbo
A consistent, well defined approach is based on robust energy efficiency data	Labelling is not used to its full potential
Flexible framework allows for horizontal and product specific measures	Key electronics, including many IT items, are still not covered
Increasing public support	Circular economy potential is largely untapped

What ecodesign standards and energy labelling have achieved

"Ecodesign is one of the strongest measures we've seen… in terms of addressing our climate and energy efficiency goals."
Environmental NGO

Cutting carbon and bills

Overall, these measures have delivered emissions reductions in 2020 of 306MtCO_2e which is roughly equal to the total annual emissions of Spain, and cost savings of €63 billion for end users across the EU.[15] Additional measures, agreed in 2019, are expected to result in annual carbon savings of over 46MtCO_2e , roughly equivalent to the annual emissions of Denmark, and average consumer savings of €150 per household by 2030.[16] As one interviewee commented: "You just need to look at the numbers. Ecodesign is one of the strongest measures we've seen… in terms of addressing our climate and energy efficiency goals."

Removing the worst products from the market

Ecodesign has removed inefficient products from the market, driving innovation in design. One interviewee said: "What it has done, more than anything else, is get rid of a lot of the garbage on the market."

A UK manufacturer provided a specific example, noting that, before the directive's vacuum standards were implemented, "most vacuum cleaner manufacturers were making vacuum cleaners two kilowatts, three kilowatts, because there was a perception that the customer will pay more the greater power you put on the label, but that was completely false… Now, we're making machines at 900 watts or less with the same performance as the machines made prior to ecodesign." A trade association also praised the "level playing field" it creates where "substantial changes in design" can take place.

A consistent, well defined lifecycle approach

Our interviewees praised the science based approach that underlies the standards and labels. This includes careful selection of the most important product groups for standard setting to deliver cost effective greenhouse gas emission reductions from the in-use phase, as well as the transparent process and in depth and independent preparatory studies. As one interviewee noted: "The strength is really the systematic methodology, so that each product group has to be scrutinised in a certain way, which gives profound data that decisions are based on."

Another summarised why this is so important: "The measures are not just taken out of pure fantasy from the lawmakers, but are based on specific methods that are replicated for all the measures." There was also a general view that tackling environmental impacts at the design stage, rather than at end of life, is more effective. This approach prevents the need to "try and pick up the pieces" if impacts are addressed later, for instance when products become waste.

High levels of stakeholder engagement and understanding

Robust data collection is matched by an equally robust system for engaging stakeholders with different interests throughout the process, and most prominently in a consultation forum. One environmental NGO involved in this process noted: "The consultation forum itself works quite effectively. The industries and the civil society who are involved are, in general, very positive about ecodesign. It's something which has been run very well, and it shows the effectiveness of stakeholders at a real multi-stakeholder platform." Another environmental NGO was more blunt: "Many

"Many stakeholders are involved in the process from early on, so what's developed is not completely disconnected from reality."
Environmental NGO

stakeholders are involved in the process from early on, so what's developed is not completely disconnected from reality."

A flexible framework

Most of our respondents supported the ability to have product specific as well as 'horizontal' measures, such as those limiting power use in standby and off modes. Respondents noted the approach gives the system the ability to address a number of issues. This could become increasingly important as resource efficiency standards are set, which was another development largely welcomed by those we spoke to.

Public support

Some interviewees commented that public support for the measures is increasing as people become more aware of the impacts and savings, although one noted that it "has not always been the case in the past". In the UK, for instance, false claims, including that rules around toasters, vacuum cleaners and energy efficient lightbulbs would be bad for consumers, have now largely been debunked. What is more, previous Green Alliance research has shown the public will overwhelmingly support measures to improve the resource efficiency of products, with three quarters, for instance, agreeing that: "The government should be responsible for ensuring that businesses produce repairable and recyclable products."[17]

How to improve the system

"There are still routes in for non-compliant, really inefficient, or sometimes dangerous products coming to the UK, particularly with digital markets".
Trade Association

Despite overwhelming support for the process, our interviewees recognised that it could still improve. Below, we summarise the weaknesses they identified and make suggestions on how the UK government could fix them.

Improve market surveillance

The EU has suggested that at least ten per cent, and possibly as much as a quarter, of products on the market do not meet its ecodesign and energy labelling requirements.[18] Interviewees were universal in their condemnation of the current approach across member states, which are responsible for identifying products that violate standards. All participants called for much more funding and resources to ensure that only products that meet requirements are allowed to be sold. One UK trade association expressed frustration that they "undertake more market surveillance… than the government does", noting the folly of "introducing new regulations when they're not policing the ones that have already been introduced".

Poor enforcement means the UK is missing out on considerable emissions savings[19]

This matters because poor market surveillance is exposing people to inefficient, low quality electronic goods. It also puts domestic manufacturers on an uneven playing field, with the risk they will be undercut by competitors who are not incurring the costs of meeting the high standards or producing accurate labels.

One trade association expressed concern "that there are still routes in for non-compliant, really inefficient, or sometimes dangerous products coming to the UK, particularly with digital markets". Another respondent noted that, while some online marketplaces had made positive moves towards participating in producer responsibility schemes that fund waste collections, they are still not engaging with ecodesign and energy labelling requirements.

There was concern about the lack of a joined up approach and poor communication between parties involved in market surveillance, as well as inadequate resourcing. One UK-based manufacturer observed that "the regulatory bodies are stretched beyond all belief", adding they had never had anyone visit their

"The regulatory bodies are stretched beyond all belief."
UK manufacturer

factory to do a standards check. As the government is introducing standards for resource efficiency, traditionally in the remit of the Department for Environment, Food and Rural Affairs (Defra), alongside those already in existence for energy efficiency, in the remit of the Department for Business, Energy and Industrial Strategy (BEIS), establishing clear roles and responsibilities between these departments and market surveillance authorities will be even more vital.

Enhancing market surveillance and enforcement requires:

- adequate funding, including for sufficient staffing to monitor and enforce regulations;
- better communication and engagement with producers and online marketplaces to ensure they know the legal requirements;
- greater co-operation and information sharing between authorities across different countries to identify and remove illegal products, as happens with dangerous non-food products through the rapid alert system, RAPEX. This occurs in EU and EFTA countries to some extent through the Information and Communication System on Market Surveillance;
- naming and shaming producers that violate standards, as in the Japanese Top Runner system, where compliance is estimated to be 100 per cent;[20]
- heavy fines for repeatedly non-compliant companies, with revenue ringfenced to pay for market surveillance.

Avoid frustrating delays

The average time to develop a product standard is four years, and one of our interviewees noted that, in extreme cases, it can take seven years. Another called the process "soul destroying", while yet another said delays were "the bane of our lives". All agreed delays were really "frustrating for everyone involved" and resulted in unnecessary administrative burdens and continuing ecological impacts.

While a process for developing product standards must allow for in-depth market and technology studies, standard development and stakeholder engagement, four years is longer than necessary. Seven years is unjustifiable and risks creating regulations that run after the market, meaning that regulation cannot keep pace with technological developments. Interviewees largely agreed that, after the preparatory studies, "things do tend to happen really slowly" and that delays were often political, caused by a lack of prioritisation or inadequate resourcing.

This process could be improved by ensuring consultation forums take place quickly, and according to a standardised timeline, after preparatory studies have concluded. Deviations should be allowed to speed up progress where possible, but not to delay it.

Participants largely indicated that the package approach, whereby regulations for multiple products are developed simultaneously, also hinders progress. Because all regulations from a package come in at the same time, one respondent explained: "If

"Why do you take a product which has a whole set of materials and only tell people about the energy consumption?" Stakeholder involved in standard setting

anything is delayed, it causes a delay for all of the products rather than just one of them." This process could be improved by ensuring that individual measures are implemented as soon as they are ready. An explanation of the procedure for developing ecodesign standards and for making energy labelling decisions is in the annex.

Improve energy labelling

Some participants believed labels had been successful, whereas some were not so sure, but all agreed they could be improved. For instance, recognition of what labels mean could be improved or expanded to include aspects of resource efficiency (see the French example on page 15).

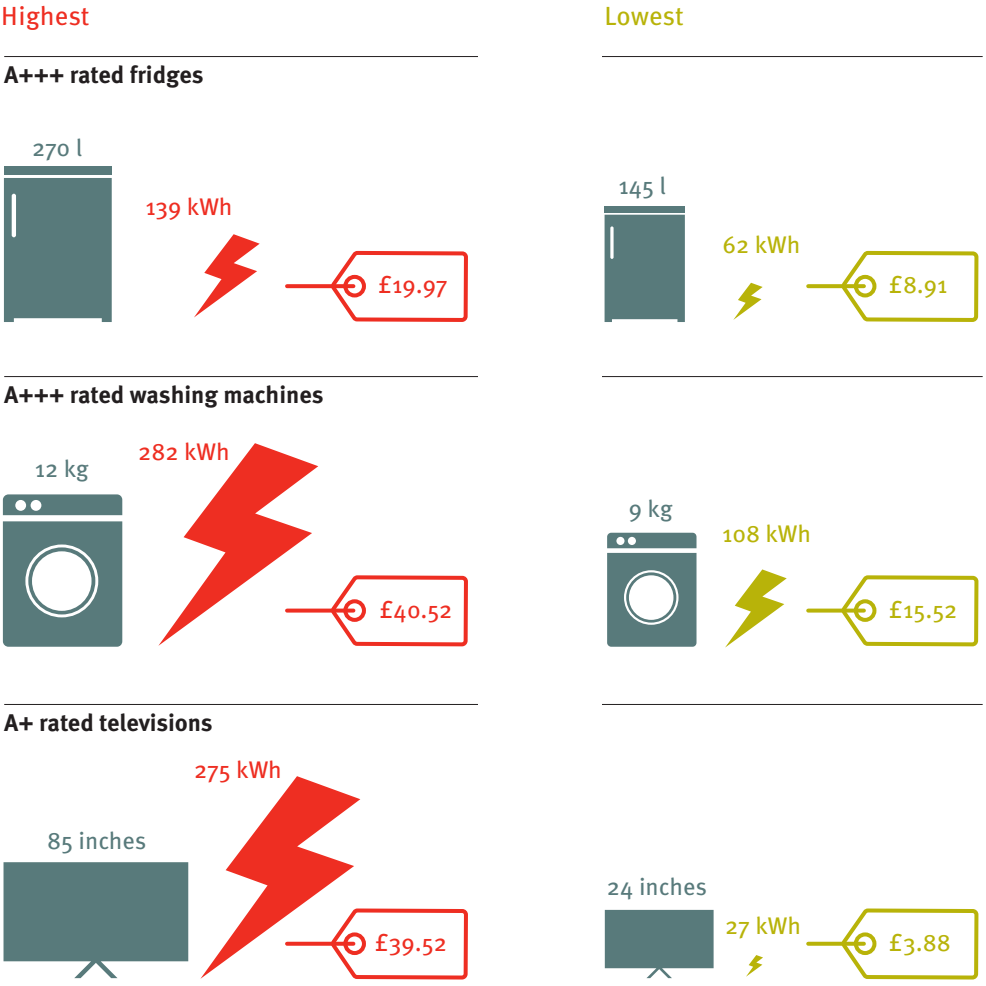
As with ecodesign requirements, several interviewees cited the potential benefits of providing more than just energy information, with one involved in standard setting asking: "Why do you take a product which has a whole set of materials and only tell people about the energy consumption? That just seems to be a really narrow application of what you would anticipate should be multifaceted information."

Some thought that labelling needs to better account for overall energy use, as the current system does not account for the size of a product, meaning large appliances are just as able to get top rating as small products as "there's nothing about absolute reduction of energy." As one participant observed: "If everybody has got American-style fridges, they're going to be using [much more energy than] a small under-counter fridge, but that's not accounted for in the energy label currently."

Another cited the same problem with televisions. This is especially problematic as the trend towards bigger products could mean that "although appliances have overall got more efficient, generally their energy usage has gone up".

Energy use and running costs vary widely under the same rating[21]

Product annual energy consumption and running costs



The system could ensure that labels better reflect total energy use by indicating the expected running costs over a year or the lifetime of a product. Currently, they indicate the kilowatt hours used per year, but these figures are not prominent and will not be immediately meaningful to many consumers.[22] It could also present a more rounded account of material impact, as measurements and standards for resource efficiency and impacts become more common.

There was some dissent on this from manufacturers sceptical of the effectiveness of the labels. In some cases, they questioned the need to have them at all or argued they should not take up space on packaging. Providing information for additional measures, either at the point of sale or electronically, potentially through QR codes connected to databases like EPREL, might therefore be more acceptable to manufacturers. This will only work if it can be shown that consumers are receptive to getting their information that way and that it continues to pull through better products (see our recommendations on product passports on page 18).

Lessons from France: exceeding the EU on ecodesign

The French repairability index

At the start of 2020, the French parliament passed its Anti-Waste and Circular Economy Bill. Among other measures, the bill introduces a repairability index for electronic items. Due to come into force in January 2021, it will require manufacturers of smartphones, washing machines, TVs, computers and lawnmowers to provide labels on their products, with a rating from 0-10 to indicate how easily repairable they are.

Through this approach, it is hoped that consumers will be empowered to make better choices, and manufacturers will have the incentive to design longer lasting, easily repairable products.

The scoring system is being developed by the French Environment and Energy Management Agency (ADEME) with input from stakeholders, and will take into account the following four overarching criteria, as well as potential product specific criteria:

1. how long technical documentation and advice on use and maintenance is available for
2. ease of disassembly, including the tools required
3. availability of spare parts, including the duration of availability and delivery time
4. price of spare parts, compared to the price of the new product

Each model of a product will be rated from 0 (red, difficult to repair) to 10 (green, easily repairable), and the label will have to be easily visible on the packaging.

Consumers will also be encouraged to repair rather than replace items by an additional six month guarantee for professionally repaired products, and discounts on professional repair services. Refurbished models will have longer guarantees than new products.[23]

The French Ministry of Environment has already committed to expanding labelling. As well as increasing the product groups covered, it plans to introduce a mandatory label to indicate product durability in 2024 – as either a separate label or an evolution of the repair index – with the aim of encouraging consumers to choose longer lasting as well as repairable products.

Although the label has been widely welcomed, there are concerns over how the scores will be calculated, as this is currently the responsibility of the manufacturers, and critics have suggested that the bill lacks teeth, as it will not impose fines for non-compliance.[24,25] Producers must explain the methodology behind their scoring in a product's manual and online, but environmental groups are worried that rigorous checks will not take place to ensure the programme works as intended.

How to achieve greater resource efficiency

"From a climate impacts perspective, the need to ensure products last as long as possible is actually more important than improving energy efficiency."

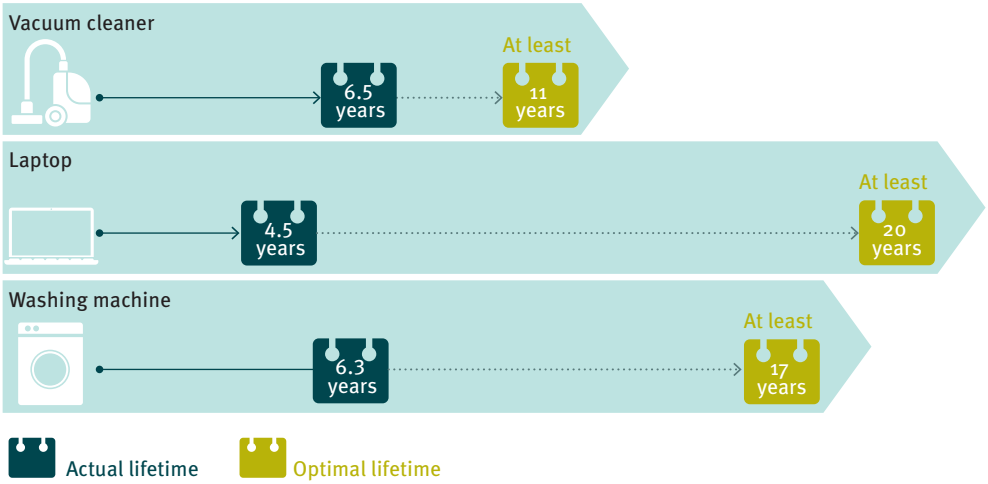
As products become more energy efficient, other environmental impacts associated with their manufacture and end of life become relatively more significant. We asked our interviewees for their views on how this should be addressed. The following recommendations on improving resource efficiency are based on their feedback as well as our research.

Prioritise high impact products

Governments clearly still need "to be driven by the science about what is the best bang for your buck", as one trade association we interviewed noted. Resource efficiency measures will offer the best savings for products that have the largest impacts in the production phase or the biggest tonnage of product on the market or which produce the most amount of waste. These are items that should be prioritised.

This is likely to include IT devices, like smartphones and laptops, where the majority of carbon emissions are associated with production rather than use.[26] From a climate impacts perspective, the need to ensure products last as long as possible is actually more important than improving energy efficiency.[27] One interviewee observed: "The general trend is that [consumer products] have a lifetime which isn't long enough for them to reach that theoretical point where their energy efficiency is offset by a new model coming onto the market which is more efficient."

How long should energy efficient products last to compensate for emissions associated with production, transport and disposal?[28]



Set standards for important criteria

Being able to measure something is necessary to create a standard for it, because it allows identification of best practice, as well as compliance and non-compliance. With an eye on material efficiency, the EU has asked its three standard setting bodies CEN, CENELEC and ETSI (the European Committee for Standardisation, the European Committee for Electrotechnical Standardisation and the European Telecommunications Standards Institute) to produce a suite of resource efficiency standards. The project, which involves the British Standards Institution (BSI) as a member organisation, will provide a methodology for measuring characteristics and setting product specific requirements in future. Some have already been released,

"We suggest that washing machines should be given a ten year guarantee as a conservative standard"

including on information provision and declaring critical raw materials in energy-related products. The project is seeking agreed definitions for relevant terms.[29]

Ultimately, the UK and EU governments should both be incorporating product specific standards according to the following measurable criteria.

Durability

Standards around the technical designed lifetime of products can be backed up with warranty requirements, where products must either last or be repairable for a number of years. In the illustration opposite, for instance, it shows that washing machines would need to last at least 17 years, so we suggest that washing machines should be given a ten year guarantee as a conservative standard, to counter the trend towards decreasing lifespans.[30,31] In the UK, the average washing machine is thrown away after just 6.3 years.[32]

Upgradeability

This is an often overlooked aspect of durability, which relates most often to software updates allowing IT equipment to effectively function. For smartphones, for instance, we have previously suggested that software support should be provided for a minimum of 3.5 years in line with current best practice.[33] This should be kept under review and increased if possible.

Repairability

As the French are showing (see page 15), ease of repair is determined by multiple, interlinked factors: documentation and advice; ease of disassembly, including both the time it takes and a consideration of the tools needed, availability of parts and price.

Component reuse

Once a product can no longer be reused, the next best option is often for its components to be reused instead. For electronics, recycling often leads to highly engineered parts being shredded and significant value is lost in the process.[34] Standards could stipulate that parts can be reused for their original purpose, for example through modular design, and could require the proportion of reused parts in new products to be quantified.

Recycled content

The history of recycling policy in the EU and UK has shown that it is not enough just to have targets, markets for collected material also need to exist.[35] Better reporting of recycled content, along with minimum recycled content requirements for products, can help to support market growth.

"Information on where critical raw materials are being used in a product would make reuse and recycling easier."

Critical raw material content

Some substances, including rare earth elements used in electronic devices and low carbon infrastructure like wind turbines and electric vehicles, are vital to society, but can come from areas of conflict in the world or face other supply chain risks.

Information on where critical raw materials are being used in a product would make reuse and recycling easier and help to guarantee secondary supply sources. As well as these criteria, efforts should continue to ensure the removal of hazardous substances from products that prevent safe reuse or recycling.[36]

The situation for material efficiency can be compared to that of energy efficiency at the end of the last century. The aim should be to establish the definitions quickly and standardise methodology for calculating information to support the criteria outlined above. Once the system is established and working well, standards should then be used to eliminate the worst offenders, continuing the highly effective combination of applying push and pull to the market.

Develop product passports

Digitalisation offers exciting potential to develop the circular economy. Both the UK and the EU have indicated interest in developing 'product passports'. Such digital records would allow a much broader range of product-related information than can currently be included through labelling or on the EPREL database. One environmental NGO we spoke to during our research observed that product passports are "a major enabler for the circular economy".

Our respondents were generally very supportive of this approach, although they recognised the substantial logistical challenge of gathering data. One noted: "Manufacturers don't even hold all that information in one place. They are running a number of databases where they hold this information and pulling it together is tricky for them." A UK-based manufacturer highlighted the scale of the undertaking that collecting data for product passports would entail, noting that they create 250,000 individual products. They did note, though, that these could be bundled in many cases and that the barrier was "surmountable".

The UK and EU governments should be working together on this initiative because of the extensive crossover of markets and to avoid unnecessary duplication of effort. Priority information that should be covered by product passports includes:

Environmental footprint. This can be based on the energy efficiency label, in the first instance, as well as the additional product details relevant to resource efficiency. As reporting standards and evaluation methods improve, this information will become more useful.

Hazardous substances or chemical composition. At the moment, reuse and recycling can be hampered by a lack of knowledge about the materials contained in a product, some of which might have been considered safe at the time of manufacture, but were later discovered to be hazardous. As one of our interviewees noted: "There was asbestos, there's now persistent organic pollutants and brominated flame retardants. There will be another one, I'm pretty certain of it."

Critical raw material content. This should include information about where critical raw materials are located within products. The priority should be to facilitate component reuse wherever possible. Where this is not possible and as recycling technologies develop, information about the location of key materials can facilitate their recovery and reuse in new products. (For more on this, see page 18.)

Repair information. This should include product specific details to enable repair, by both professionals and product owners. The 'right to repair' movement, which calls on governments to help consumers repair their own products, could be significantly boosted by such a move. As well as changes to design to allow for repair, and provision of affordable spare parts, the movement calls for manufacturers to provide access to official repair manuals.

Information on social impact and due diligence. Information should be given to show that a product has not resulted in harm to communities or environments where its component materials were extracted and where it was manufactured. The UK government is looking to bring in due diligence legislation to ensure the production of goods used in the UK does not result in deforestation.[37] This is a welcome move, but the scope should be expanded over time to account for other impacts, and consumers should be able to access the information easily. This will be a challenge as complicated supply chains make accessing information difficult, though it is not insurmountable with better tracking and data systems. One interviewee highlighted the problem of knowing whether products are free of conflict minerals: "There's middle men involved here that we have absolutely no visibility on. Where your cadmium comes from – it could be coming from a good mine or it could be coming from an absolutely dreadful situation. But you don't know because it gets amalgamated."

The future of ecodesign

"We've got a relatively successful scheme here that's already in place, and it would be pretty crazy to try and start from scratch."
Energy adviser

Staying ahead of the game

There was a strong feeling amongst our interviewees that, to progress on this agenda, the UK would have to remain aligned with, and continue to participate in, the EU process. The government's promise to match and, where possible, exceed what the EU does was considered to be right. This could be achieved by continuing to feed into the EU process, with the BSI remaining a member of CEN and CENELEC, and by continuing to adopt EU standards as a minimum.[38] One of our interviewees said: "We've got a relatively successful scheme here that's already in place, and it would be pretty crazy to try and start from scratch, emulating it just in a UK context." Another said it would be "mad" for the UK to do something completely different.

If the UK does not remain aligned with the EU's minimum standards, the view was that risks would mount for both British manufacturers and consumers. As one environmental NGO noted: "If there isn't sufficient alignment, manufacturers might have to compete locally with products that wouldn't be acceptable elsewhere in Europe, and consumers might be attracted by products for which they don't fully know the environmental and repairability credentials. It's a false economy because that ultimately generates additional waste and people lose out by having to replace products more frequently."

That said, many felt that there were areas where the UK could be more ambitious than the EU, although one UK-based manufacturer said explicitly that any difference, even if the "British go off and do even better", would "cause stomach ache, one way or another", adding simply: "I want to see alignment."

There are certainly areas where we believe the UK should exceed the EU's minimum requirements, as countries like France are already doing, including the swift adoption of standards and better information provision on product durability and repairability. It could also consider regulating products not covered at the EU level. The EU, for instance, has begun a study on electric kettles, but may decide not to pursue regulations. As electric kettles are more common in the UK than the EU, and there is considerable difference between the lifespan of low quality kettles compared to high quality kettles, it would make sense for the UK to pursue minimum requirements regardless.

Including more products

The remit of ecodesign and energy labelling has already expanded from energy-using products to energy-related products, such as taps, shower heads, insulation and windows, and our interviewees thought there was an opportunity for this to continue. Products that the government should consider creating design standards for, due to their very high environmental impacts, include:

Textiles

The textiles industry is responsible for more emissions than aviation and shipping combined, with the majority of these emissions coming from fibre production and processing.[39] These two stages account for over 70 per cent of the carbon footprint of UK clothing, and voluntary efforts have so far failed to reduce the industry's overall impacts, largely because of the increasing volume of sales.[40]

Furniture

By 2011, UK households were disposing of nearly 700,000 tonnes of furniture a year. If commercial and industrial sectors were included, the figure would increase considerably. Reuse and recycling rates for many commonly discarded items of furniture are nowhere near what they could be, and the average lifetime of furniture items within the same class also varies considerably. For instance, each year, 7,260,000 mattresses (equivalent to 181,500 tonnes) are disposed of in the UK, each one having lasted anywhere from five to 15 years.[41] Less than 20 per cent go to recycling.[42]

The Nordic Council has already proposed ecodesign standards for textiles and furniture, which the UK could emulate, in line with promises in its resources and waste strategy and the powers it has proposed in the draft Environment Bill.[43]

Buildings and building products

Construction is responsible for ten per cent of UK territorial emissions and influences 47 per cent through the maintenance of infrastructure and the built environment.[44] It also devours large amounts of resources and, along with excavation and demolition, generates 62 per cent of total UK waste.[45] Between 1990 and 2014, the industry only achieved a six per cent reduction in embodied emissions associated with the construction and disposal of buildings. This is compared to a 32 per cent cut in the amount of carbon emitted from heating and powering buildings.[46] Standards set at the design stage, for example on maximum limits of CO_2 generated per square metre of building, would stimulate design innovations along with reductions in emissions and material use.[47]

Expanding the use of ecodesign principles

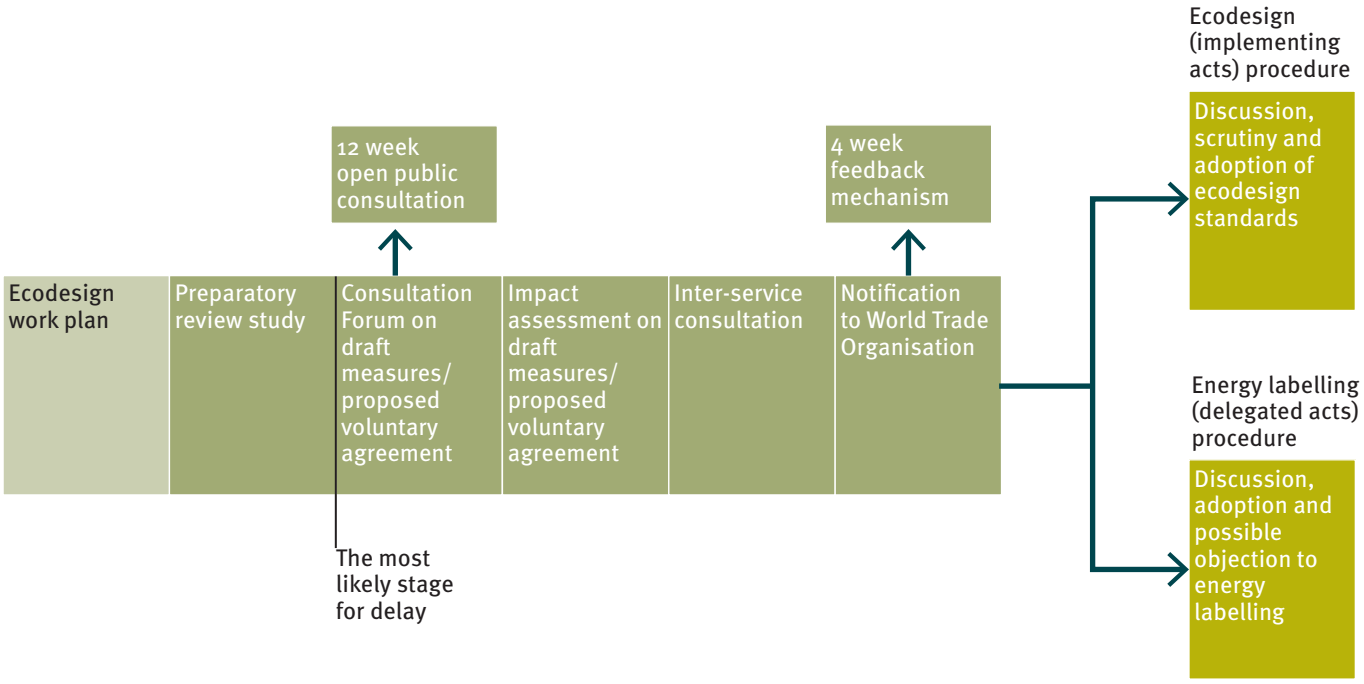
As ecodesign principles are more widely adopted, they should work in harmony with other policies, like extended producer responsibility, and be implemented along with systemic changes. So far, as our review shows, ecodesign principles have been applied exclusively at the product level. While this has undoubtedly led to improvements, much more attention needs to be given to ensuring that well designed products are also supported by data, logistics, infrastructure and business models so they can deliver on their environmental promises. The next report from the Circular Economy Task Force will consider how ecodesign principles can be applied at a systems level to provide a firm basis for a truly resource efficient economy.

Annex

The procedure for developing ecodesign standards and for making energy labelling decisions involves a number of steps, outlined below, which are always followed. In the first instance, a working plan identifies priority product groups according to their potential for cost effective emissions reductions. For each product category selected, an independent consultant undertakes an extensive preparatory study, after which the first drafts of proposed measures are submitted for discussion to the stakeholder Consultation Forum. It is at this stage where unnecessary delays are most likely to occur.

After consultations and impact assessments are carried out, draft implementing measures are published in the WTO notification database. Energy labelling delegated acts are then discussed in an expert group where a consensus is sought but not required. The draft ecodesign measures, meanwhile, are submitted for a vote following discussion.

Ecodesign standards are developed with robust procedures, but can face unnecessary delays[48]



Endnotes

[1] Technically, this report covers both electrical and electronic devices. Electrical devices, like basic lights, toasters and vacuum cleaners, are those that use electricity in a simple way to create light, heat or motion. Electronic devices, like televisions and smartphones, meanwhile, are more complicated, and manipulate electricity for more complicated ends like creating images or sound. For simplicity's sake, throughout this report we are using electronic as shorthand for both sorts of devices, which overlap in many cases in any case.

[2] Department for Business, Energy and Industrial Strategy (BEIS), 2019, *Ecodesign requirements for external power supplies: draft regulation*

[3] Global E-waste Statistics Partnership, 2020, *The Global e-waste monitor 2020*

[4] Figures adapted by Green Alliance from the UN's *Global e-waste monitor* 2020. In Europe, only Germany produces more e-waste that is not collected for recycling than the UK, at 770kt compared to 727kt in the UK. Germany's population is more than 16 million people higher than the UK's, though.

[5] The water figure is derived from Friends of the Earth, 2015, *Mind your step: the land and water footprints of everyday products*. The other calculations are explained in full in our methodology. See: www.green-alliance.org.uk/design_for_a_circular_economy_methodology.php

[6] These figures were calculated for this report by PwC and are explained in full in our methodology. See: www.green-alliance.org.uk/design_for_a_circular_economy_methodology.php

[7] H Wieser, et al, 2017, *Smartphones are replaced more frequently than T-shirts: patterns of consumer use and reasons for replacing durable goods*. The study found that the 'desired lifespan' of a smart phone was 5.2 years.

[8] European Commission, June 2020, *Ecodesign preparatory study: on mobile phones, smartphones and tablets: draft task 2 report (markets)*. The study found that the replacement cycle for smartphones in the UK was 27 months, which is higher than the EU average. As some phones are reused, the study assumed an average lifespan of three years for a smartphone.

[9] For a detailed methodology for these calculations, please see: www.green-alliance.org.uk/design_for_a_circular_economy_methodology.php

[10] Global E-waste Statistics Partnership, 2020, op cit

[11] Image adapted from: European Commission, 2019a, *The new ecodesign measures explained*

[12] Ibid

[13] European Commission, 2019b, *New energy efficiency labels explained*

[14] HM Government, 2018, *Our waste, our resources: a strategy for England*

[15] European Commission, 2018, *Ecodesign impact accounting: status report 2018*. Estimates vary for how much an average household saves as a result of the measures. In general, savings are considered lower in England, according to the UK government – the figure of £100 per year cited earlier – while the European Commission has estimated the average European household is saving €285 per year. This may be down to differences in calculation methods, but will also be affected by the relatively low domestic energy prices in the UK. The emission figure for Spain is from European Environment Agency, 2020, *Annual European Union greenhouse gas inventory 1990-2018 and inventory report 2020, Submission to the UNFCCC Secretariat*. In 2018, Spain produced 334.3 $MtCO_2e$.

[16] European Commission, press release, October 2019, 'New rules make household appliances more sustainable'. The emission figure for Denmark is from European Environment Agency, 2020, op cit. In 2018, Denmark produced 48.2 $MtCO_2e$.

[17] Green Alliance, 2018, *By popular demand: what people want from a resource efficient economy*

[18] European Commission, 2016, *Ecodesign working plan 2016-2019*

[19] For a detailed methodology for these calculations, please see: www.green-alliance.org.uk/design_for_a_circular_economy_methodology.php

[20] UNESCAP, no date, *Mandating the best energy-efficient appliances: Japan's Top Runner programme*

[21] For a detailed methodology for these calculations, please see: www.green-alliance.org.uk/design_for_a_circular_economy_methodology.php

[22] European Commission, 11 March 2019, 'New energy efficiency labels explained'

[23] Although the guarantees are longer for refurbished products than new ones, we would argue that the guarantee periods are still too short – just 12 or six months, respectively. For more reaction to the index, see: Repair EU, 2020, 'Major steps for durability and right to repair taken in France'

[24] Ibid

[25] *The Guardian*, 30 January 2020, 'Landmark French law will stop unsold goods being thrown away'

[26] The EU is already actively considering ecodesign standards for products including mobile phones, smartphones and tablets.

[27] See, for instance: EEB, 2019, *Cool products don't cost the earth*. Smartphones, tablets and laptops have not been covered by the process so far, although studies have been completed and the process is ongoing at the EU level.

[28] Image adapted from: EEB, 2019, op cit. The research generously assumes there will be a five per cent increase in energy efficiency each year; if this is not achieved, products would need to last even longer to make up for production impacts. Our statistic for the average life of a washing machine is different from the source report because we have used a UK specific figure.

[29] CEN and CENELEC, 2019, 'CEN and CENELEC just published two new standards on material efficiency aspects for ecodesign'

[30] Green Alliance, 2016, *Better products by design: ensuring high standards for UK consumers*

[31] Several of our interviewees commented that durability might come with trade offs. One trade association noted: "In mobile phones, some of the most frequent causes of failure were from water and dust ingress. Manufacturers have now sealed the units to prevent that from happening." There was a feeling amongst others, though, that this was either not documented or overstated. One eNGO observed sceptically: "Something which comes up a lot is what the waterproofing rating for phones are, and if you can reach the highest rating for waterproofing on phones and still be able to remove the battery." Another said that it was "very contested" and "a false problem".

[32] WRAP, 2017, *Switched on to value: powering business change*

[33] Green Alliance, 2016, *Better products by design: ensuring high standards for UK consumers*

[34] Green Alliance, 2015, *A circular economy for smart devices: opportunities in the US, UK and India*

[35] Green Alliance, 2018, *Completing the circle: creating effective UK markets for recovered resources*

[36] This is covered to some extend already by regulations on the restriction of hazardous substances (RoHS), which specifies that "EEE placed on the UK market must contain less than the maximum prescribed levels of lead, cadmium, mercury, hexavalent chromium, two specified flame-retardant groups, and four specified phthalates". For more, see gov.uk guidance for 'Regulations: restriction of hazardous substances (RoHS)'

[37] Department for Environment, Food and Rural Affairs (Defra), press release, August 2020, 'World-leading new law to protect rainforests and clean up supply chains'

[38] Currently, this is guaranteed until the end of 2021, and BSI is "confident" it will continue after that: BSI, no date, 'Standards and EU exit'

[39] Environmental Audit Committee, 2019, *Fixing fashion: clothing consumption and sustainability*

[40] Figures calculated from WRAP, 2017, *Valuing our clothes: the cost of UK fashion*.

[41] Oakdene Hollins, July 2019, *End of life mattress report*

[42] Ibid

[43] Nordic Council of Ministers, 2018, *Ecodesign requirements for textiles and furniture*

[44] National Federation of Builders, 2019, *Transforming construction for a low carbon future*

[45] Defra, March 2020, *UK statistics on waste*

[46] Centre for Industrial Energy, Materials and Products, 2018, *Reducing carbon in construction: a whole life approach*

[47] Green Alliance, 2020, *Smart building: how digital technology can help futureproof the UK construction sector*

[48] Image adapted from: European Commission, 2019a, op cit

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Design for a circular economy: reducing the impacts of the products we use

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This report was produced by Green Alliance as part of our work programme for the Circular Economy Task Force. The task force is a policy focused business forum which aims to promote ambitious ideas on the better management of resources.

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