Analysis of the concepts of remanufacturing and repair under the Ecodesign Directive

Project name	**Analysis of the concepts of remanufacturing and repair under the Ecodesign Directive**
Project nr	**11320052811**
Client	**Swedish Energy Agency**
Type of document	**Memo**
Version	**1**
Date	**2021-11-18**
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1. Introduction

This report was ordered by the Swedish Energy Agency and performed by Ramboll. The content should not be seen as any official position, rather information gathering. The study was conducted in the last months of 2020.

Since 2015, the European Union has embarked on a transition towards a circular economy in which "the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised".[1] The EU´s commitment to this transition has recently been renewed in its 2020 Circular Economy Action Plan (CEAP 2020).[2] Especially in this recent CEAP, attention is paid to the lengthening of product life, as well as the reparability of products to avoid generation of waste. The role of the Ecodesign Directive in the realisation of reusability and repairability of energy-related products is explicitly mentioned in this regard.

The increased focus on reusability and reparability is in line with the waste hierarchy laid down in Article 4 of the Directive 2008/98/EC on waste (WFD)[3], which favours preparation for reuse and direct reuse over other recovery operations such as recycling. Generally, the EU circular economy (CE) policy is shifting from a predominant focus on recycling to a more encompassing focus on other CE practices such as remanufacturing, refurbishment and repair. In order to effectively promote such activities, EU and Member State legal framework may have to be assessed regarding their fit and conduciveness.

The specific focus of this report is the Ecodesign Directive[4] and, as such, energy-related products. Also the Energy Labelling regulation[5] will be examined. Certain effects of the Ecodesign directive on different product life-extending or renewing CE activities such as remanufacturing, repair, refurbishment etc. will be examined.

The Ecodesign Directive includes several obligations that only apply when a product is placed on the Union market for the first time. "Placing on the market for the first time" will per definition involve a "new product" as any "old product" will have been placed on the market already. This raises the question to what extent product life-extending CE activities such as remanufacturing, refurbishing, repair, etc. will lead to the production of a new product, based on an old (used) product. This, in turn, will determine the legal obligations which apply to remanufactured, refurbished, repaired products. The present report aim to examine this question and clarify the present legal situation as well as how this is perceived and handled by stakeholders within the remanufacturing and repair businesses.

A main focus is placed on remanufacturing, as it entails comprehensive treatment of a product. Remanufacturing involves, in general terms, the use of recovered spare parts to produce or heavily update a product. Previous analysis by Ramboll[6] has shown that the specifics of remanufacturing are not taken into account under EU law, including legislation concerning energy-related products. More

[1] European Commission, CEAP (2015) Closing the loop - An EU action plan for the Circular Economy, COM (2015) 614 final
[2] European Commission, CEAP (2020) A new Circular Economy Action Plan For a cleaner and more competitive Europe, COM/2020/98 final
[3] Directive 2008/98/EC on waste https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0098-20180705
[4] Ecodesign Directive 2009/125/EC https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0125&from=SV
5 Energy labelling regulation (EU) 2017/1369 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R1369&from=en
[6] Kemikalieinspektionen, 2021. Regulatory mapping for remanufacturing of products under EU law. PM 6/21 https://www.kemi.se/publikationer/pm/2021/pm-6-21-regulatory-mapping-for-remanufacturing-of-products-under-eu-law

specifically, it has not been clarified under which circumstances such legislation is applicable to remanufacturing and what obligations arise if the legislation is indeed applicable.

Figure 1 shows the problem definition in a graphical manner: used products that have undergone a product life extension or a renewing (e.g. remanufacturing) operation are only considered "new products" under certain circumstances. These circumstances can be broad upgrades and specific modifications as indicated on the left side of the figure. If the definition as "new product" applies, the product is effectively considered to be placed on the market for the first time. As this is the main trigger for important requirements under the Ecodesign Directive, it is crucial to establish whether a product is to be regarded as "new" or not.

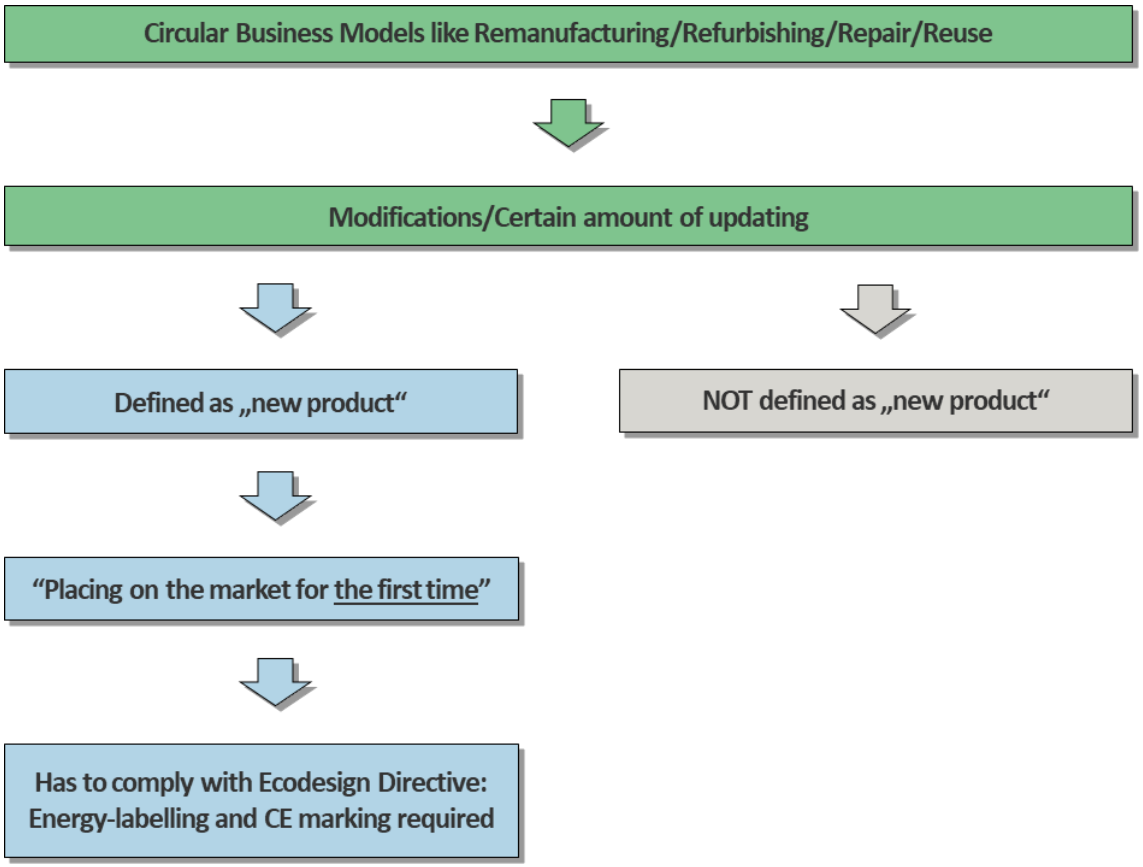

Figure 1: Products that are placed on the market for the first time, i.e. "new products", need to be compliant with the Ecodesign Directive, as well as other directives and regulations.

A second question will concern the difference between repair and remanufacturing both from the legal perspective of the Ecodesign Directive and the perspective of EU industry and manufacturing practice. An interesting question in this regard would be whether the point of distinction between repair and remanufacturing can be used to determine whether a product remains the same or becomes a "new" product again.

2. Methodology

The findings in this report are based on two main research methods. Firstly, a desk research was carried out, including a legal analysis of the Ecodesign Directive. Based on this first analysis of published sources and legislation, a preliminary idea of the report´s subject was gained. Subsequently, a number of relevant stakeholders and experts in the field of remanufacturing, repair and energy-related products were interviewed to gain insights from EU remanufacturing and repair practice. More information on the participant can be found under section 4.

It should be noted that the selection of interviewed experts and stakeholders is by no means comprehensive and, as such, provides a sample of the views currently held in practice on this subject. It should also be noted that the findings in this report provide a first indication concerning the research questions introduced under section 1. As will become clear, various important questions remain open and may require additional research and stakeholder consultation. It is also clear that discussion concerning the definitions of remanufacturing and repair, as well as the criteria for what constitutes a "new" product are currently ongoing, especially within the context of the draft revision of the EU´s Blue Guide[7] on the implementation of EU product rules.

[7] European Commission - The 'Blue Guide' on the implementation of EU products rules 2016 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016XC0726(02)&from=BG

3. Legal, policy and standardisation framework

3.1 "New" product under the Ecodesign Directive

A central concept under the Ecodesign Directive (2009/125/EC) is that of "placing on the market". The placing on the market of an energy-related product covered by the Ecodesign Directive will trigger some of the main obligations under the Ecodesign Directive, most notably:

- Compliance with any applicable implementing measures adopted under the Ecodesign Directive;
- Ensuring that an energy-related product undergoes a conformity assessment;
- Issuing a declaration of conformity for the energy-related product in question; and
- Affixing the CE marking on the energy-related product in question.

Article 2(4) of the Ecodesign Directive defines "placing on the market" as making a product available for the first time on the Community market with a view to its distribution or use within the Community, whether for reward or free of charge and irrespective of the selling technique.

The definition makes clear that the making available of an energy-related product on the internal market for the first time will be considered "placing on the market". This means that making available of a product on the market for the second time, e.g. through second-hand sales will not be considered placing on the market. The European Commission´s Ecodesign FAQ document explains the rationale behind this:

"Furthermore, the EU legislation is not retroactive. Products legally placed on the market can stay on the market (i.e. in the distribution chain) and still be sold even if the legislation changes in the meantime; products legally placed on the market can be sold to the end-user and can also be put into service even if the legislation has changed in the meantime."[8]

However, a main question within the scope of this report concerns products that after their use phase are subjected to changes, e.g. due to repair or remanufacturing practices. It could be argued that such products stop being the "old" product which was already made available on the market. If this argument is accepted, then the making available of such products on the market again after repair or remanufacturing will be considered "placing on the market" as defined by the Ecodesign Directive.

The Ecodesign Directive does not define what is to be understood as a "new" product. Article 2(1) of the Directive only defines "energy-related product" (a "product") as any goods that has an impact on energy consumption during use which is placed on the market and/or put into service.[9]

Article 2(14) of the Ecodesign Directive does define "reuse" as any operation by which a product or its components, having reached the end of their first use, are used for the same purpose for which they were conceived, including the continued use of a product which is returned to a collection point, distributor, recycler or manufacturer, as well as reuse of a product following refurbishment.

[8] European Commission, Frequently Asked Questions (FAQ) on the Ecodesign Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products and its Implementing Regulations, Question and Answer Nr. 1; https://ec.europa.eu/docsroom/documents/38822

[9] The same Article adds that this includes parts intended to be incorporated into energy-related products covered by this Directive which are placed on the market and/or put into service as individual parts for end-users and of which the environmental performance can be assessed independently.

While this definition indicates that a product can remain the same "old" product after refurbishment, it does not clarify under which circumstances a product will be changed to an extent in which it can be considered as "new".

Finally, the European Commission´s Ecodesign FAQ document does not seem to provide any guidance on the interpretation of "placing on the market" or what constitutes a "new" product.

Based on the above, it can be concluded that:

It is important to assess under what circumstances a product is considered "new" after repair or remanufacturing, in order to determine whether it is placed on the market as defined by the Ecodesign Directive; and

The Ecodesign Directive does not provide concrete indications of the circumstances under which a product can be considered as "new" after operations such as repair or remanufacturing.

3.2 End-of-waste and "new" product

One highly likely indication that can be assumed from the general structure of EU law concerns the status of an object as product or waste. EU law distinguishes between:

- an object which is legally classified as waste and therefore subject to relevant EU waste law; and
- an object which is legally classified as a product and therefore subject to relevant EU product law.

An object cannot be classified as product and waste at the same time. Following the product lifecycle, an object which is produced from virgin materials to be placed on the market will be considered a product under EU law. However, when this product meets the definition of waste as defined under Directive 2008/98/EC on waste (WFD)[10], the legal framework on products will cease to apply and the one on waste will become applicable. Waste is defined in Article 3(1) WFD as any substance or object which the holder discards or intends or is required to discard. As such, the action of, as well as the intention or obligation to discard can be considered the key concept for the application of the definition of waste.[11,12]

A product that has become waste (i.e. a discarded energy-related product) can become a product again, for example via repair or remanufacturing. However, to this end, the repair or remanufacturing will have to result in a product that meets a number of "end-of-waste" criteria.[13] One of these end-of-waste criteria requires explicitly that the recovered object or substance meets the existing legislation and standards applicable to the product. In other words, the end-of-waste criteria seem to require that the repaired or remanufactured product is a "new" product. One reason for this could be that products which have entered the waste phase may have been subject

10 Directive 2008/98/EC on waste https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0098-20180705

[11] See in this regard the judgment of the ECJ in the case: Inter-Environnement Wallonie ASBL v Région Wallonne, C-129/96, [1997] ECR I-7411, paragraph 26.

[12] It is relevant to note that in a landmark case (*Arco Chemie*) the Court of Justice of the European Union (CJEU) concluded that the concept of waste cannot be interpreted restrictively. This means that, in principle, any substance or object can become waste as defined by the WFD. In addition, the CJEU concluded that the question whether a substance or object is to be considered waste as defined by the WFD must be determined in the light of all the circumstances, regard being had to the aim of the directive and the need to ensure that its effectiveness is not undermined. In other words: no standard criteria or rules can be adopted and applied to determine whether a substance or object become waste or not.

[13] These criteria are laid down in Article 6(1) of Directive 2008/98/EC on waste (WFD)

to waste management practices which could have affected the quality and safety of the product, such as mixing or bad storage. Furthermore, the requirement that a repaired or remanufactured waste meets the existing applicable legislation and standards is an important mechanism to ensure that legacy substances of concern which have been prohibited or restricted since the initial placing on the market of the product are phased out of the product cycle.

The above provides good arguments to conclude that that an energy-related product which has become waste and is then repaired or remanufactured should be considered a "new" product. As such, this energy-related product will be placed on the market for the first time again, as defined by the Ecodesign Directive.

However, it should be noted that not all products are discarded after their use. As such, there is also a scenario under which an energy-related product does not become waste. In such a case, the reasoning above cannot apply. Consequently, other indication will have to be found concerning the question whether repair of remanufacturing of such a used product will lead to it becoming "new". The following section will provide consideration for this scenario.

3.3 "New product" according to the Blue Guide

Since the Ecodesign Directive does not provide sufficient clarity on what constitutes a "new product" it is relevant to consider additional EU guidance material on the subject. The Blue Guide 2016[14] is a guidance document which primarily concerns a number of EU legal instruments on products, including the Ecodesign Directive. The Blue Guide provides guidance concerning main concepts which are common to the covered products legislation, including the concept of "placing on the market". It should be noted that the blue guide does not attempt to cover Union legislation on Chemicals, among which Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). This is important to note, as energy-related products can be subject to obligations under REACH (e.g. substance restrictions) and other chemicals legislation such as the Regulation (EU) 2019/1021 on persistent organic pollutants (POP Regulation).

The European Commission Blue Guide on the implementation of EU products rules offers several considerations that can be applied when trying to establish whether a remanufactured product should be seen as new or not. The following considerations are especially relevant:

- *"A product, which has been subject to important changes or overhaul aiming to modify its original performance, purpose or type after it has been put into service, having a significant impact on its compliance with Union harmonisation legislation, must be considered as a new product. This has to be assessed on a case-by-case basis and, in particular, in view of the objective of the legislation and the type of products covered by the legislation in question. Where a rebuilt or modified product is considered as a new product, it must comply with the provisions of the applicable legislation when it is made available or put into service."*

- *"In particular, if the risk assessment leads to the conclusion that the nature of the hazard has changed or the level of risk has increased, then the modified product has to be considered as a new product, i.e. compliance of the modified product with the applicable essential requirements has to be reassessed and the person carrying out the modification has to fulfil the same requirements as an original manufacturer, for example preparation of the technical*

[14] European Commission - The 'Blue Guide' on the implementation of EU products rules 2016 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016XC0726(02)&from=BG

documentation, drawing up a EU declaration of conformity and affixing the CE marking on the product."

- *"Products which have been repaired or exchanged (for example following a defect), without changing the original performance, purpose or type, are not to be considered as new products according to Union harmonisation legislation. Thus, such products do not need to undergo conformity assessment again, whether or not the original product was placed on the market before or after the legislation entered into force."*

- *"If the original performance of a product is modified (within the intended use, range of performance and maintenance originally conceived at the design stage) because the spare-parts used for its repair perform better due to technical progress, this product is not to be considered as new according to Union harmonisation legislation. Thus, maintenance operations are basically excluded from the scope of the Union harmonisation legislation. However, at the design stage of the product the intended use and maintenance must be taken into account*

As detailed above, only the first two of the considered cases (first two bullets) leads to a new product and repair and maintenance operations are generally not considered to give rise to new products. The specific criteria that must be fulfilled in order for a "rebuilt or modified" product to be considered a new product are that the changes are:

- *Aiming to modify its original:*
  - *performance;*
  - *purpose; or*
  - *type.*
- *Having a significant impact on its compliance with Union harmonisation legislation.*

As mentioned in the Blue Guide, this is an assessment that needs to be performed on a case-by-case basis. Furthermore, the Blue Guide seems to place special emphasis on modifications which lead to the need to reassess compliance of the modified product with the applicable essential requirements under applicable products legislation.

The above raised questions concerning the manner in which elements such as performance, purpose, type and impact on compliance should be interpreted and assessed. Furthermore, it is not clear under what circumstances modifications will create a need for reassessment of compliance with applicable product legislation. The Blue Guide does not seem to provide further clarification. To this end, various experts and stakeholders from the EU´s remanufacturing and repair practice were interviewed to collect views.

Finally, it should be noted that the Blue Guide is currently being revised. It is expected that, among other things, the revised version will contain some clarifications concerning the concept of "placing on the market" and "new" product. The new version of the Blue Guide is expected to be available during 2021.

3.4 Relevant standards

Another relevant source of indications concerning "new" product could be relevant technical standards which have been adopted in the EU and Europe. As such, standards are drafted with

considerable involvement of industry stakeholders and it is expected that any indications contained in them provide an idea of the current approach to "new" product in practice.

Standard EN 45553:2020[15] was adopted in July 2020 giving a definition of remanufacturing and other circular economy practices in the context of energy related products. It should be noted that the definitions presented in Standard 45553 are identical to the definitions in current EN standards on WEEE treatment (EN 50614: Requirements for the preparing for re-use of waste electrical and electronic equipment [16]).

Most notably, Standard EN 45553:2020 defines "remanufacturing" as an industrial process which produces a product from used products or used parts where at least one change is made which influences the safety, original performance, purpose or type of the product. An added note to this definition clarifies that the product created by the remanufacturing process may be considered a new product when placing on the market and refers to the EU Blue Guide for additional information.

While this standard seems to connect the activity of remanufacturing directly to the production of a "new" product, it does not seem to provide clarity beyond the Blue Guide. Actors involved in circular economy practices will still have to determine whether their activities qualify as remanufacturer by assessing whether changes are made which influences the safety, original performance, purpose or type of the product. As such, actors will de facto have to apply the criteria provided by the Blue Guide, which are not fully clarified.[17]

The definition for remanufacturing in British standard BS 8887-2[18] is returning a used product to at least its original performance with a warranty that is equivalent or better than that of the newly manufactured product. An added note to this definition clarifies that, from a customer viewpoint, the remanufactured product can be considered to be the same as the new product. In the understanding of the consultant this means that the remanufactured product has to be as good as the product was when it was new. The product is not as a new product on the market in that moment, but as this specific product when it was placed on the market. Which means that if tougher ecodesign or chemical legislation has come into force the product is now illegal – if it is to be seen as a new product from a legal perspective. However, even if seen as "new" for the consumer – it is not necessarily a "new product on the market" from legal perspective. A second note adds that performance after remanufacturing is expected to be at least equivalent to the original performance specification and that any subsequent warranty is generally at least equal to that of a new product. British standard BS 8887-2 defines repair as returning a faulty or broken product or component back to a usable state. An added note to this definition clarifies manufacturing effort is the minimum which is required to address the specified fault and that after remanufacture, the product is expected to be in a useable state, but assurances of performance are generally limited to the repaired part. The note also clarifies that any subsequent warranty is generally less than that of newly manufactured, remanufactured or reconditioned equivalents and may apply only to the component that has been replaced or repaired.

[15] European Standard, EN 45553:2020, General method for the assessment of the ability to remanufacture energy-related products

[16] CLC standard, EN 50614 :2020, Requirements for the preparing for re-use of waste electrical and electronic equipment, https://standards.iteh.ai/catalog/standards/clc/2d2c2325-910c-48fa-b8d9-f3a0255d8115/en-50614-2020 m

[17] It is interesting to note that the standard does not explicitly refer to the requirement that the changes due to remanufacturing should have significant impact on its compliance with Union harmonisation legislation

[18] British Standard, BS 8887-2:2009, Design for manufacture, assembly, disassembly and end-of-life processing (MADE) Part 2: Terms and definitions

The definition and notes under the British standard seem less definitive regarding the question of whether a "new" product is produced. The reference in the added note to "new" from a customer viewpoint seems to concern the perception of newness in practice, rather than a state of "new" for the purpose of the regulatory framework. However, the requirement under the standard that remanufacturing should result in a "new" product from a customer viewpoint could be seen as an additional indirect indication that remanufacturing, at least under the technical standard, will lead to a "new" product.

Based on the above, it can be concluded that relevant technical standards in the EU and Europe do not provide full clarity on whether remanufacturing or repair lead to a "new" product per se.

4 Stakeholder input

The following section will summarize the view from stakeholder interviews, divided in the overall topics that were discussed.

The following six stakeholders were interviewed. The questionnaire used to get into discussion with the stakeholders can be found in the Annex to this report.

1. European Remanufacturing Council (Conseil Européen de Remanufacture, CER)[19]: David Fitzsimons (Fitzsimons, 2020)
2. RREUSE (Reuse and Recycling Social Enterprises in the European Union)[20]: Mathieu Rama (Rama, 2020)
3. University Linköping: Erik Sundin (Professor in Sustainable Manufacturing, Department of Management and Engineering) (Sundin, 2020)
4. APPLiA (Home Alliance Europe)[21]: Korrina Hegarty, Michał Zakrzewski (Hegarty & Zakrzewski, 2020)
5. ECOS (Environmental Coalition on Standards)[22] : Ernestas Oldyrevas (Oldyrevas, 2020)
6. Orgalim (Europe's Technology Industries)[23]: Stéphanie Mittelham, Elinor Kruse, Helena Le Goff, Federica Boledi (Mittelham, Kruse, Le Goff, & Boledi, 2020)

4.1 When is a product new?

According to the stakeholders, the required aspects of the Blue Guide[24] defining new product (performance upgrade, changes of type or function) are rarely fulfilled by remanufacturing. Only a few remanufacturers do a performance upgrade and virtually never change the function or type of the product. RREUSE recognises that a function improvement should lead to a new product according to the Blue Guide but state that their members never realise this kind of improvement. RREUSE mentions that their members sometimes even support a performance or efficiency decrease in order for a product life extension to be realised. As the manufacturing phase in general is the

[19] The Conseil Européen de Remanufacture will represent small and large businesses from all remanufactured product sectors to fulfill the European's Commission request for a coordinated voice from EU-28 remanufacturing businesses.
[20] RREUSE is an international network representing social enterprises active in re-use, repair and recycling. Since 2001, RREUSE supports and champions the development of social enterprise in the circular economy.
[21] APPLiA is a trade association that represents the interests of the home appliance industry in Europe
[22] ECOS is an international NGO with a network of members and experts advocating for environmentally friendly technical standards, policies and laws.
[23] Orgalim represents Europe's technology industries, especially companies within mechanical engineering, electrical engineering and electronics, and metal technology branches.
[24] European Commission - The 'Blue Guide' on the implementation of EU products rules 2016 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016XC0726(02)&from=BG

most energy consuming part of the life cycle, they see the product lifetime extension as more environmentally beneficial (Rama, 2020).

The interpretation of performance upgrade is likely a deciding factor regarding whether the product is new or not. According to the stakeholders, replaced parts in remanufacturing activities are new in the majority of cases. In the product categories where the technical development is fast, e.g. computers, mobile phones, it could be argued that the replacement parts likely will be more advanced with better specifications. Whether this is this enough to classify as performance upgrade and thereby lead to a new product would need further clarification. This seems highly relevant especially considering that the Blue guide´s guidance on repaired products specifically mentions that this kind of performance upgrade does not lead to a new product;

" If the original performance of a product is modified (within the intended use, range of performance and maintenance originally conceived at the design stage) because the spare-parts used for its repair perform better due to technical progress, this product is not to be considered as new according to Union harmonisation legislation"

All stakeholders mentioned the new standard EN 45553:2020 but the opinions on its usability varied. The European Remanufacturing Council (Conseil Européen de Remanufacture, CER) states that use of the standard is not realistic for many practitioners of remanufacturing since the standard defines remanufacturing as a process that perform "at least one change in performance…" although only a few remanufacturers actually does a performance upgrade (Fitzsimons, 2020). This reasoning is also given by Mr Sundin of Linköping University as in his experience, only a few remanufacturers do a performance upgrade in practice (Sundin, 2020). ECOS mentions that refurbishment was left out in EN 45553 but that they nevertheless welcome the standard as it is the first industry initiative in this direction (Oldyrevas, 2020).

Mr Sundin from the University Linköping is critical towards definitions of remanufacturing (e.g. in Standard 8887) that make "warranty giving" a criterion for remanufacturing. He reasons that a warranty is a sales and price topic to offer an extra advantage to the customer but it is not a necessary attribute to decide on remanufacturing. He claims that remanufactured products should show at least the same performance as the original one. But there is also the possibility to upgrade a product e.g. when exchanging physical modules and parts (Sundin, 2020). Warranty giving is common in the remanufacturing sector. Repairer and refurbishers also try to give warranty as it ensures the quality of repair/refurbishment (Fitzsimons, 2020). RREUSE confirms that repairers also provide warranty. This is important to show that the repair was performed properly. As repaired products even do not reach "as good as new level", RREUSE are of the opinion that warranty giving cannot be an indication for a new product.

APPLiA provided us with a criteria set they use to define a "new product". To do this, they do not define "new product" itself but the term of "substantial modifications". The long standing APPLiA position on substantial modifications is the following:

A hardware/software change to a product is regarded as a substantial modification if the three following conditions are cumulatively met i.e. if not all three conditions are met it is not a substantial modification:

- The hardware/software modifies the intended functions, type, or performance of the product; and
- The nature of the hazard has changed, or the level of risk has increased because of the hardware/software change; and

- The modified product is made available.

APPLiA points out that it is a must to look at the three criteria in a cumulative way. If, for example, the last point is not met, e.g. the product is not sold, the other two criteria do not lead to a substantial modification. APPLiA "promotes" the named criteria in different legal frameworks e.g. in the draft revised Blue Guide, GPSD Review, RED Q&A to realise consistent, transparent and aligned criteria across different legislations such as Waste, Ecodesign, RoHS (Hegarty & Zakrzewski, 2020).

According to RREUSE their members do not create new products (like defined in Blue Guide) as they put it back in the state how it was when put on the market the first time. Moreover, the brand is not changed. ECOSmentions that repaired products should not be treated as "new".

4.2 Who performs remanufacturing and what does it encompass?

According to CER, remanufacturers mostly disassemble products to a certain degree and reassemble it with exchanged parts. CER also mentions that Original Equipment Manufacturer (OEMs) mostly use new parts to ensure longevity and fulfil high quality standards. Remanufacturing products by exchanging defective parts with used components is not the common practice at industrial scale remanufacturing. Most new components are rather cheap compared to the effort (labour cost) of sorting and testing used spare parts (Fitzsimons, 2020). There are however exemptions to this and Mr Sundin, told of a case where a toner cartridge remanufacturer takes 3 used toner cartridges to disassemble and use the parts to make 2 remanufactured cartridges. The reason to do so is time and money saving.

Information from CER indicate that remanufacturers do not reuse parts from discarded equipment in the following sectors: aviation, medical, trains, defence, hydraulics, electronics, bearings. In some other sectors where operators are either not OEM owned or OEM approved, minor components will be salvaged for use later. This occurs in for example some engine, transmission, steering and similar components but the safety requirements are such that this is an atypical practise (Fitzsimons, 2020).

In general, remanufacturers often change parts that easily brake or those that are broken most often (Fitzsimons, 2020). It is nearly never the case that parts of one product type are transferred to another one. When using a used part from another product it is called "repurposing" (e.g. using a part of a washing machine for a car) (Sundin, 2020).

RReuse mentions that for them remanufacturing is an activity done by manufacturers as they can provide a certain level of professionality and have good access and low prices on new spare parts. Moreover, the OEM have the Blueprint of the products, so that they can easily improve them.

CER (Fitzsimons, 2020) and Orgalim (Mittelham, Kruse, Le Goff, & Boledi, 2020) describe that remanufacturing mostly happens business to business (B2B). Typically, remanufactured products are not expected to be business to consumer (B2C). APPLiA confirms that remanufacturing is not very common for household applications and in the B2C sector in general. Hence, their members focus on repair and refurbishment activities. Orgalim decided on the common understanding of remanufacturing, but not yet on a detailed definition.

RREUSE indicates that the most advanced refurbisher from their members can provide products that are as new, but the quality level is still different to remanufacturing (Rama, 2020).

Based on the above it can be concluded that remanufactured products are not per se seen as new products in practice. On the one hand, remanufacturing seems to be the concept that is most likely to create new products, as it is performed as a professional industrial process. However, the required aspects of the Blue Guide defining new product (performance upgrade, changes of type or function) are often not fulfilled by remanufacturing. Only a few remanufacturers do a performance upgrade and virtually never change the function of the product. Most often, the products are restored to the same performance (Fitzsimons, 2020). Sundin & Bras states that "remanufacturing […] allows for the steady upgrading of product quality and functionality, and does this without the need to manufacture completely new products and scrap used ones" (Sundin & Bras, 2004).

4.3 Criteria that should be considered for defining remanufacturing and new products

Several stakeholders are of the opinion that safety criteria should be part of either the legislation or included in the Blue Guide. There is also a worry about unauthorised repair and many OEMs fear that third parties do not comply with safety standards and sell less qualitative products.

When it comes to environmental and health hazards and risks from content in remanufactured products, CER sees few risks to return remanufactured products on the market. Mr Sundin is of the same opinion and states that remanufacturing might offer a good opportunity to get products back that may contain hazardous substances in a regulated way, e.g. "R" concept[25] can work like a pollutant sink. He proposes to implement rules that specify several parts that are likely to be contaminated that should always be replaced (Sundin, 2020).

Some ideas were expressed by the stakeholder regarding how to determine if a product should be regarded as new or not. ECOS mentions that it could be a criterion to whom you make the product available, thus if the recipient of a remanufactured product is a new customer (Oldyrevas, 2020).

Another suggestion was that a criterion for a "new product" could be that an OEM was responsible for the product life extension since a requirement would be that it was done professionally. CER believes that criteria for a new product should be defined by each sector (e.g. aviation, IT etc.) as remanufacturing activities differ strongly from sector to sector and that the level of detail would be too high for the Ecodesign Directive. Orgalim mentions that a lot of remanufacturing is already happening, especially in B2B. When drafting new legislation, it is therefore crucial to acknowledge that existing business models already practice remanufacturing and may be impaired by new legislations, definitions, or standards. Several of the stakeholders also mentioned that they are discussing this matter both internally and with policy makers, i.e. the European Commission.

4.4 Distinguishing remanufacturing, refurbishment and repair

For the question whether a remanufactured or repaired energy-related product can be considered a "new" product, the differences between remanufacturing and repair on the one hand, and remanufacturing and refurbishment on the other seem relevant. The reason for this is that these differences show to what extent these activities differ in their modification of a used product.

[25] R-concept is used to describe a number of similar concepts that all starts with the letter R, e.g. Refurbishment, Remanufacturing, Repair, Reuse,

4.4.1 Remanufacturing v. Repair

According to a report by the CER, the must-have feature for a remanufactured product is the assurance that the quality and performance of the item is like that of a new product. According to the CER report, this is where it differs from repair: in repair, only the apparent fault is rectified while in remanufacturing the whole product performance is guaranteed – for a new life[26].

E. Sundin states that the main difference between repair and remanufacturing is that repair is done on the customer's side whereas remanufacturing is an industrial process. Remanufacturers are mostly better equipped than repair companies. Remanufacturers and repair companies could collaborate to split tasks depending on the degree of improvement needed. Moreover, it is possible to use remanufactured products as spare parts when replacing defective components when performing a repair process (Sundin, 2020).

In contrast to remanufacturing the using of used parts is more common in repair. E. Sundin gives an example: "If a car is crashed and it becomes an insurance issue, the insurance company has to decide of whether the car should be repaired or not. If there are possibilities to find used parts to make the car functional again to a price that is not too high, it will happen. If only using new expensive spare parts, the repairs will be too expensive. This is why car dismantlers are working much with insurance companies in Sweden. Insurance companies along with the car workshops are good customers for car dismantlers and car part remanufacturers" (Sundin, 2020).

According to RREUSE, repair includes using worn out spare parts (e.g. taken from other products), but ordering new parts is also good practice (Rama, 2020). Remanufacturers often use new parts to exchange faulty parts (Fitzsimons, 2020). The CER (Fitzsimons, 2020) and Orgalim (Mittelham, Kruse, Le Goff, & Boledi, 2020) describe that remanufacturing mostly happens B2B what distinguish it clearly from repair. For RRESUSE the main difference between repair and remanufacturing is that repaired products do not reach an "as good as new level".

4.4.2 Refurbishment v. Repair

At a first glance, the concepts of repair and refurbishment look quite similar. Both aim to bring a product back to a usable state through which it can be reused. Both concepts can include fixing faults whereas a major disassembly is not necessarily foreseen. However, the definition under British Standard BS 8887-2:2009 for refurbishing makes clear that repair can be part of a refurbishment process: "Return a used product to a satisfactory working condition by rebuilding or repairing major components that are close to failure, even where there are no reported or apparent faults in those components"[27]. An added note to this definition clarifies that refurbishing effort involves the replacement of worn or broken parts, generally less extensive than required to remanufacture, but more than necessary for repair.

Other information highlights that repair and refurbishment differ in the way of upgrading products. Refurbishment sometimes only focus on aesthetic changes whereas repair aims to resolve functional failures. APPLiA mentions that repair and refurbishment activities are already part of the business models of the OEMs for a long time.

[26]Remanufacturing council, Remanufacturing: a primer https://www.remancouncil.eu/studies/0ba5005f0f998051c6e5.pdf
[27] British Standard, BS 8887-2:2009, Design for manufacture, assembly, disassembly and end-of-life processing (MADE) Part 2: Terms and definitions

According to RREUSE their members do not create new products (like defined in Blue Guide) as they put it back in the state how it was when put on the market the first time. Moreover, the brand is not changed. ECOS mentions that repaired products should not be treated as "new".

6 Obligations for "new" products

Based on the systematic of the Ecodesign Directive, it can be concluded that remanufactured or repaired energy-related products which can be considered as "new" will have to comply with all obligations under the Directive which would apply products produced from virgin materials. The reason for this is that such remanufactured or repaired energy-related products will be considered as being "placed on the market" i.e. made available for the first time.

This conclusion is supported by the Blue Guide which also states that that "new products" need to be compliant with Union harmonizing legislation and thus with the Ecodesign Directive:

"Where a rebuilt[28] or modified product is considered as a new product, it must comply with the provisions of the applicable legislation when it is made available or put into service. This has to be verified by applying the appropriate conformity assessment procedure laid down by the legislation in question. In particular, if the risk assessment leads to the conclusion that the nature of the hazard has changed or the level of risk has increased, then the modified product has to be considered as a new product i.e. compliance of the modified product with the applicable essential requirements has to be reassessed and the person carrying out the modification has to fulfil the same requirements as an original manufacturer, for example preparation of the technical documentation, drawing up a EU declaration of conformity and affixing the CE marking on the product."[29]

Exemptions from certain obligations under the Ecodesign Directive for repaired or remanufactured products were not identified.

7 Conclusions

Making available of an energy-related product on the internal market for the first time will be considered "placing on the market" and will in turn trigger the obligations laid down in the Ecodesign directive. This means that making available of a product on the market for the second time, e.g. through second-hand sales will not be considered placing on the market. However, it is not clear whether remanufactured or repaired energy-related products can be considered to remain the same products which are made available on the market for a second time or whether they are wholly new products which are made available for the first time again. The Ecodesign Directive does not define what is to be understood as a "new" product and therefore, products that have undergone a life extension operation cannot with certainty be classified either as "new" or "old".

It is furthermore not clear what a new product means as it is stated in standards such as in e.g. British standard BS 8887-2. It could be argued that there are two types of new products, at least from a consumer perspective. A remanufactured product could appear, function and have a

[28] Under medical devices legislation, the term "fully refurbished" exists. "Fully refurbished" products are assimilated to new products.

[29] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016XC0726(02)&from=DE (p.16)

warranty just the same way as a newly manufactured product in the eyes of the consumer but simultaneously not be a new product from a legal perspective.

For energy related products that have been waste but that are returned to product status, the end-of-waste criteria provide arguments that infer that a new product has been created. This does however not apply to second-hand products that have not become waste in a legal sense and therefore, it does not cover all situations. Further guidance can be found in the EU Blue guide but still, a case-by-case assessment will have to be performed to elucidate whether a modification has affected either the product's original performance, purpose or type and has had a significant impact on its compliance with union harmonisation legislation.

Based on the information retrieved within this assignment, it can be concluded that remanufactured products are rarely seen as new products in practice. To distinguish between "new" products and "old" products it is necessary to better define what kind of changes to performance, purpose or type that must be performed to trigger the classification of a product as new from a legal perspective.

The interviewed stakeholders do not consider their member´s remanufacturing, repair or refurbishment activities to fall under the scope of producing new products. Most remanufacturing seems to include use of new parts instead of used parts and remanufactured items are in general accompanied by a warranty. This is however often the case for repaired and refurbished products as well which makes it a less decisive argument for classifying a product as new. The European standard EN 45553 does include a definition of remanufacturing but according to stakeholders, it does not fit the commonly performed remanufacturing activities.

The stakeholders are generally of the opinion that although remanufacturing as a concept could create new products, the required aspects of the Blue Guide defining new products are often not fulfilled. Only a few remanufacturers do a performance upgrade and virtually never change the function of the product. Most often, the products are restored to the same performance as they originally had. It should however be kept in mind that this is the industry´s interpretation and that it may differ from a strict legal interpretation. For this reason, further clarification in this issue from policy makers would benefit circular business operators and reduce uncertainty related to product status.

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9 Annex

9.1 Questionnaire for Stakeholder Consultation

Dear Sir or Madam,

Thank you very much for your time and your interest in participating in our study on certain effects of the Ecodesign directive on different product life-extending or renewing Circular Economy (CE) activities such as remanufacturing, refurbishing, repair, etc. In the study, a main focus is placed on remanufacturing, as it entails comprehensive treatment of a product.

EU CE policy is shifting from a predominant focus on recycling to a more encompassing focus on other CE practices such as the ones mentioned above. In order to effectively promote such activities, EU and Member State legal framework may have to be assessed regarding their fit and conduciveness.

As mentioned above, the specific focus of this study is the Ecodesign Directive and, as such, energy-related products. The Ecodesign Directive (but e.g. RoHS Directive as well) includes several obligations that only apply when a product is placed on the Union market **for the first time**. "Placing on the market for the first time" will per definition involve a "new product" as any "old product" will have been placed on the market already. This raises the question to what extent product life-extending CE activities such as remanufacturing, refurbishing, repair, etc. will lead to the production of a new product, based on an old (used) product. This, in turn, will determine the legal obligations which apply to remanufactured, refurbished, repaired products.

Through the scheduled interview we would like to collect your knowledge and views on the following:

1) What are the main activities in your sector regarding product life-extending or renewing activities such as remanufacturing, refurbishing, repair, etc.?

2) What does, in your view, the activity "remanufacturing" entail (i.e. which process steps and which output)?

3) Which modifications will in your view lead to the creation of a "new product" out of a used one. As the concept of remanufacturing is not legally defined and sometimes used interchangeably with refurbishment we are especially interested in concrete practical processes, regardless of how they are called in practice. Possible criteria are:
    a. New warranty;
    b. Added or improved functions;
    c. Activity can only be performed by an OEM;
    d. The purpose of the product changes (partly or wholly); and
    e. The product was waste and has reached end-of-waste status again following recovery.
    f. …

4) To really get into the practical application of the before mentioned question we would like to ask on your assessment of different scenarios, such as:
    a. The used device that was collected is declared as waste:

i. The device gets repaired and reached end-of-waste status. Is it a „new product" or not?
ii. Some components that are waste get upgraded to full function and are reintegrated in another product. Is the resulting full product a „new product" or not?
iii. What about software changes? How do you deal with this?

b. The used device was never waste:
i. Defective parts are exchanged with new spare parts → Is it a „new product" or not?
ii. Defective parts are exchanged with use of old (but non-waste) components, e.g. from stock → Is it a „new product" or not?
iii. Defective parts are exchanged with spare parts that have other function and another performance → Is it a „new product" or not?
iv. The function of the whole product is changed. → Is it a „new product" or not?

The list is non-limitative, and many other scenarios could be imagined. Please let us know if any other scenarios are relevant and should be taken into account.

5) Would your answer be different to one of the above questions if it were not in the context of the Ecodesign Directive (e.g. within context of RoHS)? In other words: are your answers generally applicable on the definition of "new product" or only in the context of the Ecodesign Directive?

6) The EU Blue Guide 2016 indicates that a new product is created in the case of: important changes or overhaul aiming to modify its original performance, purpose or type after it has been put into service, having a significant impact on its compliance with Union harmonisation legislation
a. How would you define important changes?
b. How would you measure the modifications?
c. When is the impact on compliance "significant", in your view?

7) The EU Blue Guide 2016 indicates that the assessment of whether a "new product" is created should take place on a case-by-case basis. How do such assessments (if any) take place in practice within your sector?