Study to support the Commission's policy development on promoting repair of consumer goods and contracts in the data economy

Part A: Extending useful life of consumer goods
Annex 3 – Impact assessment (method explained)

Written by Kantar Public, Ramboll, Behavia and Milieu
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KANTAR PUBLIC
BEHAVIA
RAMBOLL
milieu
Law & Policy Consulting

EUROPEAN COMMISSION

Directorate-General for Justice and Consumers
Directorate A — Justice policies
Unit A1 — Digital transition and judicial training

E-mail: JUST-A1@ec.europa.eu

European Commission
B-1049 Brussels

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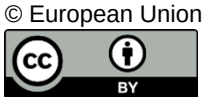

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Contents

This annex presents additional explanation of the method and assumptions made for the assessment of impacts. It includes:

- Assumptions made for repair take-up rates
- Product categories covered and extrapolation of results to the EU economy
- Baseline data for the environmental and the economic impacts
- Additional data and explanation of the environmental impacts' estimates
- Additional data and explanation of the economic impacts' estimates
- Detailed assessments of impacts (at measure level)
- Results from the Multi-Criteria Analysis (MCA)

1. Assumptions made for repair take-up rates

The assumptions on increase in take-up of repair as a result of the measures analysed took into account the most relevant data available for each measure. Furthermore, both the take-up by consumers and businesses was considered. For some measures the business-take-up was decisives - notably measures where the business takes the ultimate decision whether to repair or not (notably M1 or M2). On the other hand, for measures where the consumer takes the ultimate decision on whether to repair, the consumer take-up rate was used (for instance M13 and M14). The relevant take-up rate for the estimate of impacts of each measure is highlighted in bold.

Measures	Increase in the take up of repair due to the measure		Scope	Data source	How the data was calculated
M1 – Repair as the primary remedy	Businesses	**+74.3% (businesses)**	Sellers	Estimate based on SHAREPAIR figures	As this measure will require businesses by law to offer repair as primary remedy, it is assumed almost all companies will take up this measure. We assume 100% compliance, however some replacements will take place because repair is not possible. Therefore, the 100% willingness to take up was reduced by 25.7%, reflecting cases where repair is impossible. This calculation based on the data provided by the SHAREPAIR initiative.[1] We use the average share across the last 5 years (2017-2021) of defective products that were disposed due to technical and economic reasons to estimate the share of irreparable products among all defective products. Based on this data, the share is 25.7% among all products. Therefore, the rate of repair is assumed to be 74.3%.

[1] https://www.sharepair.org/, data provided by lead researcher Yoko Dams on 26 October 2022.

Measures	Increase in the take up of repair due to the measure		Scope	Data source	How the data was calculated
M2 – Preference for repair in the proportionality test	Businesses	+74.3% (businesses)	Sellers	Estimate based on SHAREPAIR figures	As this measure will require businesses by law to offer repair if the proportionality test determines that it is more convenient than replacement, it is assumed that 74.3% of companies will take up this measure. We assume 100% compliance; however some replacements will take place because repair is not possible (as in M2) but also because the proportionality test shows that repair is more expensive than replacement. We reduced the willingness to take up rate by 25.7%, reflecting cases where repair is impossible. This calculation based on the data provided by the SHAREPAIR initiative.[2] We use the average share across the last 5 years (2017-2021) of defective products that were disposed due to technical and economic reasons to estimate the share of irreparable products among all defective products. Based on this data, the share is 25.7% among all products. Therefore, the increase in the rate of repair is assumed to be 74.3%. An alternative calculation based on the results of the business survey would lead to a somewhat higher value which is still within a similar range. For instance, 100% willingness to take up was reduced by 12%[3], reflecting cases where repair is significantly more expensive than replacement according to the business survey respondents.
M3 – Interruption/Suspension of the legal guarantee period	Consumers Businesses	**+12% willingness to repair (consumers)** +100% (businesses)	Sellers	SGD experiment	This figure is based on the results of the behavioural experiment among consumers (SGD experiment). It compares the effect of the condition that consumers can benefit from a restart of the guarantee period after a repair on their likelihood to choose a repair against the likelihood to repair under the condition that such a restart is not offered. The percentage figure represents the average increase in the effect sizes. The results are explained in detail in Annex 1where the SGD experiment is explained.

[2] https://www.sharepair.org/ , data provided by lead researcher Yoko Dams on 26 October 2022.

[3] Business survey (Q10) respondents indicated that 29% of products were replaced. Other data from the business survey suggests that only 41% of respondents agreed that costs are a reason for not repairing it (Q65). Multiplying 29% of replaced goods with 41% (meaning that in these cases costs might have been the reason for replacement) leads to 12%.

Measures	Increase in the take up of repair due to the measure		Scope	Data source	How the data was calculated
M4 – Extending the legal guarantee period	Consumers Businesses	**+21% willingness to take-up of repair** +100% (businesses)	Sellers	SGD experiment	This figure is based on the results of the behavioural experiment among consumers (SGD experiment). Under the condition that the legal guarantee period is extended for repairs only, but not for replacements, the likelihood of consumers to have their product repaired increases by this magnitude compared to likelihood to repair under the condition that the legal guarantee period is not extended and thus neither repair nor replacement would be covered. On the other hand, under the condition that the legal guarantee period is extended for both repair and replacement, the likelihood of consumers to repair decreased by 3% compared to the condition when the legal guarantee period is not extended and thus the defective product is not covered for either repair or replacement. These figures represent the relative changes in effect size that the experiment revealed. The results are explained in detail in the section 3.2 of the SGD experiment annex.
M7 - Aligning the legal guarantee period for refurbished second-hand goods with new goods	Consumers Businesses	**+13.5% willingness to purchase refurbished goods with longer guarantee period** +100% (businesses)	Sellers	SGD experiment	This figure is based on the results of the behavioural experiment among consumers (SGD experiment). The figures in the brackets show the relative difference of consumers' willingness to pay for a used product with a two-year guarantee period compared to their willingness to pay for the same used product when it comes with a one-year guarantee period. Overall, three products were tested and revealed considerable price differences. The average increases in willingness to pay under the condition of an aligned, two-year guarantee period for highly refurbished products were the following: for a smartphone 33%, for a refrigerator 31%, and for shoes 20% (average across all three products: 26.5%). These are the relative increases in the amounts that consumers are willing to pay when highly refurbished products of these categories come with a guarantee period of 2 years instead of 1 year. These results are explained in detail in the section 3.4 of the SGD experiment annex. It should be noted that, the assumed impacts figures are discounted to take account of the fact that this option will only benefit consumers in some MS where the liability period for refurbished goods can be lower than 2 years (50%) discount. Therefore, the assumed increase in the take up EU-wide rate has been decreased to 13.5%.

Measures	Increase in the take up of repair due to the measure		Scope	Data source	How the data was calculated
M8 - Refurbished goods used as a replacement	Businesses	**42-43%** of businesses (sellers of new goods and manufacturers) perceive this measure as having high to very high potential	Sellers Manufacturers	Business survey	Of all the measures tested in the business survey, M8 is perceived to be having the relatively high potential in leading to more repairs compared to the other measures tested in the survey (42-43% of manufacturers and sellers consulted said it had high to very high potential).
M9a - Right to Repair (only Ecodesign products)	Consumers Businesses	+**12.1%** increase in the willingness to repair (consumers) +100% willingness to take up (businesses)	Manufacturers	R2R experiment Business survey	This figure compares the preference share of consumers from the conjoint analysis to have their product repaired under the condition of a 'Right to repair' against the average likelihood of consumers to have a defective product repaired that is no longer covered by the legal guarantee (thus, when a right to repair is absent). This relative increase represents the increase under a realistic configuration tested for the 'right to repair', which assumed in all cases a moderate price for the repair (20% of the price of the product) and longer repair duration (four weeks). The details are documented in section 3.3 of the R2R experiment annex. To derive a figure for Ecodesign products, we only considered the results for those product categories that are covered already or will soon be covered by Ecodeisgn rules, respectively (refrigerators and smartphones). It is assumed that all businesses (manufacturers) will take up this measure as they will be required by law.
M9b - Right to Repair (all products)	Consumers Businesses	**+15.2**% increase in the willingness to repair (consumers) +100% willingness to take up (businesses)	Manufacturers	R2R experiment Business survey	This figure compares the preference share of consumers from the conjoint analysis to have their product repaired under the condition of a 'Right to repair' against the average likelihood of consumers to have a defective product repaired that is no longer covered by the legal guarantee (thus, when a right to repair is absent). This relative increase represents the increase under a realistic configuration tested for the 'right to repair', which assumed in all cases a moderate price for the repair (20% of the price of the product) and longer repair duration (four weeks). The details are documented in section 3.3 of the R2R experiment annex. For this measure, we considered the results for all product categories that were included in the experiment. It is assumed that all businesses (manufacturers) will take up this measure as they will be required by law.

Measures	Increase in the take up of repair due to the measure		Scope	Data source	How the data was calculated
M 11 – Issuing a repair quote	Consumers Businesses	**+13.4%willingness to repair (consumers)** +57-65% willingness to take up (manufacturers/sellers) +100 willingness to take up (repairers)	Manufacturers Sellers Repairers	R2R experiment Business survey	This figure is based on the results of the behavioural experiments related to the 'right to repair'. It represents the increase in the share of consumers that would commission a repair when the prices for repair quotes to consumers are capped at a maximum of 5% of the product value. The details are documented in the R2R experiment annex, section 3.2. Businesses willingness to take up might differ between repairers (estimated at 100%) and other actors. Currently, between 57 and 65% of businesses provide repair services as part of their offering. It can be assumed that while repair services will have a high incentive to offer the quote, only those manufacturers and sellers that currently offer such services might be impacted by this measure. This measure addresses a range of convenience related barriers to the take up of repair: difficulty to estimate the price of repair, availability of repair services, difficulty to find information on how to get the product repaired.
M12 – Obligation to inform where to repair	Consumers Businesses	**+2.0% willingness to repair (consumers)** +100% (businesses)	Manufacturers	Estimated based on the M11	Consumers' willingness to take-up repairs as a result of this measure was not tested in the experiments. However, it is assumed that its effectiveness would be the lowest compared to the other four measures proposed outside the legal guarantee. In absence of other data, we assume take-up rates of M12 based on the M11 take-up rate. Both measures are meant to improve consumers' knowledge on repair possibility. M11 provides the consumer with a quote for the repair at a certain fixed price and addresses a number of barriers. On the other hand, M12 informs consumers solely on the repair location thus addresses only the barrier regarding "how to get the product repaired". Therefore, we assume that the take-up of repair as a result of this measure would be considerably lower compared to M11 – estimated at 2.0% (or 15% of the willingness to take up under the conditions of M11 – 0.15x13.4%).

Measures	Increase in the take up of repair due to the measure		Scope	Data source	How the data was calculated
M13 – Platform with information on available repair services	Consumers Businesses	**+6.7% willingness to repair (consumers)** +87% willingness to take up (businesses)	Repairers	Estimate based on M11 combined with Desk research	This figure is based using a similar approach as for M12 – i.e., based on the results of the Right to repair experiment for the quote combined with the insights from an existing online repair platform in France[4] . The platform will address fewer convenience barriers than the issuing of a quote. It will provide information on where to repair and should also make it easier to find than for M12 as this information will be centralised on an online platform. It will also make the process of getting a quote easier even though it will not directly address the barrier about knowing the costs of the repair (an additional step is needed as the consumer will need to request the quote after having searched the platform). Depending on the platform functionalities, the platform could be enhanced to inform consumers about repair prices to some extent. On the other hand, the reach of the platform in the population might be limited and will be dependent on the quality of the platform and the reach of the communication campaigns (while as part of M11 there is an obligation that everyone can benefit from). When comparing the scope of M13 with M11, this leads to an assumed take-up of 6.7% (or 50% of the willingness to take up under the conditions of M11). As mentioned above, a similar platform already exists in France. This has approximatively 127,000 repair services registered. Considering that in 2019, there were 145,696 repair services available in France[5], approximatively 87% of repair services were subscribed to the platform. The take up rates will depend on the awareness campaigns carried out to engage businesses on the platform, as well as resources invested to keep the platform up to date.

[4] http://www.reparacteurs.artisanat.fr/

[5] See Eurostat, NACE Rev. 2 under S95 - Repair of computers and personal and household goods

Measures	Increase in the take up of repair due to the measure		Scope	Data source	How the data was calculated
M14 – Voluntary commitments to an EU common "easy repair standard"	Consumer Businesses	+4.0% willingness to repair (consumers) +30-50% willingness to take up (businesses)	Repairers	Estimate based on M11 combined with Desk research	Consumers' willingness to take-up repairs as a result of this measure was not tested in the experiments. However, it is assumed that its effectiveness would be lower than the platform (M13) but higher than the requirement to inform where to repair (M12). In absence of other data, we assume take-up rates of M14 based on the M11 take-up rate. Both measures are meant to improve consumers' knowledge on repair possibility. M11 provides consumers with a repair quote for a reasonable price. On the other hand, M14 informs consumers on the quality of the repair provider and therefore addresses the distrust in repair. We assume that the take-up of repair as a result of this measure would be slightly lower compared to M11 – estimated at 4.0% (or 30% of the willingness to take up under the conditions of M11). The results of the OPC suggest that 52% of businesses would favour such a measure. Based on the results of perceived effectiveness of the measure, it is assumed that between 30 and 50% of businesses for which this measure would be relevant would adhere to the voluntary commitment. It should be noted that consumers' take up of repair as a result of this measure would depend on various factors (i.e., the take up of businesses, label presentation and content, etc.). While there is not sufficient data to estimate consumer willingness to repair as a result of this measure, it can be assumed that the measure could nudge those consumers that currently do not repair because they do not trust the quality of the repair. According to the consumer survey results, together with price, trust in the quality of repair is among the most important aspects that refrains consumers from repairing (8.2 out of 10, according to the consumer survey)[6].

[6] See QB4 in the consumer survey results (Annex 1)

Optional discount levels for increase in take up rates

The impact assessment is based on assumptions about the increase in take up rates of repair that can be expected when individual measures are introduced in society. In the case of some measures in the scope of this study, this expected increase is based on insights from behavioural experiments, which allows to estimate the exact effect sizes that can be expected from a measure to shift consumer behaviour in society. This inference is valid under the condition that the policy measure is adequately reflected in the laboratory situation of the experiment.

Several considerations help us to qualify these assumptions and establish that it could be advised to use a more conservative scenario when it comes to the increase in repair rates. Most notably, in their day-to-day life, consumers may for practical reasons be more reluctant to change their behaviour than in a hypothetical situation of an experiment. When measures are implemented, they often come with practical obstacles for consumers to fully adopt a new behaviour. Furthermore, preferences may shift slower than we would expect from looking purely at experimental findings.

For example, based on the general population survey data, we carried out a segmentation analysis which revealed that close to 40% of consumers can be classified into a category that we labelled 'enthusiastic replacers', a segment of consumers that habitually replaced defective products and showed an attitudinal preference for replacement over repair. When such a group of consumers are faced with hurdles that come naturally with the practical implementation of policy measures, we expect that, in practice, the behavioural changes could occur at a smaller rate than the experiment suggested.

To come up with a value for M1 and M2 a theoretical take up rate of 100% was assumed as the measures contain a legal obligation (i.e., no free choice for companies). Since within both measures replacement can still be an option if the costs of repair are disproportionally high or if repair is technically impossible, the 100% take up was reduced by 26%, reflecting cases in which a product can technically or economically not be repaired. The 26% stem from historical data from VITO and reflect the 'number of disposed products (due to technical or economical or other reasons)'.

To account for this in the study, we suggest implementing in the assessment an option to reduce the increase in repair rates at certain levels. The assumption dashboard will allow the user to apply stepwise discount levels of 10%, 20%, 30% or 40%, in order to arrive at more conservative scenarios in the assessment. We recommend excluding measures M1, M2 and M8 from this calculation, as they are not dependent on consumer behaviour.

The following table provides an overview of the discounted relative increase in repair rates per measures.

Table 1 - Effect of discount levels on relative increase in repair rates

Measure	Increase in repair rates	Discount 10%	Discount 20%	Discount 30%	Discount 40%
M1 - Repair as the primary remedy	74.3%	Not considered			

Measure	Increase in repair rates	Discount 10%	Discount 20%	Discount 30%	Discount 40%
M2 - Preference for repair in the proportionality test	74.3%	Not considered			
M3 - Interruption/Suspension of the legal guarantee period	12.0%	10.8%	9.6%	8.4%	7.2%
M4 - Extending the legal guarantee period (for repair only)	21.0%	18.9%	16.8%	14.7%	12.6%
M7 - aligning the legal guarantee period for refurbished second-hand goods with new goods	26.9%	24.2%	21.5%	18.8%	16.1%
M8 - Refurbished goods used as a replacement (original version)	42.5%	Not considered			
M8a - Replacement with refurbished goods in the extended liability period	42.5%	Not considered			
M8b - Replacement with refurbished goods from the second year of the liability period	42.5%	Not considered			
M9a - Right to Repair (only Ecodesign products)	12.1%	10.9%	9.7%	8.5%	7.3%
M9b - Right to Repair (all products)	15.2%	13.7%	12.2%	10.6%	9.1%
M 11 – Issuing a repair quote	13.4%	12.1%	10.7%	9.4%	8.0%
M12 – Obligation to inform where to repair	2.0%	1.8%	1.6%	1.4%	1.2%
M13a – Platform with information on available repair services	6.7%	6.0%	5.4%	4.7%	4.0%
M13a.extra – Platform with information on available repair services - extra	0.6%	0.5%	0.5%	0.4%	0.4%
M13b – Platform with information on available repair services	6.7%	6.0%	5.4%	4.7%	4.0%
M14 – Voluntary commitments to an EU common "easy repair standard"	4.0%	3.6%	3.2%	2.8%	2.4%

2. Product categories covered and the extrapolation of results

The detailed assessment of environmental and economic impacts – including data collection and processing, *inter alia*, on raw material and energy needs for their production, quantity and value of goods manufactured, relevant repair activities, stakeholder views on the extent of the problem and the likely impacts of measures – was undertaken for a sample of 7 product categories which together were representative of all repairable consumer durables (an eighth one, cars, was explored but no problems with customer unwillingness or barriers to repair comparable to the other product groups were identified). As these seven product categories only cover a part of all relevant goods, the results of the model calculations were later extrapolated with the use of a multiplication factor to all repairable consumer durables in order to estimate the full impacts on the environment and the (European) economy.

2.1. Product categories

The table below gives an overview on the detailed sources for calculating the quantities of the selected product categories.

Table 2 - Data sources to calculate quantities and values produced and sold in the EU for the seven selected product categories

Product category	Data source / PRODCOM codes
Mobile phones	26302200 - Telephones for cellular networks or for other wireless networks
Televisions	26402040 - Colour television projection equipment 26402090 - Other television receivers […] n.e.c.
Refrigerators	27511110 - Combined refrigerators-freezers, with separate external doors 27511133 - Household-type refrigerators (excluding built-in) 27511135 - Compression-type built-in refrigerators
Laptops	26201100 - Laptop PCs and palm-top organisers
Clothing (jackets and blazers only)	Based on Eurostat figures on the weight of jackets and blazers and an assumed average weight of 0.444 kg based on representative product. (14111000 to 14391090 to calculate trend between 2009 and 2019)
Shoes/footwear	15201100 to 15203200
Wooden furniture	31091230 - Wooden bedroom furniture; 31091250 - Wooden furniture for the dining-room and living-room; 31091300 - Other wooden furniture

Selection of a reference product for each category

For the calculation of current resource use and prospective resource savings within the environmental model, reference products were needed to collate material input data. For each product category a reference product was chosen based on the most recent scientific literature on life cycle assessment (LCA). This was needed to narrow down the product categories to a concrete product for which quantitative information was available. A vital criterion for the selection of reference products was the availability of life cycle inventory data that lists the required resources and respective quantities for a product. Where possible, the market significance of products was considered to identify products that are representative for the product categories.

In the selected LCA studies, up to five most important material resource inputs (i.e., those with the highest weight percentage) necessary for the production have been identified, including the amount and the unit of measure for a specific resource (e.g. 32 kg of steel for a refrigerator). It is important to highlight that the resource inputs might show qualitative and/or quantitative variation (i.e., different types and amounts of resources, respectively) if different reference products are selected (Manhart et al. 2016). This is of special relevance regarding the product categories clothing, cars and wooden furniture that represent a broad variety of products. For example, clothing can include basic everyday items such as underwear, trousers, t-shirts/shirts, dresses/skirts and jackets; wooden furniture can encompass a small bedside table, an average office desk or a two-door wardrobe. The product category "cars" shows a similar heterogeneity regarding engine type (e.g. combustion, electric or hybrid engine). Therefore, these product categories subsume a multitude of products that must be considered when interpreting the baseline for environmental and economic impacts. LCA studies, bills of material, and other sources of input material data are provided for single products only. As such, it was imperative to select only one product to represent each product category in order to collate material input data. It should be noted that this representative product may not be completely characteristic of every single product within the respective category—particularly within the clothing and wooden furniture categories. However, best attempts were made to select the most representative product possible based on sales data and consumer surveys in these cases. For example, the reference product used to assess the resource inputs for TVs a LCD TV 20.1 and for clothing a 444g unisex jacket was chosen.

2.2. Extrapolation of results to the EU economy

As the product categories selected for the study are broadly representative of consumer durables, it is possible to extrapolate from the results to the full range of relevant consumer durables. Information on the overall consumption of durables, taken at consumer prices, was sourced from Eurostat[7] for the pre-Covid year of 2019, which was also the base year for the economic indicators in the detailed model. The Eurostat estimates on total household consumption expenditure euros for EU27 was broken down to COICOP categories (Classification of Individual Consumption According to Purpose). The list of relevant categories is given in the table below. This brings together all durable goods where a need for repair is at least somewhat prevalent. As an example, we did not include books and printed material (antiques may be restored but this is not considered relevant repair from the

[7] Final consumption expenditure of households by consumption purpose (COICOP 3 digit) [NAMA_10_CO3_P3]

point of view of the policy initiative). The lowest-level breakdown for the expenditures was not given in the original database but was estimated using a different, more detailed Eurostat dataset on the structure of consumption (base year 2015).[8]

Table 3 - Household consumption expenditure in the EU27, by COICOP category (2019, EUR million)

COICOP categories	2019 expenditure (Eurostat)	Relevant expenditure (estimated)	
		Purchase	Repairs
03 Clothing and footwear	336,321.7		
Clothing	268,588.0		
Clothing materials		868.3	
Garments		249,196.4	
Other articles of clothing and clothing accessories		11,287.6	
Cleaning, repair and hire of clothing			7,235.7
Footwear	67,733.7		
Shoes and other footwear		66,098.7	
Repair and hire of footwear			934.3
05 Furnishings, household equipment and routine household maintenance	406,776.7		
Furniture and furnishings, carpets and other floor coverings	137,201.7		
Furniture and furnishings		126,762.4	
Carpets and other floor coverings		8,202.3	
Repair of furniture, furnishings and floor coverings			1,491.3
Household textiles	30,690.4		
Household appliances	59,912.3		
Major household appliances whether electric or not		43,793.8	
Small electric household appliances		12,469.1	
Repair of household appliances			2,737.1
Glassware, tableware and household utensils	38,287.5	38,287.5	
Tools and equipment for house and garden	31,202.6		
Major tools and equipment		6,240.5	
Small tools and miscellaneous accessories		16,475.0	
06 Health	320,477.7		
Medical products, appliances and equipment	136,748.9		
Therapeutic appliances and equipment		36,392.9	
07 Transport	961,811.7		
Purchase of vehicles	276,159.0		
Motor cars		258,276.4	
Motor cycles		8,174.9	
Bicycles		5,109.3	

[8] Mean consumption expenditure per household by COICOP consumption purpose [hbs_exp_t121]

COICOP categories	2019 expenditure (Eurostat)	Relevant expenditure (estimated)	
		Purchase	Repairs
Operation of personal transport equipment	520,256.7		
Maintenance and repair of personal transport equipment*			*77,792.5*
08 Communications	174,174.7		
Telephone and telefax equipment	:	11,037.7	
09 Recreation and culture	638,291.0		
Audio-visual, photographic and information processing equipment	86,166.3		
Equipment for the reception, recording and reproduction of sound and picture		27,935.2	
Photographic and cinematographic equipment and optical instruments		7,475.6	
Information processing equipment		36,197.7	
Repair of audio-visual, photographic and information processing equipment			1,573.8
Other major durables for recreation and culture	22,204.5		
Major durables for outdoor recreation		16,758.1	
Musical instruments and major durables for indoor recreation		3,770.6	
Maintenance and repair of other major durables for recreation and culture			2,094.8
Other recreational items and equipment, gardens and pets	136,160.3		
Games, toys and hobbies		34,438.7	
Equipment for sport, camping and open-air recreation		16,262.7	
13 Miscellaneous goods and services	819,454.7		
Personal care	174,623.3		
Electrical appliances for personal care		16,906.8	
Personal effects n.e.c.	:		
Jewellery, clocks and watches		n/a	
Other personal effects		n/a	
TOTAL		**1,058,418.2**	**93,859.5**

The total value of annual household expenditure on relevant consumer durables (in 2019) has been estimated at EUR 1,058 billion. In contrast, the baseline sales of the seven product categories assessed in the EU27 was, according to our estimates based on Eurostat PRODCOM and complementary data sources, EUR 184.4 billion. Hence, we suggest a **simple extrapolation quotient of 5.74**. This is to be used to multiply all modelled impact figures in order to obtain a rough estimate for the total set of consumer durables that will be affected.

3. Baseline data and key first-round effects

This section presents the method to estimate the key baseline indicators to which the measures' impacts are compared, and the essential first-round effect from which the calculation of both environmental and economic impacts departs.

The modelling of environmental and economic impacts has been undertaken for a period of 15 years (2023-2037), applying a dynamic baseline which assumed the continuation of past observed trends in the sales of the seven selected product categories as well as in repair rates. The key estimates used throughout the modelling exercise are the number of products sold in the EU - under the seven product categories – the number of goods from these that were produced in the EU, and average (producer and retail) prices to calculate monetary values. The method is presented below.

Furthermore, this section also explains the key set of calculations for first-round effects affecting businesses and consumers alike.

3.1. Goods sold in the EU

The baseline number of goods projected to be sold in the EU between 2023 and 2037 is estimated on the basis of Eurostat's PRODCOM data for the according codes. As a first step, the amount sold ($Qsold_i$) in the EU in 2019 was calculated by adding up the total EU production ($Qprod_i$) and import ($Qimp_i$), and subtracting export ($Qexp_i$). The formula for a given product category *i* is:

$$Qsold(2019)_i = Qprod(2019)_i + Qimp(2019)_i - Qexp(2019)_i$$

The same calculation has been repeated for the year 2009. The observed average product-group-specific annual growth rate between these two points in time (which could be negative) was halved to obtain a more conservative projection on the future annual growth rate in sales.

$$\alpha_i = \frac{\sqrt[10]{Qsold(2019)_i / Qsold(2009)_i} - 1}{2}$$

This rate (α_i) was used to adjust the baseline 2019 values for the years 2023-2037 accordingly, and to calculate an aggregate volume over these 15 years.

$$Qsold_i = \sum_{y=2023}^{2037} (1+\alpha_i)^{y-2021} * Qsold(y)_i$$

3.2. Goods produced in the EU

The fraction of goods sold in the EU that was also produced in the EU (e_i) was calculated by using PRODCOM data. The formula assumes that the share of domestic production in the amount of goods ultimately sold in the EU is the same as its share in export (i.e. a share

of imports is re-exported). The share was calculated for the year 2019 and it was fixed for future projections.

$$e_i = Qprod(2019)_i/(Qprod(2019)_i + Qimp(2019)_i)$$

The above calculated share was used as a multiplier to obtain the number of goods sold and also produced in the EU, which is the main figure for the derivation of economic effects on European manufacturers.

$$Qeu_i = e_i * Qsold_i$$

3.3. Average product prices

The average price of a product under the seven selected product categories was calculated for the year 2019. The environmental and the economic assessment uses these fixed prices throughout all calculations, i.e. price inflation is not taken into account. The producer prices – these are import prices for the fraction of goods originating from extra-EU imports – were calculated from PRODCOM data:

$$Pprod_i = Vsold(2019)_i/Qsold(2019)_i$$

The quantity of products sold in the EU ($Qprod(2019)_i$) comes from the calculations described earlier in the section 'Goods sold in the EU', while the aggregate value of these goods ($Vprod(2019)_i$) is calculated in an analogous manner to the quantities:

$$Vsold(2019)_i = Vprod(2019)_i + Vimp(2019)_i - Vexp(2019)_i$$

To obtain consumer prices, producer prices were augmented by 50%. This core assumption comes from web search on typical markups on the market.

$$Pcons_i = 1.5 * Pprod_i$$

The model assumes that there is no difference between prices of products produced in or outside the EU.

3.4. Amount of products additionally repaired

The additional number of products repaired as a consequence of implementing a given measure (or indeed as a consequence of the dynamic baseline which involves increasing repair rates as compared to the situation in 2019) is a key indicator in the Impact Assessment, used inter alia to calculate savings to businesses under measures 1 and 2, as well as consumer savings under measures affecting repair beyond the legal guarantee. This metric is calculated on the basis of:

– the estimated baseline number of goods to be sold between 2023 and 2037 ($Qsold_i$, see above)

- the measure-relevant current repair rate - i.e., within or outside the legal guarantee (the rates are based on the results of the consumer survey) and is uniform for all product categories;
- the assumption on the effectiveness of the measure, uniform for all product categories. This leads to the calculation of the future repair rate.

The formula used is the following:

$$\Delta Qrep_i = (r1_i - r0_i) * Qsold_i$$

In this equation, $r0_i$ is the baseline repair rate. The original survey-sourced repair rates (rs_i) with the base year 2021 (as questions in the survey referred to the last year) were augmented by an average annual growth rate of 0.28%, applied for the period between 2023 and 2037. This figure equals to the observed average growth rate in the number of repairs in the SHAREPAIR dataset. In total, this led to an augmentation by 2.55%, uniform for all product categories. The calculation of the augmentation factor γ is:

$$\gamma = \frac{\sum_{y=1}^{15} 1.028^y}{15}$$

Hence,

$$r0_i = \gamma * rs_i$$

The future repair rate ($r1_i$), upon implementing the measure, is calculated by increasing the baseline repair rate by the percentage representing the effectiveness of the measure, as estimated above. This effectiveness value is uniform across all seven product categories.

$$r1_i = (1 + \varepsilon) * r0_i$$

3.5. Number of products whose production/purchase is avoided

The number of products whose production and purchase is avoided has been calculated based on the amount of repaired products (see above), new and old average lifetimes of the product categories and the rate of defects recurring directly after repair. It must be emphasized that although input values for these four variables are provided based on recent statistics and scientific literature, they can be altered to reflect further evidence such as new scientific findings or even more recent statistical data. In particular, the lifetime of products (both average consumption and absolute lifetime) shows variability across studies. Therefore, exploring the model with input values covering the lower and higher end of lifetime ranges is recommended.

The formula applied is:

$$Qav_i = (1 - d_i)(\Delta Qrep_i - \frac{\Delta Qrep_i}{\frac{Ln_i}{Lo_i}})$$

Where Qav_i is the production avoided (globally), Ln_i and Lo_i are the new and old average lifetimes of the product categories, respectively, and d_i is the rate of defects recurring directly after repair. The different parameters are described in the following paragraphs:

3.5.1. Average consumption lifetime Lo_i

The average consumption lifetime describes the length of usage by consumers on average The values were determined based on scientific literature and/or product-specific information provided through interviews, as well as the business and the consumer survey.

3.5.2. New average consumption lifetime Ln_i

The new average consumption lifetime reflects the lifetime increased by repair(s). Due to lacking data on lifetime increase by repair, assumptions on lifetime extensions were made (see E_i). These assumptions are based on the theoretical absolute lifetime of a product category (see La_i).

$$Ln_i = (La_i - Lo_i) * E_i + Lo_i$$

3.5.3. Absolute lifetime La_i

The absolute lifetime is defined by the timeframe to which the usage time can be extended, i.e., it is a hypothetical maximum product lifetime. The values were as well determined based on scientific literature and/or product-specific information provided through interviews, as well as the business and the consumer survey.

3.5.4. Estimated lifetime extension by repair E_i

As the aim of the policy measures is to extend the lifetime to ultimately diminish the problem of premature disposal, lifetime extensions (in percentages) were examined. Based on estimates which took into consideration different influencing factors (see table below), we came up with possible lifetime extensions for all products.

Selected products	**Factors influencing the possible extension of lifetime [the factors rank if repair might be successful for the respective device in the long and short term]**		**Estimated realistic lifetime extension**
	Factors positively influencing possible lifetime extension	Factors negatively influencing possible lifetime extension	in % and years
Mobile phones, TVs, laptops		• High-tech devices with fast technological developments, making repair obsolete quickly • Relatively fragile and therefore more susceptible to defects • High use frequency as everyday objects • Software obsolescence might outweigh repair • Partly fashion objects • Literature suggests that repair extends the lifetime of TVs by around 1 year.	25%
Refrigerators	• Less high-tech devices compared to mobile phones, etc. • Defect due to inattention or misuse less likely • Less dependent on fashion tastes	• High use frequency	40%

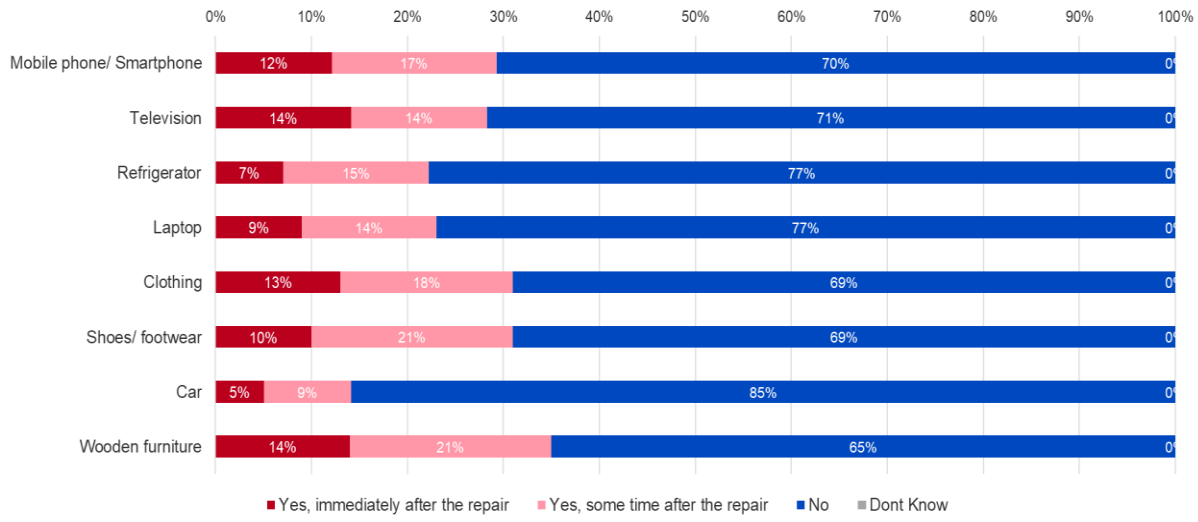
Clothing, Shoes	• No high-tech objects	• Fashion objects • High use frequency (at least for some clothes)	15%
Cars	• Lifetime extension potential less high as repair is already common use	• Increasing complexity of technologies, e.g. due to more reliance on software • High use frequency	30%
Wooden furniture	• If it is a robust furniture, repair can extend the lifetime greatly	• Increased purchase of less robust furniture • Increasingly subjected to fashion tastes	40%

The table below summarises the different values of the presented lifetimes per product category:

	$Lo_i\ [years]$	$La_i\ [years]$	E_i	$Ln_i\ [years]$
Mobile phones	1.8	7	25%	3.1
TVs	7	22	25%	10.8
Refrigerators	10	20	40%	14.0
Laptops	4	7	25%	4.8
Clothing	1	4	15%	1.5
Shoes	3	5	15%	3.3
Cars	11.5	18	30%	13.5
Wooden furniture	9.65	22.50	40%	14.8

3.5.5. Recurring defects d_i

According to the consumer survey, 5-14% of defects directly recur after a repair (depending on product type). Hence, this number of products gets repaired, but is likely to be replaced directly after, as repair has not proven to be effective. In consequence, the number of defects directly recurring after a repair reduces the number of repaired product and thus reduced the total lifetime extension. As a result, the total number of products whose purchase could potentially be avoided is reduced by this percentage. To consider this factor in the model, all numbers of products whose purchase could potentially be avoided were reduced by a defect rate. In consequence, this leads to less environmental and economic savings, but seems to contribute to a more realistic presentation of the current situation. The table below indicates the different amounts of defects directly recurring after repair (source: consumer survey)


0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Mobile phone/ Smartphone
12%
17%
70%
0%
Television
14%
14%
71%
0%
Refrigerator
7%
15%
77%
0%
Laptop
9%
14%
77%
0%
Clothing
13%
18%
69%
0%
Shoes/ footwear
10%
21%
69%
0%
Car
5%
9%
85%
0%
Wooden furniture
14%
21%
65%
0%
Yes, immediately after the repair
Yes, some time after the repair
No
Dont Know

4. Additional data and explanation of estimates of environmental impacts

An assumption-based model was developed for the assessment of environmental impacts and is provided separately as an Excel file. The model includes the quantitative description of the most important material inputs necessary to produce a reference product (in each category) that serves as basis for the impact assessment. Moreover, the model was fed with CO2 (equivalents) data and waste generation data for the different product categories. In a next step, assumptions that are needed for the quantification of potential environmental savings were defined. It is expected that the various discussed measures will all ultimately lead to an increased repair rate of the products and result in a prolonged lifetime. However, the extent of the lifetime extension may vary (see previous chapter). Through this, savings in terms of resource consumption, emissions and waste can be achieved if existing products are used longer, resulting in fewer new products being produced.

4.1. Amount of products repaired due to a certain measure

Differently to the baseline, which lies down a repair rate applicable to all products beyond and within legal guarantees, the setup of the measures made it relevant to nuance the potential of repair per measure. Two aspects were considered for the measure-specific repair potential

1) the measure-relevant current repair rate $(see\ r0_i)$ - i.e., within or outside the legal guarantee (the rates rs_i are based on the results of the consumer survey) and specific to the amount of products affected by the measure. The formulas can be found in chapter 2 of this Annex. Please refer to the next table for the calculations of rs_i.

1) the assumption on the effectiveness of the measure $(see\ \varepsilon_i)$, uniform for all product categories. This leads to the calculation of the additional repair realisable by a measure. Please refer to chapter 21 of this Annex to get an overview on the assumptions made for the increase in repair .

As all measures in discussion would ultimately lead to repair it can be assumed that the repair rate can also be used for measures which focus on refurbishment. However, there is the limitation that by using the current repair rate as basis for further calculations, the focus is on those consumers who repair already today.

Measure-relevant repair rate:

Based on the consumer survey it could be approximated how many defect products get repaired within and how many get repaired beyond legal guarantee. The shares of product owners were then used as approximation for the current products repaired.

Several measures are designed to apply to year 1 or 2 of the legal guarantee or to cover an extended third year as well. To adapt include the different time scopes in the measure-specific repair rate, the different numbers of defects in year 1, 2 or 3 was considered.

According to the Commission's own studies, most product defects for which legal remedy is sought occur within the first six months (71%), within the first year (87%) or within the first two years (96%) after purchase[9], as most production defects occur soon after production. Therefore, in a third year a maximum of 4% of defects covered by a legal guarantee remain. In the model it was assumed that the share of defects (e.g. 7,1% for mobile phones) represent 96% of the defects occurring within the first two years. As the guarantee extension under M4 is only available for repair, we can assume a 100% repair rate in the third year.

M3 assumes that in addition to the defects occurring in the first two years, defects can also be declared in year 3 or 4 (depending on how long the respective guarantee extensions will be). Since the average length of future guarantee extensions is not known, it can be assumed that the remaining 4% of production defects that occur after years 1 and 2 can be covered with M3. Instead of 96% production defects (see M1, M2 etc.), 100% production defects were calculated in for M3.

Since M8a will only consider repairs in an extended third year of a liability period and M8b will only consider defects in the second year of the current two-year period, the number of defects in year 2 resp. year 3 was included.

As M9a and M13b only cover Ecodesign products, the share of product owners that had defects repaired from the non-relevant product categories (clothing, shoes, cars and wooden furniture) was artificially set on 0% to exclude it from further calculations.

Table 4 - Measure-specific repair rate – Detailed calculation of rs_i for every measure

Meausure		**Calculations/Chosen values for measure-relevant repair rate rs_i**
1 - Repair as the primary remedy	%	$= percentage\ of\ product\ owners\ that\ experienced\ defect\ and\ had\ product\ repaired,\ covered\ by\ legal\ guarantee$
M2 - Preference for repair in the proportionality test	%	
M3 - Interruption/Suspension of the legal guarantee period	%	$= \frac{percentage\ of\ product\ owners\ that\ experienced\ defect\ and\ had\ product\ repaired,\ \ covered\ by}{defects\ in\ year\ 1\ and\ 2}$
M4 - Extending the legal guarantee period (for repair only)	%	$= percentage\ of\ product\ owners\ that\ experienced\ defect\ and\ had\ product\ repaired,\ covered\ by\ legal\ guarantee\ \times defects\ in\ year\ 3/defects\ in\ year\ 1\ and\ 2$

[9] Study on the costs and benefits of minimum harmonisation under the Consumer Sales and Guarantees Directive 1999/44/EC and of potential full harmonisation and alignment of EU rules for different sales channels; 2018: https://op.europa.eu/en/publication-detail/-/publication/358f6bb9-9ac0-11e8-a408-01aa75ed71a1/language-en/format-PDF

M7 - aligning the legal guarantee period for refurbished second-hand goods with new goods	%	$= percentage\ of\ product\ owners\ that\ experienced\ defect\ and\ had\ product\ repaired,$ $covered\ by\ legal\ guarantee$
M8 - Refurbished goods used as a replacement (original version)	%	
M8a - Replacement with refurbished goods in the extended liability period	%	$= percentage\ of\ product\ owners\ that\ experienced\ defect\ and\ had\ product\ repaired,$ $covered\ by\ legal\ guarantee \times (defects\ in\ year\ 3/defects\ in\ year\ 1\ and\ 2)$
M8b - Replacement with refurbished goods from the second year of the liability period	%	$= repaired\ defects\ in\ year\ 2$
M9a -M14	%	$= percentage\ of\ product\ owners\ that\ experienced\ defect\ and\ had\ product\ repaired$ $(in\ and\ outside\ legal\ guarantee) - percentage\ of\ product\ owners\ that\ experienced\ defect\ and$ $had\ product\ repaired, covered\ by\ legal\ guarantee$

4.2. Number of products whose production/purchase is avoided due to a certain measure

As a consequence of the measure-related repair rates and the measure specific take up rates for repair, the number of products whose production/purchase is avoided varies among the measures. The number of products whose production and purchase is avoided has been calculated based on the amount of repaired products (see above), new and old average lifetimes of the product categories and the rate of defects recurring directly after repair.

$$Qav_i = (1 - d_i)(\Delta Qrep_i - \frac{\Delta Qrep_i}{\frac{Ln_i}{Lo_i}})$$

Please refer to the previous chapter, for the calculation of Ln_i, Lo_i and d_i.

4.3. Environmental savings

To assess the impacts of the policy measures compared to the baseline, calculations that include all retained measures were carried out. The environmental savings are based on the number of products whose purchase and production can potentially be avoided, as this suggests that consumers would then generate a lower demand for products, leading to

reduced production volumes and savings of material resources. To reflect the specifics of the repair market, the results of the 'Number of products whose purchase can potentially be avoided' are once presented with cars and without cars. However, the final results are based on results without cars.

4.3.1. Fostering the efficient use of resources - displayed as resource savings

To assess the criterion 'Fostering the efficient use of resources' the resource savings (see $ENVr$) for each product category were calculated. The number of products whose production/purchase is avoided (Qav_i) comes from the calculations above. For the resource input R_i for each reference product (one per category), up to 5 most important materials according to weight percentage where included (see R_i). The resource savings were summed up across all product categories and multiplied with the extrapolation factor e.

$$ENVr_i = Qav_i * R_i$$

$$ENVr = \sum ENVr_i * e$$

4.3.2. Contribute to fighting climate change - displayed as CO_2-eq. savings

The contribution to fighting climate change was reflected as CO2-eq. savings (see $ENVc$). The research of CO_2 emissions data per product category (see C_i) was based on literature. Contrary, to the resource savings, the CO_2 emissions and the generated waste volumes are not related to a specific reference product but reflect general data available for a product category. In any case emission arising during the manufacturing phase were considered as we assume that a longer lifetime reduces the number of products that need to be manufactured. Where available CO_2 emission data from the End-of-Life phase and raw material extraction phase were included as well. Where possible data of CO_2 equivalents; was included; however, for some products only CO_2 data could be identified and was then used as an approximation. Product specific data was extrapolated with the total amount of sold products to a total of CO_2 emissions.

$$ENVc_i = Qav_i * C_i$$

$$ENVc = \sum ENVc_i * e$$

4.3.3. Waste production, generation and recycling – displayed as waste savings

The waste savings associated with the reduced number of products (see $ENVw$). was calculated using the current amount of waste (see W_i). Where possible waste generation data was retrieved from Eurostat or recent reports on waste amounts in the EU. Waste quantities given per unit were converted into tonnes with an estimate of the average weight

per product. Unlike the resource data, which was calculated per product and then extrapolated to total quantity, the waste quantity is directly given as a total quantity (i.e., in tonnes).

The waste savings were summed up across all product categories and multiplied with the extrapolation factor e.

$$ENVw_i = Qav_i * W_i$$

$$ENVw = \sum ENVw_i * e$$

4.4. Monetization of environmental savings

The CO_2, waste and resources that will be avoided due to the proposed policy measures were translated into monetary savings (see $Menv$).

To calculate costs that can be avoided when saving CO_2, the costs of damages caused by CO_2 emission were used as basis. While these costs represent costs to the society, CO_2 cost in relation to the European emission trade system could be used to reflect companies' costs savings. However, for the present model the latter costs were not included. Literature indicates that costs of damages caused by CO_2 emission are around 180 €/ton.[10]

Since the resource savings are based on the 5 most important materials in each of the product categories, the monetary savings were calculated by including the prices of the respective material. The results are based on available prices of materials between 2020 and 2022, but savings may vary due to fluctuating prices in the last year due to the market crises.

To monetize waste savings average landfill (29%), incineration (34%) and recycling (37%) shares were multiplied with the respective costs and gains related to landfilling, incineration, and recycling. The shares are based on the current Eurostat data on municipal waste since they cover most of the selected products (white goods and furniture included). Literature suggests across Europe average landfilling costs (including 78€ collection costs) of 154€[11] and average incineration costs (including 78€ collection costs) of 163€[12]. Based on available data for plastic recycling, costs and gains of recycling could be identified to calculate recycling costs (by subtracting gains from costs). It is assumed that data for plastic recycling can be used as reference as much of the recycled municipal waste is plastic. The average price of the three disposal routes amount to 163 €/t. This value was used across all product categories.

[10] https://www.umweltbundesamt.de/presse/pressemitteilungen/hohe-kosten-durch-unterlassenen-umweltschutz

[11] https://www.eea.europa.eu/data-and-maps/figures/typical-charge-gate-fee-and

[12] https://zerowasteeurope.eu/wp-content/uploads/2021/10/ZWE_Delft_Oct21_Waste_Incineration_EUETS_Study.pdf

The formula used for CO_2 and waste monetary savings was the same and is therefore only displayed once:

$$Menv_i = ENV_i * M_i$$

$$Menv = \sum Menv_i * e$$

4.5. Impact realisation profile

The impacts are mainly based on the 'Increase in the take up of repair due to the measure'; however, we assume that it would take 1-2 years for consumers to familiarise themselves with the measures, so the conservative assumption was made that the impact will be partial in the first two years (33% in the first year, 67% in the second year and 100% in third year).

5. Additional data and explanation of estimates of economic impacts

The economic impacts of the baseline scenario and the individual measures were assessed for three key stakeholder groups: businesses, consumers and public administration. The measures are grouped in two clusters:

- Cluster I (within legal guarantee): M1, M2, M3, M4, M7, M8a and M8b
- Cluster II (outside legal guarantee): M9a, M9b, M11, M12, M13, M14

Businesses are further broken down to manufacturers (with impacts calculated separately for all who sell to European consumers and for EU-based ones only), traders and repairers. The economic effects accruing to them are grouped under two top-level headings: (i) knock-on effects of the measures on key economic variables; and (ii) business adjustment and administrative costs.

For consumers, the relevant impacts that were modelled only included the monetary savings from buying less or cheaper (the price of a refurbished good is lower than that of a new product) and the additional expenditure on repairs where applicable: these were Cluster II measures where repair takes place outside the legal guarantee.

For public administrations, the projected effects include investments and operational costs linked to the implementation of the measures.

a. Businesses

The first stakeholder category involves a whole value chain from manufacturers over traders to repairers, all of whom are affected by the measures. The key economic impacts affected them that the study uses as evaluation criteria are: the savings in production costs (for manufacturers), growth and investment in Europe (the change in GVA generated is used for quantification), and the change in employment. The calculation of these indicators and the assumptions behind them are described below.

Key economic impacts

Cost savings - manufacturers

Cost savings for businesses – relevant for some measures - originates in the possibility to reduce the number of new products offered free of charge as a remedy for defective products and offering to repair the good instead or offering a refurbished product. A diminution of their obligation to offer new replacement products is partly offset by the need to finance repair instead, repairing either the defective product of the consumer himself, or refurbishing another returned product and offering this as remedy.

All figures concerning manufacturers are calculated first for all manufacturers selling in the EU, and then separately for EU manufacturers. The evaluation of the measures does not however consider costs and benefits accruing to non-EU businesses (or consumers).

Savings from avoided uncompensated production

Businesses under M1, M2 benefit from not replacing a defective product with a new product but repairing it instead, within the legal guarantee. A shift towards repair will achieve similar savings under M3. They also avoid the obligation to replace defective products under M7 and M8b as consumption will shift towards refurbished products (where replacement with a new product is not a legal remedy). The gross saving from avoiding replacement, under the product category *i* is calculated simply as:

$$Srep_i = Pprod_i * \Delta Qrep_i$$

$Pprod_i$ is the average price of a new product at producer/import prices, and $\Delta Qrep_i$ is the amount of products additionally repaired, explained above.

Financing additional repair

The cost of additional repair that traders have to bear within the legal guarantee under Measures 1 to 8b is the monetary value they will have to reimburse to the repair service providers (where the repair is done in-house by the trader, this calculated amount may not actually be transferred between business units, but is assumed to be at least accounted differently, under different NACE activities).

This estimate for this value is derived from the aggregate value of the defective products that were additionally repaired under the measure, and the calculated share of repair cost as a percentage of the price of a new product. In the consumer survey, respondents indicated that their maximum willingness to pay (WTP price) for repairs was an average of 30% of the price of a new product. The model regards this value as a guidance also for repairs commissioned by traders or manufacturers as a remedy under the legal guarantee. The average value of repairs as a percentage of the price of a new product has been set at the half of this value: if a repair takes place, its cost is certainly below the WTP, hence the average cost must be significantly lower than WTP. The formula for a given product category *i* is:

$$Crep_i = 0.15 * (Pcons_i * \Delta Qrep_i)$$

$Crep_i$ stands for the aggregate cost of repair in product category *i*, while $Pcons_i$ is the average consumer price of the product category, and $\Delta Qrep_i$ the aggregate amount that is additionally repaired. The same multiplier has been applied consistently across all the product categories.

Total cost savings

Total (or net) cost savings for traders under Measures 1 to 8b is simply the gross saving from not making a new product available as replacement minus the cost of additional repair, as presented above:

$$S_i = Srep_i - Crep_i$$

Economic growth - Manufacturers

Change in turnover

Three different revenue streams of manufacturers have been considered in the economic assessment: revenues from the sales of (i) new products, (ii) refurbished products, and (iii) spare parts and components. The assessment did estimate changes in all these three revenue streams.

(i) Firstly, the change in the value of new products sold is estimated simply by the equation:

$$\Delta Vnew_i = Pprod_i * Qav_i$$

The calculation method for estimating the amount of production avoided (Qav_i) has been explained earlier in Section 1. $Pprod_i$ stands for the average producer price of the products in category *i*.

(ii) Secondly, while businesses save on repairing instead of replacing under M1 and M2, they will not have the returned defective goods available that they can refurbish and sell on the secondary market.[13] The situation is similar for M3 where a shift towards repair will reduce the volume of defective new product replaced.

The estimated methods are slightly different for the measures. The model calculates for M1 and M2 with loss of revenue ($\Delta Vref_i$) equalling to the re-sale value of the goods additionally repaired – which would have been replaced by a new product in the absence of the measure and thus available for refurbishment. This assumes that the full volume of the returned products would have been refurbished and re-sold - as these are products that can be economically repaired (this is why sellers opt for this remedy under M1 and M2). Specifically, the formula takes the amount of goods additionally repaired ($\Delta Qrep_i$) and multiplies it by the average producer price ($Pprod_i$), amended by an average price discount for refurbished products (*d*):

$$\Delta Vref_i = (1 - d) * Pprod_i * \Delta Qrep_i$$

Under M3, the main expected effects include a shift towards more repair. This will, as for M1 and M2, also result in a lack of goods available for refurbishment and re-sale. However, the method considers that not all returned products are repaired and refurbished:

$$\Delta Vref_i = (1 - d) * Pprod_i * \omega * \Delta Qrep_i + \Delta Vref2_i$$

[13] These products will be economically repairable as the model calculates with a corresponding increase in repair which only takes place if it is economic.

Where *d* is the price discount for refurbished products (assumed to be 50%), ω is the share of returned products that would normally be repaired/refurbished and resold (37%), and $\Delta Qrep_i$ indicates the number of products additionally repaired. $\Delta Vref2_i$ is a small modifying factor representing the effects from the re-selling of returned and refurbished goods from the extension of the legal guarantee.

$$\Delta Vref2_i = (1-d) * Pprod_i * r * \frac{1-\varphi}{\varphi} * r1_i * \Delta Qrep_i * t * y2$$

In the above formula, φ is the share of returned goods that is repaired instead of being replaced, hence $1-\varphi$ stands for the ratio of returned goods that is replaced instead of being repaired In the baseline scenario, and the ratio $\frac{1-\varphi}{\varphi}$ translates the amount of returned and repaired products (which is the amount calculated first in the method) into the amount of returned and replaced goods. $r1_i$ is the future repair rate, $\Delta Qrep_i$ the number of initial additional repairs (representing the shift towards more repair), t is the average time of the extension of the legal guarantee (0.33 years as per assumption, reflecting the fact that most relevant repairs within the legal guarantee take place early in the lifetime of a product), and *y2* is the share of defects occurring in the second year (9.4% according to the consumer survey).

For M7, the shift towards refurbishment means additional revenues from the sale of such goods. The increase in revenues from refurbished goods ($Vref_i$) is estimated by the formula:

$$\Delta Vref_i = (1-d) * Pprod_i * r * \Delta Qref_i$$

The last element in the equation, the number of products displaced by refurbished products ($\Delta Qref$) equals the number of products additionally repaired, minus the calculated number of refurbished (and sold) products going defective and repaired and covered by new legal guarantee in the second year:

$$\Delta Qref_i = \Delta Qrep_i - y2 * r0_i * Qref(base)_i$$

Where $\Delta Qrep_i$ is the amount of products additionally repaired, *y2* is the share of defects occurring in the second year (9.4%), $r0_i$ is the overall baseline repair rate within the legal guarantee (first 2 years), and $Qref(base)_i$ is the base amount of returned products that would later be refurbished.

$$Qref(base)_i = r * \frac{1-\varphi}{\varphi} * r1_i * (Qsold_i - Qav_i)$$

In the formula, $Qsold_i$ stands for the baseline amount of products sold and Qav_i for the production/sales avoided as a consequence of introducing the measure.

$$\Delta Vnew_i = Pprod_i * Qav_i$$

(iii) Thirdly, the additional value of spare parts produced (i.e. manufacturers' revenues) for the additional repair as induced by the measures is estimated by calculating the spare parts and components share of the total cost of repair ($Crep_i$). The calculation makes use of a basic accounting relationship between turnover, intermediate goods and services, and

added value. Notably, the total output (turnover) of businesses can be disaggregated into the value of intermediate goods and services that were produced by another economic actor but used in their production processes, and everything else. The latter is the gross added value (GVA) that the company generates, which aggregates several elements of value - such as the contribution of machinery to producing the final product, labour, intellectual property as well as company profits.

In the following equation, $gva(rep)_i$ is the share of GVA as percentage of the total turnover of EU repairers, sourced from Eurostat's Structural Business Statistics for the repair sub-sectors corresponding to the seven product categories covered; σ is the assumed share (50%) of spare parts and components within the volume of intermediate goods and services (i.e. that is not GVA).

$$\Delta Vparts_i = \sigma * (1 - gva(rep)_i) * Crep_i$$

The ultimate change of turnover for manufacturers is simply computed as the sum of the change in the sales from new products, spare parts and refurbished products:

$$\Delta TOman_i = \Delta Vnew_i + \Delta Vparts_i + \Delta Vref_i$$

In this equation, $\Delta Vnew_i$ stands for the value of new products not sold as a consequence of the measure, $\Delta Vparts_i$ for spare parts and $\Delta Vref_i$ for the change in the value of refurbished goods sold – all at producer prices.

Change in GVA

The change in the GVA ($\Delta GVAman_i$) produced by manufacturers is calculated by applying the observed share of GVA in 2019 as a percentage of turnover (this is sourced from Eurostat SBS for the manufacturing of the individual product categories selected) to the overall modelled change in turnover linked to the sale of new products and spare parts. The re-selling of refurbished products is not included in the generation of GVA as there is no new production activity involved (except the repair activities).

$$\Delta GVAman_i = gva(man)_i * (\Delta Vnew_i + \Delta Vparts_i)$$

Economic growth - Traders

Change in retail margin

The aggregate value of products that traders (importers, wholesalers, retailers) will be able to sell will be reduced upon the introduction of almost all measures. This will be either due to the expansion of repairs instead of buying a new replacement product, the increase in sales of refurbished goods which are cheaper, or the reduction in the amount of defective goods returned and later resold. The change in sales concerns new products ($\Delta Vnew_i$) and refurbished goods ($\Delta Vref_i$).

Spare parts are not included in the calculations, as the model assumes that these are typically transferred from the manufacturer directly to the repair shops (which can be business units within the manufacturing company or within a trader, but with their business

activities being accounted for as repair services) without a markup on the price charged by the manufacturer.

The above-mentioned new or refurbished products might be sold to the consumer via a chain of distributive trade involving an importer/wholesaler and a general or specialised retail company (including online retail) - or by the manufacturers themselves, without any intermediary. The revenue in the latter case is still regarded as traders' revenue.

The main economic indicator for traders is the retail margin, which is the share of retail revenues once the cost of goods sold is subtracted. This margin pays for the costs of distributive trade and its profit. 'Distributive trade' means here the full chain of distribution of manufacturers' products from wholesale trade to retail, and including importers in cases where the product is manufactured in a third country. As explained earlier, the overall average margin of distributive trade (the markup on producer prices) was set at 50% in the model. The aggregate loss to European traders in retail margin ($\Delta Mtrad_i$) - from the products not sold in Europe as a consequence of measures (i.e. not only goods produced by European manufacturers) - is given by the following formula:

$$\Delta Mtrad_i = 0.5 * (\Delta Vref_i + \Delta Vnew_i)$$

The formula for the change in total revenue, which equals to the value of all the distributed products sold to consumers at retail prices,$\Delta Rtrad_i = 1.5 * (\Delta Vref_i + \Delta Vnew_i)$

The multiplier changes here from 0.5 to 1.5 because total revenue does not only include the margin of distributive trade but also the original procurement value of the goods sold at producer prices.

Change in GVA

The calculation of the modelled change in the GVA produced by traders is similar equivalent to that of manufacturers, but the set of products included in the formula differs. The share of GVA in total turnover in retail trade for the year 2019 (sourced from Eurostat SBS) is applied to the projected change in turnover coming from the sale of new and refurbished products, which are assumed to be channelled through distributive trade. The value of revenues accruing to manufacturers is augmented by the retail markup (50%) to obtain retail sales. Spare parts (used for repair) are not going through traders in the model and are thus not involving GVA generation. The formula is the following for product category *i*:

$$\Delta GVAtrad_i = gva(trad) * 1.5 * (\Delta Vnew_i + \Delta Vref_i)$$

Economic growth - Repairers

Change in turnover

Repair shop, including in-house services at manufacturers or traders, will generate revenues from the additional repair (and refurbishment) induced by the measures. These are paid for by traders or manufacturers under the measures in Cluster I, and by consumers in Cluster II.

As described above, the total cost of repair, which equals the revenue of repairers, is estimated as the number of products additionally repaired ($\Delta Qrep_i$), multiplied by the retail price (consume price - $Pcons_i$) and by the average cost of repair as a proportion of of the consumer price – assumed to be 15%. The latter assumption is derived from the consumer survey, where respondents indicated that their maximum willingness to pay (WTP price) for repairs was an average of 30% of the price of a new product. This value has been halved to estimate an average value of repairs. The formula for a given product category *i* is:

$$\Delta Rrep_i = 0.15 * (Pcons_i * \Delta Qrep_i)$$

Change in GVA

The change in the GVA produced by repairers is estimated in the same way as for manufacturers and traders: the share of GVA in total turnover in the various corresponding repair sub-sectors for the year 2019 (sourced from Eurostat SBS) is applied to the projected change in turnover.

$$\Delta GVArep_i = gva(rep)_i * \Delta Rrep_i$$

Employment

Impacts on the labour market are measured by the projected change in employment (as direct effect of the measures). The implementation of the measures will have a small effect on employment according to the economic model. Notably, the model estimates that employment among EU manufacturers and traders of consumer durables affected will decrease as a direct impact of most measures, as fewer new goods will be sold. On the other hand, European repair service providers (which may include in-house repair services of producers or sellers) are projected to create jobs as a result of the demand induced by the measures.

The calculation uses personnel cost estimates to back-estimate the number of jobs won or lost. The model assumes that the share of personnel cost as percentage of turnover will remain stable after a change in revenues for manufacturers, traders and repairers alike. Hence the projected changes in turnover were multiplied by the observed rate in 2019 (in various manufacturing and repair sub-sectors, as well as in retail as a whole). The corresponding formula is:

$$\Delta Cpers_i = pers(man)_i * \Delta TO_i + pers(man) * \Delta Rtrad_i + pers(rep)_i * \Delta Rrep_i$$

Where $\Delta Cpers_i$ is standing for the change in personnel cost, ΔTO_i for (European) manufacturers' change in turnover, $\Delta Rtrad_i$ for the change in traders' gross revenue, and $\Delta Rrep_i$ for the change in repairers' revenue. The multipliers ($pers_i$) represent personnel cost's share in turnover for the sectors and sub-sectors concerned, sourced from Eurostat's Structural Business Statistics.

To calculate from the aggregate personnel cost (a flow variable) the number of jobs that will be created or destroyed (a stock variable), depending on the sector, the above value is divided by a rounded average annual personnel cost (€25,000) and by 15 (the number of years covered by the model).

$$\Delta Emp_i = \frac{\Delta Cpers_i}{25000}/15$$

The above equation is broken down to EU manufacturers, traders and the repair sector.

The calculations do not take into account any indirect job generation in various manufacturing, retail and consumer service sectors. As European consumers will be retaining more of their spending power if average product lifetimes expand, they will be spending these savings to a large extent on the purchase other goods and services.

Business adjustment and administrative costs

This second sub-section presents the main assumptions and sources used to estimate the business costs of the policy measures, which are grouped under two categories: business adjustment and administrative costs.

Business adjustment costs

Major business adjustment costs were monetised using stakeholder information, statistical data and accompanying assumptions. The measures will impose certain one-off compliance costs upon businesses (manufacturers, traders and repairers) – in relation to companies familiarising themselves with the new rules, updating terms and conditions, product documents (e.g. information on available repair) company procedures and forms (e.g. for quotes) as well as management planning, negotiating and agree with (authorised) repair shops, setting out terms and conditions for repairs outside the current SGD remedies system, supplying repair shops with the necessary information and tools.

Recurring costs are also expected, for instance, ensuring that spare parts are available.

Most of the costs are estimated on the basis of the number of business entities (manufacturers, traders, repairers) affected, which was sourced from Eurostat with additional assumptions on the share of entities relevant for the measures; as well as the time needed per entity to carry out certain activities for adjustment (based on business survey, other impact assessments and expert judgement) and average hourly labour cost for administrative work sourced from Eurostat.

a. Manufacturers

The basic formula used for manufacturers - when the cost estimate was given on the basis of the time input required for adjustment - is as follows:

$$ADJ(man)_i = N(man)_i * \pi_i * \rho_i * t * W$$

In this equation, $N(man)_i$ is the number of entities in the manufacturing sector of interest (product category *i*), according to data sourced from Eurostat (Structural Business Statistics) and π_i is an estimated share of entities for which any consumer-policy-related measure may be applicable, reflecting the fact that many EU manufacturers are only suppliers (Tier 1, 2 or even lower) in a larger supply chain and are not affected by the administrative requirements of the measures. ρ_i is an estimate of the share of producers or products for which the specific measure is relevant (this is measure-specific, based on web search and

expert estimates), t is the average time per entity needed to carry out the adjustment tasks in question and W is the average hourly labour cost (which is obtained from Eurostat labour cost statistics and has been rounded to 50 EUR).

For mobile phone and laptops, lacking appropriate data on the number of entities or relevant shares, the calculations departed from turnover in the product category and the estimated share of the relevant administrative cost as percentage of turnover (this is calculated as the unweighted average of the remaining four product categories).

b. Traders (importers)

In many situations when the product is imported, it is the trader who will need to carry out the above adjustment tasks, or at least a certain proportion of it (it is assumed that they can transfer some of the costs to the third-country manufacturer, depending on their bargaining position). The cost for such importers/traders was estimated via extrapolation from the previously calculated costs for manufacturers:

$$ADJ(trad)_i = ADJ(man)_i * \frac{1 - e_i}{e_i} * \theta$$

Where θ is the share of adjustment costs they can not transfer to the third-country manufacturer (this is 50-100% in the model, depending on the measure) and e_i is the fraction of goods sold in the EU that was also produced in the EU, calculated for the year 2019 as follows (see sub-section b. for more explanation) :

$$e_i = Qprod(2019)_i / (Qprod(2019)_i + Qimp(2019)_i)$$

For some product categories, costs were extrapolated on the basis of their proportion of turnover.

The voluntary measures M13-M14 are not imposing any regulatory obligation on businesses, hence the business costs the incur if they join the initiatives (platform or the 'Easy repair standard') are not classified as adjustment costs.

Administrative costs

Administrative costs were monetised following the same logic as adjustment costs. However, only M9a and M9b were included in the quantification. Other measures do not impose significant administrative burdens upon businesses, as they lack noteworthy information obligations (communication: adapting company documentation/web-site to inform consumers as stipulated by the new legislation). Note that making available information on repair services or repair quotes were considered as business adjustment costs.

a. Manufacturers

The formula used for manufacturers is fully analogous to the equation used above for adjustment costs:

$$ADM(man)_i = N(man)_i * \pi_i * \rho_i * t * W$$

$N(man)_i$ is the number of entities in the manufacturing sector of interest, π_i is the estimated share of entities potentially affected by consumer-policy-related measures, ρ_i is an estimate of the share of producers or products for which the specific measure is relevant, t is the average time per entity needed to comply with the information obligations (8 h for M9a and M9b) and W is the average hourly labour cost (50 EUR).

The calculation method used the turnover in the product category and the estimated share of the relevant administrative cost as percentage of turnover for mobile phone and laptops (the unweighted average of the remaining four product categories) as above.

b. Traders (importers)

When the product is imported, the trader will be responsible for carrying out the administrative tasks. The cost for such importers/traders was estimated via extrapolation from the previously calculated costs for manufacturers:

$$ADM(trad)_i = ADM(man)_i * (1 - e_i)/e_i$$

Where e_i is the fraction of goods sold in the EU that was also produced in the EU, calculated for the year 2019 as follows (see sub-section b. for more explanation):

$$e_i = Qprod(2019)_i/(Qprod(2019)_i + Qimp(2019)_i)$$

b. Consumers

The proposed measures generally benefit consumers – to varying degrees – through increasing trust, empowering them in the decision-making process, and improve their financial position through monetary savings. These are explained below.

Consumer trust and protection

The effect on consumer trust and protection (an indicator of effectiveness) is assessed qualitatively on a scale from -5 to +5, on the basis of information obtained from expert interviews and the consumer survey.

Consumer decision-making process

For the second effectiveness criterion linked to consumers, the decision-making process, the quantified indicator chosen was the production avoided (measured in number of units) for measures under Cluster I, and the number of products additionally repaired for measures under Cluster II. This dual approach is explained by the argument that the impact of consumer decisions are reflected slightly differently across the clusters. For measures in Cluster I, more goods are repaired rather than being replaced, leading to fewer goods being produced (to serve as replacement products under the legal guarantee), hence the indicator most accurately reflecting the impact is avoided production. Under Cluster II, the consumer

decisions in question lead to repair more goods (at own cost), hence the most relevant impact indicator is that of additionally repaired products.

The formula for the number of products additionally repaired (by the consumer, or sold as refurbished good) is:

$$\Delta Qrep_i = (r1_i - r0_i) * Qsold_i$$

Where $r0_i$ is the baseline repair rate, and $r1_i$ is the new repair rate upon introduction of the measure for goods in product category *i* (more detail above in chapter 1.). $Qsold_i$ is the estimated baseline number of goods to be sold between 2023 and 2037

On the other hand, the number of products whose production is avoided is calculated in Section 3 baove on first-round effects as:

$$Qav_i = (1 - d_i)(\Delta Qrep_i - \frac{\Delta Qrep_i}{\frac{Ln_i}{Lo_i}})$$

Where Qav_i is the amount of goods produced anywhere that would have been consumed in the EU but which could be avoided as a consequence of the measure, Ln_i and Lo_i are the new and old average lifetimes of the product categories, respectively, and d_i is the rate of defects recurring directly after repair.

Consumer savings

The impact of measures on the key efficiency criterion of consumer savings is measured by the change in consumers' financial position, i.e. estimating the change in their spending on new/refurbished products and on repair. The change in repair costs affecting consumers is either a saving resulting from an extended coverage by the legal guarantee (i.e. consumers do not have to pay themselves for repair)- or additional (voluntary) expenditure on repair as the measure will induce consumers to repair defective products outside the legal guarantee more often (instead of purchasing a replacement product).

Change in purchases

Under Cluster I, consumers will not face a change in their financial position under M1 and M2, as it is assumed that the repair of defective products as remedy instead of replacement with a new one produces an equivalent outcome, not reducing the remaining consumption lifetime of the product.[14] With regard to M3 and M4 however, the extended legal guarantees result in somewhat fewer new products sold – for M3 also in a reduction in the number of refurbished goods sold. Under M7 and M8, consumers save money as with the help of the measures they will be buying more refurbished good instead of new products.

[14] The resale value decreases as a consequence of a repair (as compared to replacement with a new product) but the model does not calculate with a resale of the consumer durables repaired under the legal guarantee.

The change in purchases (a saving for consumers) is therefore expressed as the change in the value of new products bought and the change in the value of refurbished product bought (the values have opposite signs under M7 and M8a):

$$\Delta Vcons_i = Pcons_i * \Delta Qnew_i + (1 - d) * Pcons_i * \Delta Qref_i$$

In the equation above, $Pcons_i$ stands for the average retail price of product category *i*, $\Delta Qnew_i$ for the change in the volume of new products sold to European consumers (the calculation is described above), d is a discount factor for the price of refurbished products, and $\Delta Qref_i$ is the change in the number of refurbished goods sold.

For Cluster I measures, the change in the number of products sold equals the production avoided, while under Cluster II measures, the change is equal to the number of products additionally repaired.

Change in repair costs

As for businesses under Cluster I measures, the cost of additional repair that consumers will have to pay is derived from the aggregate value of the defective products that additionally repaired, and the calculated average share of repair cost as a percentage of the price of a new product, which is set at 15% (as explained above). The equation for a given product category *i* is:

$$\Delta Crep_i = 0.15 * (Pcons_i * \Delta Qrep_i)$$

Where $Crep_i$ stands for the cost of repair that consumers will have to reimburse in product category *i*, while $Pcons_i$ is the average consumer price of the product category, and $\Delta Qrep_i$ the aggregate amount that is additionally repaired. The same multiplier has been applied consistently across all the product categories.

Change in financial position - total

Consumers' financial position will change by the change in their expenditure on new or refurbished products (relevant for most measures), and additional repair costs (Cluster II measures). The formula is, accordingly:

$$\Delta FP_i = \Delta Vcons_i + \Delta Crep_i$$

c. Public administration

This section presents the main assumptions and sources used to estimate the enforcement costs of the policy measures.

Table 5 - Data sources overview

Sub-criteria / impacts	Assumptions	Sources
Enforcement costs	**FTE needed** for inspections per MS	- Assumption
	It was assumed that a minimum hours of familiarisation time would be needed for measures falling within the legal guarantee as staff are assumed to already be familiar with the provisions of the SGD (8 hours for familiarisation). For measures outside the legal guarantee, a higher number of familiarisation time was estimated (32 hours) as staff would need to get acquainted with the new instruments / provisions / functionalities.	- Assumption
	It was assumed that the average hourly labour cost was of EUR 29 per hour (based on 2021 data).	- Eurostat
	Operational inspections (per FTE) of EUR 50,000 have been assumed based on an existing impact assessment study on cooperation between national authorities responsible for the enforcement of consumer protection laws, which used the same assumption.[15] This was used to calculate the total enforcement cost (per MS and then for all EU27 MS). Based on Eurostat data on the size of economic sectors (number of businesses), it was determined the approximate share of relevant study's sector. Some sectors are more dominant on the market and enforcement costs would be higher for measures targeting companies from these sectors. Some measure concern also companies (manufacturers and sellers) that offer also repair services (M11 and M14). As there was no available data on share of businesses offering repair services, this data was taken from the business survey. The data represents the share of businesses (manufacturers and sellers) from the survey sample that offered repair services in addition to their core business model. The following shares were used to calculate enforcement costs at measure level: - Producers (manufacturers, importers) – all: **24%** - Producers (manufacturers, importers) – Ecodesign: **5%** - Sellers (traders) - all products: **68%** - Sellers (traders) - second hand: **1%**	- European Commission - Eurostat - Business survey

[15] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016SC0164

Sub-criteria / impacts	Assumptions	Sources
	- Repair services: **2%** - Manufacturers/sellers that offer repair services: **57%**	
	All measures require awareness raising. Consumers are already assumed to be aware of their rights under SGD so awareness raising costs are not expected to be higher than EUR 500,000. For new measures (outside the legal guarantee), awareness raising costs are likely to be higher as more efforts should be put into informing consumers about their new rights. A higher investment in communication is also assumed to have a positive impact on the effectiveness of the measures.	- Assumption based on available procurement data for communication activities from eTendering[16]
	Costs for platform development and maintenance are applicable only for measures 13a and 13b. Based on internal staff intelligence on these types of platforms, we assumed a minimum cost of EUR 500,000 (one-off) for the platform development and a EUR 100,000 (spread across five years) for maintenance. For M13a, this cost would be multiplied by 15 as separate platforms would be required. However, it was assumed that cost per platform at national level would be lower than the EU one due to the functionalities required (e.g., languages, national legislation checks). The costs for an average national platform would be between 30-60% less than the costs of an EU-wide platform. The centre of this range leads us to a multiplier of 14.85, which we rounded to 15.	- Assumption
	It is assumed that, at EU level, there will be a monitoring cost associated to the adoption of new measures. These costs are only applicable for measures outside the legal guarantee and that are expected to be oversaw at EU level and not that much at national level (EUR 100,000 assumed cost).	- Assumption
	It should be noted that for measures 13a, 13b and 14, costs are not linked to inspections, but rather monitoring costs needed to oversee the take-up and implementation of these (voluntary) measures.	

The detailed results of the enforcement costs calculations are provided below.

[16] https://etendering.ted.europa.eu/cft/cft-search.html

Category	Cost items and assumptions	Time period	Geo level	M1	M2	M3	M4	M7	M8a	M8b	M9a	M9b	M11	M12	M13a	M13a+	M13b	M14	Combined (M2, M9a, M11, M12, M13a, M13a+, M14)
Enforcement (one-off)	No. of familiarisation hours			8	8	8	8	8	8	8	32	32	32	32	32		32	32	
	Labour cost per hour (EU average)			29	29	29	29	29	29	29	29	29	29	29	29		29	29	
	Total familiarisation cost (per MS)	One-off	1 MS	464 €	464 €	464 €	464 €	464 €	464 €	464 €	1,856 €	1,856 €	1,856 €	1,856 €	1,856 €				7,888 €
	Total familiarisation cost (EU)	One-off	EU														1,856 €	1,856 €	1,856 €
	Total familiarisation cost (total)	One-off	EU + 27 MS	12,528 €	12,528 €	12,528 €	12,528 €	12,528 €	12,528 €	12,528 €	50,112 €	50,112 €	50,112 €	50,112 €	50,112 €	50,112 €	1,856 €	1,856 €	264,944 €
Enforcement (ongoing)	Operational (inspections) - per FTE			50,000 €	50,000 €	50,000 €	50,000 €	50,000 €	50,000 €	50,000 €	50,000 €	50,000 €	50,000 €	50,000 €	50,000 €				250,000 €
	Yearly monitoring cost (EU level)	1 year	EU								100,000 €	100,000 €	100,000 €	100,000 €			100,000 €	100,000 €	400,000 €
	Total enforcement cost (per MS)	1 year	1 MS	68,378 €	68,378 €	68,378 €	68,378 €	600 €	68,378 €	68,378 €	4,798 €	23,992 €	58,943 €	23,992 €	2,231 €		0 €	0 €	158,343 €
	Total enforcement cost (EU level)	1 year	EU	0 €	0 €	0 €	0 €	0 €	0 €	0 €	100,000 €	100,000 €	100,000 €	100,000 €	0 €		100,000 €	100,000 €	400,000 €
	Total enforcement cost	1 year	EU + 27 MS	1,846,209 €	1,846,209 €	1,846,209 €	1,846,209 €	16,195 €	1,846,209 €	1,846,209 €	229,559 €	747,793 €	1,691,465 €	747,793 €	60,245 €	60,245 €	100,000 €	100,000 €	4,675,270 €
Implementation costs	Platform development (one-off)	One-off	EU or 27 MS												7500000	375000	500000		7875000
	Maintenance (ongoing)	1 year	EU or 27 MS												1500000	150000	100000		1650000
	Awareness raising (one-off)	One-off	EU or 27 MS	500,000 €	500,000 €	500,000 €	500,000 €	500,000 €	500,000 €	500,000 €	1,000,000 €	1,000,000 €	1,000,000 €	1,000,000 €	1,000,000 €	250,000 €	1,000,000 €	1,000,000 €	2,500,000 €

Category	Cost items and assumptions	Time period	Geo level	M1	M2	M3	M4	M7	M8a	M8b	M9a	M9b	M11	M12	M13a	M13a+	M13b	M14	Combined (M2, M9a, M11, M12, M13a, M13a+, M14)
Totals	Total one-off costs (EU27 and EU level)	One-off	EU + 27 MS	512,528 €	512,528 €	512,528 €	512,528 €	512,528 €	512,528 €	512,528 €	1,050,112 €	1,050,112 €	1,050,112 €	1,050,112 €	8,550,112 €	675,112 €	1,501,856 €	1,001,856 €	10,639,944 €
	Total ongoing costs (EU27 and EU level)	15 years	EU + 27 MS	27,693,138 €	27,693,138 €	27,693,138 €	27,693,138 €	242,922 €	27,693,138 €	27,693,138 €	3,443,378 €	11,216,891 €	25,371,971 €	11,216,891 €	23,403,671 €	3,153,671 €	3,000,000 €	1,500,000 €	94,879,049 €
	TOTAL (annual average all MS and EU level)	One-off + 15 years	EU + 27 MS	28,205,666 €	28,205,666 €	28,205,666 €	28,205,666 €	755,450 €	28,205,666 €	28,205,666 €	4,493,490 €	12,267,003 €	26,422,083 €	12,267,003 €	31,953,783 €	3,828,783 €	4,501,856 €	2,501,856 €	105,518,993 €
	Annual average familiarisation per 1 MS	1 year (avg)	1 MS	31 €	31 €	31 €	31 €	31 €	31 €	31 €	124 €	124 €	124 €	124 €	124 €	0 €	0 €	0 €	526 €
	Annual enforcement cost per MS	1 year (avg)	1 MS	68,378 €	68,378 €	68,378 €	68,378 €	600 €	68,378 €	68,378 €	4,798 €	23,992 €	58,943 €	23,992 €	2,231 €	0 €	0 €	0 €	158,343 €
	Annual average implementation cost per MS	1 year (avg)	1 MS	1,235 €	1,235 €	1,235 €	1,235 €	1,235 €	1,235 €	1,235 €	2,469 €	2,469 €	2,469 €	2,593 €	76,543 €	7,099 €	0 €	0 €	86,728 €
	Annual average cost per MS	1 year (avg)	1 MS	69,644 €	69,644 €	69,644 €	69,644 €	1,865 €	69,644 €	69,644 €	7,391 €	26,585 €	61,536 €	26,709 €	78,898 €	7,099 €	0 €	0 €	245,598 €

6. Detailed assessment of impacts (at measure level)

6.1. Problem 1: Goods are not used as long as they could because they are not repaired

The tables below present the impacts for each measure considered under problem 1.

Table 6 - Repair as primary remedy (M1)

Measure
Impacts on consumers **Consumer decision making process:** Based on the expert interviews, this measure is expected to not necessarily incentivise consumers to repair more instead of replacing. However, consumers would have little to say in the decision-making process as the repair/replacement decision is based on the estimation of the price and impossibility of repair of the seller/producer. **Consumer trust and protection:** In the expert interviews, it was highlighted that this measure could entail a potential reduction in consumer trust in cases where products do not meet quality requirements from the start. If consumers are not able to replace products in these cases where seller/manufacturer is at fault, this may lower their trust as consumers and their perception that their rights are protected. **Consumer savings:** This measure would not lead to changes in consumers' financial position. The current measure of replacement under legal guarantee would be substituted by another remedy, both free of charge. The repair as a remedy needs to produce equivalent outcomes for the consumer as compared with replacement under consumer protection rules.
Impacts on businesses **Growth and investment:** In our economic model which builds upon the views of stakeholders with regard to the effectiveness of the proposed interventions, this measure leads to a reduction of production value of EUR 57.2 billion globally[17] over 15 years, which producers would have otherwise needed to manufacture and offer as replacement to consumers for free.[18] Of this amount an estimated EUR 20 billion would have been produced in the EU (this reflects the share of EU producers within all product sold in the EU derived from Eurostat PRODCOM data; this share varies significantly across product categories). The calculations depart from the projected additional number of goods repaired in seven product categories, a function of the assumed take-up rate of the measure (74.26% increase in repair offered as remedy). However, European producers would also experience additional costs as they would need to fund repair activities including the production or procurement of additional spare parts worth EUR 4.5 billion, calculated on the basis of the estimated amount of additional repair under this measure as well as the average cost of repair as proportion of the price of a new product (i.e., 15%). The savings from avoiding replacement and the additional costs of repair result in a net cost reduction of EUR 15.6 billion for EU manufacturers. While less production implies reduced GVA – and employment – on the producers' side, this has not been calculated as the production that is being reduced was unsold/uncompensated. However, the model calculates with EUR 10.0 billion worth of refurbished products that European manufacturers cannot sell on secondary markets. These products are those that would have been returned by consumers for replacement but are now repaired as an effect of the measures. A share of these returned products would have been refurbished by the producer anyway and sold at a discount (by its own distribution network or through intermediaries). This loss in revenue does not offset however the gains previously mentioned, hence enterprises' profitability will increase.

[17] All figures are extrapolated from the seven product groups investigated to all relevant consumer durables goods.

[18] This economic analysis excludes cars.

Changes in traders' margins and derived economic indicators would come from not being able to sell as many refurbished products as without the implementation of the measure. The replacement products offered to the consumers for free in the baseline scenario did not themselves generate revenue in the wholesale or retail sector. The loss of sales in the retail of refurbished products amounts to an estimated EUR 21.5 billion, assuming that all products returned by European consumers and refurbished by the seller or producer would be sold in the EU (which is not necessarily the case). The loss in GVA for traders will ultimately amount to EUR 5.8 billion.

Repair activities (whether in-house or outsourced) will increase in line with the shift from replacement to repair. The estimated volume of additional repair and the average cost of repair as proportion of the price of a new product leads to an estimate for the cost of repair for manufacturers of EUR 12.9 billion, of which EUR 4.5 billion would be paid by European producers, the rest by third-country companies. This expenditure corresponds, on the other side, to the revenues of repair services. While a portion of repair is conducted in third countries according to feedback from the business survey and market research, this is a rather small fraction which can be disregarded in this economic model. Hence all of the increased repair activities is assumed to take place in the EU. The estimated revenue translates into an additional EUR 5.0 billion in GVA produced in the sector.

Employment: This measure will lead to losses of jobs in distributive trade due to the loss of turnover in the retail trade of refurbished goods. The employment impact was calculated by assuming that personnel costs, hence the number of jobs, will change proportionate to the expected change in turnover. The likely change in the number of jobs is estimated to amount to 9,725 lost jobs in the retail of refurbished goods. On the other hand, the measure would lead to an increase of 8,438 jobs in the repair sector, compensating most of the job loss in retail. The net impact amounts to 1,287 jobs lost.

Business adjustment costs: The adjustment costs for producers under this measure will be very small, comprising of the one-off costs of affected businesses familiarising themselves with the new rules and revising their terms and conditions, procedures and forms, as well as certain ongoing costs commissioning and managing additional repairs including the delivery fees. The one-off costs were estimated to be around 88 million euro. Costs for manufacturers were calculated to be EUR 52 million: estimated by multiplying the calculated number of relevant producers (those EU manufacturers included in Eurostat's SBS data for the manufacturing sectors of interest that are at the end of the production chain – i.e. final assembly – and can reasonably offer repair as remedy for their defective products), an estimated 4 hours per entity for familiarising with new rules and another 4 hours for adjusting company procedures/relationships/forms (2 hours for shoes, garments and wooden furniture), and the average total labour cost for such administrative work (EUR 50). For entities in distributive trade (sellers that put imported goods on the market), the model extrapolated from the average adjustment cost per turnover data for producers. This rate was applied to the volume of imported goods, but a discount rate of 50% was applied which reflects the economies of scale retailers who import many different products enjoy. The estimated one-off adjustment cost for trader is thus EUR 35 million.

Ongoing adjustment costs in connection with handling repairs were estimated to reach EUR 758 million, divided between European manufacturers who handle remedies directly (EUR 227 million) and traders (importers) who act on behalf of third-country manufacturers or in their own name (EUR 531 million). This was calculated by applying a 10% surplus cost to handling repair over the projected value of repair to be ultimately borne by EU manufacturers, and 5% European importers (the assumptions here being that half of the additional cost will be successfully transferred and ultimately borne by third-country manufacturers).

Business administrative burdens: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance has been identified.

Functioning of the internal market and competition: The measure will contribute to the harmonisation of rules on the internal market and hence to fair competition with regard to remedies offered in case of defective products within the legal guarantee period.

Facilitating SMEs growth: The significance of SMEs is relatively high in the repair sector, including both independent and authorised repair shops who do outsourced work for producers or traders. The increasing revenues for repair shops under this measure will therefore benefit to a large degree SMEs. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 4.0 billion. On the other hand, SMEs account for about 51% of retail trade de in terms of the value added generated, which would correspond to a loss in GVA of EUR 2.9 billion in distributive trade for SMEs. In addition, SMEs would also benefit from around half of the EUR 15.6 billion worth of net operational production cost savings (savings from avoiding uncompensated production, reduced by additional costs for repair): they account for over 60% of the total turnover in the manufacture sectors of footwear, clothing and furniture, although only for about 20% in the manufacturing sector of mobile phones, laptops and TVs. Cost reductions from shifting remedies from

replacement to less costly repair (where feasible) therefore will also affect European SMEs to a significant extent. Adjustment costs relative to business revenues are disproportionately higher for SMEs, as most of these are more or less stable at business entity level and not proportionate to turnover. The overall balance of costs and benefits is however positive for the SME sector as a whole (although not for retailers), as the benefits from the cost reduction for producers and the increased business for repair shops outweigh the costs of implementing the measure for SMEs.
Impacts on public administration (enforcement costs) This measure requires limited familiarisation costs as market surveillance authorities are already aware of provisions of the SGD (8 hours are assumed to be needed for 2 FTE, with an assumed hourly rate for EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to sellers (traders) of all goods falling under the SGD, which is also the stakeholder group with most businesses. This has implications on costs for inspections which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the awareness raising cost is assumed to be EUR 500,000. The one-off costs are assumed to be of EUR 512,528 while the ongoing costs for a 15-years period would amount to EUR 27,693,138.
Environmental impacts (2023-2037) **Contribute to fighting climate change:** This measure is expected to increase the number of repairs within the legal guarantee. Hence, an extended average consumption lifetime of consumer goods through increased repairs and less replacement of goods is expected. This leads to a reduction in the **CO_2** equivalent emissions associated with consumption. The increased repairs correspond to 5.3 million tonnes **CO_2**-eq which represent a 11% increase in **CO_2** equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 958 million. **Fostering the efficient use of resources (renewable & non-renewable):** This measure will potentially reduce replacement rates and reduce the use of resources for production of new goods due to increased repair. The increased repairs correspond to resource savings of 0.66 million tonnes which is equal to a 13% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 342 million. **Waste production, generation and recycling:** This measure is expected to have a direct impact on reducing waste production as consumers will use their goods for a longer period. More specifically, the increased repairs correspond to waste savings of 1.05 million tonnes which translates into a 12% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 171 million.
Coherence with other EU legislation This measure is coherent with the legal framework in place and would complete provisions of the SGD, possibly through an amendment of Article 13(2) SGD and Recital 48. Implementation of this measure would not reverse the fundamental approach in awarding remedies to consumers for lack of conformity, as they would retain the right to specific performance first. This continues to aim at the preservation of the contractual relationship between the parties. However, now the SGD promotes consumers' choice of the type of specific performance. The proposed measure takes this choice away from consumers. This increases the paternalistic aspect of the legislation. The paternalistic approach may be justified by the need to protect public policy interests, incl. achieving goals of sustainable development.

Table 7 - Preference for repair in the proportionality test (M2)

Measure
Impacts on consumers **Consumer decision making process:** According to the views expressed in the expert interviews, this measure is unlikely to increase incentives for consumers to repair more from their own initiative. However, the stakeholders think that under this formulation, the measure will reduce considerably consumers' rights to request a replacement should the proportionality test recommend a repair. **Consumer trust and protection:** In the long run, this measure is likely to make repair more accepted by consumers, according to the expert interviews, as the level of experience with repairs among consumers will increase. This measure may also give a boost to the repair market which would make repair in sufficient quality more accessible also beyond the legal guarantee situations. **Consumer savings:** This measure would not lead to changes in consumers' financial position. The current measure of replacement under legal guarantee would be substituted by another remedy, both free of charge. The repair as a remedy needs to produce equivalent outcomes for the consumer as compared with replacement under consumer protection rules.
Impacts on businesses

Growth and investment: For this measure, the model built upon the stakeholder consultations assumed an uptake - and corresponding extension of product lifetimes - equal to that of M1 (74.26% increase in repair offered as remedy). Correspondingly, the number of product repairs offered as remedy instead of replacing defective products will be the same as under M1, thus the cost savings for manufacturers from avoiding the production of replacement products will also be the same: EUR 57.2 billion for manufacturer globally between 2023 and 2037, of which EUR 20 billion will be cost savings accruing to EU businesses.

From the estimated number of products repaired the model calculates the additional cost of repair which is ultimately borne by producers. This additional cost will amount to an estimated EUR 4.5 billion (this is derived from the assumption that the average cost of repair as proportion of the price of a new product is 15%). The resulting net savings amount to EUR 15.6 billion for EU manufacturers. The model does not consider changes in the GVA generated by manufacturer.

European manufacturers will not be able to sell about EUR 10.0 billion worth of refurbished products on secondary markets. This concerns products that would have been returned by consumers for replacement but are now repaired as an effect of the measures. From the business survey it is estimated that 36.5% of returned products were refurbished and sold (through its own distribution network or intermediaries) – and the average price discount has been estimated to be 50%.

As under M1, the model does not calculate with changes in the turnover of traders in connection with the change in the nature of remedies, as the reduction in the number of replacement products given to the customer free of charge does not reduce revenues for importers and retailers.

However, retailers selling previously returned, repaired and refurbished goods will lose out on revenue. As described above, 36.5% of products previously replaced but now repaired would have been refurbished and re-sold at a price discount of 50% (calculation made here at retail prices). This yields an estimate of an estimated EUR 21.5 billion in traders' margins, which corresponds to a loss in GVA for traders would ultimately amount to EUR 5.8 billion. The model assumes that all products returned by European consumers and refurbished by the seller or producer would be sold in the EU.

European businesses providing the repair services, including in-house repair at traders and manufacturers, would increase their sales by EUR 12.9 billion, which is financed by producers (note that this may also be a transfer within the same company from the production unit to a repair unit). Of this sum, EUR 4.5 is financed by European producers, the rest by third-country companies. While a portion of repair is conducted in third countries according to feedback from the business survey and market research, this is a rather small fraction which can be disregarded in this economic model. Hence all of the increased repair activities is assumed to take place in the EU. The estimated revenue translates into an additional EUR 5.0 billion in GVA produced in the sector.

Employment: This measure leads according to the model to the same amount loss of jobs as M1, affecting European retail of refurbished goods in the magnitude of 9,725 jobs. It would also lead to an increase in employment in the repair sector (8,438 jobs), compensating a large part of the job losses in production and retail. The calculated net impact is 1,287 jobs lost.

Business adjustment costs: The one-off adjustment costs for producers under this measure – including familiarising themselves with the new rules and updating their terms and conditions, processes and forms – are projected to be small (around EUR 69 million) but slightly higher than for M1 as additional preparation is needed for the justification of why repair is offered instead of replacement. This estimate comes from multiplying the calculated number of relevant producers (those EU manufacturers included in Eurostat's SBS data for the manufacturing sectors of interest that are at the end of the production chain – i.e. final assembly – and can reasonably offer repair as remedy for their defective products), an estimated 4 hours per entity for familiarising with new rules and another 6 hours for adjusting company procedures/relationships/forms (4 for shoes, garments and wooden furniture), and the average total labour cost for such administrative work (EUR 50). For entities in distributive trade (sellers that put imported goods on the market), the model extrapolated from the average adjustment cost per turnover data for producers. This rate was applied to the volume of imported goods, but a discount rate of 50% was applied which reflects the economies of scale retailers who import many different products enjoy. The estimated one-off adjustment cost for trader is EUR 35 million.

The annual ongoing costs comprise of commissioning and managing additional repairs including the delivery fees. This was estimated to be around EUR 758 million, the same as for M1. This amount is divided between producers who handle remedies directly (about EUR 227 million) and traders/importers who act on behalf of producers or in their own name (about EUR 531 million). The method of calculation was the same as for M1: applying a 10% surplus cost to handling repair over the projected value of repair to be ultimately borne by EU manufacturers, and 5% European importers (the assumptions here being that half of the additional cost will be successfully transferred and ultimately borne by third-country manufacturers).

Business administrative burdens: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance have been identified.

Functioning of the internal market and competition: The measure will contribute to the harmonisation of rules on the internal market and hence to fair competition with regard to remedies offered in case of defective products within the legal guarantee period.

Facilitating SMEs growth: The significance of SMEs is relatively high in the repair sector, including both independent and authorised repair shops who do outsourced work for producers or traders. The increasing revenues for repair shops under this measure will therefore benefit to a large degree SMEs. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 4.0 billion. On the other hand, SMEs account for about 51% of retail trade in terms of the value added generated, which would correspond to a loss in GVA of EUR 2.9 billion in distributive trade for SMEs. In addition, SMEs would also benefit from around half of the EUR 15.6 billion worth of net operational production cost savings (savings from avoiding uncompensated production, reduced by additional costs for repair): they account for over 60% of the total turnover in the manufacture sectors of footwear, clothing and furniture, although only for about 20% in the manufacturing sector of mobile phones, laptops and TVs. Cost reductions from shifting remedies from replacement to less costly repair (where feasible) therefore will also affect European SMEs to a significant extent.

Adjustment costs relative to business revenues are disproportionately higher for SMEs, as most of these are more or less stable at business entity level and not proportionate to turnover. The overall balance of costs and benefits is however positive for the SME sector as a whole (although not for retailers), as the benefits from the cost reduction for producers and the increased business for repair shops outweigh the costs of implementing the measure for SMEs.

Impacts on public administration (enforcement costs)

This measure requires limited familiarisation costs as market surveillance authorities are already aware of provisions of the SGD (8 hours are assumed to be needed for 2 FTE, with an assumed hourly rate for EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to sellers (traders) of all goods falling under the SGD, which is also the stakeholder group with most businesses. This has implications on costs for inspections which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the awareness raising cost is assumed to be EUR 500,000. The one-off enforcement costs are estimated to be of EUR 512,528 while the ongoing costs would amount to EUR 27,693,138 for a period of 15 years.

Environmental impacts (2023-2037)

Contribute to fighting climate change: This measure is expected to lead to preference for repair over replacement. An increased number of repairs leads to less products which need to be purchased new and thus leads to a reduction in the CO_2 equivalent emissions. More specifically, the increased repairs correspond to 5.3 million tonnes CO_2-eq. This represents a 11% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 958 million.

Fostering the efficient use of resources (renewable & non-renewable): This measure will potentially reduce replacement rates and reduce the use of resources for production of new goods due to repair. The increased repairs correspond to resource savings of 0.66 million tonnes which translates into a 13% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 342 million.

Waste production, generation and recycling: This measure is expected to have a direct impact on reducing waste production as consumers will use their goods for a longer period. The increased repairs realised by M2 correspond to waste savings of 1.05 million tonnes. This represents a 12% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 171 million.

Coherence with other EU legislation

This measure is coherent with the legal framework in place and would complete provisions of the SGD. The proposed measure retains consumers' choice as to how non-conforming goods should be brought into conformity, which is the current legal status quo. However, the measure limits the situations, in which consumers could exercise this choice. The application of the proportionality test has previously been contentious and various MS regulated it differently under Directive 1999/44/EC. E.g., Germany compared costs of repair and replacement to determine the disproportionality, whilst Ireland took costs of all remedies into consideration. Putz and Weber judgment of the CJEU (joined cases C-65/09 and C-87/09) also showed the distinction in results if the proportionality test was applied in its absolute vs relative sense. Article 13(2) SGD harmonised the test, clearly establishing preference for a relative proportionality test, in which only costs of repair and replacement will be compared.

Table 8 - Interruption/Suspension of the legal guarantee period (M3)

Measure
Impacts on consumers **Consumer decision making process:** The experiment has shown that the measure is suitable to shift consumer behaviour towards repair. In the behavioural experiment, the suspension (or re-start) of the guarantee period after the repair only significantly increased the likelihood of consumers to choose a repair (an increase of 12%). On the other hand, the interruption of the guarantee period for the duration of the repair did not have a significant effect on the consumer behaviour in the experiment. Based on the findings, it can be expected that benefiting from a prolonged guarantee period after the repair can motivate consumers to choose a repair, which is supported by the views expressed in the expert interviews. The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 29 million products. **Consumer trust and protection:** The measure provides additional protection of consumers with an extended guarantee period for repaired products, according to the opinions stated in the expert interviews. This can increase trust and acceptance of repairs and consequently increase the overall number of repairs that are carried out. **Consumer savings:** We estimate that slightly more consumers will decide to let their defective products be repaired in the legal guarantee period in order to take advantage of the suspension of the legal guarantee period, practically extending the duration of their guarantee. The extension of the guarantee will result in an estimated EUR 5.4 billion in consumer savings over 15 years.
Impacts on businesses **Growth and investment**: We estimate that under this measure, thanks to an induced shift towards more repair as assumed in the environment assessment (see the projected uptake of the measure, i.e., increase in repairs, equal to 12%), producers can avoid the manufacturing of products used for uncompensated replacements worth EUR 9.6 billion between 2023 and 2037 (calculated at the previously estimated average producer prices for the seven product categories, using Eurostat PRODCOM data for 2019). This estimate is already discounted by a small additional amount of uncompensated production due to the extension of the legal guarantee period in the magnitude of EUR 10 million. Producers in the EU are estimated to save EUR 3.4 billion (European manufacturers' savings is calculated from global savings by using the apparent share of EU manufacturing in Eurostat's PRODCOM dataset). Producers in the EU will however need to finance additional repair – including repairs where the original remedy was replacement and repairs during the extended legal guarantee period - in the value of about EUR 766 million. This results in net cost savings of about EUR 2.6 billion. EU producers will lose some revenue (estimated to be EUR 616 million annually) as due to the shift to repair they will not be able to re-selling previously returned and repaired/refurbished products after offering a replacement product as a remedy. This is estimated by considering the amount of replacements with new products avoided, the assumed rate of refurbishment of returned products (36.5%, based on the business survey's results) and the average price discount for refurbished goods (50%, assumption supported by web research). Due to the shift to repair (leading to avoided production calculated in the environmental assessment) and the longer legal guarantee period producers will also lose some additional customer sales. For European businesses this is estimated to reach only about EUR 387 million. While the sales figures of traders will not be directly affected by switching from replacement to repair during the legal guarantee period (as distributing replacement products free of charge to consumers did not involve revenues), they will lose some sales of new equipment due to the avoided production and the suspension of the legal guarantee, while sellers of refurbished goods will lose some business as the amount of goods returned for which replacement was requested will diminish. Retailers' margin on these lost sales is estimated to be EUR 2.7 billion, and the GVA in the sector lost is estimated to be EUR 728 million. The figures are based on the corresponding losses at the level of manufacturers as described above (measured at producer prices) and the assumed retail markup (50%). Repair service providers in Europe, including in-house repair at producers or traders will be able to grow their business by an estimated EUR 2.2 billion in additional sales paid for by the producers under the legal guarantee (ultimately financed in the model by the manufacturer) – based on the average price of repair in terms of the cost of the product (15%). The figure assumes that all of the increased repair activities will take place in the EU. The above sales estimate corresponds to an increased GVA in the sector of EUR 836 million. **Employment**: Employment will be basically unchanged under this measure: the projected net change will be a gain of 24 jobs. The sales of refurbished goods, and the small reduction in the sales of new products as a result of the suspension of the legal guarantee period is estimated to lead to 175 jobs lost in European manufacturing and 1,222 in retail. About 1,420 jobs will, on the other hand, be created by the repair sector, including sellers themselves offering in-house repairs and third-party repairers collaborating with sellers.

Business adjustment costs: The one-off adjustment costs for producers – including familiarising themselves with the new rules and updating their terms and conditions, processes and forms – are estimated at EUR 52 million). This estimate comes from multiplying the calculated number of relevant producers (those EU manufacturers included in Eurostat's SBS data for the manufacturing sectors of interest that are at the end of the production chain – i.e. final assembly – and can reasonably offer repair as remedy for their defective products), an estimated 4 hours per entity for familiarising with new rules and another 4 hours for adjusting company procedures/relationships/forms (2 for shoes, garments and wooden furniture), and the average total labour cost for such administrative work (EUR 50). For entities in distributive trade (sellers that put imported goods on the market), the model extrapolated from the average adjustment cost per turnover data for producers. This rate was applied to the volume of imported goods, but a discount rate of 50% was applied which reflects the economies of scale retailers who import many different products enjoy. The estimated one-off adjustment cost for traders is EUR 35 million.

The annual ongoing costs comprise of commissioning and managing additional repairs including the delivery fees, of additional administrative work linked to the calculation and communication of the extension of the liability period for each consumer case, and of the costs of additional remedy obligations that come from the extension of the legal guarantee period. These cost factors in total were estimated to be around EUR 2.0 billion (EUR 865 million for producers and EUR 1.2 billion for traders). The method for calculating the cost of commissioning and managing additional repairs was the same as for Measures 1 and 2: applying a 10% surplus cost to handling repair over the projected value of repair to be ultimately borne by EU manufacturers, and 5% European importers (the assumptions here being that half of the additional cost will be successfully transferred and ultimately borne by third-country manufacturers). The cost of calculating and communicating individualised extensions of liability for each case has been modelled by using the calculated number of defects over the time period concerned, an average of 1 minute administrative work for the relevant administrative task concerning the extension of the legal guarantee and EUR 50 average labour cost. The cost of additional remedies coming from the extension of the legal guarantee was calculated by assuming 0.33 years of average extension of the liability period, an assumption on the defect rate for these additional 0.33 years and the value of replacement products or repair (15%).

Business administrative burdens: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance had been identified.

Functioning of the internal market and competition: There are currently diverging national rules on the internal market with regard to the interruption or suspension of the legal guarantee period. The measure will harmonise rules there and thus take an important step towards safeguarding fair competition.

Facilitating SMEs growth: The significance of SMEs is relatively high in the repair sector, including both independent and authorised repair shops who do outsourced work for producers or traders. The increasing revenues for repair shops under this measure will therefore benefit to a large degree SMEs. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 668 million. On the other hand, SMEs account for about 51% of retail trade de in terms of the value added generated, which would correspond to a loss in GVA of EUR 370 million in distributive trade for SMEs. In addition, SMEs would also benefit from around half of the net operational production cost savings (savings from avoiding uncompensated production, reduced by additional costs for repair): they account for over 60% of the total turnover in the manufacture sectors of footwear, clothing and furniture, although only for about 20% in the manufacturing sector of mobile phones, laptops and TVs. Cost reductions from shifting remedies from replacement to less costly repair (where feasible) therefore will also affect European SMEs to a significant extent.

Adjustment costs relative to business revenues are disproportionately higher for SMEs, as most of these are more or less stable at business entity level and not proportionate to turnover. The overall balance of costs and benefits is however positive for the SME sector as a whole (although not for retailers), as the benefits from the cost reduction for producers and the increased business for repair shops outweigh the costs of implementing the measure for SMEs.

Impacts on public administration (enforcement costs)

This measure requires limited familiarisation costs as market surveillance authorities are already aware of provisions of the SGD (8 hours are assumed to be needed for 2 FTE, with an assumed hourly rate for EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to sellers (traders) of all goods falling under the SGD, which is also the stakeholder group with most businesses. This has implications on costs for inspections which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the awareness raising cost is assumed to be EUR 500,000. The one-off enforcement costs are estimated to be of EUR 512,528 while the ongoing costs would amount to EUR 27,693,138 for a period of 15 years.

Environmental impacts (2023-2037) **Contribute to fighting climate change:** This measure is expected to make repair more attractive for consumers (option of interruption or suspension of legal guarantee) and in consequence is expected to lead to more repair. Increased repairs and less replacement of goods lead to a reduction in the CO_2-equivalent emissions as less new products need to be purchased. The increased repairs correspond to 0.9 million tonnes CO_2-eq what is equal to a 2% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 161 million. **Fostering the efficient use of resources (renewable & non-renewable):** This measure will potentially increase repair and hence reduce replacement rates and thus reduce the use of resources for production of new goods. The increased repairs correspond to resource savings of 0.11 million tonnes translating into a 2% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 58 million. **Waste production, generation and recycling:** This measure is expected to have a direct impact on reducing waste production as consumers will use their goods for a longer period. The increased repairs correspond to waste savings of 0.18 million tonnes. This represents a 2% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 29 million.
Coherence with other EU legislation This measure is coherent with the legal framework in place and would complete provisions of the SGD. Currently, the SGD is silent on the impact that the timeframe during which goods are brought into conformity might have on the seller's liability period (it was left to the MS to determine this issue) hence such measure could fill that void. This measure requires amending Article 10(1) SGD, extending the timeframe of two years stipulated there, as well as Recital 41. It would benefit cross-border trade to have this measure harmonised at the European level. Introduction of the measure would necessitate removal of Recital 44 and adding a new paragraph to Article 14 SGD to that effect. No current provisions of SGD would need to be changed further to accommodate this measure. However, it should be considered whether the introduction of these measures, especially of interruption, should not be combined with adopting a maximum liability period for sellers in Article 10 SGD. E.g. if defect in consumer goods manifests 1.5 years after delivery, it is repaired and the liability period was interrupted – the consumer would be able to claim repair again if a new defect manifests 1.5 years later (and not only within the next 6 months). Following example of Article 10(2) of the Product Liability Directive (Directive 85/374/EEC) a prescription period could be adopted of 10 years from the moment of delivery under the contract for the sale of goods.

Table 9 - Extending the legal guarantee period (M4)

Measure
Impacts on consumers **Consumer decision making process:** This measure is expected to have a high impact on increasing the number of consumers that choose repair when the guarantee period is extended for the repair only. In the behavioural experiment that was carried out as part of the study, consumers had a significantly increased likelihood to choose repair under the condition of an extended guarantee period that allowed them to claim a repair beyond the current two years. The likelihood of consumers to have the product repaired increased by 21%. On the other hand, when the guarantee period is extended for both repair and replace, the likelihood to repair actually slightly decreases compared to the baseline, by 3%. The experiment results have shown that extending the guarantee period for both repair and replacement has a detrimental effect. It increases the likelihood that older products will be replaced instead of repaired (the likelihood to replace the product increased by 24% when the guarantee period was extended to cover both repair and replacement compare**d** to the scenario when neither repair nor replacement are covered). The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 5 million products. **Consumer trust and protection:** It is expected that consumers will appreciate this measure that offers some sort of security of goods functioning well over a longer period, a view that was expressed in the expert interviews. **Consumer savings:** Regardless of whether the extension of the legal guarantee will be for repair only or repair and replacement, consumers would benefit financially as this measure would relieve consumers from the financial burden of having to buy new products or let their old consumer durable repaired for at least one year. Total consumer savings are estimated to be EUR 406 million.
Impacts on businesses

Growth and investment: The model to gauge the effectiveness of the measure with regard to the extension of product lifetimes does indicate additional costs for producers originating from additional repairs during the extended legal guarantee period. This is discussed under ongoing adjustment costs below. Other effects on operational costs have not been identified. Producers will lose some revenue however (estimated to be EUR 165 million annually) as the extended legal guarantee period for repair will lead to an additional number of products being repaired free of charge, hence avoiding the production and sale of new products. The figure corresponds to a fall of EUR 58 million in sales and EUR 13 million in GVA generation for European producers.
This reduction in sale directly translates into a EUR 203 reduction in the retail margin that distributive trade would have achieved through the sale of new goods replacing defective ones which can now be repaired free of charge. The GVA in the sector lost is estimated to be EUR 55 million. The figures are based on the corresponding losses at the level of manufacturers as described above (measured at producer prices) and the assumed retail markup (50%).
Repair service providers in Europe, including in-house repair at producers or traders will be able to grow their business by an estimated EUR 349 million, paid for by the producers under the extended legal guarantee (ultimately financed in the model by the manufacturer) – based on the average price of repair in terms of the cost of the product (15%). The figure assumes that all of the increased repair activities will take place in the EU. The above sales estimate corresponds to an increased GVA in the sector of EUR 137 million.
Employment: The estimated net change in the number of jobs will be a gain of 112 jobs, according to the modelling. The diminished sales of new products as a result of the repair during the extended legal guarantee period is estimated to lead to 24 jobs lost in European manufacturing and 92 in retail. About 228 jobs will, on the other hand, be created by the repair sector, including sellers themselves offering in-house repairs and third-party repairers collaborating with sellers.
Business adjustment costs: The one-off adjustment costs for producers – including familiarising themselves with the new rules and updating their terms and conditions, processes and forms – are estimated at EUR 26 million). This estimate comes from multiplying the calculated number of relevant producers (those EU manufacturers included in Eurostat's SBS data for the manufacturing sectors of interest that are at the end of the production chain – i.e., final assembly – and can reasonably offer repair as remedy for their defective products), an estimated 2 hours per entity for familiarising with new rules and another 2 hours for adjusting company procedures/relationships/forms (1 for shoes, garments and wooden furniture), and the average total labour cost for such administrative work (EUR 50). For entities in distributive trade (sellers that put imported goods on the market), the model extrapolated from the average adjustment cost per turnover data for producers. This rate was applied to the volume of imported goods, but a discount rate of 50% was applied which reflects the economies of scale retailers who import many different products enjoy. The estimated one-off adjustment cost for traders is EUR 18 million.
The annual ongoing costs consist of the commissioning and managing additional repairs including the delivery fees, and of the costs of additional remedy obligations (repair only) that come from the additional year of legal guarantee. These cost factors in total were estimated to be around EUR 974 million (EUR 840 million for producers and EUR 134 billion for traders). The method for calculating the cost of commissioning and managing additional repairs was the same as for Measures 1-3: applying a 10% surplus cost to handling repair over the projected value of repair to be ultimately borne by EU manufacturers and 10% for European importers. The cost of additional remedies arising from the additional year of legal guarantee was calculated by assessing the expected number of repairs of defective products in the third year, based on survey data, and the value of replacement products or repair (15%).
Business administrative burdens: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance had been identified.
Functioning of the internal market and competition: National rules on the length of the legal guarantee period are not uniform. The measure will help harmonise these, contributing to the proper functioning of the internal market and the safeguarding of fair competition.
Facilitating SMEs growth: The significance of SMEs is relatively high in the repair sector, including both independent and authorised repair shops who do outsourced work for producers or traders. The increasing revenues for repair shops under this measure will therefore benefit to a large degree SMEs. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 110 million. On the other hand, SMEs account for about 51% of retail trade de in terms of the value added generated, which would correspond to a loss in GVA of EUR 28 million in distributive trade for SMEs. In addition, SMEs would also benefit from around half of the net operational production cost savings (savings from avoiding uncompensated production, reduced by additional costs for repair): they account for over 60% of the total turnover in the manufacture sectors

of footwear, clothing and furniture, although only for about 20% in the manufacturing sector of mobile phones, laptops and TVs. Cost reductions from shifting remedies from replacement to less costly repair (where feasible) therefore will also affect European SMEs to a significant extent.
Adjustment costs relative to business revenues are disproportionately higher for SMEs, as most of these are more or less stable at business entity level and not proportionate to turnover. The overall balance of costs and benefits is however positive for the SME sector as a whole (although not for retailers), as the benefits from the cost reduction for producers and the increased business for repair shops outweigh the costs of implementing the measure for SMEs.

Impacts on public administration (enforcement costs)
This measure requires limited familiarisation costs as market surveillance authorities are already aware of provisions of the SGD (8 hours are assumed to be needed for 2 FTE, with an assumed hourly rate for EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to sellers (traders) of all goods falling under the SGD, which is also the stakeholder group with most businesses. This has implications on costs for inspections which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the awareness raising cost is assumed to be EUR 500,000. **The one-off enforcement costs are estimated to be of EUR 512,528 while the ongoing costs would amount to EUR 27,693,138 for a period of 15 years.**

Environmental impacts (2023-2037)
Contribute to fighting climate change: This measure is expected to influence the perception of lifetime and hence motivating consumers to keep a product longer. The perception of a longer lifetime might also lead to increased repairs and less replacement of goods. The increased repairs correspond to 0.1 million tonnes CO_2-eq which translates into a 0.3% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 26 million.
Fostering the efficient use of resources (renewable & non-renewable): This measure will increase repair and thus reduce replacement rates and reduce the use of resources for production of new goods. The increased repairs correspond to resource savings of 0.02 million tonnes which is equal to a 0.3% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 9 million.
Waste production, generation and recycling: This measure is expected to have a direct impact on reducing waste production as consumers will use their goods for a longer period. The increased repairs correspond to waste savings of 0.03 million tonnes. This represents a 0.31% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 4 million.

Coherence with other EU legislation
This measure is coherent with the legal framework in place and would complete provisions of the SGD. This measure requires amending Article 10(1) SGD, extending the timeframe of two years stipulated there, as well as Recital 41.

Table 10 - Right to repair (M9a – only Ecodesign products)

Measure
Impacts on consumers **Consumer decision making process:** This measure would potentially increase the likelihood of consumers to choose to repair defective products instead of replacing them. The results of the experiment show that price information is particularly important for consumers and the willingness of consumers to choose repair decreases by 45% if this information is missing. The conjoint analysis has shown that the difference by price has by far the greatest effect on consumers preference for different repair options. The relative importance of price versus other factors is around 70%. If we compare the preference of consumers to repair under favourable conditions of a right to repair with the baseline scenario, we see an average increase by 12.1% of consumer's likelihood to have the product repaired. The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 31 million products. **Consumer trust and protection:** The measure requires awareness of consumers of this right, also some sort of guarantee on the repaired goods needs to be provided in order to reinforce consumers' trust in repair. According to the expert interviews, such a right would empower consumers and improve compliance of industries with the eco-design requirements as pressure would be twofold: from the surveillance authorities and consumer complaints. Moreover, this measure could represent a considerable deterrent for companies to create non-compliant goods.

Consumer savings: This measure is shown to benefit consumers due to the better availability of repair outside the legal guarantee. However, the monetizable consumer welfare would depend on consumers' willingness to use this right and hence buy less products. The model used for assessment of impacts results in expected consumer savings of EUR 39.2 billion between 2023 and 2037, comprising of a reduction in the purchase of new products (EUR 46.2 billion) but also an increase in repair costs (of about EUR 6.9 billion).

Impacts on businesses

Growth and investment: An increased volume of repair of defective products – outside the legal guarantee - would not bring cost saving benefits to manufacturers but a disadvantage as economic activity and profit linked to the production of new products will be lost. This is understood to concern their production activities, not their additional in-house repair activities: gains in repair activities are discussed below. As the measure addresses defects outside the legal guarantee period, or defects that appear during the legal guarantee period but are not covered by the SGD, the producers or traders are not obliged to repair or replace the products. The increased repair projected by the model (by 42.5 %) would come to the detriment of producers' ability to sell the consumers new products. Producers will therefore lose revenue from their reduced product sales worth EUR 4.5 billion between 2023 and 2037, at constant prices. European manufacturers would lose EUR 990 million, corresponding to EUR 195 million in GVA (the figures already include increased revenues from selling spare parts used in repair).

Under this measure, traders in Europe would also lose some of their turnover. With less new products sold, the retail margin would shrink by EUR 5.1 billion, which is associated with a drop of EUR 1.4 billion in GVA.

The repair sector will be able to very significantly increase its activities, with a calculated EUR 6.9 billion additional sales paid for by consumers. This estimate corresponds to an increased GVA in the sector of about EUR 2.3 billion. Note that this – as for other measures - also covers the in-house repair activities of manufacturers as well as possible licence fees of from outsourcing repair to third-party suppliers (the GVA produced includes the economic value from which such financial obligations have to be met).

Employment: This measure could boost employment in the repair sector by 4,566 jobs according to our model. However, direct employment losses are expected in European manufacturing (342) as well as retail (2,296) due to the reduction of sales of new products as a consequence of increased repairability. The net impact is estimated to be a gain of 1,928 jobs – note that this estimate does not take into account indirect job generation enabled by the purchasing power retained at the consumer, which will translate (partly) into the purchase of other goods or services.

Business adjustment costs: The measure will only impose minimal one-off compliance costs of about EUR 8 million on producers or traders. While the costs per entity are higher here than for Measures 1-4, the number of relevant European manufacturers of products (those EU manufacturers included in Eurostat's SBS data for the manufacturing sectors of interest that are at the end of the production chain – i.e. final assembly – and whose products are repairable) under the Ecodesign directive is rather small. The adjustment tasks considered include: entities familiarising themselves with the new rules (4 hours), planning implementation (own repair services, sub-contracting independent repairers etc.) (12 hours), and adjusting company procedures/forms (4 hours). The calculated total time needed for the adjustment tasks is multiplied with the average total labour cost for such administrative work (EUR 50). For entities in distributive trade (sellers that put imported goods on the market), the model extrapolated from the average adjustment cost per turnover data for producers. This rate was applied to the volume of imported goods, but a discount rate of 75% was applied which reflects the economies of scale retailers who import many different products enjoy, as well as their likely options to transfer costs to third-country manufacturers.

The annual ongoing costs comprise of commissioning and managing additional repairs including the delivery fees. This was estimated to be around **EUR 582 million** (extrapolated figure). The method of calculation with regard to manufacturers is the same as for earlier measures: applying a 10% surplus cost to handling repair over the projected value of repair to be ultimately borne by EU manufacturers. The relatively low figure takes into account that the production of goods in the EU falling under the Eco-design directive is rather moderate, and that a large part of manufacturers already meets most requirements linked to the Right to repair.

Business administrative burdens: A minor one-off administrative cost of about EUR 70 million will accrue to European businesses in connection with related information obligations. The time per entity for the necessary communication activities - adapting company documentation/web-site to inform consumers is estimated at 8 hours.

Functioning of the internal market and competition: The measure would set up a new legal instrument which could pre-empt divergence in national laws in the future, therefore harmonising the rules on the internal market.

Facilitating SMEs growth: The significance of SMEs is relatively high in the repair sector, including both independent and authorised repair shops who do outsourced work for producers or traders. The increasing revenues for repair shops under this measure will therefore benefit to a large degree SMEs.

According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 1.8 billion. On the other hand, SMEs account for about 51% of retail trade de in terms of the value added generated, which would correspond to a loss in GVA of EUR 696 million in distributive trade for SMEs.
Adjustment costs relative to business revenues are disproportionately higher for SMEs, as most of these are more or less stable at business entity level and not proportionate to turnover. The overall balance of costs and benefits is however positive for the SME sector as a whole (although not for retailers), as the benefits from the cost reduction for producers and the increased business for repair shops outweigh the costs of implementing the measure for SMEs.

Impacts on public administration (enforcement costs)
This measure requires higher familiarisation costs as market surveillance authorities would need to deal with a new instrument (32 hours are assumed to be needed for 2 FTE, with an assumed hourly rate for EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to producers (importers) of Eco-design goods falling. This has implications on costs for inspections which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the awareness raising cost is assumed to be EUR 1,000,000 as more efforts are assumed to be needed in making consumers aware of their new rights. The one-off enforcement costs are estimated to be of EUR **1,050,112** while the ongoing costs would amount to EUR **3,443,378** for a period of 15 years.

Environmental impacts (2023-2037)
Contribution to fighting climate change: This measure is expected to influence the perception of lifetime and hence motivating consumers to keep a product longer. The perception of a longer lifetime might also lead to increased repairs and less replacement of goods. The increased repairs correspond to 3.2 million tonnes CO_2-eq translating into a 7% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 570 million.
Fostering the efficient use of resources (renewable & non-renewable): This measure will increase repair and thus reduce replacement rates and reduce the use of resources for production of new goods. The increased repairs correspond to resource savings of 0.16 million tonnes which is equal to a 3% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 32 million.
Waste production, generation and recycling: This measure is expected to have a direct impact on reducing waste production as consumers will use their goods for a longer period. The increased repairs correspond to waste savings of 0.18 million tonnes. This represents a 2% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 30 million.

Coherence with other EU legislation
This measure is coherent with the legal framework in place**,** and it usefully fulfils a gap in the European legal framework. Currently, consumers must seek remedies for defective products outside the legal guarantee by themselves (or seek remedies though commercial guarantees, provided that they had purchased one). This measure would provide consumers with additional rights and protection. Furthermore, the obligation would apply only to product categories for which eco-design requirements exist or will be adopted in the coming years. In this way, the consumer's right to repair will be limited in scope and but be practically possible in practice, thanks to the legal instruments on the supply side, which establish the range of spare parts to be made available and the minimum periods of their availability for specific product categories.
This measure would require the adoption of a new provision, however, in consideration on its impact on Article 17 SGD on commercial guarantees. Currently, sellers may offer consumers additional guarantees that would provide consumers also with a right to repair extending beyond the timeframe of a legal guarantee period or applying in situations when legal guarantee would not apply (e.g.**,** when consumers contributed to the occurrence of a defect).
This measure could further increase consumer awareness about their right to repair and would complement the recently adopted Directive on Empowering Consumers for the Green Transition (adopted in March 2022) which amends the Consumer Rights Directive to ensure that consumers are provided with better information on the existence of commercial guarantees and their duration and coverage.

Table 11 - Right to repair (M9b – all products)

Measure
Impacts on consumers

Consumer decision making process: This measure would potentially increase the likelihood of consumers to choose to repair defective products instead of replacing them. The results of the experiment show that price information is particularly important for consumers and the willingness of consumers to choose repair decreases by 45% if this information is missing. The conjoint analysis has shown that the difference by price has by far the greatest effect on consumers' preference for different repair options. The relative importance of price compared to other factors, such as the duration of the repair, the shipping and handling, and the assignment of responsibility to either vendor, producer or a third party, is around 70%. If we compare the preference of consumers to repair under realistic conditions of a right to repair with the baseline scenario, we see an increase of 15.2% in consumer's likelihood to have the product repaired.

The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 190 million products.

Consumer trust and protection: To be effective, the measure requires awareness of consumers of this right. Also, some sort of guarantee on the repaired goods needs to be provided in order to reinforce consumers' trust in repair. According to the expert interviews, such a right would empower consumers and improve compliance of industries with the eco-design and related requirements as pressure would be twofold: from the surveillance authorities and consumer complaints. This applies only if the 'Right to repair' is linked to a standard, such as eco-design requirements. Moreover, this measure could represent a considerable deterrent for companies to create non-compliant goods.

Consumer savings: This measure is shown to benefit consumers due to the better availability of repair outside the legal guarantee. The model used for assessment of impacts results in expected consumer savings of EUR 79.9 billion, which is comprised of a reduction in the purchase of new products worth EUR 94 billion, but an increase of repair expenditure of EUR 14.1 billion. This is higher than under M9a which only covers Eco-design products.

Impacts on businesses

Growth and investment: An increased volume of repair of defective products (not only under the Ecodesign directive) – outside the legal guarantee - would not bring cost saving benefits to manufacturers but a disadvantage as economic activity and profit linked to the production of new products will be lost. This is understood to concern their production activities, not their additional in-house repair activities: gains in repair activities are discussed below. As the measure addresses defects outside the legal guarantee period, or defects that appear during the legal guarantee period but are not covered by the SGD, the producers or traders are not obliged to repair or replace the products. The increased repair projected by the model (by 42.5 %) would come to the detriment of producers' ability to sell the consumers new products. Producers will therefore lose revenue from their reduced product sales worth EUR 6.4 billion between 2023 and 2037, at constant prices. European manufacturers would lose EUR 2.0 billion, corresponding to EUR 473 million in GVA (the figures already include increased revenues from selling spare parts used in repair).

Under this measure, traders in Europe would also lose some of their turnover. With less new products sold, the retail margin would shrink by EUR 8.1 billion, which is associated with a drop of EUR 2.2 billion in GVA.

The repair sector will be able to very significantly increase its activities, with a calculated EUR 14.1 billion additional sales paid for by consumers. This estimate corresponds to an increased GVA in the sector of about EUR 5.5 billion. Note that this – as for other measures - also covers the in-house repair activities of manufacturers as well as possible licence fees of from outsourcing repair to third-party suppliers (the GVA produced includes the economic value from which such financial obligations have to be met).

Employment: This measure could boost employment in the repair sector by 9,317 jobs according to our model. However, direct employment losses are expected in European manufacturing (865) as well as retail (3,657) due to the reduction of sales of new products as a consequence of increased repairability. The net impact is estimated to be a gain of 4,795 jobs – note that this estimate does not take into account indirect job generation enabled by the purchasing power retained at the consumer, which will translate (partly) into the purchase of other goods or services.

Business adjustment costs: The measure will impose one-off compliance costs of about EUR 506 million on producers (extrapolated figure). As for M9a, the adjustment tasks considered for the calculation include: entities familiarising themselves with the new rules (4 hours), planning implementation (own repair services, sub-contracting independent repairers etc.) (12 hours), and adjusting company procedures/forms (4 hours). The calculated total time needed for the adjustment tasks is multiplied with the average total labour cost for such administrative work (EUR 50). The number of entities concerned is however much larger than under Measure 9a as not only products under the Ecodesign directive are affected.

For entities in distributive trade (sellers that put imported goods on the market), the model extrapolated from the average adjustment cost per turnover data for producers. This rate was applied to the volume

of imported goods, but a discount rate of 75% was applied which reflects the economies of scale retailers who import many different products enjoy, as well as their likely options to transfer costs to third-country manufacturers. The estimated one-off adjustment cost for traders is EUR **169** million.
Annual ongoing costs comprise of commissioning and managing additional repairs including the delivery fees. This was estimated to be around EUR 3.3 billion. The method of calculation with regard to manufacturers is the same as for Measure M9a and earlier measures: applying a 10% surplus cost to handling repair over the projected value of repair to be ultimately borne by EU manufacturers. The result is considerably larger than for M9a as it concerns all goods.
Business administrative burdens: A minor one-off administrative cost of about EUR 162 million will accrue to European businesses – manufacturers and importers – in connection with related information obligations. The time per entity for the necessary communication activities (adapting company documentation/web-site to inform consumers) is estimated to be 8 hours.
Functioning of the internal market and competition: The measure would set up a new legal instrument which could pre-empt divergence in national laws in the future, therefore harmonising the rules on the internal market.
Facilitating SMEs growth: The significance of SMEs is relatively high in the repair sector, including both independent and authorised repair shops who do outsourced work for producers or traders. The increasing revenues for repair shops under this measure will therefore benefit to a large degree SMEs. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 4.1 billion. On the other hand, SMEs account for about 51% of retail trade de in terms of the value added generated, which would correspond to a loss in GVA of EUR 1.1 billion in distributive trade for SMEs.
Adjustment costs relative to business revenues are disproportionately higher for SMEs, as most of these are more or less stable at business entity level and not proportionate to turnover. The overall balance of costs and benefits is however positive for the SME sector as a whole (although not for retailers), as the benefits from the cost reduction for producers and the increased business for repair shops outweigh the costs of implementing the measure for SMEs.

Impacts on public administration (enforcement costs)
This measure requires higher familiarisation costs as market surveillance authorities would need to deal with a new instrument (32 hours are assumed to be needed for 2 FTE, with an assumed hourly rate for EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to producers (importers) of all products. This has implications on costs for inspections which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the awareness raising cost is assumed to be EUR 1,000,000 as more efforts are assumed to be needed in making consumers aware of their new rights. **The one-off enforcement costs are estimated to be of EUR** 1,050,112 **while the ongoing costs would amount to EUR** 11,216,891 **for a period of 15 years.**

Environmental impacts (2023-2037)
Contribution to fighting climate change: This measure is expected to influence the perception of lifetime and hence to motivate consumers to keep a product longer. The perception of a longer lifetime might also lead to increased repairs and less replacement of goods. The increased repairs correspond to 5.7 million tonnes CO_2-eq and represent a 12% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 1,020 million.
Fostering the efficient use of resources (renewable & non-renewable): This measure will increase repair and thus reduce replacement rates and reduce the use of resources for production of new goods. The increased repairs correspond to resource savings of 0.58 million tonnes translating into a 12% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 341 million.
Waste production, generation and recycling: This measure is expected to have a direct impact on reducing waste production as consumers will use their goods for a longer period due to increased repair. The increased repairs correspond to waste savings of 1.02 million tonnes which represent a 12% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 167 million.

Coherence with other EU legislation
This measure is coherent with the legal framework in place**,** and it usefully fulfils a gap in the EU legal framework. Currently, consumers must seek remedies for defective products outside the legal guarantee without any additional legislative mandate (or seek remedies though commercial guarantees, provided that they had purchased one). This measure would provide consumers with additional rights and protection.
This measure would require an adoption of the new provision, however, in consideration on its impact on Article 17 SGD on commercial guarantees. Currently, sellers may offer consumers additional

guarantees that would provide consumers also with a right to repair extending beyond the timeframe of a legal guarantee period or applying in situations when legal guarantee would not apply (e.g., when consumers contributed to the occurrence of a defect).
This measure could further increase consumer awareness about their right to repair and would complement the recently adopted Directive on Empowering Consumers for the Green Transition (adopted in March 2022) which amends the Consumer Rights Directive to ensure that consumers are provided with better information on the existence of commercial guarantees and their duration and coverage.

Table 12 - Issuing a repair quote (M11)

Measure
Impacts on consumers **Consumer decision making process:** The costs for the diagnosis of the defect may prevent consumers currently to commission a repair. The results of the consumer survey showed that 43% of consumers that experienced a product defect had the product repaired or repaired it themselves. Among those who did not repair, 11% mentioned that it was not possible to estimate the costs of the repair as a reason why they did not have their product repaired. The behavioural experiment that was conducted as part of this study showed that this policy measure has the potential to remove this obstacle and encourage consumers to have defective products repaired. Under the condition that the repair quote is free, 85.3% of consumers would commission the diagnosis of the product defect. With increasing price for the repair quote, the share of consumers who would do so would continuously decrease. In the group that received a repair quote for 15% of the product/repair price, only 40.2% would commission the diagnosis. If the costs for the repair quote were capped at 5% of the product price, the overall likelihood among the participants of the behavioural experiment to purchase a repair increased by 13.4%. The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 168 million products. **Consumer trust and protection:** Providing information about duration of repair, quality standards and costs can improve perception of convenience as well as perception a fair bargain for the repair activities. This measure can reassure consumers about repair content and costs associated. It will promote transparency of repair costs in the market and hence economic operators might be forced to reduce their prices due to competition. Furthermore, the measure can create a boost for the repair market. In the experiment, when the diagnosis price was set at 15% of the product price, the share of those who would not initially commission the diagnosis but decide to repair after receiving a free repair quote, was overall 35% of the participants in this group. This illustrates the magnitude by which the numbers of repairs would increase, if repair quotes were provided for free or at a fixed lower cost for consumers. **Consumer savings:** This measure would lead to higher consumer welfare via making repair more accessible and attractive, hence reducing consumer spending on new products. Total savings for consumers are estimated by our model to reach EUR 70.5 billion in the 15 years between 2023 and 2037, which is the result of savings worth EUR 82.9 billion from avoiding the purchase of new product, and additional expenditures worth EUR 12.4 billion on repairs.
Impacts on businesses **Growth and investment**: The measure, as it will make repair more accessible to consumer due to better information on the costs and duration of repairs, will lead to an increase in repair activity (benefitting the sector) and correspondingly to a loss of revenues and GVA for producers and traders. An increased volume of repair of defective products, on the other side, will reduce the production and sales volume of new products (bought by consumers as replacement). This is a disadvantage to manufacturers and traders as economic activity and profit linked to the production and sales of new products will be lost. The projected increased repair rate (an uptake by 13.4 %) will lead to a reduction in production worth EUR 5.7 billion between 2023 and 2037, at constant prices. European manufacturers would lose EUR 1.7 billion, corresponding to EUR 417 million in GVA (the figures already include increased revenues from selling spare parts used in repair). Traders in the EU will similarly lose business. With less new products sold, their retail margin would shrink by EUR 7.1 billion, which is associated with a drop of EUR 1.9 billion in GVA. On the other side, the repair sector will increase its sales by EUR 12.4 billion paid for by consumers. This estimate corresponds to an increased GVA in the sector of about EUR 4.8 billion. As for other measures, this amount includes in-house repair activities of manufacturers as well as licenced repair shops and independent third-party repairers. **Employment**: If this measure is to be implemented, it is estimated to have a rather large impact on employment, given the expected high take-up rate. It would give more information to those consumers who are already willing to use repair services and actively search for such. The model estimates an

increase by 8.213 jobs in the repair sectors. Losses in EU manufacturing amount to an estimated 763 jobs, and employment is expected to decrease among traders by 3,224 jobs, leading to a net loss of gain of 4,227. The estimates do not take into account indirect job generation enabled by the purchasing power retained at the consumer, which will translate (partly) into the purchase of other goods or services.

Business adjustment costs: The measure will impose a moderate one-off adjustment cost of about EUR 475 million on repairers (no costs for manufacturers or traders). These businesses will need to learn the new rules (assumed to be 4 hours per relevant entity) and to introduce standardised form of the quote into the company documentation and web-site (an average of 16 hours per entity). The calculated total time needed for the adjustment tasks is multiplied with the average total labour cost for such administrative work (EUR 50).

The annual ongoing costs comprise of issuing repair quotes. It was assumed based on supporting desk research that with automation and economies of scale this could be a small fraction only of the actual repair cost - about 2.5% on average (5% for shoes, garments and wooden furniture). It was furthermore assumed that the number of quotes issued is twice the number of repairs that will indeed be commissioned. A further assumption concerned the proportion of repair shops that do not issue such standardised quotes yet. Altogether, these ongoing adjustment costs were estimated to amount to EUR 5.9 billion.

Business administrative burdens: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance had been identified.

Functioning of the internal market and competition: The measure would set up a new legal instrument which could pre-empt divergence in national laws in the future, therefore harmonising the rules on the internal market.

Facilitating SMEs growth: The measure is positive for SMEs growth as it significantly facilitates growth in the repair sectors where SMEs play a larger role than in the overall economy. The increasing revenues for repair shops under this measure will therefore benefit to a large degree SMEs. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 3.9 billion. On the other hand, SMEs account for about 51% of retail trade de in terms of the value added generated, which would correspond to a loss in GVA of EUR 977 million in distributive trade for SMEs.

This outweighs the negative impacts on SMEs in manufacturing, where producers will face a loss of business due to more repairs, and the adjustment costs which affect SMEs more relative to turnover than large enterprises.

Impacts on public administration (enforcement costs)

This measure requires higher familiarisation costs as market surveillance authorities would need to deal with a new instrument (32 hours are assumed to be needed for 2 FTE, with an assumed hourly rate for EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to repair services and producers/sellers with in-house repair facilities. This has implications on costs for inspections which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the awareness raising cost is assumed to be EUR 1,000,000 as more efforts are assumed to be needed in making consumers aware of their new rights. The one-off enforcement costs are estimated to be of EUR 1,050,112 while the ongoing costs would amount to EUR 25,371,971 for a period of 15 years.

Environmental impacts (2023-2037)

Contribution to fighting climate change: This measure is expected to increase the predictability of repair costs and results. A higher predictability might increase trust in repair services and thus increase the number of repairs and decrease the number of replacements. In this case, environmental savings can be realised as less new products need to be purchased and produced. Less new products directly lead to CO_2 and CO_2 equivalent savings which contributes to the fight against climate change. The increased repairs correspond to 5.0 million tonnes CO_2-eq and represent a 10% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 899 million.

Fostering the efficient use of resources (renewable & non-renewable): This measure will increase repair and hence reduce replacement rates and reduce the use of resources for production of new goods. The increased repairs correspond to resource savings of 0.51 million tonnes which translate into a 10% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 301 million.

Waste production, generation and recycling: As the measure is expected to make repair costs and results more transparent and thus more attractive, consumers might repair more and purchase less new goods. If this is the case, the reduced number of purchased and produced goods will lead to a decrease in waste amounts generated in the future. The increased repairs correspond to waste savings of 0.9 million tonnes. This represents a 10% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 147 million.

Coherence with other EU legislation
This measure is coherent with the legal framework in place and would complement legislation that aims at improving transparency and information provision to consumers. Repair outside the legal guarantee due to (among others) lack of information about the repair price and duration is currently not covered by any of the existing legal instruments. This measure would ensure that consumers are equipped with all the necessary information that helps them in their decision to repair or not.
The adoption of a new information right would require adjustment of Consumer Rights Directive (Directive 2011/83/EU), Articles 5, 6, 7 and 8. Adding the new information right to this legal instrument would keep all the consumer information rights in one legal instrument. Further, if the repair quote is included in the scope of the information rights under the CRD, consumers would benefit from sanctions following from a breach of the imposed obligation (following amendments from Directive (EU) 2019/2161). However, the SGD could specify that sellers or producers have an obligation to provide this repair quote. This likely requires adjustment of Article 14 SGD.

Table 13 - Obligation to inform where to repair (M12)

Measure
Impacts on consumers **Consumer decision-making process:** While this measure does not directly increase the likelihood of consumers to choose a repair, it may however have the effect of removing barriers created by lack of information and search costs for consumers. In the behavioural experiment, a considerable share of those who were exposed to a lack of information in regard to their repair options and that were not willing to commission the repair or search for missing information, chose to repair their defective product, once missing information was presented to them (in the experiment, this group accounted for 2.9% of all participants). The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 25 million products. **Consumer trust and protection:** The measure is suitable to have a positive impact on consumer trust in repair services, especially if the manufacturers recommend those they are in close contact with. While it does not directly increase consumer protection, it can however protect consumers from untrustworthy repair shops delivering poor repair quality, since these shops will not be listed by the manufacturers. Additionally, this measure potentially contributes to an increase of consumer trust in repair services (particularly those that are listed by the producers). It can help to bridge the gap between consumers and suppliers of repair services, as this information makes consumers aware that these offers exist. **Consumer savings:** This measure is expected to result in consumer savings worth EUR 10.5 billion over 15 years. This figure is composed of savings from avoiding the purchase of new products in the value of EUR 12.4 billion and additional expenditure on repairs worth EUR 1.9 billion.
Impacts on businesses **Growth and investment**: As missing information on repair services has been confirmed in the consumer experiment to be indeed a barrier, we expect a small expansion of repair activities outside the legal guarantee period, and consequently a reduction of production, albeit relatively modest. The environmental assessment calculates with an increase in repair rates of 2%. The model calculates with a moderate loss of sales for manufacturers worth EUR 849 million, and EUR 257 for EU manufacturers leading to a loss of EUR 62 million in GVA. For traders, the loss from selling fewer new products is projected to amount to EUR 1.1 billion (EUR 287 million loss in GVA). The measure is expected to moderately increase repair volumes and GVA generated in the repair sector: an additional sale of EUR 1.9 billion, which corresponds to EUR 723 million in GVA. It should be noted that this includes in-house repair activities of companies that are also manufacturers and/or traders. **Employment**: If this measure is to be implemented, it is estimated to have a moderate impact on employment. The model estimates an increase by 1,226 jobs in the repair sectors. Losses in EU manufacturing amount to an estimated 114 jobs, and employment is expected to decrease among traders by 1,226 jobs, leading to a net loss of gain of 631. The estimates do not take into account indirect job generation enabled by the purchasing power retained at the consumer, which will translate (partly) into the purchase of other goods or services. **Business adjustment costs**: The measure will impose a moderate one-off adjustment cost of about EUR 60 million on manufacturers and EUR 46 million to traders. This includes learning about the new rules (assumed to be 2 hours per relevant entity) and to adjust company documentation/web-site to provide information on repair networks (an average of 8 hours per entity). The calculated total time

needed for the adjustment tasks is multiplied with the average total labour cost for such administrative work (EUR 50).
The annual ongoing costs comprise of updating the information, which is assumed to occur on average every 4 years and would take 4 hours to undertake. Altogether, these ongoing adjustment costs were estimated to amount to EUR 91 million for manufacturers and EUR 69 million for importers.
Business administrative burdens: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance had been identified.
Functioning of the internal market and competition: The measure would contribute to the further harmonisation of rules on the internal market, as information on repair services available is already widespread for certain product categories and in certain jurisdictions. The information provided, depending on the product category, may only include repair services in the country of the seller, hence this may even dissuade consumers to buy cross-border.
Facilitating SMEs growth: Similarly to M9 and M11, the measure is seen as being somewhat facilitating SMEs growth, as it significantly helps the growth of the repair sector, where SMEs have a larger market share than in the business economy overall: according to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 578 million. On the other hand, SMEs account for about 51% of retail trade de in terms of the value added generated, which would correspond to a loss in GVA of EUR 146 million in distributive trade for SMEs. This positive effect outweighs the negative impacts on SMEs in manufacturing and trade, where companies will face a loss of business due to the reduced sale of new products, as well as regarding the (otherwise small) adjustment costs, which impose a larger cost on SMEs relative to their turnover or GVA than large enterprises.

Impacts on public administration (enforcement costs)
This measure requires higher familiarisation costs than others as market surveillance authorities would need to deal with a new instrument (32 hours are assumed to be needed for 2 FTE, with an assumed hourly rate of EUR 29, the EU average). Operational inspections per FTE are assumed to cost EUR 50,000. This measure applies to producers (importers) of Ecodesign products. This has implications on costs for inspections, which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the awareness raising cost is assumed to be EUR 1,000,000 as more efforts are assumed to be needed in making consumers aware of their new rights. The one-off enforcement costs are estimated to be of EUR 1,050,112 while the ongoing costs would amount to EUR 11,216,891 for a period of 15 years.

Environmental impacts (2023-2037)
Contribution to fighting climate change: As mentioned above, this measure aims at increasing transparency and trust in repair and to empower customers to decide for repair. However, the decision for repair still depends on the consumers' willingness to repair. Hence, the repair rate and related CO_2 savings increase moderately. More specifically, the increased repairs correspond to 0.7 million tonnes CO_2-eq. This represents a 2% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 134 million.
Fostering the efficient use of resources (renewable & non-renewable): This measure increases repair and thus replacement rates and the use of resources for the production of new goods are reduced. As this measure only partly tackles the willingness of consumer to repair, the repair increase and related resource savings are moderate. The increased repairs correspond to resource savings of 0.08 million tonnes which represent a 2% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 45 million.
Waste production, generation and recycling: Waste is avoided in the future when less products are newly purchased in the present, which can be achieved with increased repair rates. As this measure only partly tackles the willingness of consumers to repair, the repair increase and related waste savings are moderate. The increased repairs correspond to waste savings of 0.13 million tonnes. This represents a 2% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 22 million.

Coherence with other EU legislation
This measure builds on a precedent in the regulatory framework, namely on the Commission Regulation (EU) 2019/2022 of 1 October 2019 laying down Ecodesign requirements for household dishwashers pursuant to Directive 2009/125/EC of the EP and of the Council amending Commission Regulation (EC) No 1275/2008 and repealing Commission Regulation (EU) No 1016/2010 (Text with EEA relevance), Annex II, point 6 (14): 'User and installer instructions shall be provided in the form of a user manual on a free access website of the manufacturer, importer or authorised representative, and shall include… how to access professional repair (internet webpages, addresses, contact details)'. However, in order to avoid overlaps with existing sectoral provisions, a new instrument should exclude existing requirements**,** or the existing requirements should be extended to other sectors.

Table 14 - Platform with information on available repair services (M13a – national level)

Measure
Impacts on consumers **Consumer decision-making process:** A systematic price comparison as suggested by this measure can improve the decision-making process of consumers, by allowing them to take an informed decision. As the behavioural experiment has shown, the lack of information can create a barrier for consumers to choose repair. This is especially the case with regard to price information, which, when lacking, decreased the likelihood of consumers to choose a repair by 45%. While this measure does not per se increase consumers' willingness to repair, it can remove obstacles for consumers to choose to do so by increasing the convenience of repair. It may also increase the number of consumers that are comfortable switching providers, when having more information available. The experiment has shown that the share of participants that would commission a repair can increase by at least 2.9% by lowering the lack of information barrier for consumers who are not willing to search for missing information. In a scenario where no information at all is initially available to consumers, this share was 5.7%. The platform can be expected to have even more positive effects and to increase the willingness to take up repairs further, by generating information that was not available on the market before. The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 84 million products (with 8 million more if the functionality on refurbished goods is considered). **Consumer trust and protection:** The measure may have the potential to increase consumer trust in repair services, as it can increase transparency in the market and the information available to consumers about repair offers and their quality. While it would not increase consumer protection, it can potentially provide a positive effect for the market and, by doing so, increase the quality of repairs that consumers can find on the market and bolster their trust. **Consumer savings:** Although difficult to quantify, consumers interested in having their goods repaired might save time and money as they can compare various offers available on the market and make an informed purchasing decision. According to our model, this measure will ultimately result in net consumer savings worth EUR 35.2 billion, which comes from a EUR 41.4 billion reduction in the purchases of new products and an additional expenditure on repairs worth EUR 6.2 billion between 2023 and 2037.
Impacts on businesses **Growth and investment**: As the consumer experiment has shown, price information and comparison between suppliers can boost willingness to repair. If the proposed portal proves to be effective in reaching consumers and is not obsolete because other (private or public) entities provide the same service, we expect that repair will indeed increase and sales of new goods will decrease. This could happen by a considerably larger margin than for M12, where only contact details of one (or a few) repair shops are given, which is already being done for several products. Hence, under the assumption of effective implementation and genuine EU added value, the national portals would lead to a loss in the sales of new products, affecting producers (with the majority of them being from outside the EU) and traders. Our model calculates with a loss of sales of EUR 2.8 billion for manufacturers, and EUR 860 million for European manufacturer. The latter corresponds to a EUR 208 million loss in GVA. Traders will lose business (retail margin) worth EUR 3.6 billion, which is associated with a EUR 960 million drop in GVA. On the other hand, the repair sector would benefit. We estimate an additional turnover in the sector worth EUR 6.2 billion (EUR 2.4 billion in GVA). It is expected that in-house or authorised repair shops who usually offer higher prices could lose some business, while independent shops with lower prices (who would be now visible to consumers) could expand their business very significantly. **Employment**: This measure will have a significant impact on employment at EU level, as the take-up rate is projected to be relatively high. The number of employees needed to manage and maintain the national platforms (from the public administration side), as well as additional staff needed from the repair services side to keep the information updated on the platform will be noteworthy, but part of public implementation costs. Lastly, as the platforms are assumed to have an impact on the number of repairs carried out, additional staff would be needed in order to respond to the demand. We estimate in our model a total loss of 381 jobs in EU manufacturing, and a loss of 1,612 jobs in retail, while the number of jobs in the repair sector is estimated to grow by 4,106. The overall net employment impact is a gain of 2,113 jobs. **Business adjustment costs**: Repair companies are not likely to face noteworthy costs when participating, although this depends on the details of the measure and its implementation. Joining the national platforms and providing information on the services and fees offered would be voluntary. The decision on whether to join would be led by business interest considerations. This is thus not a cost

mandated by EU legislation which would fall under the category of adjustment costs in the sense of the Better Regulation guidance.

Business administrative burdens: A possible (but not certain) administrative cost would stem from the need to meet information or documentation requirements that the EU platform may set from these companies over and above what similar private (or national) platforms may require: e.g. proof that repairers are authorised to carry out the relevant repair services, liability insurance, etc. Some MS may not have the same legal requirements than the ones that the portal would follow. Nonetheless, this burden is likely to be very low in most MS, as the authorisations and documents would already be mandated and readily available. Importantly since participation would be voluntary for businesses, the costs would not be understood as mandatory information obligations under this proposed EU legislative change.

Functioning of the internal market and competition: This platform has the potential to significantly increase the level of competition between repair services, most notably improving the position of independent shops with better price offers vis-à-vis in-house or authorised third-party repair services. This is likely to lead to a perceptible reduction of average repair prices, while overall sales and GVA will increase. In-house and authorised shops may lose their advantage in attracting customers. The measure will also harmonise the level of this competition between providers across MS, as a similar portal already exists in France.

Facilitating SMEs growth: The measure would be clearly positive for SMEs in general. While some of the losses in the sales of new products affects SMEs, the independent workshops in the repair sector, which are overwhelmingly SMEs, could see their sales and GVA expand by very considerable margins. Business costs for repair-sector SMEs for participation (manufacturers and traders will not be affected, unless they also have repair activities) will be voluntary and rather small, not to mention far outweighed by the benefits, at least for those who indeed join the platform based on their voluntary business decision. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 1.9 billion.

Impacts on public administration (enforcement costs)

This measure requires higher familiarisation costs as staff overseeing this measure would need to deal with a new instrument (32 hours are assumed to be needed for 2 FTE, with an assumed hourly rate of EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to repair services. This has implications on costs for monitoring, which are assumed to be proportionate with the share of businesses affected by this measure. As this measure is voluntary in nature, there is no need for market surveillance authorities' intervention, but costs will stem from monitoring activities of the staff overseeing these platforms. Lastly, the awareness raising cost is assumed to be EUR 1,000,000 (for a period of 5 years) as more efforts are assumed to be needed in making consumers aware of their new rights.

The one-off enforcement costs are estimated to be of EUR 8,550,112 while the ongoing costs would amount to EUR 23,403,671 for a period of 15 years.

Environmental impacts (2023-2037)

Contribution to fighting climate change: Similarly to M12, this measure makes the overview on and the access to repair services easier. However, the willingness to repair still depends on consumers. If the platform proposed under this measure leads to more repair, less products need to be newly purchased, which in turn leads to CO_2 savings. The environmental impact of the platform itself (e.g. electricity use of servers) is considered to be negligible. The increased repairs correspond to 2.5 million tonnes CO_2-eq and translate into a 5% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 450 million.

Fostering the efficient use of resources (renewable & non-renewable): This measure will potentially reduce replacement rates and the use of resources for the production of new goods. As this measure only partly tackles the willingness of consumer to repair, the repair increase and related resource savings are moderate. The increased repairs correspond to resource savings of 0.26 million tonnes and represents a 5% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 150 million.

Waste production, generation and recycling: Waste is avoided in the future when less products are newly purchased in the present, which can be achieved with increased repair rates. As this measure only partly tackles the willingness of consumers to repair, the repair increase and related waste savings might be moderate. The increased repairs correspond to waste savings of 0.45 million tonnes which is equal to a 5% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 73 million.

Coherence with other EU legislation

Currently there is **not** any EU-wide or national (except for France) registers of repair services and consumers which relies on its own research to find repair services. Both options of having matchmaking

platforms at EU or national level would fill a void in the market as there are no similar initiatives. The EU-wide platform would complement the existing product database on energy related goods, hence there would be no overlap between the two. Similarly, having the matchmaking platforms at national level would not overlap with any other existing initiatives.

Table 15 - Platform with information on available repair services (M13b – EU level)

Measure
Impacts on consumers **Consumer decision-making process:** A systematic price comparison as suggested by this measure can improve the decision-making process of consumers, by allowing them to take an informed decision. As the behavioural experiment has shown, the lack of information can create a barrier for consumers to choose a repair. This is especially the case with regard to price information, which, when lacking, decreased the likelihood of consumers to choose repair by 45%. While this measure does not per se increase consumers' willingness to repair, it can remove obstacles for consumers to choose to do so by increasing the convenience of repair. It may also increase the number of consumers that are comfortable switching providers, when having more information available. The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 17 million products **Consumer trust and protection:** This measure may have the potential to increase consumer trust in repair services, as it can increase transparency on the market and the information available to consumers about repair offers and their quality. While it would not increase consumer protection, it can potentially provide a positive effect for the market and, by doing so, increase the quality of the repairs that consumers can find on the market and bolster their trust. **Consumer savings:** Consumers interested in having their goods repaired might save time and money as they could compare various offers available on the market and make an informed purchasing decision. However, the extent to which consumers would save time and money is difficult to quantify. According to our model, this translates to net consumer savings worth EUR 21.7 billion, which comes from taking into account an EUR 25.6 billion reduction in the purchases of new products and an additional expenditure on repair of EUR 3.8 billion.
Impacts on businesses **Growth and investment**: As the consumer experiment has shown, price information and comparison between suppliers can boost willingness to repair. If the proposed portal proves to be effective in reaching consumers and is not obsolete because other (private or public) entities provide the same service, we expect that repair will indeed increase, and sales of new goods will decrease. This could happen by a larger margin than for M12, where only contact details of one (or a few) repair shops are given, and which is already being done for several products, although the expected magnitude of changes would remain below that of M9. Hence, under the assumption of effective implementation and genuine EU added value, the EU-level portal would lead to a considerable loss in the sales of new products, affecting producers (with the majority of them being from outside the EU) and traders. Our model estimates this to amount to a loss of EUR 2.5 billion in sales for manufacturers, of which EUR 548 million will affect EU businesses. This translates into a reduction of GVA worth EUR 108 million in the EU. European traders would forego revenues of around EUR 2.8 billion, and GVA worth EUR 757 million. On the other hand, the repair sector would benefit. We calculate with increased sales of European repairers in the magnitude of EUR 3.8 billion, which corresponds to EUR 1.3 billion additional GVA generated. It is expected that in-house or authorised repair shops who usually offer higher prices could lose some business, while independent shops with lower prices (who would be now visible to consumers) could expand their business very significantly. **Employment**: This measure would not have a large impact on employment at EU level as it would only indirectly nudge consumers to repair more of their defective goods. As the platform will be implemented at EU level, it will need fewer employees (and contractors) to manage and maintain it (from the public administration side). The additional staff needed from the repair services side to keep the information updated on the platform will be similar to that of M13a. However, these are implementation costs, discussed separately below. Lastly, the platform will have some impact on the number of repairs carried out, hence additional staff would be needed in order to respond to the demand. We estimate in our model a total loss (of the stock of jobs) of 190 jobs in EU manufacturing, and a loss of 1,271 jobs in retail, while the number of jobs in the repair sector is estimated to grow by 2,528, leading to a net gain of 1,067 jobs.

Business adjustment costs: Repair companies are not likely to face noteworthy adjustment costs, although this depends on the details of the measure and its implementation. Joining the platform and providing information on the services and fees offered would be voluntary. The decision on whether to join would be led by business interest considerations, hence not falling under the category of business adjustment costs mandated by legislation as of the Better Regulation guidance.
Business administrative burdens: A possible (but not certain) administrative cost would stem from the need to meet information or documentation requirements that the EU platform may require from these companies over and above what similar private (or national) platforms may require: e.g. proof that repairers are authorised to carry out the relevant repair services, liability insurance, etc. Some MS may not impose the same legal requirements than the ones the EU portal would follow. However, this burden is likely to be very low in most MS, as the authorisations and documents would already be mandated and readily available. As participation in the platform's services will be voluntary, based on the independent business decision of the repair companies, this cost is not considered an administrative burden in the sense of the Better Regulation guidance.
Functioning of the internal market and competition: This platform has the potential to significantly increase the level of competition between repair services, most notably improving the position of independent shops with better price offers vis-à-vis in-house or authorised third-party repair services. This is likely to lead to a perceptible reduction of average repair prices, while overall sales and GVA will increase. In-house and authorised shops may lose their advantage in attracting customers. The measure will also harmonise the level of this competition between providers across MS, as a similar portal already exists in France.
Facilitating SMEs growth: The measure would be clearly positive for SMEs in general. While some of the losses in the sales of new products would affect SMEs, the independent workshops in repair sector, which are overwhelmingly SMEs, could see their sales and GVA expand by very considerable margins. Business adjustment costs for repair-sector SMEs (manufacturer and traders will not be affected, unless they also have repair activities) are not noteworthy, especially since joining the EU platform would be a voluntary business decision of repairers, not mandated by any legislation.

Impacts on public administration (enforcement costs)
This measure applies to repair services and would solely require monitoring costs estimated at EUR 100,000 yearly. As this measure is voluntary in nature and there is no need for market surveillance authorities' intervention, but only some monitoring activities of the staff overseeing the platform. Lastly, the awareness raising cost is assumed to be EUR 1,000,000 as more efforts are assumed to be needed in making consumers aware of their new rights.
The one-off costs of this measure amount to EUR 1,501,856 (including platform development), while ongoing costs amount to EUR 3 million (including maintenance costs for the platform) over a period of 15 years.

Environmental impacts (2023-2037)
Contribution to fighting climate change: Similarly to M12, this measure makes the overview on and the access to repair services easier. However, the willingness to repair still depends on consumers. If the platform proposed under this measure leads to more repair, less products need to be newly purchased, which in turn leads to CO_2 savings. The environmental impact of the platform itself (e.g. electricity use of servers) is considered to be negligible. The increased repairs correspond to 1.8 million tonnes CO_2-eq and represent a 4% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 315 million.
Fostering the efficient use of resources (renewable & non-renewable): This measure will potentially reduce replacement rates and the use of resources for production of new goods. As this measure only partly tackles the willingness of consumers to repair, the repair increase and related resource savings might be moderate. The increased repairs correspond to resource savings of 0.09 million tonnes which translates into a 2% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 99 million.
Waste production, generation and recycling: Waste is avoided in the future when less products are newly purchased in the present, which can be achieved with increased repair rates. As this measure only partly tackles the willingness of consumers to repair, the repair increase and related waste savings might be moderate. The increased repairs correspond to waste savings of 0.10 million tonnes and represent a 1% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 16 million.

Coherence with other EU legislation
Currently there is not any EU-wide or national (except for France) registers of repair services and consumers rely on their own research. Both options of having matchmaking platforms at EU or national level would fill a void in the market as there are no similar initiatives. The EU-wide platform would complement the existing product database on energy related goods, hence there would be no overlap. Similarly, having the matchmaking platforms at national level would not overlap with any other existing initiatives.

Table 16 - Voluntary commitments to an EU common 'easy repair standard' (M14)

Measure
Impacts on consumers **Consumer decision-making process:** For many consumers, finding trustworthy, intelligible, and transparent information about product repair and to assess a product's lifecycle can be difficult. This measure can help consumers make well-informed purchasing decisions as such a label would support them in making better estimations on the convenience and ease of repair. With the EU as a trustworthy and credible third-party organisation, consumers' main concerns regarding the repair process could be alleviated. It can be expected that such a label would lead to an increased uptake of repair services. The effectiveness of this measure depends greatly on businesses' willingness to commit to this standard. According to the results of the OPC and depending on its content, up to 30-50% of relevant businesses would take-up this measure. The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 50 million products **Consumer trust and protection:** Consumers are often unable to assess the ease or convenience of the repair process for a product. Thus, the commitment to an EU 'easy repair standard' could serve as a signal of trustworthiness, quality and durability, as consumers could trust that those manufacturers will address their main concerns about repair. An easy repair label would boost consumer trust in repair services. Although the take-up of this measure would be voluntary, services may be incentivised to adhere to it to avoid losing business in favour of those who have the label. **Consumer savings:** Consumers interested in having their goods repaired might save money as they can receive a higher quality of service due to businesses adhering to robust quality standards. However, the extent to which consumers would save money is difficult to quantify. It is assumed that better quality repair services might lead to products lasting longer (hence consumers would not have immediate needs for investing in new products). Our model assumes that the measure will indeed have a positive effect on the amount of goods repaired, resulting in consumer savings worth EUR 21.0 billion (this is the result of savings on the purchase of new goods for the value of EUR 24.7 billion on the one hand and an additional expenditure on repairs worth EUR 3.7 billion on the other)**.**
Impacts on businesses **Growth and investment:** Based on the assumption on the effectiveness of the measure (estimating with an increase in repair outside the legal guarantee of 4%), this measure will bring about a moderate shift in consumer behaviour - from purchasing new replacement products towards more repair. Consequently, the measure will yield a moderate reduction in production and sales levels. The model used to assess economic and environmental impacts estimates the loss of sales for manufacturers to be about EUR 1.7 billion between 2023 and 2037. Losses to EU manufacturers only will amount to EUR 513 million, leading to a decrease of EUR 114 million in the generation of GVA in European manufacturing. For traders, the loss from selling fewer new products is projected to amount to EUR 2.1 billion in turnover (EUR 573 million loss in GVA). Measure M14 is expected to moderately increase repair volumes and GVA generated in the repair sector: this means additional sales of EUR 3.7 billion, which corresponds to EUR 1.4 billion in GVA. This estimate includes the in-house repair activities of companies that are also manufacturers and/or traders. **Employment:** This measure's impact on employment depends on the extent to which it is taken up by the industry. On the one hand, the measure could lead to more employment of specialised repairers that can deliver repairs up to the new standards. On the other hand, if repair services cannot find repairers that meet the new requirements, overall employment in the sector might drop due to consumers opting for large repair services (with somewhat lower employment levels per turnover) that have the label. The model used in this assessment projects gains in the stock of jobs of 2,451 in the repair sector. However, as more products will be repaired, EU manufacturers are bound to lose an estimated 228 jobs, and traders to lose 962 jobs. The net effect is an increase in employment by 1,261 jobs **Business adjustment costs:** The measure will not involve adjustment costs mandated by European legislation for businesses under the corresponding definition in the Better Regulation guidelines, as the application of the labelling scheme will be voluntary. **Business administrative burdens:** No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance have been identified. **Functioning of the internal market and competition:** The measure does not contribute significantly to the further harmonisation of rules on the internal market and competition. However, by facilitating and promoting a pan-European voluntary quality standard it will have a small indirect positive effect.

Consumers will be somewhat encouraged to buy cross-border (notably: products that have the label of the 'Easy repair standard' as this will be understood and seen as a reliable information on repairability.
Facilitating SMEs growth: Similarly to other measures in this cluster, the measure is seen as being somewhat facilitating SMEs growth, as it significantly helps the growth of the repair sector, where SMEs have a larger market share than in the business economy overall. This positive effect outweighs the negative impacts on SMEs in manufacturing and trade, where companies will face a loss of business due to the reduced sale of new products, which imposes a larger burden on SMEs relative to turnover or GVA than on large enterprises.

Impacts on public administration (enforcement costs)
This measure applies to repair services and producers/sellers offering repair services. As the measure is voluntary in nature, only costs associated with EU-level monitoring of take-up of voluntary commitments would be sustained. These, combined with awareness raising costs, lead to estimated one-off costs of 1,001,856 while the ongoing costs would amount to EUR 1,500,000 for a period of 15 years.

Environmental impacts (2023-2037)
Contribution to fighting climate change: As the measure aims to improve consumer trust in repair, make repair more convenient and of a better quality, consumers would be incentivised to decide for repair. Although it cannot be quantified, the measure might increase repair and thus reduce the need to purchase new products. The extent to which the commitment will be known by consumers and will be associated with quality is likely to play an important role. If less products are indeed purchased and thus produced, the amount CO_2 released into the atmosphere is likely to be reduced. More specifically, the increased repairs correspond to 1.5 million tonnes CO_2-eq. This represents a 3% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 268 million.
Fostering the efficient use of resources (renewable & non-renewable): This measure will potentially reduce replacement rates and reduce the use of resources for production of new goods. As this measure only partly tackles the willingness of consumer to repair, the repair increase and related resource savings are moderate. The increased repairs correspond to resource savings of 0.15 million tonnes which is equal to a 3% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 90 million.
Waste production, generation and recycling: Waste is avoided in the future when less products are newly purchased in the present, which can be achieved with increased repair rates. As this measure only partly tackles the willingness of consumers to repair, the repair increase and related waste savings are moderate. The increased repairs correspond to waste savings of 0.27 million tonnes and represents a 3% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 44 million.

Coherence with other EU legislation
Voluntary commitments are often used, especially in areas where the EU competence is limited. An EU common 'easy repair standard' would not overlap with other existing or upcoming initiatives to increase consumer trust in repair services.

6.2. Problem 2: Limited use of second-hand goods by consumers

The tables below present the impacts for each measure considered under problem 2.

Table 17 - Aligning the legal guarantee period for refurbished second-hand goods with new goods (M7)

Measure
Impacts on consumers **Consumer decision-making process:** This measure can be expected to increase considerably the trust that consumers have in the quality of refurbished products. As this is often a barrier of consumers to purchase such products, the measure has the potential to increase consumers' uptake of such products. The behavioural experiment, carried out as part of the study, seems to confirm this assumption, as it reveals that consumers put a high monetary value on an aligned guarantee period. The experiment revealed that consumers value a highly refurbished smartphone 33%, a refrigerator 31% and shoes 20%

higher when they come with a guarantee period of 2 years instead of 1 year. In the impact assessment, we thus assumed an average increase in the repair rate of 26.5% across the range of products.
The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 31 million products
Consumer trust and protection: As consumers often perceive refurbished products to be of a lesser quality than new products, the longer liability period could be perceived as evidence of better quality. According to the views expressed in the expert interviews, this measure can be suitable to increase trust in the product quality. This can lead to an increase in the number of second-hand or refurbished goods sold and improve the quality of these products in the market.
Consumer savings: This measure is expected to increase consumers' trust in refurbished goods, which will lead to loss for traders of new goods, but to consumer savings of approximatively EUR 1.5 billion. Consumers' benefit would stem mainly from the price difference of a refurbished good compared to a new one. While this varies by product type, a refurbished good can be on average around 50% cheaper[19] than a new one.

Impacts on businesses
Growth and investment: The higher rate of refurbishment of used products (and the repair of defective products when needed) will not result in large cost saving benefits for producers, as the measure does not focus upon their obligations to provide replacement products within the legal guarantee period but on raising the attractiveness of refurbished goods on the secondary market. However, there is an indirect effect: the attractiveness of refurbished products (characterised via the estimated take-up rate of the measure) leads to a replacement of new product purchases by the purchase of such refurbished goods. When defective within the legal guarantee period and where the remedy is replacement, refurbished goods only need to be replaced by another refurbished good which is less costly than a new one. Thus, the model calculates with a gross saving of EUR 238 million on new replacement products, partly offset by additional cost of EUR 119 million on refurbished products (the underlying assumption is that the price of a refurbished product is half of a new one), which leads to a net saving of EUR 119 million (EUR 42 million for EU manufacturers).
At the same time, the shift away from new products causes manufacturers to lose revenue and, consequently, GVA. The method developed to estimate the extent of additional repair (13.45%) suggests that the sales of producers of new products may shrink by EUR 1.9 billion. The value is EUR 416 million for European manufacturers – this corresponds to a loss of about EUR 103 million in GVA. However, this loss would be to a large extent offset by the economic profit realised on selling repaired and/or refurbished goods. The amount of revenues coming from selling these on the secondary market has been estimated to reach EUR 635 million for European producers.
With diminished sales of new goods, but an increased sales volume of refurbished goods, traders in Europe will not lose very significant amounts of business. The model suggests that retail margin would decline by EUR 741 million, which is associated with a reduction of EUR 200 million in GVA.
Companies undertaking the repair and refurbishment (including in-house departments of traders or producers), which were for simplicity assumed to be in this study to a large extent based in Europe (repair of large appliances or furniture is usually location-bound, and according to the market research repair of smaller durables often also takes place close to the seller), will benefit from increased revenues in the estimated amount of EUR 2.3 billion, which corresponds to a GVA increase in the sector by EUR 899 million.
Employment: Employment in the repair and refurbishment sector is expected to increase as a result of this measure by an estimated 1,528 jobs in total (i.e., the stock of jobs) according to our model. In contrast, due to lower production volumes and less sales volumes, employment in EU manufacturing will decrease by an estimated 188 jobs and employment in trade by 336 jobs. The net employment impact is thus a gain of 1,004 jobs. The employment estimates are derived from the calculated change in turnover from the sale of new or refurbished products, and from supplying repair services. The method assumes that the change in total personnel cost in the sector concerned will be proportionate, and that one job is associated with an average annual personnel cost of EUR 25,000 (the latter is a rough average of the different labour cost/job statistics across various manufacturing and repair sectors, as well as retail, sources from Eurostat Structural Business Statistics).
Business adjustment costs: Producers or traders will face moderate adjustment costs under this measure, including actions that need to be undertaken to check whether the products they put on the secondary market fit the definition of refurbished goods, and align their existing terms with the new rules. As in practice some traders would be liable for defects in refurbished products for an extended period of time, their costs of performing remedies would increase. Overall, the one-off costs to producers

[19] There are no available studies on the price difference between refurbished and new goods, hence the difference is based on a sample of products from our study selection.

are estimated to be around EUR 28 million and EUR 63 for traders. Ongoing adjustment costs are estimated to amount to EUR 137 million. **Business administrative burdens**: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance had been identified. **Functioning of the internal market and competition**: The measure will moderately contribute to the harmonisation of rules on the internal market and fair competition. **Facilitating SMEs growth**: The growth of business for repair shops will benefit SMEs especially, as they have a relatively large share in this sector in terms of turnover. The negative effects on producers and manufacturers are moderate under this measure, as their loss of business from the sales of new products is partly offset by the profit from selling refurbished goods. SMEs are not disproportionately affected by this loss, as their share in the production sector is relatively low. While they account for over 60% of the total turnover in the manufacture of footwear, clothing and furniture sectors, their share is below 20% in the manufacturing of mobile phones, laptops and TVs, the most affected by this measure. The measure is moderately disadvantageous for traders, although the weight of SMEs is relatively low in retail with regard to the product categories covered. On the other hand, the adjustment and administrative costs relative to business revenues are disproportionately higher for SMEs.
Impacts on public administration (enforcement costs) This measure requires limited familiarisation costs as market surveillance authorities are already aware of provisions of the SGD (8 hours are assumed to be needed for 2 FTE, with an assumed hourly rate of EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies only to sellers of second-hand goods. This has implications on costs for inspections, which are assumed to be proportionate with the share of businesses affected by this measure. Lastly, the one-off enforcement costs are estimated to be of EUR 512,528 (including awareness costs) while the ongoing costs would amount to EUR 242,922 for a period of 15 years.
Environmental impacts (2023-2037) **Contribution to fighting climate change:** This measure is expected to make refurbishment more attractive for consumers. The measure potentially creates the perception of equal quality between new and refurbished goods and therefore supports longer lifetimes for second-hand items. An original (broken) item might be discarded; however, the purchase of a refurbished product allows environmental savings. The lifetime extension of the products which experience refurbishment leads to a reduction in the $CO_2$2-equivalent emissions. The increased refurbishment activities correspond to 1.0 mi**llion** tonnes CO_2-eq which represents a 2% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 174 mi**llion**. **Fostering the efficient use of resources (renewable & non-renewable):** This measure will potentially reduce the purchase of new products and hence allow resource savings leading to resource savings of 0.12 mi**llion** tonnes. This represents a 2% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 62 mi**llion**. **Waste production, generation and recycling:** This measure is expected to have a direct impact on reducing waste production as goods are not discarded but refurbished and hence used for a longer period. The increased refurbishment activities correspond to 0.19 mi**llion** tonnes which represents a 2% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 31 mi**llion**.
Coherence with other EU legislation Currently, there is no recognised definition of refurbished goods at EU level. The SGD does not define refurbished goods, which means that at the moment it may depend on the seller's description of the refurbished goods (not applicable to goods falling under the Ecodesign Directive, as this has a definition of refurbished goods). Defining refurbished goods, e.g., by revising the SGD, would complete the overall framework as currently there is no official definition at EU level that is commonly used by the market actors and cover those goods that are not covered by the Ecodesign Directive.

Table 18 - Refurbished goods used as a replacement (M8a – within the extended liability period)

Measure
Impacts on consumers **Consumer decision-making process:** The measure will allow to make use of refurbished products as replacements, but not actively encourage consumers to purchase refurbished second-hand goods. Their choice will be limited, as they cannot request a new product as replacement.

The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 10 million products

Consumer trust and protection: Refurbished products are often perceived as presenting potential issues related to quality or even safety, which means that this measure might reduce trust in the market if it is not accompanied with additional measures aimed to protect consumer's rights. The measure also potentially requires a fixed definition of refurbished goods.

Consumer savings: This measure will generate modest consumer savings worth an estimated EUR 822 million between 2023 and 2037, which comes from the extension of the legal guarantee period for refurbished goods. The estimated volume of savings is relatively modest due to the small market share of refurbished goods.

Impacts on businesses

Growth and investment: This measure will not bring cost savings for producers, as they will face an extended legal guarantee period – although they will be allowed to offer refurbished used goods as a remedy for defective products in this period. As the measure involves an extension of the legal guarantee period, it is associated with a reduction in the production and sales of new goods. Notably, on the basis of the calculated shift towards refurbished products, the expected decrease in the value of new products and spare parts sold between 2023 and 2037, at producer prices, is EUR 334 million, of which EU 116 million is produced by European manufacturers (the decrease in the value of new products sold is partly offset in this figure by the higher number of spare parts produced, which is used in repair and refurbishment). The loss in production in the EU is associated with a decrease in GVA by EUR 27 million. It follows from the relatively small impact on manufacturers that the economic performance of European traders would not be impacted in a meaningful way by this measure as the replacement within the legal guarantee period is offered free of charge and hence would not generate revenue for retail. Only marginal losses in sales have been identified, worth about EUR 411 million, corresponding to a decrease in the GVA generated by EUR 111 million.

Companies undertaking the repair and refurbishment (including in-house departments of traders or producers) will benefit from increased revenues in the estimated amount of EUR 706 million, which corresponds to a GVA increase in the sector by EUR 277 million during the 15-year period of this projection.

Employment: This measure is unlikely to lead to any significant change in the number of jobs given the relatively low modelled impact on the volume of repair/refurbishment and the production of new products and spare parts. Under the assumption of maintaining the ratio of personnel costs to turnover, and an average annual personnel cost per job of EUR 25,000, the model yields an estimated gain of 462 jobs in repair, versus a loss of 50 jobs in production as well 186 in distributive trade. The net job impact of the measure is thus calculated at 226.

Business adjustment costs: The measure may impose a modest one-off adjustment cost of about EUR 45 million on producers and EUR 106 million on traders. The one-off costs modelled comprise of the affected businesses familiarising themselves with new rules (8 hours on average), adapting company documentation and procedures to special rules for newly defined category of "refurbished goods" (8), adapting internal procedures for repair/replacement to include the use of refurbished goods in relevant scenarios (8), and mapping and establishing functioning repair/refurbishment networks (24 hours).

Ongoing adjustment costs involve checking whether the offering a refurbished good as replacement is feasible in an individual case. Altogether, ongoing adjustment costs are estimated to amount to about EUR 78 million (including both EU manufacturers and importers).

Business administrative burdens: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance have been identified.

Functioning of the internal market and competition: The measure will contribute to the harmonisation of rules on the internal market and fair competition with regard to remedies offered in case of defective products within the legal guarantee period.

Facilitating SMEs growth: SMEs will benefit from the increased repair and refurbishment work, as they have a relatively large presence in this sector in terms of turnover. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 222 million.

The negative effects on SME producers and retailers are moderate under this measure. SMEs account for over 60% of the total turnover in the manufacture of footwear, clothing and furniture sectors, their share is below 20% in the manufacturing of mobile phones, laptops and TVs. SMEs' share in retail is about 51% in terms of the value added generated, which would correspond to a loss in GVA of EUR 57 million over 15 years. The positive effects in repair thus outweigh the negative impacts on SMEs in manufacturing and trade.

On the other hand, adjustment costs relative to business revenues will be disproportionately higher for SMEs.

Impacts on public administration (enforcement costs)

This measure requires limited familiarisation costs as market surveillance authorities are already aware of provisions of the SGD (8 hours are assumed to be needed for 2 FTE, with an assumed hourly rate of EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50,000. This measure applies to sellers (traders) of all goods falling under the SGD, which is also the stakeholder group with most businesses. This has implications on costs for inspections, which are assumed to be proportionate with the share of businesses affected by this measure. The one-off enforcement costs are estimated to be of EUR 512,528 (including awareness raising) while the ongoing costs would amount to EUR 27,693,138 for a period of 15 years.

Environmental impacts (2023-2037)

Contribution to fighting climate change: This measure is expected to bring more refurbished products in circulation and to lead to the replacement of new goods with refurbished ones. As refurbishment enables a lifetime extension of a product, CO_2 equivalent emission savings are expected. The increased refurbishment activities correspond to 0.3 million tonnes CO_2-eq. This represents a 1% increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 52 million.

Fostering the efficient use of resources (renewable & non-renewable): This measure will potentially reduce the purchase of new products and hence allow resource savings. The expected resource savings are 0.03 million tonnes which translates into a 1% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 19 million.

Waste production, generation and recycling: This measure is expected to have a direct impact on reducing waste production as goods are not discarded but refurbished and hence used for a longer period. The increased refurbishment activities correspond to 0.3 million tonnes of waste savings which is equal to a 1% increase in waste savings compared to the baseline. The waste savings result in monetary savings of EUR 9 million.

Coherence with other EU legislation

This measure would not overlap with other existing EU legislation and, as explained above for M7, it would require a definition of refurbished goods as currently it may depend on the seller's description of the refurbished goods whether consumers would be granted this right.

This measure could be easily implemented through the SGD. If refurbished goods are included in the definition of 'goods' under Article 2(5) SGD, then they may also be given to consumers as a remedy, following a choice of replacement.

Alternatively, a new paragraph could be added to Article 14 SGD to provide an option for sellers to offer a refurbished good to consumers instead of a new one, when performing replacement. It should be carefully considered whether this should be an offer on the part of the seller, which could be rejected by consumers, or whether the choice of replacing defective goods with new vs refurbished goods should be left to sellers. If M8 was combined with M7 (the same liability period applies to consumers obtaining new and refurbished goods) and with M3 (interruption of legal guarantee period), then consumers would not be put in a detrimental position if the choice of replacing defective goods with refurbished instead of new goods was left to sellers.

It could be further considered whether sellers should not be required to prioritise the provision of refurbished goods rather than new goods. This would require placing the obligation on sellers to invest in refurbishing goods. As the current consumer protection framework is re-thought in light of sustainability needs, the same process should apply to sellers' obligations.

Table 19 - Refurbished goods used as a replacement (M8b - from the second year of the liability period)

Measure
Impacts on consumers **Consumer decision-making process:** The measure will allow to make use of refurbished products as replacements, but not actively encourage consumers to purchase refurbished second-hand goods. Their choice will be limited, as they cannot request a new product as replacement. The impact on the decision-making process is also reflected in the production avoided which is estimated to be of 23 million products **Consumer trust and protection:** Refurbished products are often perceived as presenting potential issues related to quality or even safety, which means that this measure might reduce trust in the market if it is not accompanied with additional measures aimed to protect consumer's rights. The measure also potentially requires a fixed definition of refurbished goods. **Consumer savings:** This measure will not result in consumer savings. Some consumers will receive a refurbished good as remedy in the second year of the legal guarantee period instead of a new

replacement product, both free of charge. As the refurbished good has to be equivalent to a remedy via a new replacement good, consumers' position is not affected.

Impacts on businesses

Growth and investment: M8b would bring cost savings for producers, as they will be allowed to offer (cheaper) refurbished used goods as a remedy for defective products. The model used suggests that considerable amounts of new production could be avoided through this measure. The value (at producer prices) of the new products that would not have to be produced and offered free of charge to the customer would amount to EUR 7.0 billion in total for producers between 2023 and 2037. Of this amount, EUR 2.6 billion savings will accrue to European manufacturers. On the other hand, European companies would also need to finance the repair and refurbishing work worth an estimated EUR 579 million. Their overall cost savings would thus amount to EUR 2.0 billion.

It is assumed that the economic performance of traders of new products would not be impacted in a meaningful way by this measure as the replacement within the legal guarantee period is offered free of charge and hence would not generate revenue for retail.

Companies undertaking the repair and refurbishment (including in-house departments of traders or producers), which are assumed to be to a large extent based in Europe, will benefit from increased revenues in the estimated amount of EUR 1.6 billion over 15 years, which corresponds to a GVA increase in the sector by EUR 624 million.

Employment: This measure could lead to an increase in repair jobs as companies will be encouraged to repair/refurbish defective products and give them as replacement instead of new goods. The impact is estimated to be a total gain of 1,040 jobs (i.e., the stock of exiting repair jobs will increase by this amount).

Business substantive compliance costs: The measure will result in a modest one-off compliance cost of about EUR 45 million on European manufacturer and EUR 106 million on traders. These costs originate from the following adjustment activities of affected businesses: familiarising themselves with new rules (8 hours on average), adapting company documentation and procedures to special rules for newly defined category of "refurbished goods" (8), adapting internal procedures for repair/replacement to include the use of refurbished goods in relevant scenarios (8), and mapping and establishing functioning repair/refurbishment networks (24 hours).

Ongoing adjustment costs involve checking whether the offering a refurbished good as replacement is feasible in an individual case. Altogether, ongoing adjustment costs are estimated to amount to about EUR 175 million (including both EU manufacturers and importers).

Business administrative burdens: No significant administrative costs falling under the corresponding definitions in the Better Regulation guidance have been identified.

Functioning of the internal market and competition: The measure will contribute to the harmonisation of rules on the internal market and fair competition with regard to remedies offered in case of defective products within the legal guarantee period.

Facilitating SMEs growth: SMEs will benefit from the increased repair and refurbishment work, as they have a relatively large presence in this sector in terms of turnover. According to Eurostat data, businesses with less than 250 employees accounted for 99.7% of all enterprises in the repair sector, 77% of aggregate turnover, 80% of value added, and 89% of employment in 2019. If these proportions remain stable, the additional GVA generated by SMEs in the repair sector will amount to EUR 499 million.

The negative effects on SME producers are moderate: SMEs account for over 60% of the total turnover in the manufacture of footwear, clothing and furniture sectors, their share is below 20% in the manufacturing of mobile phones, laptops and TVs. The positive effects in repair will outweigh the negative impacts on SMEs in manufacturing

On the other hand, adjustment costs relative to business revenues will be disproportionately higher for SMEs.

Impacts on public administration (enforcement costs)

This measure requires limited familiarisation costs as market surveillance authorities are already aware of provisions of the SGD (8 hours are assumed to be needed for 2 FTE, with an assumed hourly rate of EUR 29, the EU average). Operational inspections per FTE are assumed to be EUR 50. This measure applies to sellers (traders) of all goods falling under the SGD, which is also the stakeholder group with most businesses. This has implications on costs for inspections, which are assumed to be proportionate with the share of businesses affected by this measure. The one-off enforcement costs are estimated to be of EUR 512,528 (including awareness raising) while the ongoing costs would amount to EUR 27,693,138 for a period of 15 years.

Environmental impacts (2023-2037)

Contribution to fighting climate change: This measure is expected to bring more refurbished products in circulation and to lead to the replacement of new goods with refurbished ones. As refurbishment enables a lifetime extension of a product, CO_2 equivalent emission savings are expected. The increased refurbishment activities correspond to 0.7 million tonnes CO_2-eq. This represents a 1%

increase in CO_2 equivalent savings compared to the baseline. The savings in CO_2 equivalents result in monetary savings of EUR 117 million.

Fostering the efficient use of resources (renewable & non-renewable): This measure will potentially reduce the purchase of new products and hence allow resource savings. As this measure only partly tackles the willingness of consumers to repair, the repair increase and related resource savings is moderate. The increased repairs correspond to resource savings of 0.07 million tonnes. This represents a 1% increase in resource savings compared to the baseline. The resource savings result in monetary savings of EUR 42 million.

Waste production, generation and recycling: This measure is expected to have a direct impact on reducing waste production as goods are not discarded but refurbished and hence used for a longer period. The increased refurbishment activities correspond to 0.7 million tonnes of waste savings. This represents a 1% increase in waste savings compared to the baseline. The waste savings equivalents result in monetary savings of EUR 20 million.

Coherence with other EU legislation

This measure would not overlap with other existing EU legislation and, as explained above for M7, it would require a definition of refurbished goods as currently it may depend on the seller's description of the refurbished goods whether consumers would be granted this right.

7. Results of the Multi-Criteria Analysis (MCA)

Not all impacts could be monetised due to lack of quantitative data and other methodological challenges. Therefore, in order not to make judgments based only on the monetisable impacts, a MCA, where the monetisable impacts are complemented by and compared with intangible impacts, was carried out. The MCA has three high-level assessment criteria:

- Effectiveness incorporates both qualitative and quantitative impacts.
- Efficiency incorporates only quantifiable impacts.
- Coherence with other EU legislation is assessed only qualitatively.

The table below illustrates the weights given to all impacts criteria assessed under this study. We selected a reasonable scenario to ensure coverage of all criteria and sub-criteria without providing significantly more weight to benefits than to costs. In the scenario, points are distributed as follows: Effectiveness (33%), Efficiency (33%), Coherence (33%). Although effectiveness consists of only five sub-criteria, it overall receives an equal weight to efficiency as the ultimate goal of the measures is to encourage sustainable consumption and improve consumer decision-making process and trust/protection.

Table 20 - MCA weights

Effectiveness		33.3%
Fostering the efficient use of resources (renewable & non-renewable) (resource savings in tons)	Society	26.7%
Waste production, generation and recycling (waste savings)	Society	26.7%
Contribute to fighting climate change (CO2 emissions savings)	Society	26.7%
Consumer decision-making process	Consumers	10.0%
Consumer trust and protection	Consumers	10.0%
Efficiency		33.3%
Consumer savings	Consumers	71.2%
Savings in production costs for manufacturers	Businesses	13.9%
Change in employment	Society	1.6%
Growth and investment (in Europe - GVA traders, producers, repairers)	Businesses	2.5%
Business adjustment costs	Businesses	5.7%
Business administrative costs	Businesses	0.1%
Implementation and enforcement costs	Public administration	0.0%
Coherence		33.3%
Coherence with other EU legislation		100%

The tables below provide a detailed overview of the MCA results. It should be noted that the results of the MCA of individual measures have informed the choice of policy option of the Commission (as explained in the European Commission impact assessment report[20]).

[20] COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT REPORT Accompanying the document Proposal for a Directive of the European Parliament and of the Council on common rules promoting the repair of goods and amending Regulation (EU) 2017/2394, Directives (EU) 2019/771 and (EU) 2020/1828 {COM(2023) 155 final} - {SEC(2023) 137 final} - {SWD(2023) 60 final, Brussels, 22.3.2023 SWD(2023) 59 final

Table 21 - Results of the MCA for the policy measures

High-level criteria	Stakeholders affected	Sub-criteria / impacts	Weights	Min	Max	Direction (benefit = 1, cost = -1)	M1	M2	M3	M4	M7	M8a	M8b	M9a	M9b	M11	M12	M13a	M13a+	M13b	M14	Combined (M2, M9a, M11, M12, M13a, M13a+, M14)
Coherence		Coherence with other EU legislation	33.33%	-3	5	1	5.00	5.00	5.00	5.00	5.00	4.00	4.00	5.00	-3.00	5.00	4.00	3.00	3.00	2.00	3.00	5.00
Effectiveness	**Consumers**	Consumer decision-making process	3.33%	0	1,745,931,635	1	0.00	0.00	0.08	0.01	0.09	0.03	0.00	0.31	5.00	4.41	0.66	2.20	0.21	0.17	1.32	13.16
Effectiveness	**Consumers**	Consumer trust and protection	3.33%	-3	4	1	-3.75	-1.25	1.25	2.50	1.25	1.25	-1.25	3.75	5.00	3.75	1.25	2.50	1.25	1.25	1.25	1.25
Effectiveness	**Society**	Fostering the efficient use of resources	8.89%	15,785	661,597	1	5.00	5.00	0.84	0.12	0.91	0.24	0.54	1.22	4.38	3.86	0.58	1.93	0.18	0.68	1.15	13.93
Effectiveness	**Society**	Waste production, generation and recycling (waste	8.89%	26,772	1,046,344	1	5.00	5.00	0.84	0.13	0.91	0.26	0.58	0.87	4.89	4.31	0.64	2.15	0.20	0.48	1.29	14.47
Effectiveness	**Society**	Contribute to fighting climate change (CO_2	8.89%	143,272	5,666,947	1	4.70	4.70	0.79	0.13	0.85	0.26	0.58	2.79	5.00	4.41	0.66	2.20	0.21	1.55	1.32	16.28

High-level criteria	Stakeholders affected	Sub-criteria / impacts	Weights	Min	Max	Direction (benefit = 1, cost = -1)	M1	M2	M3	M4	M7	M8a	M8b	M9a	M9b	M11	M12	M13a	M13a+	M13b	M14	Combined (M2, M9a, M11, M12, M13a, M13a+, M14)
Efficiency	**Businesses**	Business adjustment costs	1.89%	0	6,368,214,524	-1	-0.66	-0.68	-1.67	-0.80	-0.18	-0.18	-0.26	-0.49	-3.09	-5.00	-0.21	0.00	0.00	0.00	0.00	-6.38
Efficiency	**Businesses**	Business administrative costs	0.05%	0	161,790,438	-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.16	-5.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.16
Efficiency	**Businesses**	Savings in production costs for manufacturers	4.62%	-776,480,296	15,558,115,736	1	5.00	5.00	0.84	0.00	-0.25	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
Efficiency	**Society**	Change in employment	0.53%	-1,287	4,795	1	-1.34	-1.34	0.02	0.12	1.05	0.24	1.08	2.01	5.00	4.41	0.66	2.20	0.21	1.11	1.32	9.25
Efficiency	**Businesses**	Growth and investment (in Europe - GVA	0.84%	-827,938,061	2,842,329,778	1	-1.46	-1.46	0.02	0.12	1.05	0.24	1.10	1.38	5.00	4.41	0.66	2.20	0.21	0.76	1.32	8.50
Efficiency	**Consumers**	Consumer welfare and detriment	23.72%	0	79,937,037,233	1	0.00	0.00	0.34	0.03	0.09	0.05	0.00	2.45	5.00	4.41	0.66	2.20	0.12	1.36	1.32	11.04
Efficiency	**Public administration**	Implementation and enforcement costs	0.01%	755,450	31,953,783	-1	-4.41	-4.41	-4.41	-4.41	-0.12	-4.41	-4.41	-0.70	-1.92	-4.13	-1.92	-5.00	-0.60	-0.70	-0.39	-16.51

Table 22 - Summary of MCA results per high-level assessment criteria

	M1	M2	M3	M4	M7	M8a	M8b	M9a	M9b	M11	M12	M13a	M13a+	M13b	M14	Combined (M2, M9a, M11, M12, M13a, M13a+, M14)
Effectiveness	1.18	1.26	0.26	0.12	0.28	0.11	0.11	0.57	1.60	1.39	0.23	0.72	0.10	0.29	0.42	4.45
Efficiency	0.20	0.20	0.09	-0.01	0.02	0.01	0.04	0.59	1.19	1.01	0.16	0.55	0.03	0.33	0.33	2.85
Coherence	1.67	1.67	1.67	1.67	1.67	1.33	1.33	1.67	-1.00	1.67	1.33	1.00	1.00	0.67	1.00	1.67
TOTAL	**3.05**	**3.13**	**2.02**	**1.78**	**1.97**	**1.45**	**1.48**	**2.83**	**1.80**	**4.07**	**1.72**	**2.27**	**1.13**	**1.29**	**1.75**	**8.97**

To test the sensitivity of the comparison of policy options (measures) to different weights, a total of 12 sets of weights were selected, grouped into three major clusters. The first one assigned a 45% weight to the high-level criteria of effectiveness (with several sub-criteria underneath), 45% to efficiency and 10% to coherence. The second used equal weights at this high level, assigning 33% to each of the three criteria. In the third cluster, all weight sets used a 40%-40%-20% weight split between effectiveness, efficiency and coherence.

Under each of these three clusters, the high-level criteria weights were broken down by the same four variations. The details can be seen in the table below which presents the full set of weights used in the sensitivity analysis.

Table 23 - Weight scenarios used on the sensitivity analysis

Weight no:		1	2	3	4	5	6	7	8	9	10	11	12
Effectiveness		45%	45%	45%	45%	33%	33%	33%	33%	40%	40%	40%	40%
Fostering the efficient use of resources (renewable & non-renewable) (resource savings in tons)	Society	27%	17%	20%	27%	27%	17%	20%	27%	27%	17%	20%	27%
Waste production, generation and recycling (waste savings)	Society	27%	17%	20%	27%	27%	17%	20%	27%	27%	17%	20%	27%
Contribute to fighting climate change (CO2 emissions savings)	Society	27%	17%	20%	27%	27%	17%	20%	27%	27%	17%	20%	27%
Consumer decision-making process	Consumers	10%	25%	20%	10%	10%	25%	20%	10%	10%	25%	20%	10%
Consumer trust and protection	Consumers	10%	25%	20%	10%	10%	25%	20%	10%	10%	25%	20%	10%
Efficiency		45%	45%	45%	45%	33%	33%	33%	33%	40%	40%	40%	40%
Consumer savings	Consumers	12.50%	12.50%	50.00%	71.17%	12.50%	12.50%	50.00%	71.17%	12.50%	12.50%	50.00%	71.17%
Savings in production costs for manufacturers	Businesses	12.50%	12.50%	8.33%	13.85%	12.50%	12.50%	8.33%	13.85%	12.50%	12.50%	8.33%	13.85%
Change in employment	Society	12.50%	12.50%	8.33%	1.60%	12.50%	12.50%	8.33%	1.60%	12.50%	12.50%	8.33%	1.60%
Growth and investment (in Europe - GVA traders, producers, repairers)	Businesses	12.50%	12.50%	8.33%	2.53%	12.50%	12.50%	8.33%	2.53%	12.50%	12.50%	8.33%	2.53%
Business adjustment costs	Businesses	16.67%	16.67%	8.33%	5.67%	16.67%	16.67%	8.33%	5.67%	16.67%	16.67%	8.33%	5.67%

Business administrative costs	Businesses	16.67%	16.67%	8.33%	0.14%	16.67%	16.67%	8.33%	0.14%	16.67%	16.67%	8.33%	0.14%
Implementation and enforcement costs	Public administration	16.67%	16.67%	8.33%	0.03%	16.67%	16.67%	8.33%	0.03%	16.67%	16.67%	8.33%	0.03%
Coherence		10%	10%	10%	10%	33%	33%	33%	33%	20%	20%	20%	20%
Coherence with other EU legislation		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The first and fourth sets under each of the clusters assigned larger weight to environmental and consumer protection goals under effectiveness, while the second set split these 50-50% and the third set 60-40%, giving 20% for each of the five sub-criteria. The efficiency criteria were broken down based on the calculated monetised values in the fourth set in each cluster, similarly but in a slightly more balanced way in the third set, and in an even more balanced way in the first and second sets. Weight set number 8 was chosen as the baseline as it has equal weight to effectiveness, efficiency and coherence and also considered the actual monetary estimates when comparing the efficiency of measures.

The following table presents the results of the scoring of measures under each of the 12 weight sets, with the scoring of the package that was ultimately selected added in the last row. The results show that for most of the sets, the relative ranking of alternative measures (M1 vs M2, M3 vs M4, M9a vs M9b) is preserved. An exception is the relative ranking of M9b (covering all products), which achieves a higher score due to its effectiveness in the first cluster (weights 1-4), and also for sets 11-12, where the measure performs badly on coherence, is underweighted.

Table 24 - Results of the sensitivity analysis (scores)

Measures	Weight set											
	1	2	3	4	5	6	7	8	9	10	11	12
M1 – Repair as the primary remedy	1.84	0.92	1.38	2.36	2.66	1.98	2.32	3.05	2.19	1.38	1.78	2.66
M2 – Preference for repair in the proportionality test	1.95	1.20	1.60	2.47	2.74	2.19	2.48	3.13	2.29	1.63	1.98	2.76
M3 – Interruption/Suspension of the legal guarantee period	0.47	0.45	0.72	0.97	1.64	1.63	1.83	2.02	0.97	0.95	1.20	1.42
M4 – extending the legal guarantee period	0.28	0.43	0.58	0.65	1.51	1.62	1.73	1.78	0.81	0.94	1.07	1.13
M7 - Aligning the legal guarantee period for refurbished second-hand goods with new goods	0.97	0.94	0.94	0.91	2.01	1.99	1.99	1.97	1.41	1.39	1.39	1.36
M8a - Replacement with refurbished goods in the extended liability period	0.23	0.29	0.44	0.56	1.21	1.25	1.36	1.45	0.65	0.70	0.84	0.95
M8b - Replacement with refurbished goods from the second year of the liability period	0.36	0.20	0.37	0.60	1.30	1.18	1.31	1.48	0.76	0.62	0.77	0.98
M9 a– Right to repair (ecodesign products)	1.35	1.40	1.86	2.07	2.29	2.33	2.67	2.83	1.75	1.80	2.21	2.40
M9 b– Right to repair (all products)	1.96	1.99	3.01	3.47	0.67	0.70	1.45	1.80	1.40	1.43	2.34	2.76
M 11 – Issuing a repair quote	2.44	2.42	3.35	3.74	3.10	3.09	3.78	4.07	2.72	2.71	3.53	3.88

M12 – Obligation to inform where to repair	0.66	0.71	0.86	0.93	1.53	1.56	1.67	1.72	1.03	1.07	1.21	1.27
M13a – Platform with information on available repair services - national	1.26	1.30	1.76	2.01	1.71	1.74	2.08	2.27	1.46	1.49	1.90	2.12
M13a+ - Platform with refurbished goods functionality	0.42	0.49	0.50	0.48	1.09	1.14	1.15	1.13	0.71	0.77	0.78	0.76
M13b – Platform with information on available repair services - Europe	0.72	0.69	0.92	1.04	1.05	1.03	1.20	1.29	0.86	0.84	1.04	1.15
M14 – Voluntary commitments to an EU common "easy repair standard"	1.06	1.06	1.25	1.31	1.56	1.57	1.70	1.75	1.27	1.28	1.44	1.50
Combined (M2, M9a, M11, M12, M13a, M13a+, M14)	6.53	5.49	8.22	10.35	6.14	5.37	7.38	8.97	6.36	5.44	7.86	9.76

The preferred policy package considered these relative scores and included measures with the highest overall scores under the baseline weight set 8 (M2, M9a, M11). Furthermore, the complementary voluntary measures (M1, M13a, M13a+, M14) generally all achieve consistently positive scoring across all weight sets (the scores for M12 and M13a+ are relatively low under the first cluster but good under the selected weight set no. 8).

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