EUROPEAN
COMMISSION

Brussels, 14.7.2021
SWD(2021) 202 final

COMMISSION STAFF WORKING DOCUMENT

EVALUATION

of the Low Voltage Directive 2014/35/EU

{SWD(2021) 203 final}

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Glossary

Term or acronym	*Meaning or definition*
A&I	Accidents and injuries
AdCo	Administrative Cooperation (Group)
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
DG GROW	Directorate-General for Growth - Internal Market, Industry, Entrepreneurship and SMEs
EEA	European Economic Area
EFTA	European Free Trade Association
EHSR	Essential Health and Safety Requirements
EMCD	Electromagnetic Compatibility Directive 2014/30/EU
ENs	European Standards
EU	European Union
FTE	Full-Time Equivalent
hENs	Harmonised European Standards
IEC	International Electrotechnical Commission
IoT	Internet of Things
LVD	Low Voltage Directive 2014/35/EU
Evaluation study	Interim evaluation of the Low Voltage Directive 2014/35/EU Final Report by Ecorys, Valdani Vicari & Associati, Deloitte
MD	Machinery Directive 2006/42/EC
MME	Manufacture of Machinery and Equipment
MSA	Member States Authorities
NA	New Approach
NACE	(European) Classification of Economic Activities (**N**omenclature statistique des **A**ctivités économiques dans la **C**ommunauté **E**uropéenne)
NLF	New Legislative Framework
OJEU	Official Journal of the European Union
Safety Gate/RAPEX	Rapid Alert System for dangerous non-food products

RED	Radio Equipment Directive 2014/53/EU
REFIT	(Commission's) Regulatory Fitness and Performance
RfUs	Recommendation for Use sheets

1 INTRODUCTION

Directive 2014/35/EU on electrical equipment designed for use within certain voltage limits[1], commonly known as the Low Voltage Directive (LVD), hereafter the Directive, is one of the core Union legislation regulating products of the Electrical and Electronic Engineering Industries, alongside the Radio Equipment Directive 2014/53/EU[2] (RED) and the Electromagnetic Compatibility Directive 2014/30/EU[3] (EMCD).

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PURPOSE OF THE EVALUATION

The first Low Voltage Directive (73/23/EEC[4]) was adopted in 1973. It was later amended[5] and then codified and replaced by a second Low Voltage Directive (2006/95/EC[6]) which in turn was repealed and replaced by the current Low Voltage Directive 2014/53/EU.

The purpose of this evaluation is to analyse the performance of the Low Voltage Directive towards its objectives of facilitating the free movement of electrical equipment across the Union and protecting consumers' and users' health and safety. The evaluation assesses the extent to which the Directive is fit for purpose, hence continues to deliver effectively, efficiently and at minimum cost the intended benefits for consumers and business.

The evaluation is supported by an external study (hereafter evaluation study)[7], commissioned by DG GROW and conducted from June 2018 to June 2019. It should be noted that any data

[1] Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (OJ L 96, 29.3.2014, p. 357).

[2] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC (*OJ L 153, 22.5.2014, p. 62).*

[3] Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (*OJ L 96, 29.3.2014, p. 79).*

[4] Council Directive 73/23/EEC of 19 February 1973 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (Low-voltage Directive), available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3Al21015b.

[5] Council Directive 93/68/EEC of 22 July 1993 amending Directives 87/404/EEC (simple pressure vessels), 88/378/EEC (safety of toys), 89/106/EEC (construction products), 89/336/EEC (electromagnetic compatibility), 89/392/EEC (machinery), 89/686/EEC (personal protective equipment), 90/384/EEC (non-automatic weighing instruments), 90/385/EEC (active implantable medicinal devices), 90/396/EEC (appliances burning gaseous fuels), 91/263/EEC (telecommunications terminal equipment), 92/42/EEC (new hot-water boilers fired with liquid or gaseous fuels) and 73/23/EEC (electrical equipment designed for use within certain voltage limits), available at: http://data.europa.eu/eli/dir/1993/68/oj.

[6] Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits, available at: http://data.europa.eu/eli/dir/2006/95/oj.

[7] Study on "Interim evaluation of the low voltage directive 2014/35/EU" by , ECORYS , VVA, published on 2020-02-11
https://op.europa.eu/en/publication-detail/-/publication/48c2118c-4d4d-11ea-aece-01aa75ed71a1/language-en/format-PDF/source-172841363

presented in this evaluation, which refers to EU or EU Member States, include the states which were EU Member States (i.e. EU27 and UK) when the evaluation study was carried out.

SCOPE OF THE EVALUATION

The evaluation covers all relevant product categories in the scope of the LVD (2014/35/EU) in relation to the EU, including the UK, the 4 European Free Trade Association (EFTA) countries, and Turkey.

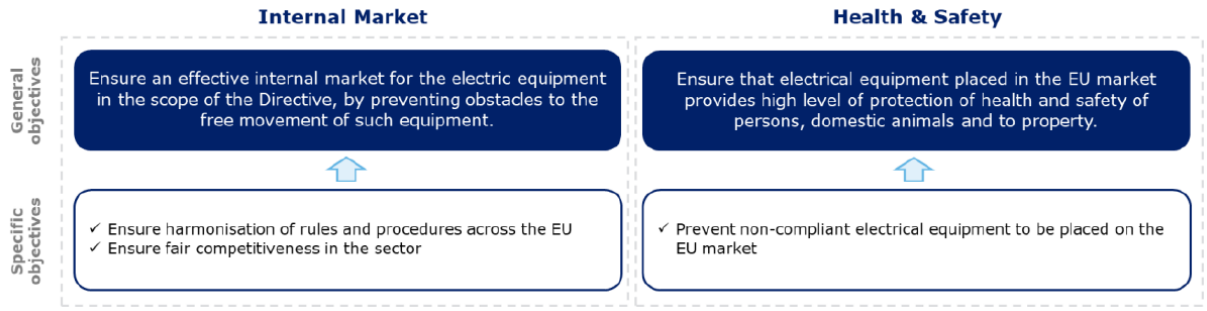
The evaluation covers the functioning of the Directive, including the processes involved in transposing, implementing and enforcing it, as well as assessment and monitoring procedures. The evaluation assesses the performance of the Directive according to five criteria: relevance, effectiveness, efficiency, coherence, and EU added value.

2 BACKGROUND TO THE INTERVENTION

DESCRIPTION OF THE LOW VOLTAGE DIRECTIVE AND ITS OBJECTIVES

The scope of the LVD covers electrical equipment with a rated voltage between 50 V and 1000 V (alternating current) or between 75 V and 1,500 V (direct current) that is placed on the internal market. The LVD has two main objectives.

Figure 1 – Objectives of the Low Voltage Directive



Source: Evaluation study

Firstly, it provides that electrical equipment, within its scope, must be compliant with the necessary requirements to ensure the health and safety of persons, domestic animals and property. The safety objectives cover all risks arising from the use of electrical equipment, not just electrical ones, but also other risks such as mechanical or chemical (in particular, emission of aggressive substances). They also include health aspects of noise and vibrations, and ergonomic aspects as far as ergonomic requirements are necessary to protect against hazards in the sense of the LVD. To this end, the economic operators can rely on harmonised standards (the references of which have been published in the Official Journal of the EU under the Directive) which, when fulfilled by the equipment, give a presumption of conformity with the corresponding safety objectives.

Secondly, it aims to guarantee that compliant products can move freely within the internal market, for the aspects it covers (health and safety), thus ensuring the functioning of the internal market.

Typical example of electrical equipment falling under the LVD are, but not limited to, household appliances[8] such as television, refrigerator, oven, microwave, toaster, blender, lamps, etc.; cables; power supply units; laser equipment; certain components such as fuses, etc.

Annex II to the LVD lists the types of equipment, which are excluded from the scope of the LVD. Moreover, pursuant to the Radio Equipment Directive (RED)[9] and the Machinery Directive,[10] the LVD does not apply to equipment within the scope of those Directives, but the safety objectives of the LVD which are up taken by those Directives, apply to that equipment.

To achieve the objectives of the LVD, the economic operators can rely on:

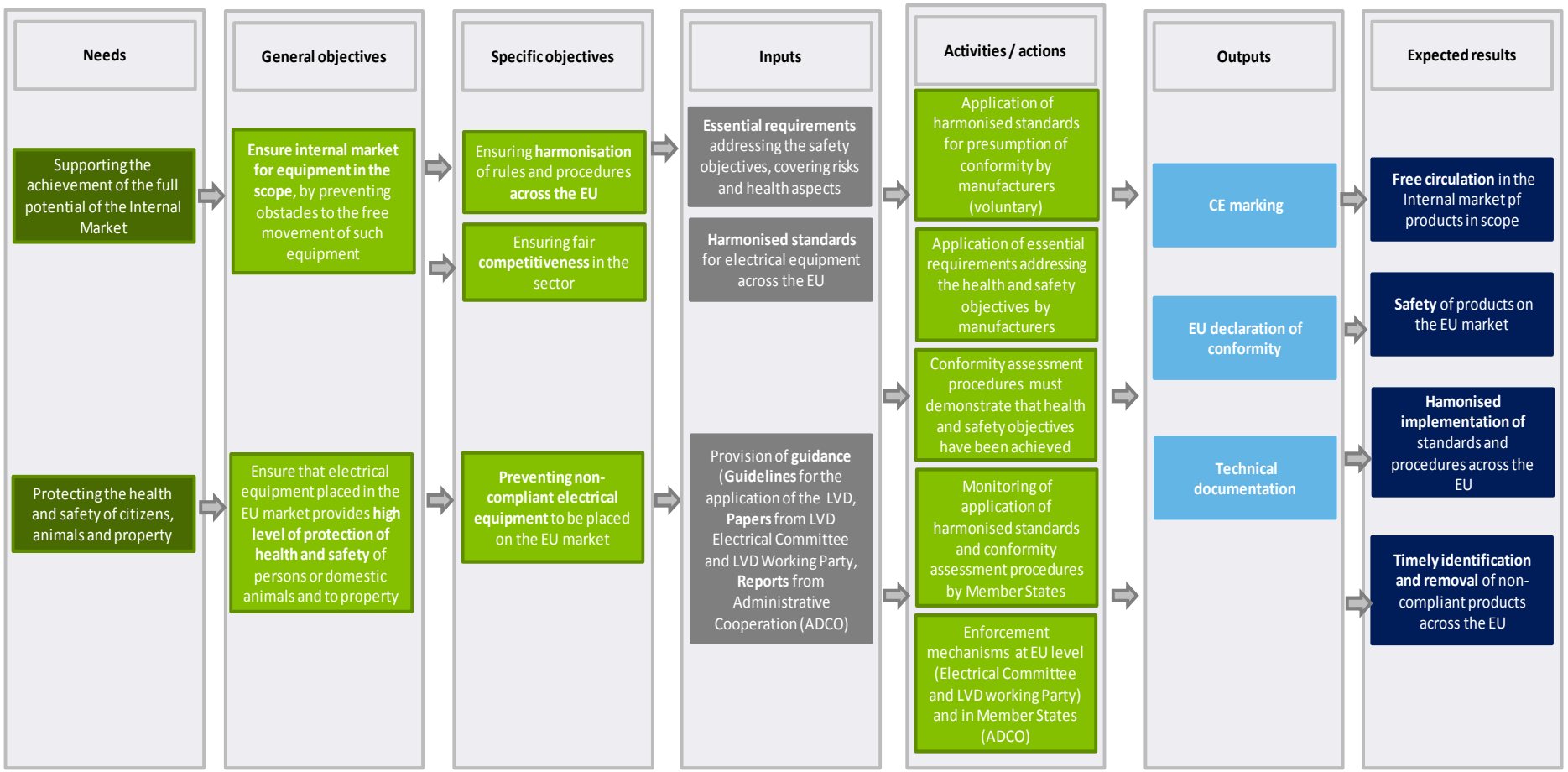
- Harmonised standards which give a presumption of conformity with the corresponding safety objectives;
- Conformity assessment procedure in which the manufacturer ensures and declares conformity of the electrical equipment with the provisions of the LVD ;
- Market surveillance which can monitor the compliance of a product with the LVD objectives.

[8] The LVD applies only to equipment having no internet function.

[9] DIRECTIVE 2014/53/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC

[10] Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (*OJ L 157, 9.6.2006, p. 24).*

The figure below (Figure 2) provides an overview of the intervention logic.



PREVIOUS LOW VOLTAGE DIRECTIVES AND CHANGES INTRODUCED BY THE CURRENT DIRECTIVE (LVD)

The first LVD 73/23/EEC, was adopted in 1973, as one of the EU's first product harmonisation directives. It introduced manufacturers' obligations to ensure that equipment placed on the market is safe, which is still the core of the LVD today. Although the CE marking did not yet exist at that point, the first Low Voltage Directive already included provisions regarding conformity declaration and marking.

In 2006, Directive 2006/95/EC replaced Directive 73/23/EEC, as amended by Directive 93/68/EEC on CE marking rules, but the contents of the amended Directive 73/23/EEC were not modified.

In 2008, the horizontal provisions of the New Approach[11] were reviewed with the adoption of the New Legislative Framework (NLF) i.e. Regulation (EC) 765/2008[12], Decision No 768/2008[13] and Regulation (EC) 764/2008[14]. The Alignment Package was a term used to describe the process of bringing Union harmonisation legislation (i.e. industrial product directives, such as the LVD) up-to-date with the NLF. On 29 March 2014, the Commission published the recasts of eight CE marking directives, which included the LVD (2014/35/EU). As a result, Directive 2006/95/EC was repealed and replaced by the current LVD, Directive 2014/35/EU, which entered into force in April 2014 and became applicable as of 20 April 2016. Additionally, the current LVD was also aligned with the procedures of the Standardisation Regulation (EU) 1025/2012.

Thanks to the alignment to the NLF, the current Low Voltage Directive clarifies the definitions and obligations of economic operators, regulates the conformity assessment in further detail, clarifies the meaning of CE marking and improves the procedures on market surveillance. The most significant changes are the removal, from the market surveillance provisions, of the references to any implication of notified bodies[15] for assessing the conformity of products in view

[11] The New Approach to technical harmonisation and standards was introduced in 1985. The key principles are: a clear separation between the EU legislation and the European standardization; the EU legislative harmonisation is limited to the essential safety requirements; the task of drawing up the technical specifications is entrusted to the standardisation bodies; products manufactured in conformity with harmonised standards published in the Official Journal of the EU are presumed to be conformant to the essential requirements; standards are not mandatory, they remain voluntary. Alternate paths are possible; standards must offer a guarantee of quality with regards to the essential requirements of the directives; public authorities are still responsible for the market surveillance; and safeguard clauses require the Member States to take all appropriate measures to restrict placing on the market or withdraw unsafe products from the market.

[12] Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93, available at: http://data.europa.eu/eli/reg/2008/765/oj.

[13] Decision No 768/2008/EC of the European Parliament and of the Council of 9 July 2008 on a common framework for the marketing of products, and repealing Council Decision 93/465/EEC, available at: http://data.europa.eu/eli/dec/2008/768(1)/oj.

[14] Regulation (EC) No 764/2008 of the European Parliament and of the Council of 9 July 2008 laying down procedures relating to the application of certain national technical rules to products lawfully marketed in another Member State and repealing Decision No 3052/95/EC, available at: http://data.europa.eu/eli/reg/2008/764/oj.

[15] A notified body is an organisation designated by an EU country to assess the conformity of certain products before being placed on the market. These bodies carry out tasks related to conformity

of their placing on the market and the introduction of the rule that the references of the harmonised standards shall be published in the OJEU under the LVD, in order to grant presumption of conformity with the corresponding safety objectives. The current LVD did not amend or modify the second LVD's legal substance with regard to its objectives (e.g. its safety objectives which remain unchanged which, unlike in the new legislative framework, are not called essential requirements) and main scope (it has only inserted an exclusion on 'Custom built evaluation kits destined for professionals to be used solely at research and development facilities for such purposes').

As of 16 July 2021, the LVD will apply in conjunction with the market surveillance provisions of Regulation (EU) 2019/1020[16].

It is in this context that the present evaluation looks at assessing the degree of achievement of the original objectives of the LVD (2014/35/EU) as regards to effectiveness, efficiency, coherence, relevance, and EU added value.

3 IMPLEMENTATION / STATE OF PLAY

All EU Member States have communicated to the Commission the texts of the main provisions of national law which they adopted in the field covered by the LVD. Currently, there are no infringement procedures[17] in relation to the LVD.

Member States are responsible for appointing competent authorities responsible for the implementation of the Directive at national level and for ensuring that the Directive is effectively enforced within their territories. As such, they are also responsible for market surveillance, including penalties.

RELEVANT BODIES

Several specific bodies assist the Commission in managing, monitoring and enforcing the implementation of the LVD:

The Committee on Electrical Equipment was established pursuant to Article 23 of the LVD, within the meaning of Regulation (EU) No 182/2011[18] concerning mechanisms for control by EU Member States of the Commission's exercise of implementing powers. It consists of representatives from the EU Member States as members, as well as EFTA countries and Turkey, as observers. The Commission is required to consult the committee when implementing acts are

assessment procedures set out in the applicable legislation, when a third party is required. The European Commission publishes a list of such notified bodies.

[16] Regulation (EU) 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011 (OJ L 169, 25.6.2019, p. 1).

[17] See online database of infringement decisions: http://ec.europa.eu/atwork/applying-eu-law/infringements-proceedings/infringement_decisions/?lang_code=en

[18] Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers, available at: http://data.europa.eu/eli/reg/2011/182/oj.

prepared under the LVD and on any question where the opinion of sectoral experts is required by the EU legislation (notably Regulation (EU) No 1025/2012[19] on European standardisation).

The LVD Working Party[20] is the most frequently used forum to discuss the practical application of the Directive at EU level. It is composed of representatives of EU Member States, as members, as well as EFTA countries, Turkey and stakeholders such as standards makers, industry representatives, consumers associations, etc., as observers. It is organised and chaired by the Commission.

The LVD AdCo (Administrative Co-operation) is composed of the national market surveillance authorities responsible with the enforcement of the Directive. It works independently from the Commission. National market authorities use this working group for international co-operation and information exchange.

GUIDELINES

Additionally to the above groups, the **Guidelines** on the application of the LVD[21] developed in cooperation with all stakeholders represented in the LVD Working Group, is a widely used tool that is highly appreciated for facilitating the effective and efficient application of the Directive.

EUROPEAN STANDARDISATION

The European harmonised standards (hENs) which give presumption of conformity to the Directive when published in the Official Journal of the EU (OJEU) underpin the implementation of the LVD. These harmonised standards are developed by the European standardisation organisations (CEN and CENELEC) with the active participation of the industry, consumers and workers representatives. Harmonised standard translate the essential health and safety requirements (EHSR) into detailed technical specifications for certain types of products.

4 METHODOLOGY

DATA COLLECTION AND CONSULTATION STRATEGY

The evaluation study was conducted from June 2018 to June 2019, with data collection activities running until April 2019, as presented in detail in Annex 3. The findings of the study are based on a programme of research and analysis, which included the following:

- **Desk research**

Desk research was a constant activity during the whole study. It analysed relevant documentation, including Regulations, Directives, Communications, Notices and Working Documents, Joint Market Surveillance Actions, as well as internal notes and minutes, reports from other studies, reviews and monitoring activities (see Annex 5). Database extracts from Eurostat, the Rapid Alert System for Dangerous Non-Food Products (Safety Gate/RAPEX) and from national authorities, etc. were also analysed.

[19] Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council, available at: http://data.europa.eu/eli/reg/2012/1025/oj.

[20] Low Voltage Directive Working Party, expert group number: E01342

[21] LVD 2014/35/EU - Guidelines on the application of the directive - August 2018

- **Interviews**

A total of 65 interviews were carried out as part of the consultation activities. Different types of stakeholders, at both EU and national level, were interviewed. Stakeholders from third countries were also interviewed with the aim of completing the understanding of legislative systems for low voltage products in other regions of the world (presented in Annex 5) and possibly spot 'best practices'.

- **Consultations**

For the evaluation, two online consultations were carried out: a targeted stakeholder survey, with differentiated questions per type of stakeholder, and a Public Consultation (Public Consultation) with one single set of questions for all respondents.

- ***Targeted stakeholder survey***

The stakeholder survey was launched on 4 December 2018 and addressed to the sector's relevant stakeholders. Its initial closure date was planned on 15 January 2019, but to maximise the response rate over the holiday period, it was extended until 31 January 2019.

In total, 221 respondents answered the survey. Out of these, 116 were manufacturers, 10 were importers and distributors, 13 were National Authorities including market surveillance authorities, 40 were business associations, 4 were consumer organisations, and 38 reported as belonging to "others" group. This last category included, among others, testing and standardisation organisations, notification bodies, consultancies, academic and educational organisations.

- ***Public Consultation***

In line with the Better Regulation Guidelines, a Public Consultation was launched on 10 January 2019, for 12 weeks. The Public Consultation questionnaire was addressed to all EU citizens.

The Public Consultation gathered 93 replies across 17 Member States. The highest number of replies came from Germany and the UK.

- **Workshop**

A workshop was organised on 8 February 2019 in Brussels during the LVD Working Party (39 members participated), to discuss the preliminary findings about the three following topics: understanding of the LVD, implementation of the LVD, and, enforcement of the LVD.

DATA ANALYSIS METHODOLOGY

Following the data collection activities, data triangulation was conducted where possible, in order to map different inputs from various sources against each other, and deduct findings. Due to the lack of existing evidence, notably quantitative data, on the actual performance of the LVD as regards the evaluation criteria, this evaluation largely draws on the findings of the interviews and workshop carried out as part of the evaluation study. The opinions of the different stakeholders' groups have been taken into account (including under-represented stakeholder groups such as SMEs and consumers) and cross-checked against each other. Further, the targeted stakeholder survey as well as the Public Consultation results – though not statistically representative - were leveraged to validate or challenge the trends identified through the previously mentioned data collection activities.

STATISTICAL DATA ON PRODUCTS IN THE SCOPE OF THE LVD

A challenge for the data collection and the analysis is that low voltage products are not a defined sector in the industry and are also not logged as a separate group of products in statistical databases.

Consequently, assumptions were needed in order to define the low voltage sector in relation to market data. The manufactured products described in the NACE categories contain products falling both within and outside the scope of the LVD. Therefore, the more detailed Prodcom-level product list for each of these NACE categories were applied to specific criteria in order to define whether each product category fall within the scope of the LVD. To fall in the scope of the Directive, a product category has to comply with the following criteria:

- The product refers to electrical equipment;
- The product falls within the voltage limits set by the Directive;
- The product is not part of the exceptions included in the Directive; and
- The product that is not excluded from the LVD because it falls under other relevant Directives (such as the Radio Equipment Directive or the Machinery Directive).

Based on those criteria, 188 Prodcom-level products under 9 NACE Rev. 2 categories are potentially falling within the scope of the LVD. However, it is not possible to have a clear conclusion for each product category as they consist of a mix of products. Hence a '*minimum*' range of products that are in the scope of the LVD, and an '*additional*' range of products that can be either within or outside the scope of the LVD. These two categories establish the '*maximum*' range of products that can be covered by the LVD.

Data on dangerous products falling under the LVD was collected through the **Rapid Alert System for dangerous non-food products (Safety Gate/RAPEX).** As Safety Gate/RAPEX uses different categorisation of products, it was not possible to link the products immediately to the product groups used in the economic analysis of the evaluation study. However, the most commonly reported Safety Gate/RAPEX category for which reference to non-compliance with the LVD is made is electrical appliances and equipment (55% of such alerts over 2005-2018), which includes equipment such as small kitchen appliances and home electronics, cables, chargers and adapters, and hand tools. 76% of the Safety Gate/RAPEX measures on products covered by the requirements of the products under the Directive reported originated from China across the years.

COST-BENEFIT ANALYSIS

It should be noted that stakeholders consulted provided very limited quantitative data on the **costs and the benefits** of the LVD during the evaluation study. There are two main reasons to that:

- The LVD sets few obligations directly for stakeholders and provides a framework for good conduct though the referral to other instruments (Market Surveillance, CE Marking, Conformity Assessment, Harmonised Standards).
- In addition, the LVD is now fully integrated in the national regulatory framework and it is challenging for stakeholders to assess (quantitatively) the costs and benefits that arise from the application of the Directive.

Detailed information on statistical data used for products within the scope of the LVD, Safety Gate/RAPEX and cost and benefits data is provided in Annex 3.

5 ANALYSIS OF THE LVD MARKET

As stated in section "Statistical data on products in the scope of the LVD", the assumptions for the products data provided allow us to present a *'minimum'* range of products that are within the scope of the LVD, and an *'additional'* range of products that can be either within or outside the scope of the LVD. Together, these categories constitute the '*maximum'* range of products that are covered by the LVD.

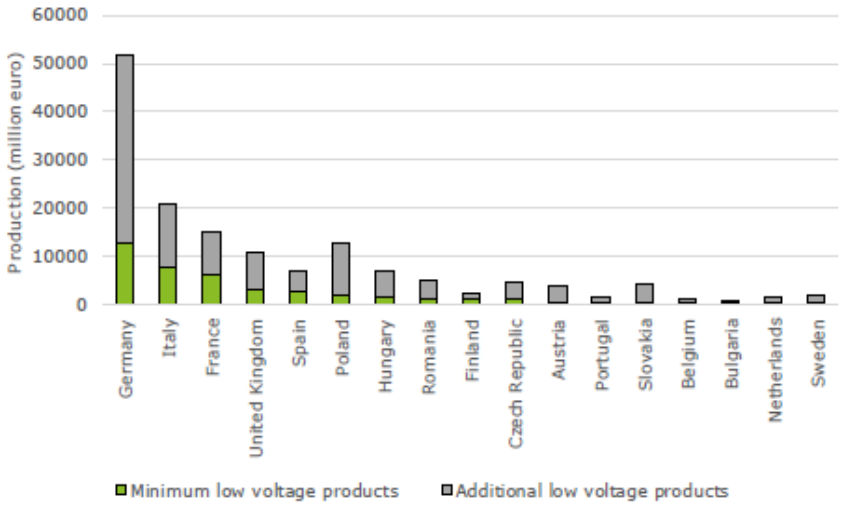
Most data presented in this section cover the maximum range of the low voltage market (minimum and additional products).

ECONOMIC IMPORTANCE IN THE EU

The minimum range of products on low voltage market represents approximately 1% of the European manufacturing sector. The additional range of products on low voltage market represents approximately 2.7%. Both together result in 3.7% of maximum range of products for a total amounted of EUR 206,067 million in 2017, with the most significant NACE industry categories being that of motors, generators, transformers and electricity distribution and control apparatus followed by domestic appliances and equipment for motor vehicles. With regards to low voltage production within each industry, those that have the highest percentage of products falling under the LVD are electrical and electronic equipment for motor vehicles, electric domestic appliances and other electric equipment. Germany has the largest average of the yearly production values over the past five years from EU Member States[22].

Figure 4 shows the average of the yearly production values over the past five years across different Member States. A five-year average is used, as annual data could give an inaccurate picture because there can be significant fluctuations in production values, largely due to data availability.[23]

Figure 3 – Member State annual average production of Low Voltage product group (annual average 2012-2017)



Source: Evaluation study

[22] To illustrate, 63 of the 188 products of the low voltage products (maximum range) were reported as confidential for Germany in 2017.

[23] It should be noted that product level data are not complete, as a large share of product-level data is reported as confidential.36 Therefore, one should be careful in drawing strong conclusions from these data.

Low voltage product manufacturing has grown at a slightly lower rate than the overall EU manufacturing industry. The maximum low voltage production (minimum and additional) dropped from representing 5.0% of EU manufacturing in 1995 to approximately 3.8% in 2017. However, it should be noted that product level data are not complete, as a large share of product-level data is reported as confidential.

INTRA- AND EXTRA-EU TRADE IN LOW VOLTAGE PRODUCTS

In 2017, intra-EU trade was larger than extra-EU trade and the EU imported more than it exported. Table 1 shows the levels of EU trade of low voltage products with EU Member States and countries outside of the EU (for readability referred to as intra- and extra- EU).

Table 1 – Intra and extra-EU trade maximum and minimum range (million euro), 2018

	Intra-EU		Extra-EU	
	Minimum range of LVD	**Maximum range of LVD**	**Minimum range of LVD**	**Maximum range of LVD**
Exports	40,606	203,059	33,972	101,825
Imports			19,735	128,874

Source: Evaluation study calculations based on Easy Comext

EU exports in low voltage products have always been higher in the intra-EU market as compared to the extra-EU market. The value of trade in low voltage products between the EU Member States has fluctuated between 60% and 70% of total low voltage trade of the EU Member States over the past decades.[24] While both types of exports have been growing at similar rates, intra-EU exports have grown a bit more rapidly over the past 5 years, gaining in importance compared to exports to extra-EU countries.

The product category in trade with the highest values is that of machines for the reception and conversion of voice images or data (including switching and routing apparatus but excluding telephones for wireless networks) as well as apparatus for electric control or the distribution of electricity, electric conductors and switches.

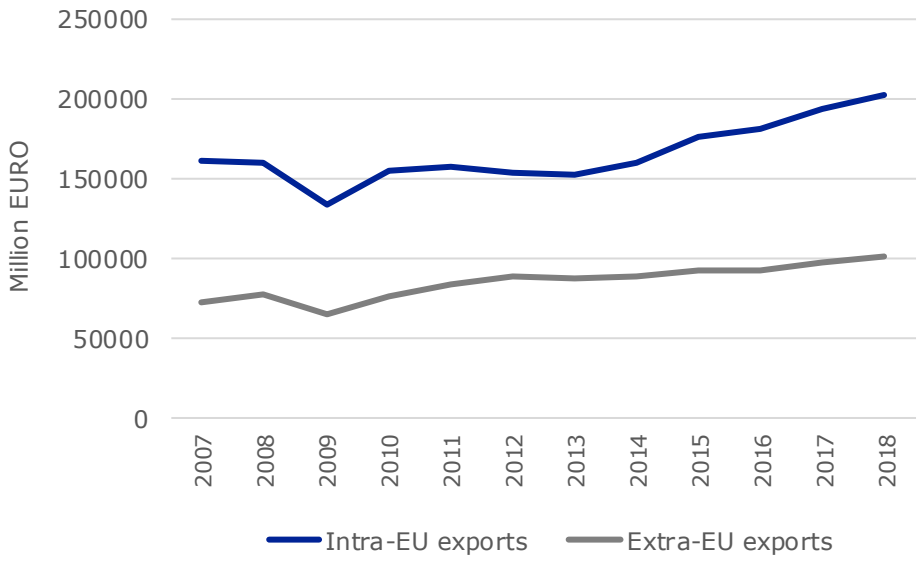
Intra EU trade shows large values for electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits, e.g., switches, relays, fuses, surge suppressors.

Extra EU exports is strong on electric motors and generators (excl. generating sets) and electric transformers, whereas extra-EU imports have larger values for products with more domestic purposes, such as electric heaters, hairdryers, hand dryers and electric smoothing irons.

For imports, the larger intra-EU flows also holds, though the difference in trends between intra and extra- EU imports in recent years has been less pronounced.

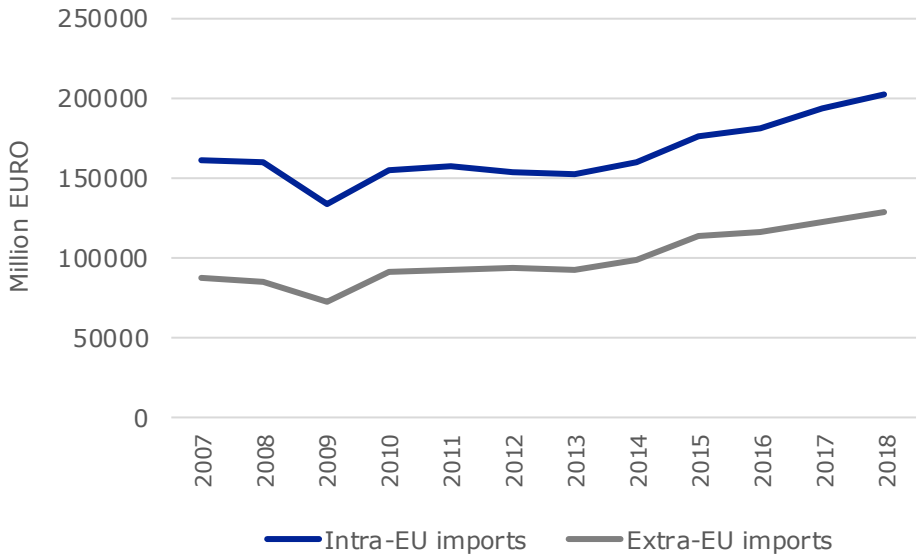
[24] As in the entire market analysis section, this is an estimation and based on a database with several gaps. The change in 2005 seen in the graph, for example, is due to previously unavailable trade data for some low voltage products becoming available, and not due to rapidly increasing exports.

Figure 4 - Intra- and extra-EU exports of LVD products (maximum range), 2000-2018



Source: Evaluation study calculations based on Easy Comext.

Figure 5 - Intra and extra-EU imports of LVD products (maximum range), 2000-2018



Source: Evaluation study calculations based on Easy Comext

The above figures show the trends for the maximum range of low voltage products. When disaggregating these values per product categories, the 'minimum' low voltage category is relatively more important in EU exports to the rest of the world than in its imports from other countries.

Since 2013, imports into the EU have increased much faster than EU exports to the rest of the world, therefore increasing the trade deficit.

Regarding trading partners outside the EU, China is by far the largest import partner. Export partners are more varied, with the US accounting for the largest share of exports. Approximately 45% of extra-EU imports in 2018 came from China, which is the result of a significant growth in Chinese low voltage imports that started in the early 00s and have been growing exponentially since 2007.

CONSUMPTION OF LOW VOLTAGE PRODUCTS

Over the last 20 years, European consumption[25] of electronic equipment has steadily increased. Although in 2008 consumption of products under the LVD showed a decrease as a result of the economic crisis, consumption has recovered after and was back on pre-crisis levels by 2016. However, values should be taking as an approximation, both due to missing values for certain products and years and due to the combination of different statistical categories (Prodcom for production and HS for trade).

Additional figures supporting this section "Analysis of the market" can be found in Annex 4.

6 TRENDS AND DEVELOPMENTS WITHIN THE LOW VOLTAGE MARKET

Main trends and developments identified within the low voltage market are technological innovations and e-commerce.

TECHNOLOGICAL INNOVATIONS: CONNECTED SYSTEMS AND THE INTERNET OF THINGS

The scope of the LVD and the products it covers are affected significantly by the increasing importance of the Internet of Things (IoT), where everyday products are embedded with computing devices allowing them to wirelessly send and receive data. Consumer electronics accounts for one of the largest segments of the IoT market. The surge of "smart homes" with multiple purposes (energy saving, replenishing, remote control, etc.) is expected to keep growing. The expected average annual growth rate of smart appliance users in Europe is 33% for the period of 2016-2022[26]. Statista[27], a provider of market and consumer data, estimated household penetration of smart homes in Europe at 10.9% for 2018, expecting this value to rise to 22.5% by 2023. This means that almost a fourth of all European households is expected to have at least one type of home automation functionality in place – be that in appliances, entertainment systems, temperature control or lighting. These were the growth rates expected before the apparition of Covid-19 crisis.

Developments in IoT affects the coherence between the LVD and the RED, which is further analysed in chapter 7.4.

E-COMMERCE

E-commerce continues to grow. Seven in ten European online shoppers bought items from retailers outside their home country in 2017[28] and EU enterprises turnover from e-commerce reached an average of 18% of their total sales in the same year.[29]

The main trends reveal that purchasers prefer to buy low voltage products online and in electric/electronic stores, while second hand transactions are the least common shopping mean. Around 77% of the shopping in electric stores happened in the country of origin of the purchasers and 18% in another Member States.

[25] Consumption levels calculated as Production level + (Extra-EU imports – Extra-EU exports).
[26] APPLiA, The Home Appliance Industry in Europe 2017-2016 (2018)

[27] Statista, Smart Home

[28] UPS Pulse of the European Shopper - ComScore Survey

[29] Eurostat, Value of ecommerce sales [isoc_ec_evaln2].

Concerning online shopping, before the Covid-19 crisis, nearly 57% of the products were purchased in the country of origin, 25% in another European country and 18% in another country outside the European Union. Overall, the participants seem to prefer buying low voltage products in their countries or at least in the European Union. The most quoted countries for the extra-European countries were the Asian ones, China in particular, and the US.

E-commerce changes the way consumers shop on a large scale, with 40% of consumers preferring to buy consumer electronics online.[30] This was also confirmed by the Public Consultation (Public Consultation) carried as part of evaluation study.

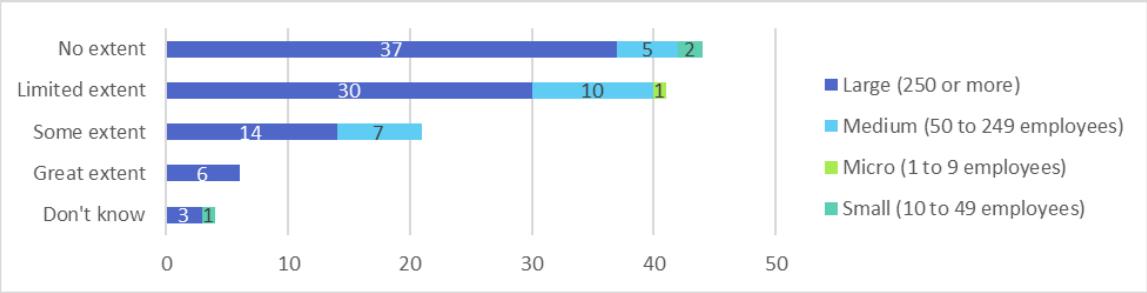
7 Analysis and Answers to the Evaluation Questions

Findings in relation to the Effectiveness of the Directive

This section presents the findings on the effectiveness of the LVD at the level of its core objectives.

Regarding the Directive's **contribution to the internal market**, notably about the difficulties to apply the LVD in practice, 85 out of 116 manufacturers that responded to the stakeholder survey[31] declare facing no issues or some issues to a limited extent. Out of the 27 economic operators having reported facing issues to some or great extent, 18 provided further insights through comments. The remaining 4 respondents didn't know if applying the LVD induced difficulties. Overall, the main concerns are related to the overlaps with other legislation such as the RED or the MD. This statement is valid irrespective of the size of the businesses as presented in the figure below. Similarly, the majority of manufacturers (90 out of 116) reported no issue related to the cross-border implementation of the Directive.

Figure 6 - Stakeholder survey/Manufacturers Q.9: "To what extent do you experience difficulties in applying the LVD?"



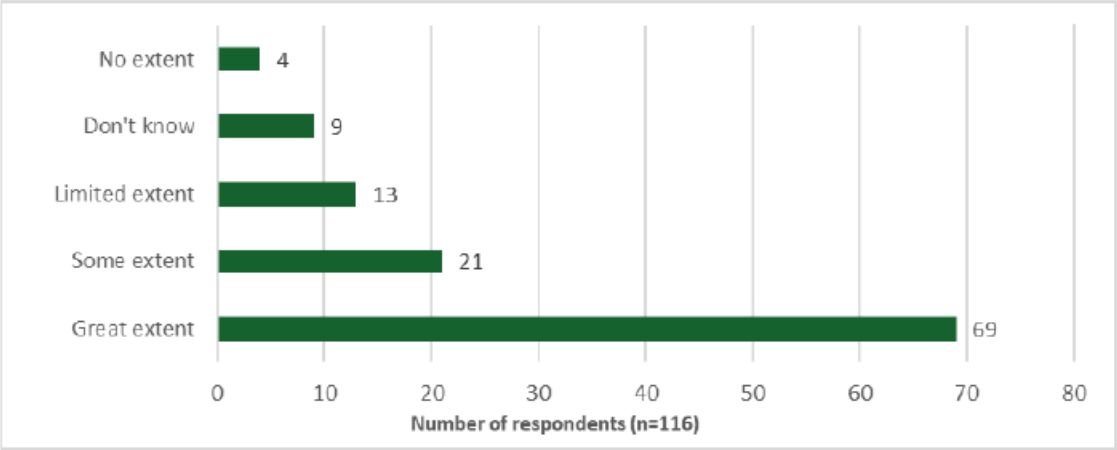
Source: Stakeholder survey, evaluation study

The stakeholder survey provides a positive feedback relating to LVD's contribution to a well-functioning internal market. 9 out of 12 national authorities having replied to the survey indicated that the LVD facilitates the functioning of the internal market. Similarly, the four consumer organisations also replied positively to LVD's contribution to intra-EU trades. The majority of consulted manufacturers, importers and distributors having taken part to the survey share the opinion that the Directive was successful in harmonising the rules and requirements within the Member States and therefore, the LVD facilitates the free movement of products in its scope across the EU. Importers and distributors that replied to the survey also reported no significant issues related the LVD when importing/distributing products within the EU.

[30] PWC, Global Consumer Insight Survey (2018).
[31] Annex 5.

Furthermore, 90 out of the 116 manufacturers reported that the LVD facilitated intra-EU exchanges to at least some extent, with the majority (69) being satisfied to a great extent; these opinions are aligned across SMEs and large corporations. Out of the 116 manufacturer respondents, only four considered that the LVD did not facilitate EU trade in any way.

Figure 7 – Q10 Manufacturers: "to what extend do you think the LVD facilitates intra-EU exchanges.



Source: Evaluation study, Stakeholder survey

The impact of extra-EU competitors reaching their consumers via online sales may be considered as a factor undermining the achievements of the LVD related to fair competition. Indeed, through e-commerce, consumers receive products directly (at home) meaning these do not transit by the shelves of stores within the internal market, and therefore, this business model might be disruptive of the usual market surveillance inspections.

E-commerce changes how businesses market products, where products are sourced from and the distribution channels. The imported products must comply with Union harmonisation legislation on products, as products offered for sale online to EU consumers are considered as being placed on the EU market. Challenges still remain related to all players in the process, including economic operators, surveillance authorities and consumers. Issues are:

- An increased number of non-EU economic operators active in the EU and the difficulty of tracing them;
- A lack of physical access to the products on the side of national market authorities making it difficult to sample products or conduct risk assessments (e.g. not all MS can purchase online items);
- A lack of awareness on the side of consumers about product compliance online.

Some steps are being taken by the Commission for an increased clarity of e-commerce rules[32] but challenges remain in particular related to market surveillance. Market surveillance authorities have – to various degrees - started developing capacities and tools to help market surveillance for products sold online, but have not yet caught up with this fast-evolving sector. Additionally, the Goods Package[33] communication was initiated in 2017 with the aim to reinforce trust in the single

[32] A Commission Notice on the market surveillance of products sold online (2017/C 250/01) was published:
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52017XC0801%2801%29

[33] The Goods Package:

market and address the weaknesses of the single market for goods that relates to the enforcement of EU harmonised product safety rules and that relates to products (sold online or offline) that do not fall under harmonised EU product safety rules, or only fall partially under such rules.

Market surveillance for the LVD has been highlighted as a key issue regarding the implementation and enforcement of the LVD and affected the fairness of LVD with regards to EU enterprises within the internal market. It was mentioned by both companies and national authorities interviewed that at the moment, (compliant) EU enterprises did not compete on a level playing field with extra-EU competitors, especially those active on e-commerce platforms. Extra-EU competitors faced fewer deterrents to incompliance than (compliant) EU enterprises, and therefore, were able to offer similar products at cheaper prices on the EU market.

As regards the European harmonised standards, which are outside the scope of this evaluation, all types of stakeholder groups consulted confirmed that standardisation is an effective means to ensure the adaptability of the Directive to market trends, including technological innovation. Harmonised standards are implemented at national-level and entail the withdrawal of any conflicting ones. This transposition at national level therefore clearly contributes to the removal of barriers to trade within the single internal market. This was also confirmed by the economic operators having replied to the survey who highlighted the positive effects of standardisation on the internal market.[34]

To analyse the extent to which the Directive **contributed to health and safety**, the consultations data as well as available data from Safety Gate/RAPEX was used, see Annex 3 for detailed explanation. Opinions from the stakeholders and limitations of the economic data were also considered. Additionally, the reports for Coordinated Activities on the Safety of Products and Joint Market Surveillance Activities for LVD products were used.

The consultations data indicated that the majority of all respondent groups, including 9 out of 12 authorities, considered the main benefits deriving from the LVD related to health and safety protection to be 'high'. Similarly, 3 out of 4 consumer associations having replied to the survey reported that the LVD had improved the safety of the low voltage products available on the market at least to 'some extent'. Regarding economic operators, 18 out of 26 SMEs reported an improvement in the safety of electrical products thanks to the LVD to a "great" or at least to "some" extent. The figure was even higher for large companies (77 out of 90).

Importers and distributors appeared to agree on the high guarantee of safety ensured by the LVD provisions with manufacturers though to a lesser extent.

During the Public Consultation, 24 out of 93 respondents[35] affirmed they had been involved in a risky situation with an LVD product. All the 24 individuals that replied positively added detailed descriptions of the dangerous situation. The dangerous products were various, such as toys, electric kitchen utensils, adaptors, etc. Situations in which instructions were not included or the CE marking was missing were also described. Following the dangerous situation, 10 consumers decided to contact the seller of the product, 9 consumers decided to contact the economic operator specified in the user's manual, 7 to not contact anyone and 7 to contact the authorities. Only 1 individual contacted a consumer association.

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https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM%3A2017%3A787%3AFIN

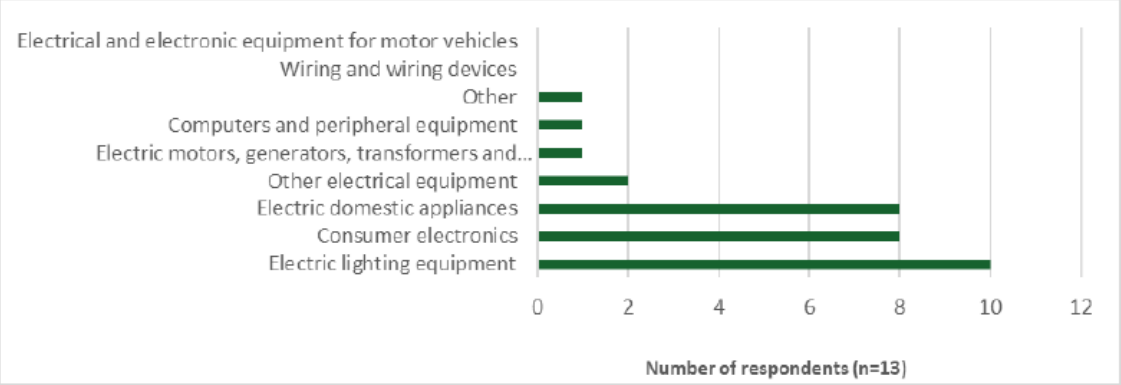
[34]Section https://op.europa.eu/en/publication-detail/-/publication/48c2118c-4d4d-11ea-aece-01aa75ed71a1/language-en

[35] The Public Consultation did not allow to differentiate the respondents per type of stakeholder.

Hence, while the perception of both EU Member States authorities and consumer organisations is rather positive about the level of safety of low voltage products in the EU, there is still quite some room for improvement in this area.

National authorities participating in the stakeholder survey[36] were also asked to provide some information from their perspective on the numbers of non-conforming equipment. According to them, 'electric lighting equipment' was the category most commonly found to be non-compliant, followed by electric domestic appliances and consumer electronics. Figure 17 below displays the numbers in more detail.

Figure 8 – Q9 Authorities: "What types of LVD equipment are most commonly found to be non-compliant



Source: Evaluation study, stakeholder survey

It should also be noted that in Safety Gate/RAPEX the most commonly reported category of equipment is electrical appliances and equipment (55% of alerts over 2005-2018), which includes equipment such as small kitchen appliances and home electronics, cables, chargers and adapters, and hand tools. In the same vein, according to the authorities having replied to the survey, electric lighting equipment, electric domestic appliances and consumer electronics are also the items most commonly recalled from the market.

Harmonised standards providing presumption of conformity have been widely reported as being the preferred method for ensuring the compliance of electrical equipment, both in quantitative (i.e. it is the most used) and qualitative (i.e. it is the most preferable) terms. This was unanimously underlined by all types of stakeholders consulted as part of the study[37], including consumer organisations, national authorities, business associations and economic operators, including standardisation bodies. All types of stakeholders highlighted the capacity of standards to ensure the convergence, throughout the EU, of state-of-the-art practices guaranteeing the safety of low voltage products, notably by formalising the essential safety requirements of the Directive that may be considered very generic and succinct.

During the interviews carried out with the 38 business-related stakeholders consulted as part of this evaluation, standards (mostly harmonised and international) were unanimously mentioned as being the most leveraged means for economic operators to manufacture compliant products. The benefits linked to the presumption of conformity offered by the use of standards was considered

[36] Only 13 national authorities took part to the stakeholder survey.

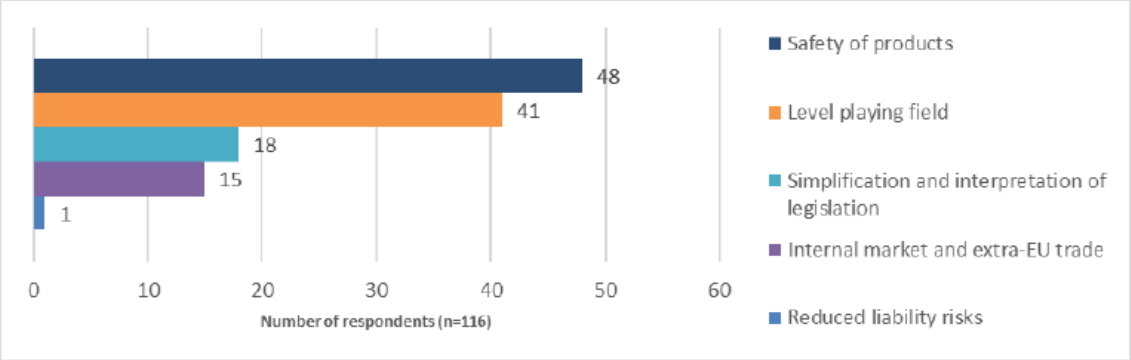
[37] https://op.europa.eu/en/publication-detail/-/publication/48c2118c-4d4d-11ea-aece-01aa75ed71a1/language-en

to strongly outweigh their economic cost[38]. Indeed, it has been reported by economic operators, industry associations and standardisation bodies that deviations from standards occurred very rarely. Industry associations actually mentioned there was an implicit rule in the sector: 'if there is a standard, use it'.

Deviations from standards may happen particularly when a product is very specific or new to the market. In such cases, manufacturers interviewed report that existing standards were used as 'inspiration' to the extent possible in order to leverage 'best practices'. This again underlines the importance of the voluntary characteristic of standards with regards to innovation and new product development.

In the same vein, the 116 manufacturers having replied to the stakeholder survey, highlighted a number of benefits related to the use of standards. These included namely: ensuring the safety of products (48x[39]), providing a level playing field in the EU (41x), allowing for the simplification and easier interpretation of the legislation (18x), enhancing the Internal Market and extra-EU trade (15x) and reducing liability risks (1x). Some manufacturers commented that the LVD is "*Defining clear & detailed rules for certain product categories to enable a level playing field in the common market*" and also "*A simple directive and well-designed standards, drafted by experts, creates safe products and a level playing field*".

Figure 9 – Manufacturers Q22: "What do you think are the main benefits deriving from standardisation for the LVD speciality?"



Source: Evaluation study, stakeholder survey

The consumer organisations having replied to the survey indicated the opportunity to play an active role in setting standards, as well as to timely modify standards to ensure the safety levels required by the Directive are reached, as the highly-ranked benefits.

Based on the national-level interviews, the stakeholder survey and the LVD Working Party Workshop, it appeared that overall, the current conformity assessment procedure (Module A, as provided by Annex III of the Directive) was rather positively regarded and considered to fulfil expectations related to ensuring safety of LVD products in a flexible and cost-effective way. Manufacturers considered themselves to be best placed to assess the risks related to their electrical equipment; for them their internal production control was effective and sufficient to ensure the safety. Opinions of national authorities and consumer organisations were more nuanced. In particular 3 out of 4 consumers' organisation stated that conformity assessment procedures guarantee safety of electrical products only to "some extent".

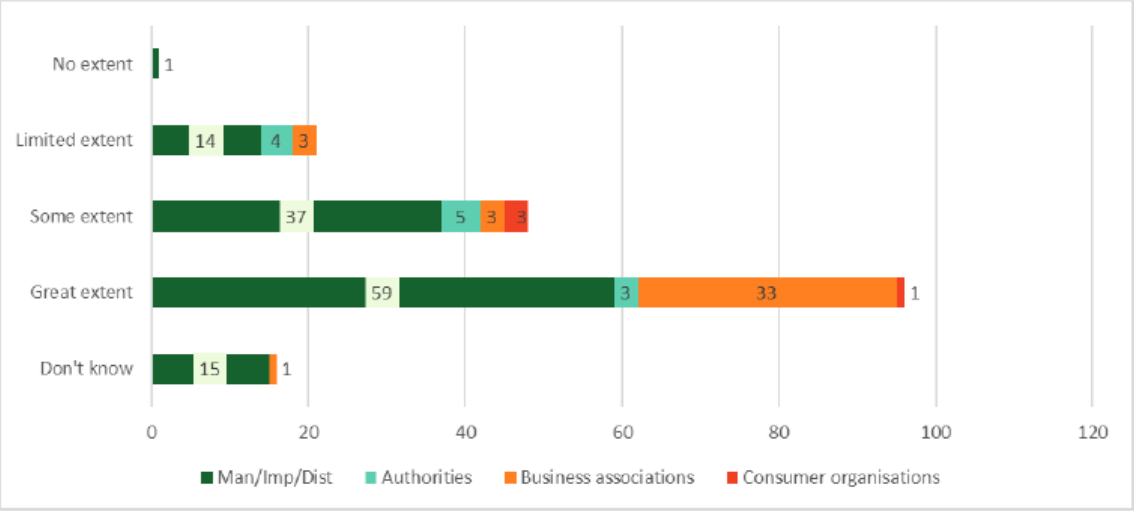
[38] The overall costs (and benefits) of the Directive will be discussed in detail in further section

[39] Number of times a reply corresponding to the benefit was provided by the responding manufacturer.

8 out of 11 market surveillance authorities having replied to the survey considered Module A (which specifies the elements that the EU declaration of conformity shall contain) as safety-enabling to some or to a great extent. Comments received included notably the following notes from market surveillance authorities:

- 'limited extent': *"Manufacturers (China!) do not always follow these procedures. Too complex? Too expensive?"*
- 'limited extent': *"Conformity assessment could be according to the risks the products present - similar to Personal Protective Equipment legislation"*
- 'limited extent': *"Modules B and H of the conformity assessment procedures should be included in the LVD Directive, because there are safety aspects involved which come with a higher risk profile."*

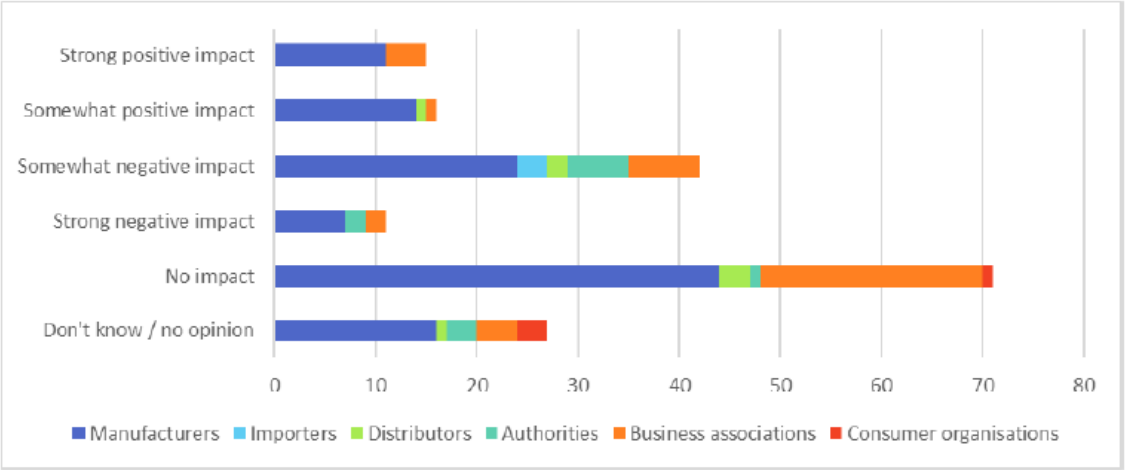
Figure 10 – Stakeholder survey: "To what extend do you think that the tool of the conformity assessment procedures, as provided by the LVD 2014/35/EU, is sufficient and appropriate to guarantee the safety of electrical products?"



Source: Evaluation study, stakeholder survey

More diverging views were expressed for the absence of the Notified Bodies. Those views were presented in the stakeholder survey as highlighted in the figure below. Overall, very few manufacturers, consumer organisations, and business associations interviewed (≤≈25%) estimate that the absence of notified bodies has a negative impact on the safety of products. This opinion is bigger among importers, distributors, and national authorities (between 50 and 60%). Only one consumer organisation stated that the removal of Notified Bodies had a strong negative impact on safety (whereas the other three having replied to the survey did not have any opinion on this). National authorities having replied to the survey had the most negative view of all stakeholder categories: none of them reported a "somewhat positive" or "positive impact" related to the absence of Notified Bodies, whereas eight out of twelve considered their removal as having at least a 'somewhat negative' impact. Unfortunately, none of the stakeholders expressing negative opinions in the stakeholder survey provided a comment to better explain their perspectives.

Figure 11 – Stakeholder survey Q14: "Since the LVD 2014/35/EU, the notified bodies are not anymore part of the procedure. What do you think is the effect of the current absence of notified bodies concerning safety of products?"



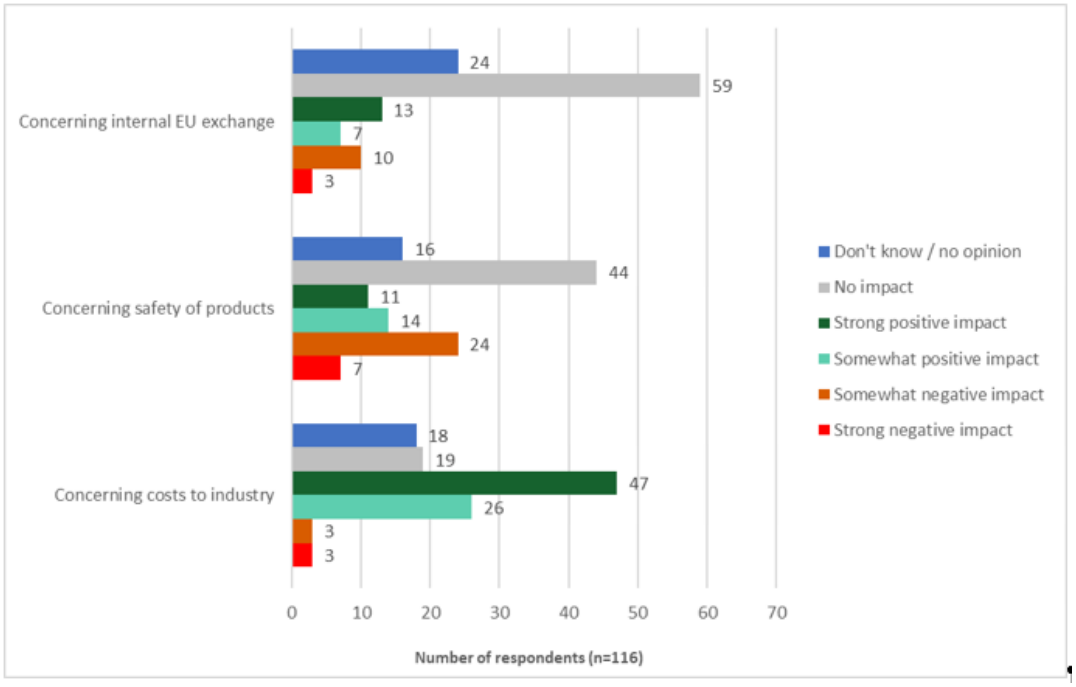
Source: Evaluation study, stakeholder survey

Consumer organisations present at the Low Voltage Working Party Workshop (and interviewed as part of other data collection efforts) welcomed the current conformity assessment procedure, however, some highlighted that in order to further enhance the current level of safety in the EU market, a Module B such as existing for the EMCD, involving a Notified Body, could be made available and/or in certain instances mandatory under the Directive, as for example proposed below. This was also in line with the comments received from national authorities outlined above.

The underlying idea is that (1) some (new/innovative) products may still pose a significant threat to end-users and the product should therefore be cleared by a third party organisation rather than the manufacturer itself, and (2) that some economic operators, including SMEs (also supported by two national authorities present at the workshop), may be willing to de facto have recourse to Module B for all types of products, regardless of the risks they may represent, as they would rather rely on the expertise of a Notified Body in conducting the actual conformity assessment. In this second case, Notified Bodies are seen as a source of support and guidance for SMEs struggling with the conformity assessment procedure, or in cases of conflicts with Market Surveillance Authorities.

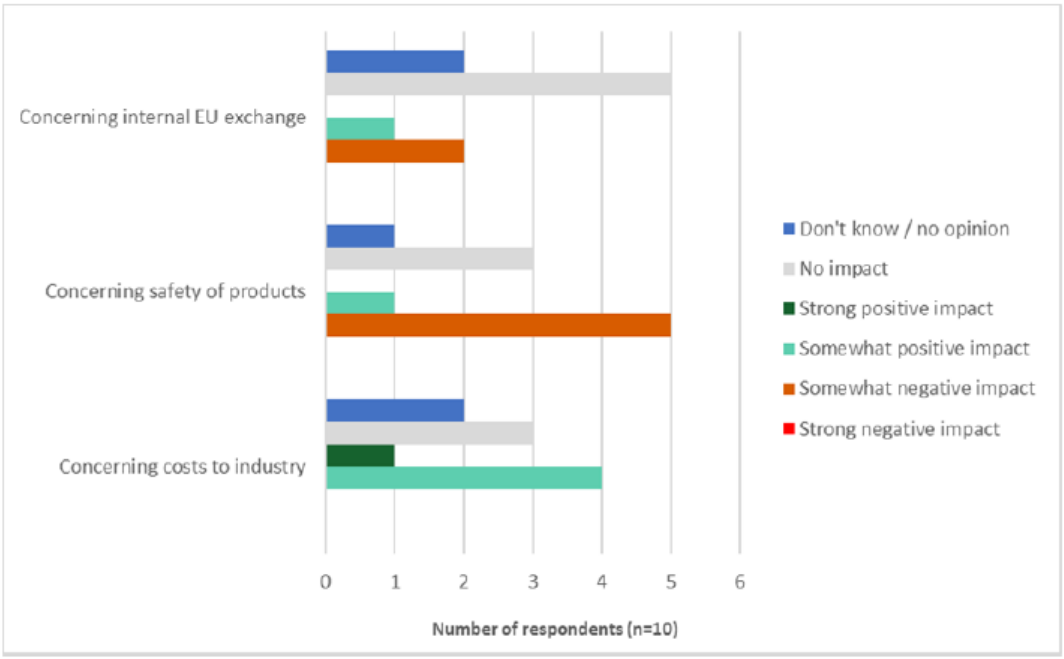
Such supportive role was also confirmed as beneficial through the stakeholder survey by manufacturing SMEs, importers and distributors. In particular, it was mentioned that for certain SMEs, it might be difficult to have the required technical expertise to demonstrate compliance, especially when developing innovative products which require a mix of different technical requirements. Further, even though there was not much information and consensus on the real impact of the provision (and how much it is strictly perceived as a "collateral effect" of the LVD), importers and distributors seemed to be more worried about the impact that the absence of notified bodies might have had on the safety of products than on the manufacturers, with 5 respondents reporting a "somewhat negative impact". On the other hand, this provision was seen as a possibility for the industry to reduce costs.

Figure 12 – Manufacturers Q14: "Since the LVD 2014/35/EU, the notified bodies are not anymore part of the procedure. What do you think of the effect of the current absence of notified bodies?"



Source: Evaluation study, stakeholder survey

Figure 13 – Importers and distributors Q15: "Since the LVD 2014/35/EU, the notified bodies are not anymore part of the procedure. What do you think of the effect of the current absence of notified bodies?"



Source: Evaluation study, stakeholder survey

For all stakeholder groups consulted (including national authorities, consumer organisations and economic operators) the majority of respondents and/or interviewees presented positive feedback as regards the LVD's contribution to safety of electrical equipment in the EU market. However, some improvement opportunities regarding practical features of the LVD were mentioned across all stakeholder groups, which would allow to further improve the safety of low voltage products made available in the internal market:

All types of stakeholders noted that within the conformity assessment procedure (Module A), it may not always be clear for economic operators when there is a need for risk assessment and how to carry it out, which can compromise its implementation. In addition, some stakeholders, notably consumer organisations, may wonder whether all products should have the same procedure, or whether a distinction between risk-levels (e.g. the current self-certification for low-risk products and third-party certification for products with higher risks) would be more appropriate to prevent accidents. Example[40] of such approach below:

- For products with low to medium risk levels, economic operators would be left with the choice of module A or B, as products in this category would not pose a serious and/or life threatening risk for consumers in any of their intended or reasonably foreseeable use.
- For products with high risk levels, economic operators would have to use Module B only, as products in this category may pose a serious and/or life threatening risk for consumers in some of their intended or reasonably foreseeable use.

Such separation and list between medium risk and high risk products are not currently part of the LVD and it might make little sense to go in that direction.

As underlined by EU Member States authorities, further analysis of the actual need to include Notified Bodies in the conformity assessment process as well as of the actual impacts of such inclusion should be carried out in order to be able to conclude with precision on this matter.

Market surveillance data for LVD has been highlighted as a key issue regarding the implementation and enforcement of the LVD, having impacts on both core objectives. It was noted that while in some countries the process works very well, and in good cooperation with economic operators, inconsistency across the EU was a challenge.

Variances in market surveillance intensity and practices, was considered by some national authorities to create '*markets within the internal market*', with some economic operators choosing to go for countries where market surveillance activities were considered less stringent.

The main issues for national market surveillance authorities were the lack of budget and adequate resources; limited administrative and legal capacity; lack of cooperation and communication at intra-EU borders and with customer authorities, and difficulty intercepting non-compliant products entering the market from outside the EU.

Overall results of market surveillance activities within the EU Internal single market, showed that 58% of products evaluated were found uncompliant[41]. However, it should be noted, that due to limited resources, products actually tested by market surveillance authorities were those that were already suspected as being dangerous.

Due to these reasons, main LVD objectives and expected results are likely to be affected, in particular safety of the products sold, as not all non-conforming products can be intercepted on time on the ''output'' end of the process; and fairness of LVD internal market, as, according to opinions gathered for the evaluation study, compliant EU enterprises do not compete on a level playing field with extra-EU competitors, especially on e-Commerce platforms.

[40]Section 5.1.2.3 https://op.europa.eu/en/publication-detail/-/publication/48c2118c-4d4d-11ea-aece-01aa75ed71a1/language-en

[41]European Commission. (2017). Safe products in the EU Single Market: Commission acts to reinforce trust. Available at: https://ec.europa.eu/growth/content/safe-products-eu-single-market-commission-acts-reinforce-trust-0_en

Market surveillance is supported by the Safety Gate/RAPEX System and a number of Joint Actions for specific products.

Safety Gate/RAPEX aims to enable a quick exchange between 30 countries and the European Commission on measures taken against dangerous non-food products posing risks for the health and safety or the environment or any other aspect of public interest for protection of persons. It should be noted that the data submitted to Safety Gate/RAPEX depends on surveillance and reporting practices as well as the frequency of those practices, which vary both between countries and between years for a given country. Therefore, Safety Gate/RAPEX data is neither comparable across Member States, nor representative of the actual safety level in the EU. However, the data is used below to identify indications on equipment which tends to be most involved in cases of dangerous products, as well as on their most recurrent origin.

Safety Gate/RAPEX includes more than 28 000 alerts overall[42]. The categories used by Safety Gate/RAPEX differ from the product groups used in the market analysis presented in chapter 5.

Following a filtering of the Safety Gate/RAPEX data based on a 'risk of non-compliance with the LVD', it appears that 3 223 alerts had been filed between 2005 and 2008. Among these products, 76% of the products reported originated from China across the years. From 2009 onwards, the share of reported LVD products originating from China has remained in the range of 79% to 89% each year. As discussed in chapter 5.2 China is the EU's largest trade partner of LVD products, which partially explains the prevalence of unsafe Chinese products reported in Safety Gate/RAPEX.

The most commonly reported risk types in Safety Gate/RAPEX for electrical appliances are the risk of electric shock (65% of all alerts in 2005-2017), the risk of fire (5%), and the combination of the two (17%). Other types of risk reported include choking, cuts, burns, damage to sight, chemical, drowning, suffocation/asphyxiation, and unspecified injuries and health risks.

The most commonly reported Safety Gate/RAPEX category is electrical appliances and equipment (55% of alerts over 2005-2018), which includes equipment such as small kitchen appliances and home electronics, cables, chargers and adapters, and hand tools.

However, the most commonly appearing equipment include chargers (including 'battery chargers', 'USB chargers' and others), power supplies/power supply units, extension leads, and travel plug adaptors. The second most common category is lighting equipment (26% of the alerts in 2005-2018). Among the most common types of equipment in this category are 'LED floodlights', 'table lamps' and 'LED lamps'. The third most common category is lighting chains[43] (13% in 2005-2018). [44]

Joint Actions Data are also relevant in regard to market surveillance activities. Among those, in recent years, a few were analysing electrical equipment falling under the LVD.

[42] Referenced on 26 May 2021.

[43] This category covers equipment simply labelled as 'lighting chain' as well as 'Christmas lighting chain', 'LED lighting chain', 'lighting decoration', 'LED strip light', 'rope light', 'string lights', twinkle net lights', 'LED tape', 'lighting tube' and 'flexible light tube'.

[44] Refer to Annex 4

For example, in 2016, a Joint Market Surveillance Action (JA) on product safety of hairdryers, curling irons and hair straighteners[45] was carried out. During this action, the results showed an overall percentage of non-conforming products at 58%. While the majority of nonconformities concerned poor user instructions, there were some significant safety-critical nonconformities, which is reflected in the 9 Safety Gate/RAPEX notifications, 18 withdrawn products and 13 sales bans. The failure of economic operators to provide documents of conformity upon request and the lack of traceability between the products shown in test reports and those products under test is concerning and suggests the need to maintain or even increase the level of technical documentation reviews.

Another relevant joint action was carried out in 2015 for toasters, mixers and blenders[46]. The results surprisingly highlighted failure rates of 95% for blenders, 87% for mixers and 58% for toasters. The overall percentage of nonconforming products examined was 80%. Lack of safety information and warnings in user instructions accounted for the largest percentage of standard clause failures. Samples demonstrating non-conformity with multiple standard clauses reached 79% for blenders, 66% for mixers and 20% for toasters. Many of the non-conformities were across several safety-critical clauses such as protection against access to live parts, heating, abnormal operation, screws and connections and resistance to heat and fire.

In 2011, the joint action on household appliances having child appealing designs[47] was published. Data on 163 different household appliances (excluding duplicates) were collected and 113 completed questionnaires were received. In regard to this data, an Atlas was developed to establish an operational and practical framework to assist the creation of a common understanding amongst market surveillance authorities of the characteristics that may increase the child-appealing nature of household appliances that are subjected to the LVD and sold on the European market.

In sum, market surveillance is an external factor affecting the full achievement of both the health and safety and the internal market objectives of the LVD. However, in light of the upcoming legislative changes, the situation should be reassessed in the near future, following the implementation of all rules stemming from Regulation (EU) 2019/1020 on market surveillance.

FINDINGS IN RELATION TO THE EFFICIENCY OF THE DIRECTIVE

This section assesses the efficiency of the LVD, i.e. the extent to which the contribution to the objectives as discussed in the previous section is 'good value for money' in terms of the resources used to obtain the actual effects.

The analysis of costs-benefits of the LVD is analysed for stakeholders: national authorities, economic operators and society as a whole. Different types of costs and benefits apply for each stakeholder group and they are briefly explained in this section.

Costs for **economic operators** along the process of making low voltage products available on the internal market are as following:

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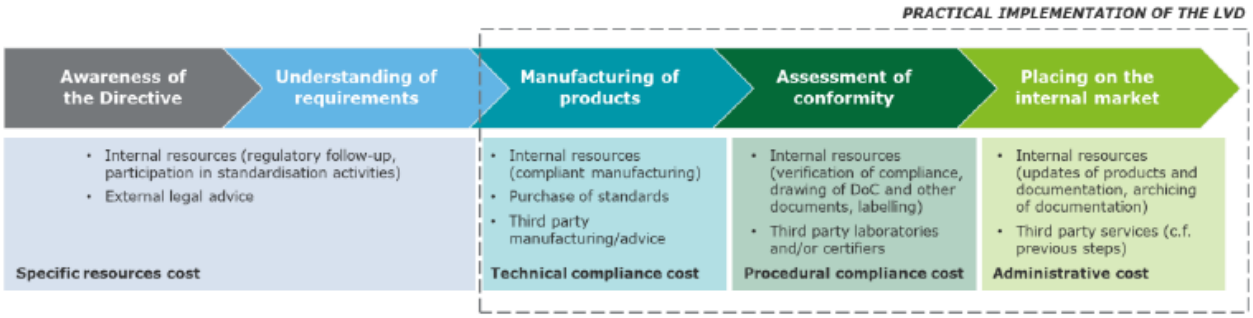
45 https://www.prosafe.org/images/Documents/JA2016/Reports/FinalVersions/JA2016_HEA_Technical_Report_Final.pdf

46 https://www.prosafe.org/index.php/knowledgebase-2/category/toasters-mixers-blenders

47 https://www.prosafe.org/images/Documents/JA2009/ChApDes_Final_Report-version_20130304-published.pdf

Figure 14 – Mapping of costs borne by economic operators



Source: Evaluation study

The first type of costs that should be considered are those related to any **specific resources** allocated to dealing with the compliance with the LVD. It appears from the interviews carried out that these costs are in fact non-significant. Indeed, regulatory compliance in general, appears to be treated within a quality assurance-related department, which therefore covers all sorts of legislation. In addition, companies irrespective of their size agree on the fact that LVD is to be considered effective and fairly easy to apply as it provides rather an overall framework of 'good conduct' than specific obligations.

The analysis of **compliance costs** have been divided in two sub-categories, and pertain mainly to manufacturers duties.

Specific resources costs, which are allocated to raise awareness of the LVD and to understand the requirements. None of the economic operators consulted reported specific resources allocated to the implementation of the LVD. This is an integrated part of the overall quality and regulatory compliance function of companies, which would exist irrespectively of the LVD.

Technical compliance costs are required for manufacturing of products in line with the LVD requirements.

Harmonised standards are the preferred option for technical compliance for all types of economic operators, irrespective of their size, whenever they are available.

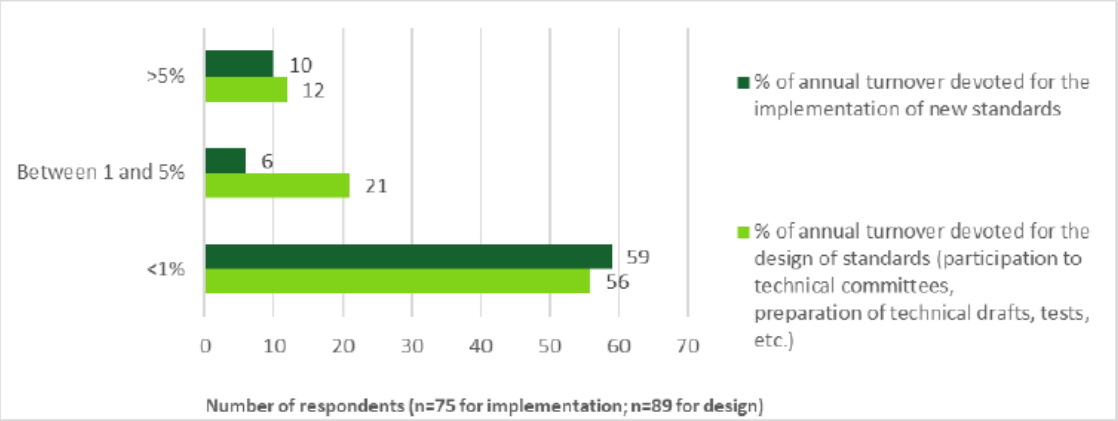
Cost estimation for purchase standards are not easy. Anecdotic evidence from stakeholders shows that cost for purchase standards usually ranges between €400 and €1000 per product. It is to be noted that very often a single product involves multiple different standards (sometimes up to ten) that would bring the overall costs for standards up to €10 000 in average per product in a worst-case scenario.

The costs of standards are in indeed significant, and even more so for smaller players (due to their limited financial availability). In addition to these, some operators are active in the standardisation activities by attending committee meetings and participating in the actual development of standards.

All economic operators acknowledge the interests of standardisation but with a limited efficiency as they feel that the costs are high in proportion of the benefits.

Some evidence from the manufacturers' perspective, shows that overall costs for standards amount to less than 1% of annual turnover for the majority of respondents: 59 out of 75 for the implementation of new standards and 56 out of 89 for the design of new standards.

Figure 15 – Manufacturers Q16: "Can you please estimate the overall annual average costs for activities linked to standardisation (% of annual turnover)?"

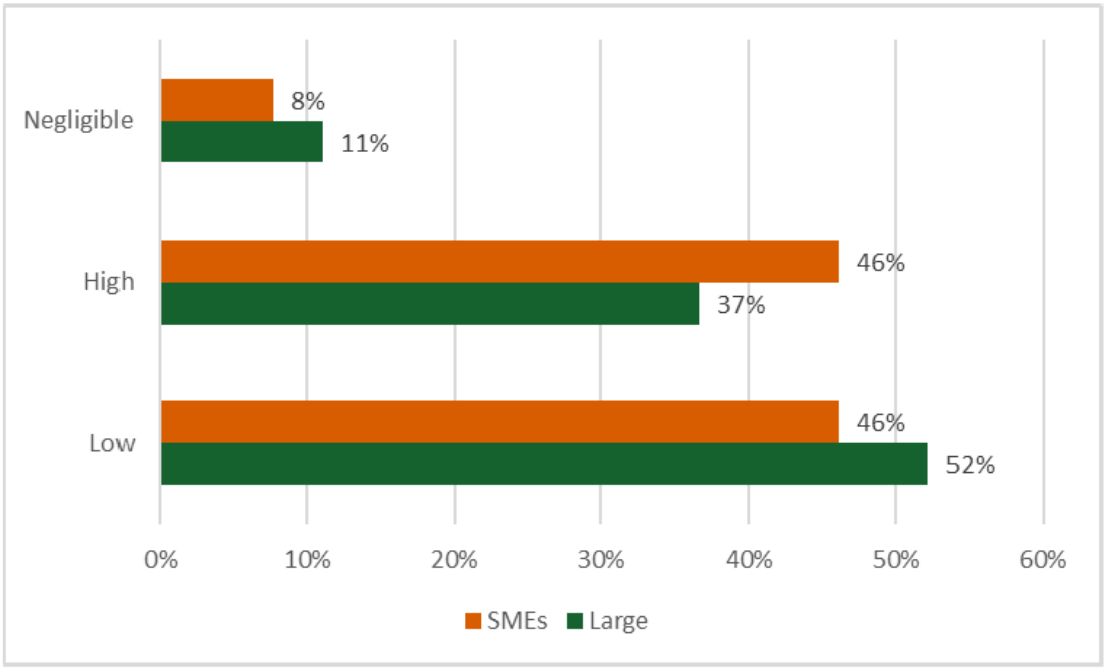


Source: Evaluation study, stakeholder survey

It should also be noted that as regards the implementation of new standards, proportionally more manufacturers consider these costs as exceeding 5% of annual turnover than it being between 1% and 5%. On the contrary, for the design of standards, more manufacturers tend to think that costs range between 1% and 5%, than over 5%. In relative terms, the cost associated with the development of new standards i.e. participation to technical committees, technical drafts, tests, etc., is perceived as higher than the actual use of standards. The findings are not sensitive to the size of the responding manufacturer.

An important element to note is that a non-negligible community of manufacturers (45 out of 116) and mostly SMEs, rate these costs related to standardisation activities as 'high'.

Figure 16 – Manufacturers Q17: "Overall, how would you rate the cost for activities linked to standardisation indicated (in the previous question)?"

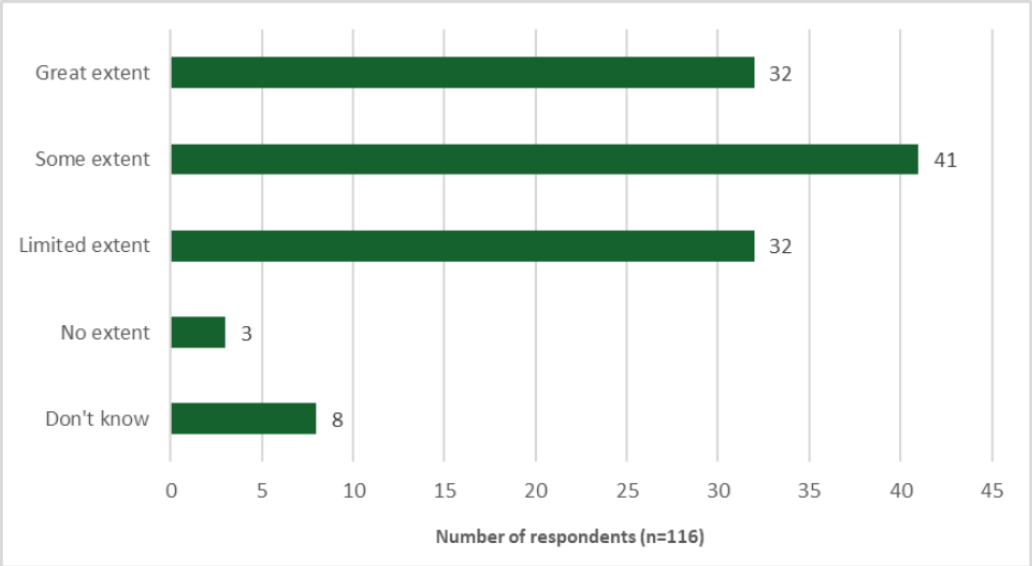


Source: Evaluation study, stakeholder survey

This indicates that even if these costs are lower than 1% or 5% of annual turnover, they are still considered to have a significant impact on businesses' resources. Again, while these trends are observed in the survey results for all manufacturers irrespective of their size, the impact could be expected to be relatively higher for a smaller player than a large corporation.

Lastly, when manufacturers are probed about the extent to which the aforementioned costs are proportionate to the benefits, the landscape is divided, as presented in the figure below: while 41 out of 116 respondents assess the costs as proportionate to 'some extent', the same number of manufacturers (32 out of 116), consider the costs as proportionate to a 'great' and 'limited' extent. The additional comments received largely point out to a lengthy publication process of harmonised standards at EU-level.

Figure 17 – Manufacturers Q18: "To what extent do you consider the costs proportionate to the benefits for activities linked to standardisation?"



Source: Evaluation study, stakeholder survey

Procedural compliance costs which are related to the conformity assessment procedure, and the affixing of the CE marking. The manufacturer has to apply the internal production control procedure (Module A), which, does not involve any third parties. It appears from the interviews carried out at national level that economic operators still involve third party laboratories in the conformity assessment procedure in order to:

- Guide the process and ensure accuracy of results;
- Shift the responsibility to a recognised third party laboratory/certifier.

Administrative compliance costs such as monitoring and reporting of complaints pertain to all types of economic operators including manufacturers, distributors and importers. For all SMEs and large companies perception on the burden associated with LVD provisions are low to medium and importers and distributors participating in the survey provided very limited information about costs linked to the LVD provisions[48].

The survey asked stakeholders to provide the opinion of the burden of a list of administrative/procedural compliance provisions in the LVD. It appears that overall, manufacturers consider the burden arising from LVD's provisions as rather low (the response was selected 272 times in total across all provisions surveyed) or moderate (the response was selected 266 times in total across all provisions surveyed). Based on the majority of responses for each provision surveyed, the burden they represent can be summarised as presented in the following table. 'Primary' perception is represented by the answer having being selected the most

[48] Q: "Please provide your best estimate for the costs borne on a yearly basis, on average, by your organisation for the following LVD provisions", evaluation study

by respondents, while 'secondary' perception is represented by the answer having being selected the second most times by respondents.

Table 2 – Manufacturer's perception on the burden associated with LVD provisions

Provision	Primary answer for SMEs *(Secondary answer)*	Primary answer for large companies *(Secondary answer)*
Carrying out conformity assessment following module A	**Medium** *("Low" and "High" received the same number of answers)*	**Medium** *(Low)*
Conducting sample tests	**Medium** *(Low)*	**Medium** *(Low)*
Production and archiving of technical documentation and of EU DoC	**Medium** *(Low)*	**Low** *(Medium)*
Affixing of the CE marking and labelling the product appropriately (identification of the product, the organisation)	**Low** *(Medium)*	**Low** (Medium)
Drawing up safety instructions and safety information including translations	**Medium** *("Low" and "High" received the same number of answers)*	**Medium** *(Low)*
Monitoring complaints and keeping incident records	**Low** *(Medium)*	**Low** *(Medium)*

Source: Evaluation study

In terms of the specific requirements to prove compliance with the LVD, clarity does not seem a problem to most economic operators, although they consider some provisions of the LVD outdated. This applies especially to the requirements with respect to marking and documentations. There have been technological trends that could be applied (e.g. QR codes, reference to websites), which with the current LVD provisions, is not possible yet. The related provisions are therefore considered as not responding to the current needs of economic operators that could be changed without significantly affecting the needs of other stakeholders (e.g. consumers). Based on the Public Consultation results, consumers would also favour to have information (partially) provided in electronic/digital format. Digital documentation, in fact, generates costs reductions. The Public Consultation also shows that while the level of information provided by the manuals was generally deemed sufficient by the majority of respondents, the information is not always easy to understand (e.g. (part of) the safety instructions) or to find (e.g. contact details of manufacturers or importers). All in all, from the economic operators' perspective, it appears that costs related to the implementation of LVD can be ranked as follows (highest to lowest):

1. Technical compliance costs
2. Procedural compliance costs
3. Administrative costs
4. Specific resources costs.

While some costs are perceived as being more justified/proportional to benefits than others, the overall landscape for the LVD is rather positive in terms of costs it entails for economic operators, irrespective of their size.

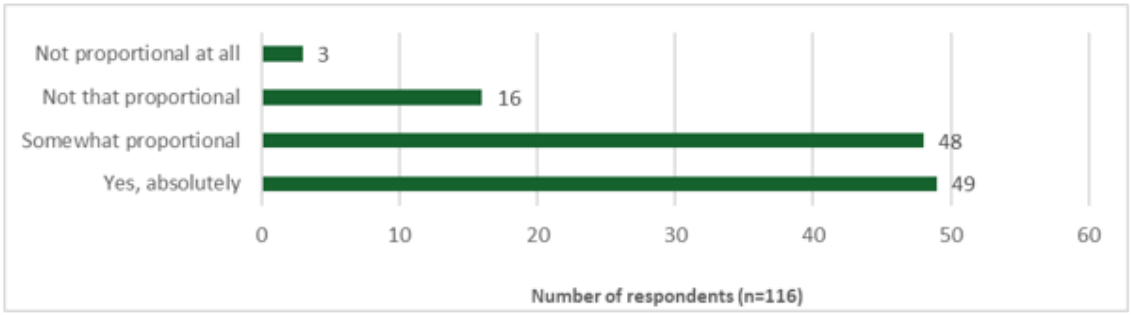
The main costs for **national authorities** are associated with the activity for the market surveillance. Although it varies between EU Member States, it represents the highest ones. The main issues are lack of budget and adequate resources and the need for more resources. However,

a new Regulation on market surveillance and compliance[49] will enter into force on the purpose of enhancing and modernising market surveillance in the EU. The Regulation will apply also to LVD and might have a positive contribution to market surveillance.

Economic operators are the principal beneficiary insofar; the LVD makes it easier to access the internal market. Furthermore, as regarding safety related elements, economic operators benefit from compliance savings and reputational benefits. Consumers (and more generally tax payers) benefit from having safer products in the market.

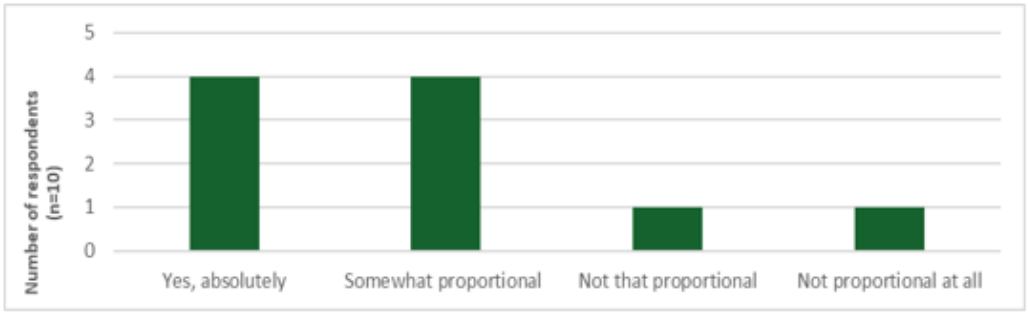
The overall opinion of economic operators concerning the efficiency of the LVD is rather positive. 83% of manufacturers (from 116 who participated in analysis) and 80% of importers and distributors (from 10 who participated in analysis) and all 40 business organisations reported that overall costs stemming from the LVD are absolutely to somewhat proportional to benefits).

Figure 19 – Manufacturers Q23: "Do you consider that overall costs stemming from the LVD are proportional to benefits?"



Source: Evaluation study, stakeholder survey

Figure 20 – Importers and distributors Q17: "Do you consider that overall costs stemming from the LVD are proportional to benefits?"



Source: Evaluation study, stakeholder survey

However, 3 respondents out of 116 deemed the costs as completely disproportional, and 16 somewhat disproportional. Comments received included notably references to duplication of work due to overlapping legislation such as Directive 2014/53/EU or Directive 2014/30/EU. It was also mentioned that "*The burden is disproportionately higher for the "good" manufacturers and suppliers*". These opinions are aligned across SMEs and large companies.

[49] Regulation (EU) 2019/1020 on market surveillance and compliance of products. See: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1562683986925&uri=CELEX:32019R1020

Overall, the benefits generated by the LVD would significantly outweigh its costs when looked at from the aggregated level for all stakeholders. Relating to the relevance and added value of the Directive it can be concluded that the costs, which appear to be outweighed by benefits for all types of stakeholders involved, are borne for a justified cause.

Regarding the potential for achieving some of the objectives of the LVD at a lower cost, it can be concluded that the lack of quantitative data does not allow to conclude on this question with precision. However, the positive contribution of the LVD in the achievement of the objectives could not be achieved at a lower cost, without compromising the safety objective, as the current conformity assessment procedure is already the less costly alternative.

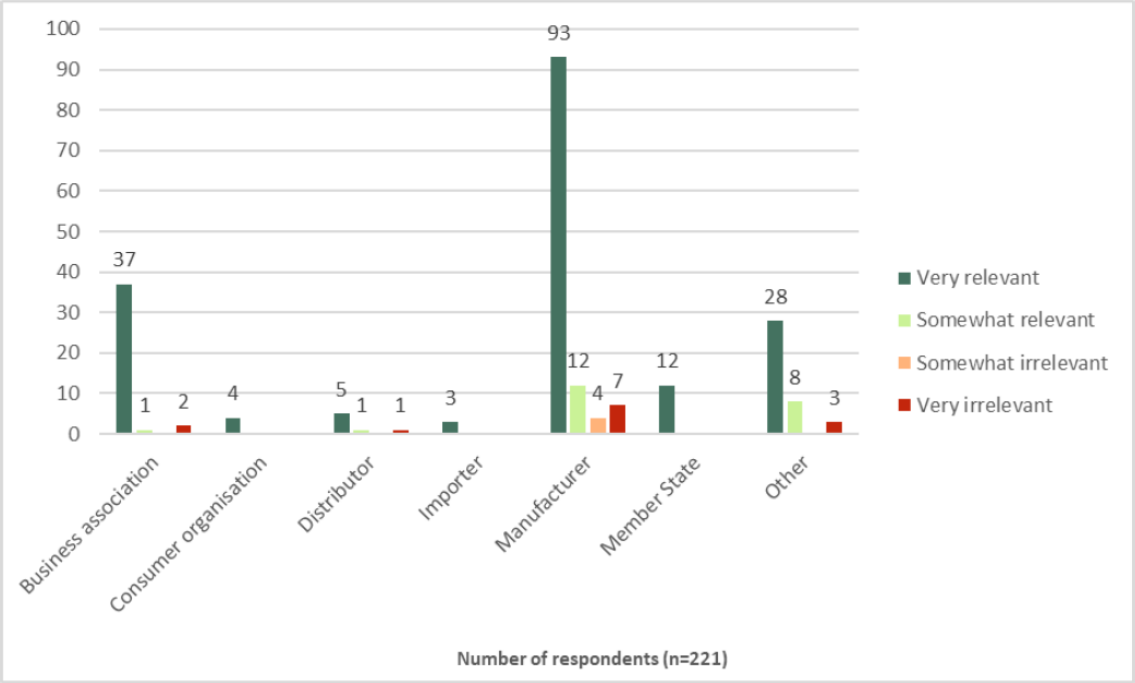
FINDINGS IN RELATION TO THE RELEVANCE OF THE DIRECTIVE

This section presents to what extent the LVD still addresses current problems and needs. Given the length of the evaluation period, it is especially important to take into account developments in technologies, markets and the regulatory landscape.

The main objectives of the LVD for safety and internal market are still relevant today, 45 years after the introduction of the first Low Voltage Directive. The LVD is relevant, because it addresses these objectives, and because there is no other legislation in place with the same scope.

The LVD helps to reduce safety risks for consumers as only products that are safe and compliant are put on the market. The interviews with business (associations) as well as the workshops showed that for most economic operators (producers, traders), safety is considered a key issue for their competitiveness, as safety problems can damage their reputation, and therefore the LVD is seen to correspond to their needs. Some stakeholders have argued for a more precise list of safety risks, but others point to the risk that new, future, risks not being covered.

Figure 21 – Survey question on relevance: "How relevant do you consider the Directive to ensure the safety of electrical products?"

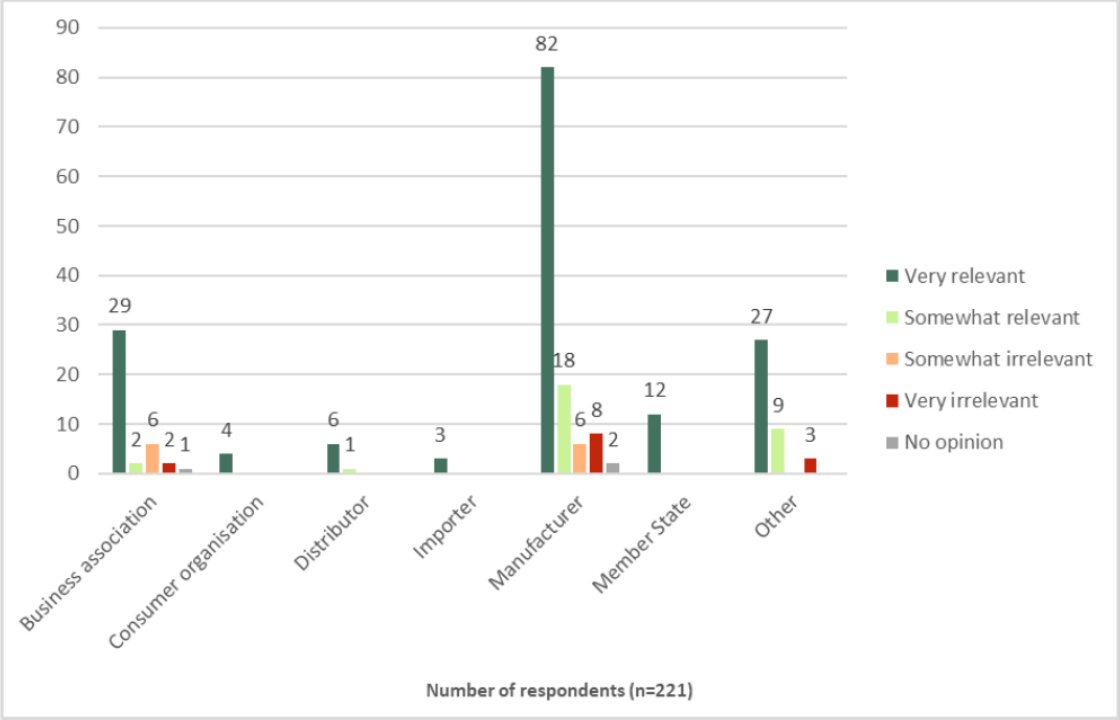


Source: Evaluation study, survey for the evaluation

82% of the 221 respondents consider the LVD to be "very relevant" for ensuring the safety of electrical products.

With respect to the objective related to the free circulation, the LVD still responds to the needs of economic operators because it helps to prevent diverging regulations between EU Member States, thereby preventing trade costs and creating a level-playing field in the EU. The level-playing field that is created by the LVD is also beneficial for consumers, as the level –playing field also helps to prevent unnecessary costs of trade in the internal market.

Figure 22 – Survey question on relevance: "How relevant do you consider the Directive to ensure an internal market for LVD products?"



Source: Evaluation study, survey for the evaluation

74% of the respondents considered the Directive as 'very relevant' in achieving its objective of free circulation.

The safety objectives should further be reflected in the future to examine whether there is need to address risks caused by the performance and not by the technical characteristics of the covered equipment.

With respect to conformity assessment, one national authority expressed the opinion that the provisions of the LVD, referring to the conformity assessment, should be modified to only refer to harmonised standards. Also, the provision of the LVD referring to national/international standards was considered outdated, as "all economic operators seek the presumption of conformity".

Some stakeholders (notably national authorities like standardisation bodies or market surveillance authorities, but also some industry representatives) preferred more clarity on the **definition of electrical product** in the LVD. With the current definition, it is not clear what exactly is considered the product; does it go down to component level, full product level or beyond systems that consist of different products?

The scope as defined in the LVD has been largely unchanged since 1973. However, there have been important developments that have affected the scope of the Directive. First, the market for LVD has increased in size and varieties. In addition, at the same time, several other Directives

have been introduced since the first LVD came into force. These Directives cover products that could formerly be considered as within the scope of the LVD. This is especially true for products that now fall under the RED. For example, computers without Wi-Fi connection are considered LVD products, whereas when they have Wi-Fi connection, they fall under the RED. And with technological developments, it will be the case for an increasing number of different products (e.g. washing machines and refrigerators with Wi-Fi). There are other Directives which have similar effects, as highlighted in the coherence section.

The increasing overlapping between LVD and other Directives reduces the clarity of the scope of the LVD and, in some cases, increase the burden for economic operators. Although the issue was brought up by many stakeholders, we note that at the same time the incidence of these problems seems to be relatively low: for almost all products it is clear which Directive is applicable. (See section on coherence for details).

However, some economic operators argued that it would be good to have a list of products that fall under the LVD, as it would reduce the uncertainty introduced by the emergence of new Directives. But many other economic operators warned that making an explicit list of LVD products runs the risk of accidentally excluding products, and the risk that with new technological developments, the list would have to be continuously updated.

The **voltage limits of the LVD**, especially the lower voltage limit, have been a point of discussion with stakeholders and experts. Stakeholders have diverging views on this issue.

It is mainly the businesses (the majority of manufacturers and business associations) who are of the opinion that the Directive should not cover the equipment operating at voltages below 50V AC / 75 V DC. These opinions are aligned across SMEs and large companies. Based on feedback received, they consider most of the products below the voltage limits as safe, also because the products still have to comply with the General Product Safety Directive 2001/95/EC (GPSD). In addition, including them in the LVD would increase the burden for economic operators. Especially where it involves very small, low cost products (e.g. birthday cards with music), the requirements of the LVD are considered too high in relation to their benefits.

According to the opinion of technical experts, and as confirmed in stakeholder consultations, the fundamental problem is that the voltage limits that are used to categorise electrical equipment as LVD products, also suggest a categorisation of risks. This is not necessarily correct because not all risks have a firm relation to the product's voltage[50].

Here below are summarised the main technical aspects:

- The safety requirements in the LVD are not specified and go beyond electrical safety. And the lower voltage limit unwarrantedly excludes electrical equipment that may also carry non-electrical safety risk.
- The risk of thermal burn is a factor that may not depend on the voltage but instead could solely depend on the current or involved chemical processes (e.g. batteries). Electrical equipment below the lower voltage limit could still contain the risk of thermal burns.
- The debate on what voltage level results in unacceptable risks to the human body as a result of electrocution is ongoing. This risk does not only depend on the voltage, but also on the maximum current an electrical source can deliver, the impedance of the medium and the time the electrocution takes place. There are several types of risks that can lead to

[50] For more details see section 5.3.2.2 https://ec.europa.eu/docsroom/documents/38701

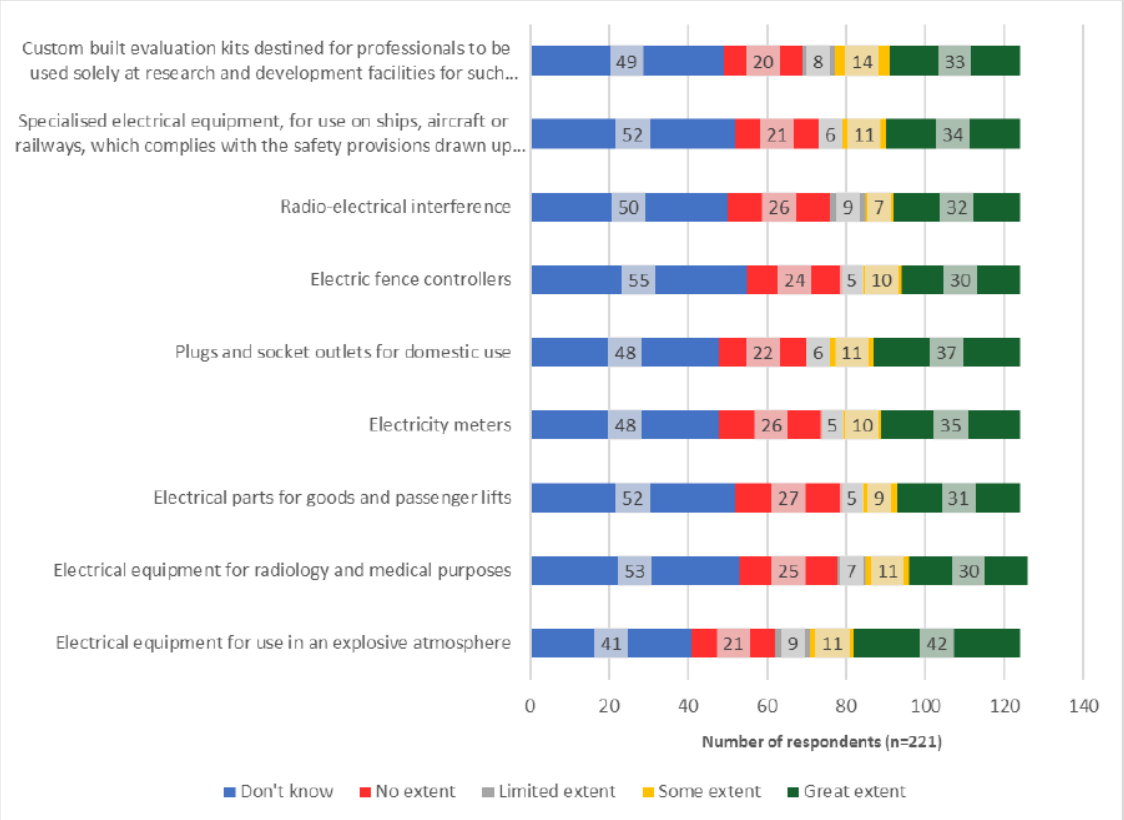
injury or death. One of them is fibrillation of the heart, which already happens at relatively low current (100 milli-Ampere).

On the opposite side, the majority of other respondent categories with a view on this (i.e. consumer organisations, EU Member State authorities but also distributors and importers as well as others) indicate that the lower voltage limit should be removed. Many stakeholders gave the example of products that are below the lower voltage limit of the LVD (most cited products are those that operate on lithium batteries), and the increasing number of accidents with these products. While it is acknowledged that the extra-low voltage products, which are not covered by another specific Union legislation (such as RED) are covered by the GPSD, the LVD has more specific requirements and is therefore better able to ensure safety in their view.

As regards **the exclusions** listed in Annex II to the LVD, many stakeholders do not have specific opinion or are of the opinion to not change the exclusions listed in Annex II. There is only one category of electrical equipment for which there are slightly more stakeholders encouraging their inclusion in the scope of the LVD, namely for "plugs and socket outlets for domestic use."

However, based on the stakeholder survey, the definitions of the equipment and phenomena excluded from the scope of the LVD could be clearer. The majority of the respondents had no opinion on the issue (e.g. due to a lack of expertise, given that it requires detailed knowledge of the Directive). Looking at the respondents who have an opinion on the definitions, we note that in general, less than half of the respondents indicate that the exceptions are well defined ("to a great extent"), while the majority indicates that this is not, to a limited, or to some extent, the case.

Figure 23 – Stakeholder survey Q6: "To what extent are the definitions of products not included (in annex II) in the scope of the Directive well defined?"



Source: Evaluation study, stakeholder survey

Furthermore, the majority of all respondent groups, including 9 out of 12 authorities, highlight a number of issues deriving from the fact that LVD safety objectives also apply to other product legislations (namely the RED and the MD).

It needs to be reflected whether the LVD safety objectives need to apply to electricity meters as they are currently excluded from the LVD. The RED applies to those products only if they are radio equipment. Non-radio electricity meters are, however, electrical equipment constructed, nowadays, with similar materials and same techniques like any other electrical equipment covered by the LVD.

Moreover, it shall also be reflected whether any new exclusions should be inserted in the Annex listing the exclusions, in order to exclude products whose safety is specifically covered by another EU legislation such as the RED or the MD, even though the RED and the MD refer both to the safety objectives of the LVD. Other example would be the vehicle equipment covered by the EU legislation on type approval of vehicles[51].

Lastly, clarifications might be appropriate on the existing exclusions, if they concern equipment covered by more specific EU legislation (such as medical devices, marine equipment[52], aviation equipment), so that those exclusions refer to any equipment to which that EU legislation applies. In addition, with such a reference, it will be clear that the LVD will not apply to equipment with non-medical intended purpose referred to in Annex XVI to Regulation (EU) 2017/745[53], when that Regulation will apply to that equipment.

FINDINGS IN RELATION TO THE COHERENCE OF THE DIRECTIVE (LVD)

This section presents the findings on the coherence of the LVD, in terms of internal coherence as well as external coherence.

The internal coherence of the Directive analyses the extent to which the legal text is internally coherent, and clear to economic operators and other stakeholders involved in its implementation, and whether the scope is appropriate. The external coherence of the Directive analyses to what extent there are any issues of coherence with other legislations with similar objectives, if there are overlaps or complementarities between the Low Voltage Directive and any other EU legislations, and to what extent is the intervention coherent with wider EU policy.

The majority of the stakeholders identified no significant problems with the internal coherence of the LVD. No contradictions have been identified between the objectives of the LVD and the wider EU single internal market policy, and as discussed above, stakeholders credit the Directive's longevity and stability as one of the reasons why it is so successful.

[51] Such an exclusion will concern not only electric vehicle equipment which is more than 50 volts but also any vehicle equipment, if the limit of 50AC-75DC is removed from the scope, in so far as that equipment falls within the scope of the EU legislation on vehicles.

[52] Marine equipment within the scope of Directive 2014/90/EU on Marine Equipment is being certified by the Member States in accordance with the relevant international maritime safety conventions. Equipment to be placed onboard EU ships in accordance with international safety standards is therefore regulated exclusively by Directive 2014/90/EU, which should in any event be considered the lex specialis.

[53] Regulation (EU) 2017/745 applies to equipment with non-medical intended purpose, referred to in Annex XVI to that Regulation, when relevant Commission Implementing acts are adopted pursuant to that Regulation.

Regarding the alignment with the New Legislative Framework, the stakeholders' attitude is largely positive. The participants to the LVD Working Party Workshop[54] considered that the new definitions integrated to LVD are clear and helpful – other aspects were not mentioned in this context.

One of the four EU-level industry representative expressed disappointment that the alignment with the NLF had introduced uncertainty to the sector as well as some additional administrative costs as "even slightly updating a label can have large costs". However, no further data was discovered to support this.

The products under the scope of LVD interact with a series of other Directives which regulate aspects other than safety and might apply in conjunction with the LVD. For the great majority of the stakeholders, they do not perceive significant incoherence. However, interactions with the RED, MD and GSPD Directives are perceived as creating significant challenges.

Where the Directives have different responsible authorities, the change of scope means that the responsibility to test the product suddenly falls on an authority that may not have the required specific training or testing equipment for the type of product in question.

Some of the Low Voltage Working Party Workshop attendees suggested that the Directives should be geared at different types of risks rather than being specific to certain areas of the industry. Others suggested merging the Directives, however, there was no consensus on whether this would be a positive or negative change. Particularly the business representatives expressed concerns towards decreased clarity for economic operators.

In addition, no significant incoherence was perceived with the Union legislation that regulates the safety of products which are listed in Annex II of the LVD (exclusions)[55] but, as stated above, better clarity might be needed in Annex II.

- Coherence with the Radio Equipment Directive 2014/53/EU (RED)

The RED establishes a regulatory framework of radio equipment (i.e. equipment which communicates with radio waves). When RED is applicable, the LVD and EMCD are not applicable. However, RED shall ensure the protection of health and safety of persons and of domestic animals and the protection of property, including the objectives with respect to safety requirements set out in LVD, but with no voltage limit applying.

The addition of radio functionalities to "traditional products" do push the products to go out of the scope of LVD and be subject only to RED.

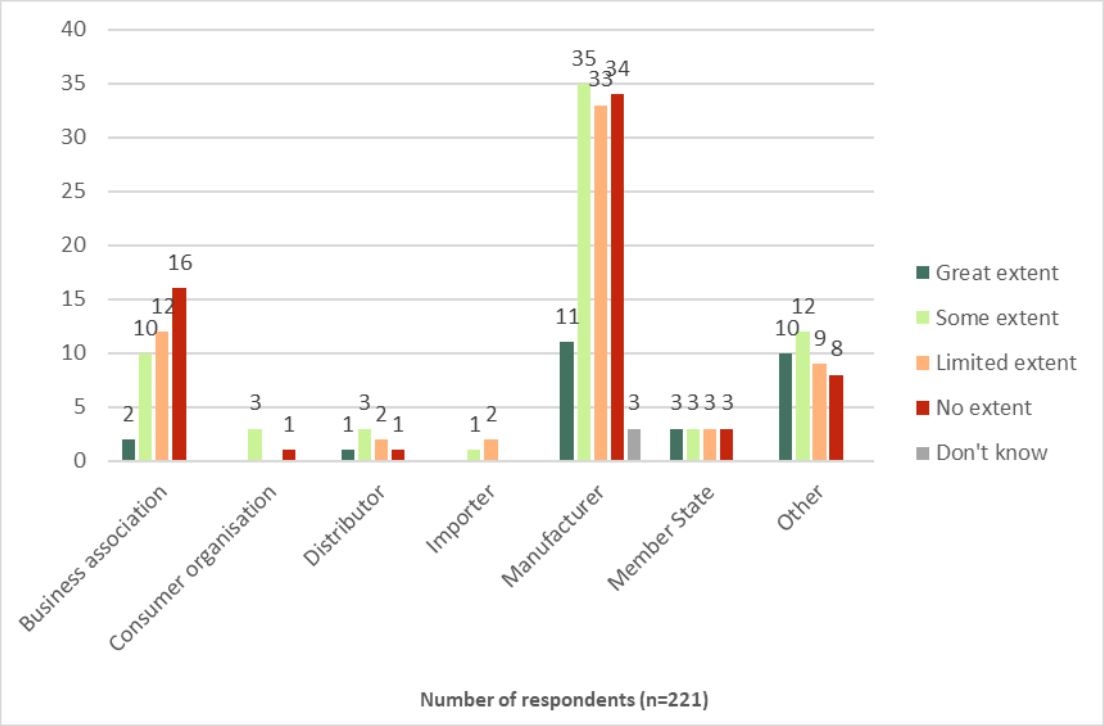
Opinions expressed in the LVD Working Party Workshop as well as standardisation authorities interviewed, expressed dissatisfaction with the fact that introducing Wi-Fi connection automatically moves an appliance from the LVD scope to RED scope. Potential safety risks of those products remain largely the same, relating to their LVD related aspects rather than IoT aspects. It was suggested that the designation could be done based on their main function. For example, in the case of a smart fridge the main function would be to cool (which imply to keep it under the LVD), rather than the use of radio communication (which would indicate moving to the scope of RED).

[54] Annex 2

[55] Such as Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX), Directive 93/42/EEC on Medical Devices and Directive 2014/33/EU on Lifts.

Correlating to the above, according to the respondents to the online survey[56] the overlaps in scope between the LVD and other legislation (notably RED) is a problematic issue for 42.5% of the stakeholders ("great extent" or "some extent"). But for the 56% of the survey respondents this is not a problem at all, or just to a "limited extent". The opinions of different stakeholder groups responding to the stakeholder survey are illustrated in the figure below. This problem was also observed during the LVD Working Party Workshop. Clarity about the scope of the LVD has an impact on several aspects, and as underlined by national authorities, one of these consequences is the variance in effectiveness of market surveillance activities across the different EU Member States.

Figure 24 – Q3 all respondents: "A number of products falling under LVD scope also fall under other legislations. To what extent do you consider this is a problem?"

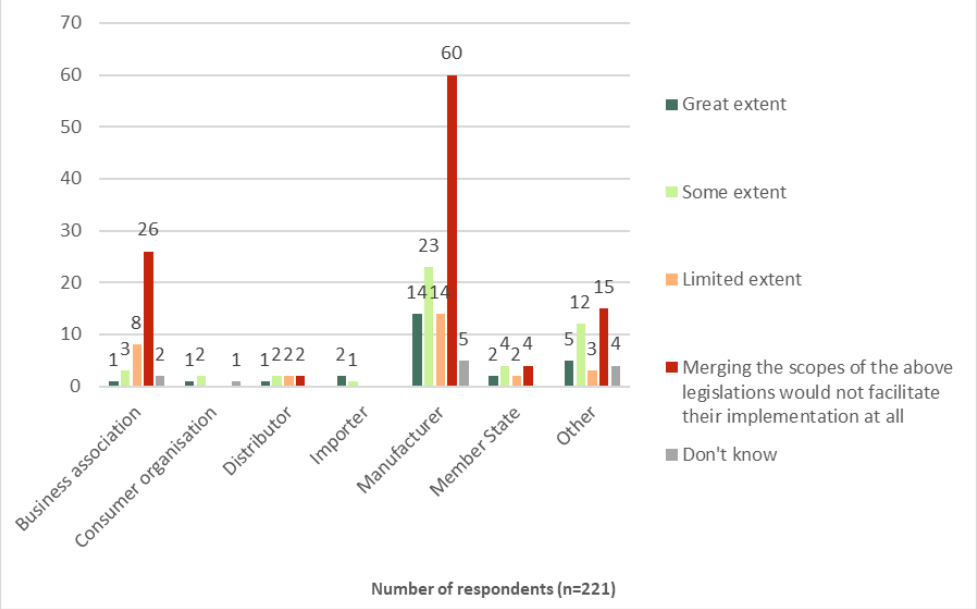


Source: Evaluation Study, stakeholder survey

The opinions on a possible merge between the RED and the LVD are quite divided across type of stakeholders: manufacturers and business organisations are overwhelmingly against a merged legislative act. Indeed, they consider the LVD as best practice example of a safety Directive and, on the contrary, the RED was described very negatively due to, for example, additional costs deriving from notified bodies (when relevant) or provisions of additional documents such as a copy of the EU declaration of conformity or by a simplified EU declaration of conformity, and the obligation on packaging as mentioned above. On the other side, three consumer organisations and six national authorities see the merge more beneficial. Among cited possible benefits of a merged Directive are a greater harmonisation and a better capability of taking into account technological developments: with the rise of Internet of Things, the connected products need to be safe both at software and hardware level. Several EU Member States participating in the LVD Working Party Workshop also noted that a new unified Directive would potentially lead to additional administrative burden.

[56] Evaluation study Annex G https://op.europa.eu/en/publication-detail/-/publication/48c2118c-4d4d-11ea-aece-01aa75ed71a1/language-en

Figure 25 – Q4 all respondents: "To what extent merging the scope of the LVD with the EMCD, the RED and the Terminal Equipment Competition Directive into one single act could facilitate implementation of these legislations?"



Source: Evaluation Study, stakeholder survey

While stakeholders gave credit to the latest LVD guidance document on how to cope with RED overlaps, industry and national representatives in one EU Member State suggested that besides the specific Directive guidelines, overall guidelines on the interaction of different Directives would be needed.

- Coherence with the General Product Safety Directive 2001/95/EC (GPSD)

The GPSD[57] applies to consumer products in so far there are not specific provisions with the same objective in the EU sectorial legislation. That Directive aims to ensure that only safe consumer products are sold in the EU.

GPSD only applies in the absence of more specific provisions in the LVD and in Regulation 765/2008/EC (which applies at the same time with, and as a complement to the LVD).

Stakeholders discussed the interaction between the LVD and the GPSD in the context of products below the LVD minimum voltage limit. Issues are reported to arise from consumer battery-powered products that are below the LVD's lower limit. These products currently fall under GPSD. This, in turn, requires distribution of competences between authorities within a Member State which is an internal issue due to the fact that the EU legislation does not prevent the same authority to deal with products under both the LVD and the GSPD.

- Coherence with the Machinery Directive 2006/42/EC (MD)

The MD is a total harmonisation Directive, for the aspects and products it covers, based on the New Approach to technical harmonisation and standards. It covers all hazards that come from machinery, including electrical hazards. However, according to the MD, the safety objectives set out in LVD shall apply to machinery, while obligations concerning conformity assessment and

[57] Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety (OJ L 11, 15.1.2002, p. 4).

the placing on the market and/or putting into service of machinery with regard to electrical hazards are governed by the MD (Essential Health and Safety Requirement 1.5.1).

The MD clarifies the borderline between its scope and the LVD and certain categories of electrical and electronic machinery products are hence excluded from the scope of the MD, namely household appliances intended for domestic use; audio and video equipment; information technology equipment; ordinary office machinery; low-voltage switchgear; and control gear; electric motors .

The first category "household appliances" designates equipment intended for typical housekeeping functions such as washing, cleaning, heating, cooling, cooking, etc. The appliances "intended for domestic use", (i.e. for use by private persons in the home environment) fall under the scope of LVD and not under MD; on the contrary, those household appliances intended specifically for commercial or industrial use are included in the scope of the MD and so excluded from the LVD (but MD refers to the safety objectives of the LVD).

The interaction with MD was mentioned by some stakeholders at the LVD Working Party Workshop as a coherence issue. The fact that for certain product categories the Machinery Directive does not provide a definition creates some (incidental) confusion as to when to take the end use as domestic or industrial (e.g. with laundry machines or 3D printers). This was seen as less of a problem with LVD, but rather with the MD, especially relating to the definitions or lack thereof of the latter. One national standardisation body also noted that the inclusion of a list of risks in the MD to solve the issue of determining which of the two Directives applies for which risk does not fully clarify the issue. This stakeholder suggested using standards and guidance documents to solve the problem.

The Machinery Directive has been revised and the Commission adopted on 21 April 2021 a proposal for a Regulation on machinery products[58]. Among other changes, the proposal reinforces the coherence with the LVD by considering the fact that electrical and electronic products excluded from the Regulation will be also excluded from the Radio Equipment Directive when they incorporate wi-fi. The proposal is subject to ordinary legislative procedure, to be adopted jointly by the European Parliament and the Council of the EU.

- Coherence with the WEEE Directive 2012/19/EU and the RoHS Directive 2011/65/EU

The WEEE Directive 2012/19/EU[59] (waste electrical and electronic equipment) aims to contribute to sustainable production and consumption by preventing the creation of WEEE as a first priority, contributing to the efficient use of resources and the retrieval of secondary raw materials through re-use, recycling and other forms of recovery, and improving the environmental performance of everyone involved in the life cycle of electrical and electronic equipment (EEE)

The RoHS Directive 2011/65/EU[60] (restriction of the use of certain hazardous substance in electrical and electronic equipment) aims to prevent the risks posed to human health and the environment related to the management of electrical and electronic waste. It achieves it by restricting the use of certain hazardous substances in EEE that can be substituted by safer alternatives. These restricted substances include heavy metals, flame retardants or plasticizers.

[58] EUR-Lex - 52021PC0202 - EN - EUR-Lex (europa.eu)

[59] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02012L0019-20180704

[60] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32011L0065

The Directive promotes the recyclability of EEE, as EEE and its components that have become waste contain fewer hazardous substances. At the same time, it ensures a level playing field for manufacturers and importers of EEE in the European market.

In January 2017, the Commission adopted legislative proposals to introduce further adjustments in the scope of the RoHS and the WEEE Directives.

The vast majority of products that fall within the scope of the LVD also fall within the scope of RoHS and WEEE Directives.

Since 2019 any product which meets the EEE definition falls under the scope of the RoHS Directive. However, several product groups are excluded from the scope. It is the responsibility of the manufacturer, importer, or any other economic operator involved to assess whether his tool or installation benefits from an exclusion. Where a combination of equipment, components and sub-assemblies is being brought together or combined and placed on the market as a single piece of equipment or a manufacturing process line, then consideration could be given to application of other directives such as the EMCD, LVD and MD. Due to the nature of the definitions, assigning broad types or classes of equipment to products' category is not possible. Decisions are to be taken on a case-by-case basis considering all criteria in each definition.

Even though no significant issues relating to the interaction with the RoHS and WEEE Directives has been explicitly reported, it appears that the definition of 'electrical and electronic equipment' offered by some of the other Directives (such as RoHS) is sometimes used as substitute for interpreting the LVD, which offers no such definition.

FINDINGS IN RELATION TO THE EU ADDED VALUE OF THE LVD

The LVD aims to eliminate barriers and ensure free movement of (compliant) products on the single internal market, as well as to ensure safety of those products. As such, its purpose is to avoid fragmentation of safety standards and to realise the internal market for products in its scope. The majority of all stakeholder categories[61] consulted also consider that the LVD has improved the safety of electrical products in the EU to a significant extent.

The majority of stakeholders view positively the role of the LVD in facilitating the free circulation of compliant products within the internal market

LVD ensures the safety of products and eases the launch of products, particularly compared to the situation where each Member State would have its own system in place. And the stakeholders consider that LVD provisions imply a low to medium burden.

Regarding the objective of ensuring safety of electrical products in the internal market, the majority of all stakeholder groups consider that the LVD is "very relevant" for ensuring the safety of electrical products. Standards are widely reported as the most widely used and also the most preferred method for ensuring the compliance of electrical equipment. According to the stakeholders, the standards ensure the convergence of state-of-the-art practices across the EU, as well as the safety of products by formalising the essential safety requirements.

The stakeholders also credit the fact that LVD also facilitates cooperation through the AdCo and the Working Party, allowing for discussion and change of views between national authorities and economic operators, creating synergies, facilitating the exchange of best practices and sharing of experiences, allowing for refining and clarifying the common rules and practices. Such

[61] Sections 0 and https://op.europa.eu/en/publication-detail/-/publication/48c2118c-4d4d-11ea-aece-01aa75ed71a1/language-en

communication platforms with similar level of authority and geographical reach would be more difficult to create outside the framework of an EU level legislation.

Without EU-level action, it is possible that safety standards and/or procedures for addressing dangerous products could differ between EU Member States, although the extent of diversity of approaches is challenging to establish. In any case, this could hinder the cross-border market of products, and information on dangerous equipment spread in different countries would not automatically be shared as widely and comprehensively. In addition, consumers could not rely on uniform safety standards across the EU. As discussed in section "Analysis of the LVD market", the intra-EU market is growing in volume, highlighting the importance of common regulation.

8 CONCLUSIONS

There is a consensus among all stakeholders that overall the Directive has successfully contributed towards its objectives by facilitating the free movement of electrical equipment across the Union and protecting consumers' and users' health and safety. Regarding its general objectives related to internal market and health and safety, the LVD can be considered fairly effective. Factors hindering the full achievement of its objectives are mostly external to the Directive.

Concerning the Directive's **effectiveness for the internal market**, the LVD is generally seen as contributing to an effectively operating internal market for electrical equipment in its scope. It removes regulatory and procedural barriers to trade, thereby facilitating intra-EU trade among economic operators by establishing a set of harmonised rules and procedures for electrical equipment throughout the EU. To that end, harmonised standards are confirmed to be an effective means to ensure Directive's adaptability to market trends, including technological innovations. No major cases of discrepancies have been detected across EU Member States in interpreting the requirements of the LVD for particular products.

Market surveillance and conformity assessment procedures are seen as areas for improvement in ensuring the Directive's effectiveness in the future. Market surveillance is not considered effective in implementing and enforcing the LVD. The development of e-commerce adds additional challenges to LVD enforcement as it leaves room for uncompliant products not being intercepted, therefore, affecting the level playing field on the internal market.. Market surveillance is outside the remit of the LVD. However, with the implementation of the Regulation (EU) 2019/1020 on market surveillance, which enters into force on 16 July 2021, the issues related to enforcement, identified by the evaluation, will be tackled. Regarding the procedures for conformity assessment, the absence of the possibility of using third party may be seen as not helping the SMEs. In general the SMEs seek support and guidance for conformity assessment due to lack of means e.g. laboratories/expertise or for competitiveness reasons.

Regarding the Directive's **effectiveness for health and safety**, the opinions of stakeholders are rather positive regarding the contribution of the LVD to the safety of products. Though highlighted by some stakeholders, the absence of third party involvement for assessing the conformity of low voltage products is not seen as having a negative impact on the safety by majority of manufacturers, consumers associations and business associations. This opinion is a bit more nuanced among importers, retailers and national authorities (around half of them). Some stakeholders, such as consumer organisations, expressed concern on the extent to which the current conformity procedures are effective enough for riskier products, wondering whether all products should have the same procedure, or whether a distinction between risk-levels would be more appropriate to prevent accidents (current self-certification for low-risk products and third-party certification for products with higher risks). However, the LVD currently does not make such distinction. Harmonised standards are seen as the best method to ensure safety compliance of the electrical equipment given that the essential safety requirements of the Directive are considered generic and succinct by stakeholders. Finally, as stated above, issues with market surveillance also impact health and safety objectives.

Concerning the **efficiency** of the Directive, the benefits generated by the LVD outweigh its costs for each type of stakeholders – including national authorities, economic operators (irrespective of their size of place in the value chain) and consumers, both individually and as a whole.

According to both economic operators and consumers, the requirements related to marking and documentation are affecting the efficiency of the Directive given that they do not facilitate the use of internet-related solutions in combination with information on the product/in manuals.

The costs related to standards are estimated between 1 and 5 % of the annual turnover. Economic operators acknowledge the importance of standardisation and they feel that the costs are high in proportion of the benefits. However, this factor is outside the scope of the LVD.

The remaining of the costs (procedural compliance costs, administrative costs and specific resource costs) for economic operators are viewed as less problematic.

The **objectives of the LVD are still relevant** today. This is true for both objectives ensuring the health and safety of persons, domestic animals and property, and ensuring free circulation of compliant products within the internal market.

The LVD reduces safety risks for consumers as only products that are safe and compliant are put on the market. For most economic operators (producers, traders), safety is considered a key issue for their competitiveness, as safety problems can damage their reputation, and therefore the LVD is seen to correspond to their needs.

With respect to the objective related to the free circulation, the LVD still responds to economic operators' needs because it helps to prevent diverging regulations between EU Member States, thereby preventing trade costs and creating a level-playing field in the EU. It addresses both the needs of consumers (which expect safety and benefit from a free circulation on the internal market) as well as those of economic operators (most of whom consider safety as a key aspect of their competitiveness, and have the need for reducing barriers for intra-EU trade).

The introduction of other Directives, notably the Radio Equipment Directive, together with technological changes such as the increased use of connected products and the Internet of Things, has reduced the scope of the LVD in terms of number of products covered. Nevertheless, the provisions of the LVD related to safety are formulated in a technological-neutral way and can therefore be applied also to new products.

Regarding the removal of the lower voltage limits of 50V for alternating current and 75 V for direct current, the evaluation indicates divergent views between the various stakeholders consulted with no clear indication if such change would be beneficial.

Regarding the **coherence** with other legislative acts, the alignment to the New Legislative Framework ensures to a certain extent the Directive’s coherence with the rest of the internal market legislation for products. However, the interplay with the Radio Equipment Directive and the Machinery Directive raised issues in determining to what extent a product should fall under each Directive. Nevertheless, most stakeholders considered that these issues stem from problems with the other Directives, respectively the Radio Equipment and the Machinery Directives. The revision of the Machinery Directive has considered the coherence problems emerged by the interplay between the two Directives, by bringing legal clarity to the specific list of LVD products excluded from the application of the Machinery Directive.

The LVD brings added **EU added value**, providing a common set of rules and standards, facilitating the free circulation of compliant products within the internal market and preventing fragmentation of safety rules across the EU Member States. The industry benefits of a level playing field through clear rules for compliance and consumers by guaranteeing a high level of safety of products across the EU.

The ***overall conclusion*** is that the Directive is relevant, effective, efficient, coherent, and has EU added value. It has stood the test of time. However, specific improvements, to ensure Directive's effectiveness going forward, have been identified by this evaluation.

On one hand, issues were identified that directly result from the Directive itself.

The first one is the absence of third party inspection body in the process of conformity assessment. The present analysis could not infirm that the current procedure is not effective in providing for the safety of products in all cases. This absence is seen as not helping SMEs who, in general, seek support and guidance for conformity assessment because they may be less accustomed to such duties and may lack of internal competencies. However, the majority of stakeholders views are positive towards the current conformity procedure arguing that such change would not address the safety of products. Further research, as indicated by some Member States, is required to determine if the inclusion of another conformity assessment module (Module B) would provide benefit to the Directive, notably (1) through the mandatory conformity assessment by third parties for certain high risk products, (2) through the optional conformity assessment by third parties for certain products. The LVD does not make such differentiation between products.

The second one is the requirements relating to marking and documentation, which do not facilitate the use of internet related solutions in combination with information on the products/in manuals. Based on the response from the surveys, there is room for improvement regarding the information provided to consumers with LVD products. Consumers are currently not always able to easily find and understand the information provided. However, this is an issue identified across other sectors of new approach legislation and that, for coherence purposes, could be assessed and addressed by a possible future reform of the New Legislative Framework.

The third one is linked to the coherence with other directives. While there may be a need for better coherence with other legislations that the Directive interplays with, particularly with the Radio Equipment Directive, the evaluation does not indicate that a merger between the two legislations would be beneficial. Minor issues were also identified with the Machinery Directive, GPSD and WEEE as regard to the scope definition, which may lead to similar competency gaps as the RED connection. However, most stakeholders considered that these issues stem from problems with the other Directives and not from the LVD.

On the other hand, the other issues identified, fall outside the remit of the LVD.

The first one is the effectiveness of market surveillance activities. They are seen as currently uneven throughout the EU. The extent to which Member States are able to identify uncompliant products is dependent on their authorities' resources, which vary across the EU. While this is an element beyond the remit of the LVD, it negatively affects the enforcement of the Directive in terms of its health and safety provisions. Furthermore, due to the introduction of Wi-Fi connection in equipment, competency gaps for the testing and market surveillance authorities can appear.

The second one is related to enforcement of the developing e-commerce. This issue comes from: an increased number of non-EU economic operators active in the EU and the difficulty of tracing them, a lack of physical access to the products on the side of national market authorities making it difficult to sample products or conduct risk assessments, and a lack of awareness on the side of consumers about product compliance online. Some steps are taken for an increased clarity of e-commerce rules[62] but challenges remain in particular related to market surveillance.

[62] A Commission Notice on the market surveillance of products sold online (2017/C 250/01) was published:

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52017XC0801%2801%29

These two aspects should however be examined in light of the Goods Package 2017 and after the entry into application of the Regulation (EU) 2019/1020 that should address both concerns.

9 ANNEXES

ANNEX 1

PROCEDURAL INFORMATION

1. Lead DG, Decide Planning/CWP references

Lead DG: Directorate-General for Growth - Internal Market, Industry, Entrepreneurship and SMEs (DG GROW); Unit C3: Engineering, Maritime and Rail Industries.

Agenda planning/work programme reference: 2015/GROW/051

2. Organisation and timing

Organisation and timing: the inter-service Steering Group consisted of SG, DG JUST, DG EMPL and DG CNECT. After the kick-off meeting on 5 February 2016, it met two times in 2016, two times in 2017 and once in 2018.

3. Exceptions to the better regulation guidelines

Not applicable.

4. Consultation of the RSB (if applicable)

Not applicable.

5. Evidence, sources and quality

The evaluation study "Interim evaluation of the Low Voltage Directive 2014/35/EU Final Report"[63] was outsourced to a consultant and was one of the main sources of information for this Evaluation of LVD 2014/35/EU. Study identify to obtain a better understanding of the market, to monitor the implementation of the LVD in EU Member States, and to assess the effectiveness, efficiency, coherence, relevance, and EU added-value. Each phase contains several tasks which take into account the data collection tools, timetables and deliverables. These tasks are aligned with the objectives of the study and with the requirements of the Better Regulations Guidelines[64] for evaluations.

[63] https://ec.europa.eu/docsroom/documents/38701

[64] https://ec.europa.eu/info/better-regulation-guidelines-and-toolbox_en

ANNEX 2

SYNOPSIS REPORT OF STAKEHOLDER CONSULTATIONS

The present synopsis resumes the main inputs received from all consulted stakeholders during the evaluation.

The Stakeholder survey's objective was to gather information on understanding, implementation and enforcement of the LVD from businesses, business and consumer associations, standardisation bodies, national authorities and consumers.

The Public Consultation was aimed at gathering factual information, data, knowledge and perception by final consumers and citizens across the EU about relevance of the scope and the objectives of the LVD compared to the needs of the consumers; and also about effectiveness of the Directive in ensuring consumers' safety.

The validation Low Voltage Working Party Workshop had the purpose to discuss the preliminary findings extracted from the survey and the public consultation with the LVD Working Party prior to their validation.

2.1 Stakeholder survey analysis

2.1.1 Effectiveness

Implementation and application of the Directive

73% of the surveyed manufacturers experienced minor or no difficulties at all when applying the LVD. In addition, only 5% of the manufacturers reported difficulties to a great extent: these were 6 out of the 116 taking part in the manufacturers' survey. 7 medium manufacturers reported difficulties to "some extent", for 18 out of 26 SMEs (69%) there are no particular difficulties (or just to a "limited extent", if any). 78% of manufacturers reported that the LVD facilitates these exchanges to at least some extent (the majority was satisfied to a great extent). Only four manufacturers considered that the LVD does not facilitate EU trade in any way. These opinions are aligned across SMEs and large companies. 78% of the **manufacturers** reported **no issue with the implementation of the LVD in different Member States**. According to **distributors and importers** participating in the survey, there were **no significant issues reported in the flows of goods within the single internal market**, with 8 out of 10 reporting "minor" or no problems at all. 2 consumer organisations reported that intra-EU exchange was facilitated to a "great extent", the other two to "some extent"; 3 consumer organisations out reported safety improvements to "some extent". **Market surveillance authorities** described several difficulties when applying the LVD in their countries. The two main observations were the lack of resources by the authorities and lack of knowledge by certain categories of economic operators. A greater cooperation between market surveillance authorities was encouraged to ensure safety especially that the LVD makes manufacturers fully responsible for compliance, removing any responsibility from distributors and importers.

Health and safety

The perception about the safety of electrical products is in general quite positive (with the exception of the issue related to voltage lower than 50V). Only a minor part of manufacturers (12%) reported "limited" or" not at all" guarantee of safety. The majority of complaints in this area were related to the enforcement of the LVD, especially for what concerns the products manufactured outside the EU. 18 out of 26 (69%) SMEs reported an improvement in the safety

of electrical products thanks to LVD, to a "great" or at least to "some" extent. The figure is even higher for large companies (85%), but the overall trend is confirmed and not significantly affected by the size of the company. Over 60% of **business associations and consumer organisations** are also satisfied to a great extent with the guarantee of safety due to the LVD provisions .**10 cable manufacturers' associations reported LVD limited success in improving health and safety of electrical products sold in the EU market** advocating for a better compliance to product standards. **Manufacturers** as well as **importers and distributors** agree on the high guarantee of safety ensured by the LVD provisions. Only one importer reported that the LVD contributes to safety only to a limited extent. **Market surveillance authorities** largely agree with manufacturers as well as importers and distributors. 8 out of 11 market surveillance authorities consider the provision safety-enabling to some or to a great extent. The only remarks made by some authorities are related to possible changes in the documentation required to accompany the products (e.g. compulsory DoC as requested for Directive 2014/53/EU) or to the opportunity to perform risk-based approach conformity assessments. For 75% of **business and consumer organisations** participating in the survey, the conformity assessment procedures provided by the LVD ensure safety of electrical products to a great extent. According to the respondents to the survey, **electric lighting equipment, consumer electronics and electric domestic appliances are the main categories found to be non-compliant within the EU.** Regarding the number of fatalities registered, there is a lack of data.[65] Only one public authority reported more than 5 fatalities linked to the LVD products.

Effects of the absence of notified bodies

According to the **manufacturers**, there is no strong correlation between the absence of notified bodies from the conformity assessment procedure required by the LVD and the suggested impact on internal EU exchange, safety of products and costs to industry. For other manufacturers this had at least a positive effect on reducing costs for the various industries. For certain SMEs, it might be difficult to have the required technical expertise to demonstrate compliance, especially when developing innovative products which require a mix of different technical requirements. However, only 8 SME manufacturers out of 26 reported a "somewhat negative impact" and only 1 SME a "strong negative impact" on safety of products. There is a general acknowledgement that "*Notified bodies are helpful in some special cases and safety aspects. Nevertheless, as long as 100% of the responsibility for product liability falls with the manufacturer, the NBs are only consultative institutions and cannot take away the manufacturer's duties*". **Importers and distributors'** views about the absence of notified bodies show some differences compared to the feedback gathered from manufacturers, even though there is not much information and consensus on the real impact of the provision (and how much it is strictly perceived as a "collateral effect" of the LVD), **importers and distributors seem to be more worried about the impact that the absence of notified bodies might have had on the safety of products than the manufacturers,** with 5 respondents reported a "somewhat negative impact". On the other hand, this provision is seen as a possibility for the industry to reduce costs. **The authorities'** views about the absence of notified bodies shows again **some concerns in terms of the impact of this provision on the safety of products.** The authorities have the most negative view of all stakeholder categories: none of them reported "somewhat positive" or "positive impact" related to the absence of notified bodies, whereas eight out of twelve consider the provision having at least a somewhat negative impact. Some concerns about safety of products were raised also by business associations and consumer organisations when asked about the absence of notified bodies.

[65] For example, the UK was unable to provide disaggregated data for fatalities and incidents.

Standardisation

27% of **manufacturers** mentioned **achieving safety benefits due to standardisation of the LVD** as the main benefit. The other 73% of respondents indicated other aspects as main benefits, such as a level playing field, an improved internal market for products or did not provide an answer. Some manufacturers commented that the benefits deriving from standardisation consist in "*Defining clear & detailed rules for certain product categories to enable a level playground in the common market*" and also that "*A simple directive and well-designed standards, drafted by experts, creates safe products and a level playing field*". These opinions are aligned across SMEs and large companies.

2.1.2 Efficiency

9 out of 10 **distributors and importers** considered an improvement in intra-EU exchange due to the LVD. 8 out of 10 respondents reported health and safety protection as a moderate or high benefit: although they somewhat expressed concerns about safety without notified bodies, the level of safety ensured by the LVD it is still seen as satisfying. When assessing LVD benefits, **authorities'** views are consistent with manufacturers, distributors and importers. This underlines positive results with easier intra-EU exchange and health and safety protection: 9 authorities out of 12 reported "high" benefits. In terms of overall benefits stemming from the LVD provisions, there is an overall consensus among **business organisations** that these benefits are high: easier intra-EU exchange and health and safety protection, with 63% of respondents being highly satisfied. This question was not presented to consumer associations.

Costs of standardisation

There are some issues regarding data availability on costs related for standardisation. In this case, it is mainly related to the interaction between manufacturers and other stakeholders (such as standardisation bodies, industry associations, etc.) which are responsible for recording these costs. However, given the results available and the evidence collected in other questions of this survey, we can assume that the annual costs due to standardisation related activities are very low. 79% of the surveyed **manufacturers** stated that these costs amount to less than 1% of their turnover. 10 manufacturers (13%) reported annual costs for standardisation above 5% of their annual turnover, but 45 manufacturers (39%) reported high costs for standardisation, which may indicate that for these manufacturers costs are high costs even if lower than 5% of the turnover. These opinions are aligned across SMEs and large companies. **There are discrepancies between data provided by the stakeholders, notably between reported costs of standardisation and a ratio between costs and benefits.** In fact, 39% of manufacturers reported high costs for activities linked for standardisation. However, for 63% of them these costs are proportionate to the benefits (at least to some extent). The participation in consultation bodies and/or standardisation committees of the LVD is not very high: only 6 **business associations and consumer organisations** reported their participation to both committees, whereas 25 business organisations only participated to the standardisation committees**.** From the consumer organisations side, 3 out of 4 did not participate in the consultation bodies, whereas 3 out of 4 declared that they have participated in the standardisation committees of the LVD. About the main benefits coming from participation in standardisation committees and consultation bodies, **the respondents ranked high the opportunity to play an active role in setting standards.**

Costs of LVD provisions

Overall, the responding **manufacturers** did not report high cost burden related to LVD provisions**.** The LVD provisions are largely reported to be **not burdensome at all** for "monitoring complaints and keeping incident records" and especially "affixing of the CE

marking and labelling the product appropriately". However, more than 50% (64 out of 116) manufacturers reported "**medium burden**" for "drawing up safety instructions and safety information including translations". The burden was also reported as "**moderate**" by circa 40% of the respondents for "production and archiving of technical documentation and of EU declaration of conformity", "conducting sample tests" and "carrying out conformity assessment following module A". These opinions are aligned across SMEs and large companies.

Importers and distributors participating in the survey provided very limited information about costs linked to the LVD provisions. 16% of **manufacturers** reported that the overall costs stemming from the LVD are not that proportional or not proportional at all. No **business organisation reported** higher costs compared to the benefits resulting from LVD provisions. **Consumer organisations** answered in the same way.

2.1.3 Relevance

Relevance regarding the safety objective

As there **is a broad consensus among respondents (82%) about the relevance of LVD for ensuring safety requirements for electrical products**. Only a very small part of the stakeholders (13 out of 221) considered the LVD "Very irrelevant" in achieving this objective. The opinions are aligned across SMEs and large companies. 92% of the respondents in the "others" category (34 out of 37) stated that LVD is "Very relevant" or at least "Somewhat relevant" in ensuring the safety of electrical products.

Relevance regarding internal market objective

A **positive feedback was received about the LVD capability to ensure a well-functioning internal market**: 74% of the respondents considered LVD "very relevant" in achieving this objective, compared to just the 6% stating the opposite ("very irrelevant"). Given the overall consensus, this statement is confirmed especially by manufacturers, importers and distributors: when requested to list the main "pros" about LVD, "improved access to all EU markets" was often acknowledged by these types of stakeholders. The opinions are aligned also across SMEs and large companies. In terms of capability of the LVD to ensure an internal market for products falling within its scope, there is very strong consensus within the "others" group: 92% of the respondents (34 out of 37) stated that LVD is "Very relevant" or at least "Somewhat relevant" in ensuring an internal market for electrical products.

Scope

67% of the respondents considered that the scope of the Directive in terms of voltage rating is still appropriate to a "great" or to "some" extent. These opinions are aligned across SMEs and large companies. However, 26% of the surveyed stakeholders stated that "it is not appropriate anymore" or appropriate only to a "limited extent", suggesting that the lower limits of the Directive should be removed or lowered even more. The main concerns were about products below 50V that might be considered dangerous, such as lithium batteries (also rechargeable ones) and battery-powered devices that might be affected by fires due to faults in circuitry. 59% of the respondents belonging to this category reported that the voltage rating covered by the LVD scope is still appropriate to some or to great extent. Almost 20% (7 out of 37) however considered the voltage limit to be "not appropriate anymore", stating that devices powered by lithium batteries might be very dangerous. But, safety is not strictly correlated to voltage. Just over half of the stakeholders (53%) claimed that the lower bound for voltage should not be lowered, against a 35% of respondents stating the opposite (based on the aforementioned explanations about electrical risks). 62% of the respondents in the "others" category expressed

their positive opinion about including in the scope of the LVD also the equipment operating at lower voltages.

Overall, there is a common understanding that the listed equipment and phenomena should not be included in the scope of the LVD. This consensus is widely spread especially for what concerns "custom built evaluation kits" (68% responding "No" against only 7% responding "Yes") and "electrical equipment for use in an explosive atmosphere" (63% responding "No" against 13% responding "Yes"). However, we have to reflect on a high degree of uncertainty for some categories: notably, for "electric fence controllers", the number of stakeholders who did not have an opinion is higher than the sum of the respondents in favour and not in favour of the inclusion of the item in the scope of the LVD.

It should be noted that none of participants who responded "Don't know" elaborated their answer. Just over one third of respondents (35%) showed uncertainty about "electricity meters", and "plugs and socket outlets for domestic use" is the only category where slightly more stakeholders (80 against 70) are encouraging their inclusion in the scope of the LVD.

This overall tendency towards the non-inclusion of the listed equipment in the scope of the LVD is confirmed also within **manufacturers**: their answers are consistent with the general trend, with the only difference related to "plugs and socket outlets for domestic use". 38 manufacturers are not in favour to the inclusion of this item in the scope, whereas 36 are in favour and 42 of them do not have an opinion. These opinions are aligned across SMEs and large companies. **Definitions listed in Annex 2 of the LVD appeared to be the most complex question for the stakeholders**. For every definition specified, the majority of the answers was "Don't know". The definition for which the respondents were able to give an opinion was "electrical equipment for use in an explosive atmosphere". 53 stakeholders (43%) stated that the definition is well defined (to a great or at least to some extent) compared to 41 (33%) who responded, "Don't know". These opinions are aligned across SMEs and large companies.

2.1.4 Coherence

The **overlaps in scope between the LVD and other legislation (Radio Equipment Directive 2014/53/EU, notably) is a problematic issue for 43% of the stakeholders across the categories** ("great extent" or "some extent"). These opinions are aligned across SMEs and large companies. Although for the 56% this is not a problem at all, or just to a "limited extent", there is room for improvement in this area.

Clarity about the scope of the LVD has an impact on several aspects. As underlined by national authorities, one of these consequences is the variance in effectiveness of market surveillance activities across the different Member States. "Others" category considered a problem the overlap between LVD and other legislations: the majority of them (57%) reported this issue to some or to a great extent, with only the 19% of respondents stating that the overlap is not problematic. However, **two thirds of respondents (62%) agreed that merging the overlapping Directives would not make the implementation more effective** (or that implementation will be improved just to a "limited extent"). These opinions are aligned across SMEs and large companies. 17 out of the 37 respondents (46%) considered that **merging the scopes of the LVD and Directive 2014/53/EU would facilitate the implementation of these legislations**. This is 13% higher compared to the 33% of positive opinions about the merger of the Directives which resulted from the answer of all the 221 stakeholders.

2.1.5 Final remarks

The final question for **manufacturers** asked about future needs. The main suggestions for improvements were the following:

- Raising awareness towards simplification of procedures and about the importance of faster standards publication in the OJEU ;
- Greater usage of e-labelling tools to reduce the administrative burden related to paperwork;
- Need for stricter market surveillance (especially for products coming from outside EU) and better sharing of information between national authorities;
- Possible reflection on the opportunity of merging the overlapping Directives.

Regarding possible room for simplification[66], five respondents from the **importers and distributors** group did not offer any views, two called for more harmonisation with the other Directives, making easier to find the right standard and to link it to the correspondent Directive. Finally, two suggested more clarity for documentation procedures and only one encouraged a narrower scope for the LVD.

Business and consumer organisations were also asked to comment on any possibilities to simplify procedures linked to the LVD.[67] While consumer organisations provided no comments, the answers of the business organisations can be summarised in three key areas of intervention:

1. LVD-related procedures are well designed, but the management of all the processes should be improved (e.g. in terms of effective and timely communication and cooperation between the economic players);
2. The harmonised standards discussed and adopted in compliance with the LVD should be published in the OJEU immediately to avoid any delays in already lengthy process;
3. Online tools to share information between manufacturers, organisations and authorities must be improved, reducing burdensome paperwork and facilitating the compliance to the various conformity requirements.

All the stakeholders were asked about the overall value added of the LVD and what would be the consequences for their organisation, should the Directive be repealed. **Overall, there is a strong consensus between manufacturers, distributors, importers, business associations, authorities and consumer organisations that there would be a very high risk of national fragmentation without the LVD.** Given the positive overall impact of the LVD, it was again stressed that there is a need for a faster implementation of international standards at EU level, through the administrative process required and the publication in the OJEU. **Also, stronger enforcement of the LVD in the future is encouraged, including better cooperation between national market surveillance authorities to properly tackle goods coming from outside the EU**. In respondents view, this should be possible through significant improvements in availability of online tools.

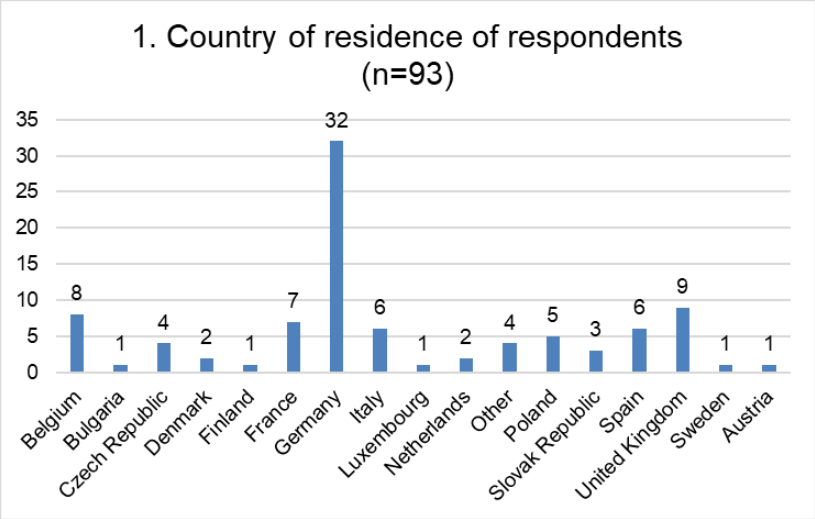
2.2 Public consultation analysis

2.2.1 Profiling questions

The Public Consultation gathered a total of 93 replies across 17 Member States, with the highest number of replies from Germany and the UK.

Figure 61 Answers to Q1. Countries of origin.

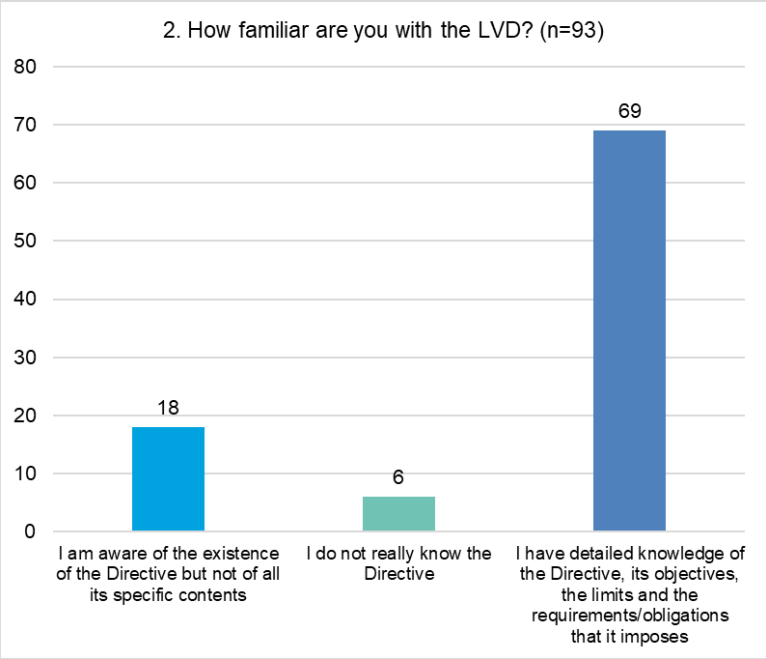
[66] Q exact phrasing: "Do you see any possibilities to simplify procedures linked to the LVD?"
[67] Q: "Do you see any possibilities to simplify procedures linked to the LVD?"



Source: Public Consultation

Concerning the sample's level of knowledge regarding the Directive, the vast majority of the respondents deemed his/her level of knowledge of the Directive complete and detailed. Only 6 respondents did not really know about the Directive, while 18 positioned themselves as being aware of the Directive, but not throughout all details.

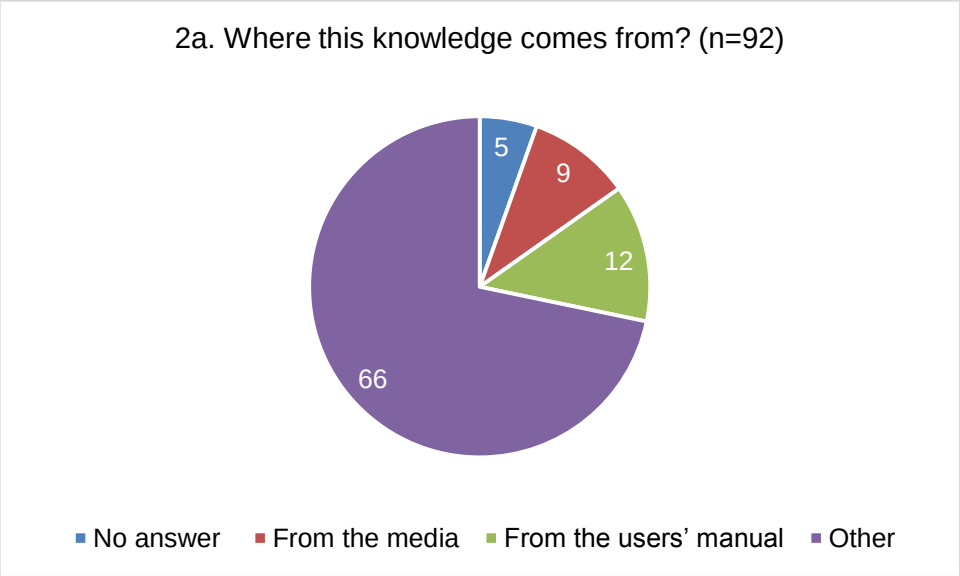
Figure 62 Answers to Q2. Familiarity with LVD



Source: Public Consultation

The sources of knowledge of the respondents concerning the Directive are different. Respectively, 12 and 9 respondents selected the products users' manual and the media as the origin of them knowledge of the LVD. On the other hand, 66 of the respondents stated they know the Directive from different sources. Some of the "other sources" identified by the participants to the consultation were: working in a LVD-related industry, delivering training on LVD, being part of the national CENELEC and reading the regulation itself.

Figure 63 Answers to Q2. Sources of knowledge



Source: Public Consultation

2.2.2 Relevance of the LVD

The first questions of this section attempt to map the purchasing habits of the sample's citizens and final consumers concerning the low voltage products in order to further understand the relevance of the scope of the Directive.

In particular, the list of products investigated includes the following categories:

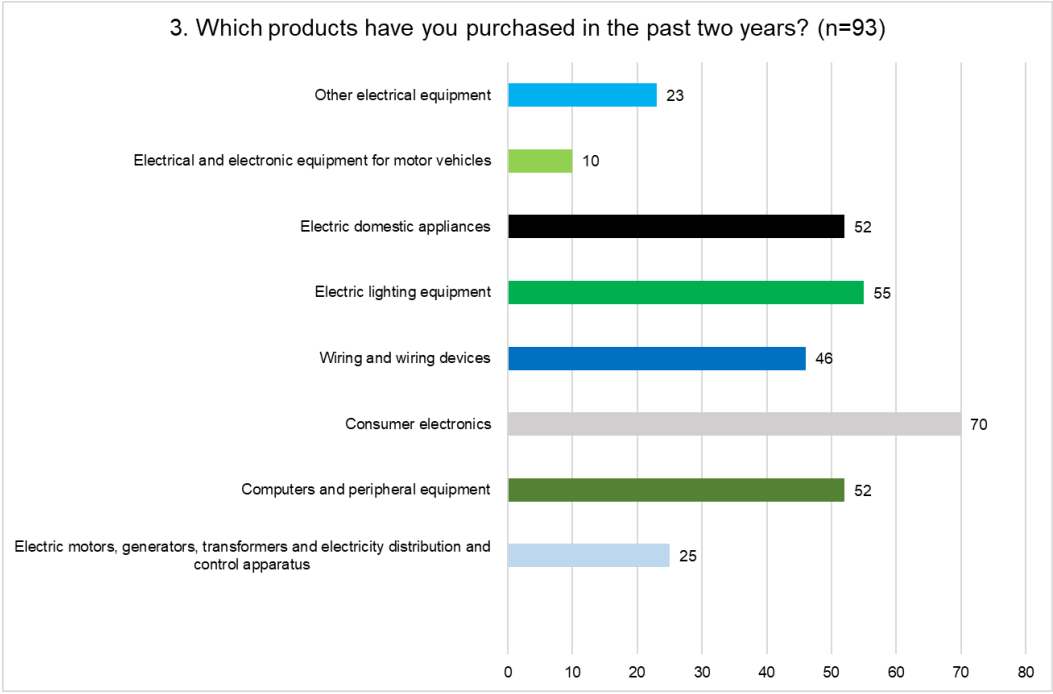
- Computers and peripheral equipment (e.g. printers, screens, etc.)
- Consumer electronics (e.g. televisions, DVD players, game consoles, etc.)
- Wiring and wiring devices (e.g. cables, extenders, etc.)
- Electric lighting equipment (e.g. chandeliers, lamps, halogen lamps for vehicles, etc.)
- Electric domestic appliances (e.g. electric ovens, washing and drying machines, electric heating, fans, refrigerators and freezers, kettles, hand dryers, cooking plates, grillers and toasters, etc.)
- Electrical and electronic equipment for motor vehicles (e.g. ignition wiring sets, parts of vehicle starting equipment, distributors and ignition coils, magneto-dynamos, manual welding apparatus with coated electrodes etc.)
- Electric motors, generators, transformers and electricity distribution and control apparatus (e.g. generators, boards, panels, consoles, desks, cabinets and other bases for apparatus for electric control, etc.)
- Other electrical equipment (e.g. parts of electrical machines/apparatus with individual functions, machines with translation or dictionary functions, signalling safety or traffic control equipment for railways, roads, inland waterways, parking, etc.)

This list is not exhaustive and it has the solely purpose of helping the respondents in selecting and illustrating them purchasing activities.

On the one hand, the participants' answers show that consumers still purchase many of the items covered by the Directive. Especially, approximately the 66% of the respondents bought electric domestic appliances, electric lighting equipment, consumer electronics and computer and peripheral equipment at least once in the past two years. On the other hand, Electrical equipment for motor vehicles and electric motors, generators and transformers seem not be so important in

consumption habits of the respondents, considering that less than 1/3 of the participants purchased one of these products in the past two years.

Figure 64 Answers to Q4. LV products purchased



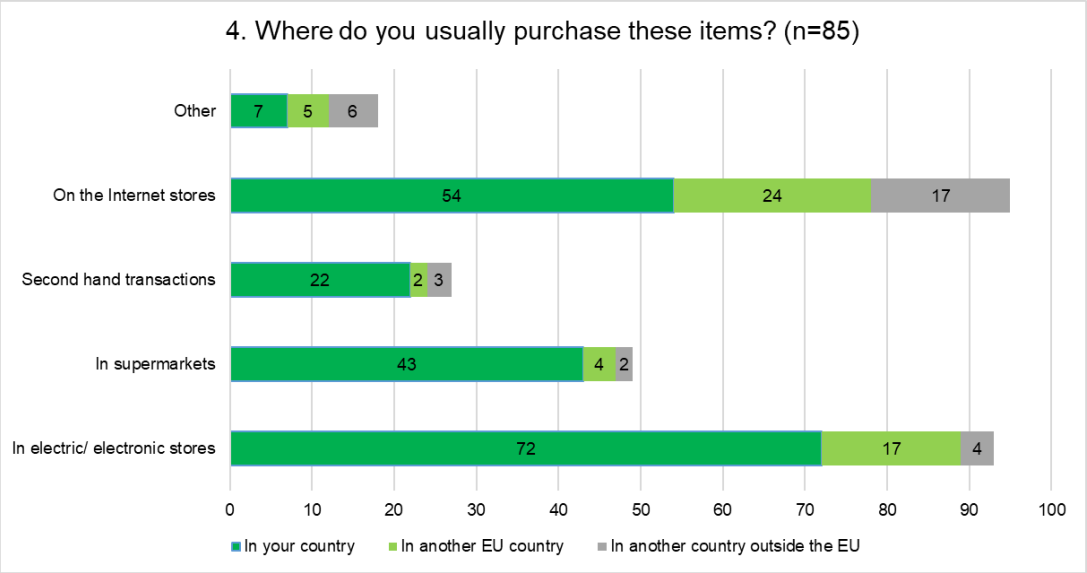
Source: Public Consultation

The main trends reveal that purchasers prefer to buy low voltage products online and in electric/electronic stores, while second hand transactions are the least common shopping mean. Approximately the 77% of the shopping in electric stores happened in the country of origin of the purchasers and the 18% in another Member States. The share of products bought abroad is negligent.

Concerning online shopping, nearly the 57% of the products were purchased in the country of origin, the 25% in another European country and the 18% in another country outside the

European Union. Overall, the participants seem to prefer buying low voltage products in their countries or at least in the European Union.

Figure 65 Answers to Q5. Purchasing habits



Source: Public Consultation

The table below summarizes the extra-European countries were low voltage items were purchased in the past two years. The most quoted countries were the Asian ones, China in particular, and the US.

Table 6 Answers to Q5. Foreign countries where LV products were purchased

5. If you have ticked any option in 'in another country outside the EU' for the question above, please specify in which country/countries:	
China	14
Korea	2
US	7
India	3
Switzerland	2
Taiwan	1
Japan	1
New Zealand	1
Norway	1
Singapore	1
Canada	1

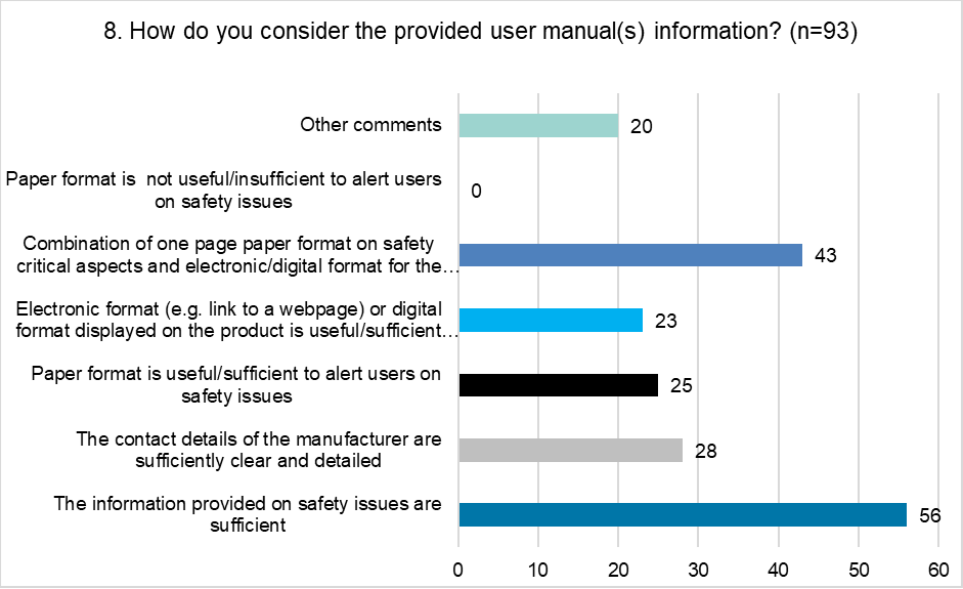
Source: Public Consultation

After assessing the purchasing habits of the consumers, it was assessed whether the information and the clarity of the Directive are still relevant to respond to consumers' needs.

Concerning the adequateness of the information provided with the user manuals, approximately the 60% of respondents stated that safety issues information are sufficient. In particular, the combination of one page paper on safety aspect and the digital format for the entire manual of instructions were deemed the more useful and complete (approximately the 47% of the respondents), while the electronic/digital format and the paper format alone were considered enough to provide information on safety issues only by less the 25% of the participants. Finally, only 28 respondents agreed that the provided manufacturer's contact details are sufficiently clear.

Further, 19 participants shared additional comments on this question. Relevant suggestions argued that the online version of the manuals could be more adequate, because it could be adapted by the manufacturers in the eventuality of mistakes or defects, and it is less likely to be lost. However, some comments stressed that the level of quality of the information provided strongly depends on the product itself, and manuals of products coming from third countries are perceived as less complete and sufficient. Additionally, some comments stated that there is the need to include more safety precautions in the manuals and that the overall quality of the safety rules reported could be improved. Finally, some users claimed that the manufacturers' contacts should be made more visible and adequate.

Figure 66 Answer to Q8. Clarity of information provided by the user's manuals

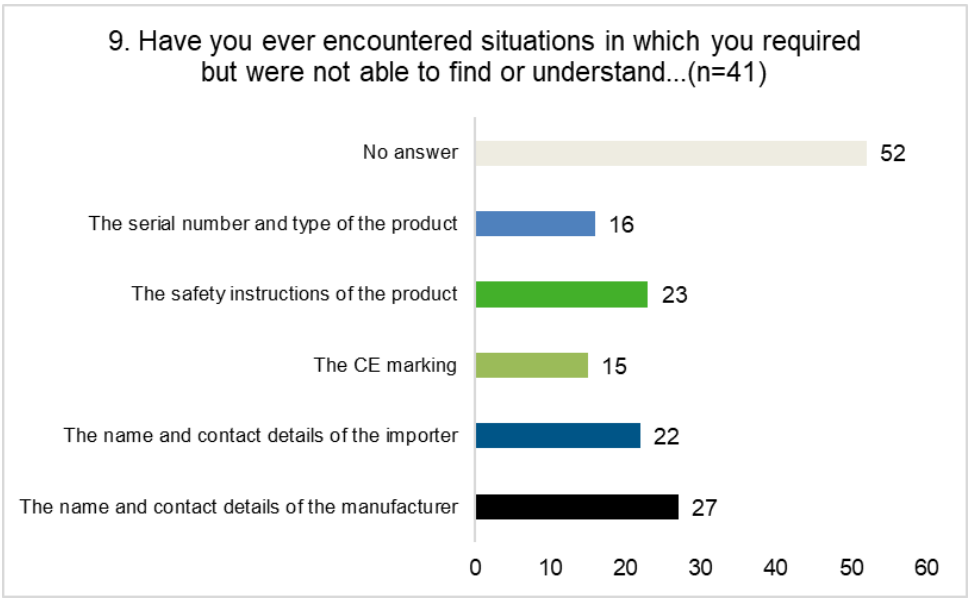


Source: Public Consultation

Even though the level of information provided by the manuals was generally deemed sufficient by the majority of respondents, it appears that often specific information are difficult to find or understand. As stated above, nearly the 66% of the respondents was not able to find the contact details of the manufacturer, more than the 50% the contact details of the importer and the safety instruction, and almost the 39% the serial number of the products and the CE marking. Moreover, 29 of the respondents provided additional descriptions of situations in which information were difficult to find or understand. In particular, it often emerged that safety information of instruction manuals are missing or incomplete, especially the ones related to products coming from extra European countries, as well as the information concerning the manufacturers.

However, it should be noted that only 41 out of 93 participants to the survey replied to this question, further restricting the sample and therefore limiting the room for assumptions.

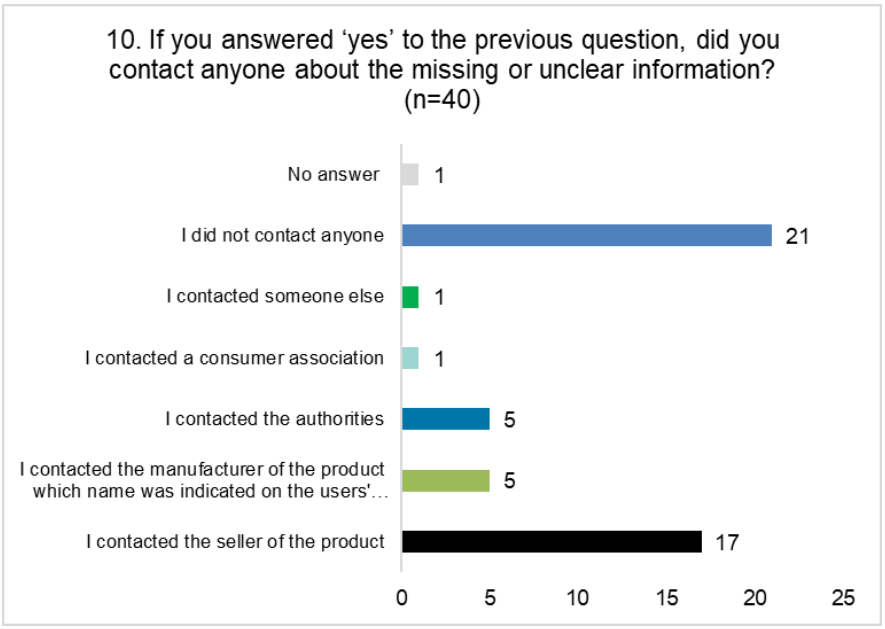
Figure 67 Answers to Q9. Information gaps



Source: Public Consultation

Among the consumers that encountered a problem in finding or understanding relevant information in users' manuals, approximately half decided to not contact anyone, while 17 out of 40 contacted the seller of the product. Only 5 respondents referred to the authorities or directly to the manufacturer specified in the manual. Finally, only one person contacted a consumer association.

Figure 68 Answers to Q10. Contacts following unclear information

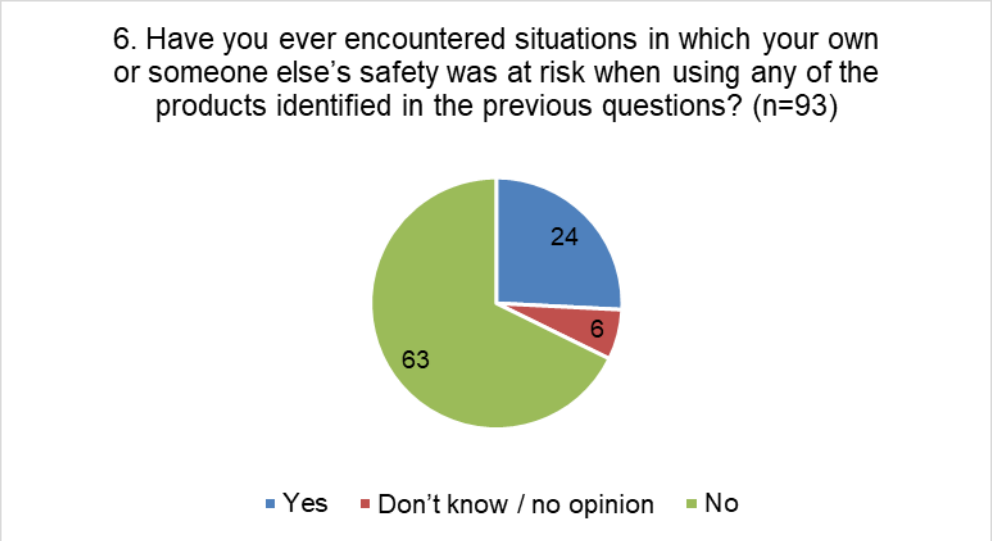


Source: Public Consultation

2.2.3 Effectiveness of the LVD

Related to the effectiveness, respondents have been asked to report on situations of safety risks encountered while using one of the products included under the scope of the Directive. Overall, the almost the 26%% of the participants affirmed they have been involved in a risky situation.

Figure 69 Answers to Q6. Situations of safety risk.

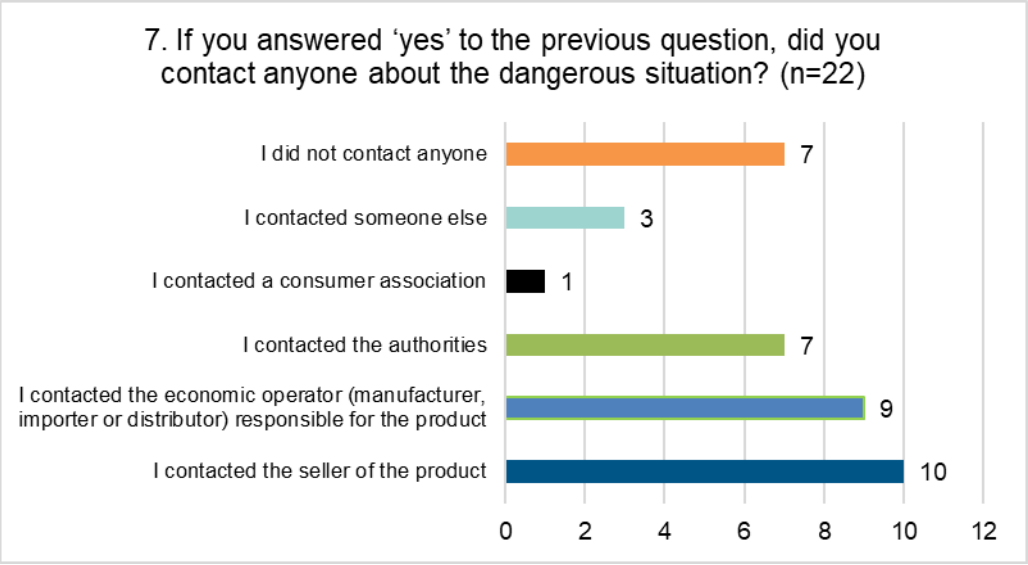


Source: Public Consultation

All the 24 individuals that replied positively added detailed descriptions of the dangerous situation. The dangerous products were various, such as toys, electric kitchen utensils, adaptors, etc. Situations in which instructions were not included or the CE marking was missing were also described.

Following the dangerous situation, 10 consumers decided to contact the seller of the product, 96 the economic operator specified in the user's manual and 7 to not contact anyone and the authorities Only 1 individual contacted a consumer association.

Figure 70 Answers to Q7. Contacts following dangerous situations.



Source: Public Consultation

2.3 Workshop report

2.3.1 Understanding of the LVD

Stakeholders agreed that there is no clear definition in the LVD of electrical equipment or of the types of products that should be considered electrical equipment. Especially in relation to the interaction with other legislation, it sometimes creates confusion, although this is only an issue for a limited number of products.

The supporting documents are appreciated by the different stakeholders. Where the Directive is sometimes written in a less clear way, the guidelines provide explanations, which are easier to understand and to follow. Some were of the opinion that this clarity is also needed in the legislation and not only in the guidance and that the LVD wording should be further aligned with the new legislative framework.

One source of confusion for the LVD scope are sets of products that are intended to be used together, such as peripheral products for computers. One example provided by the AdCo chair was that of solar panels, which separately have very low voltage but when used together fall within the voltage range. The AdCo group made a point that they would want a revision to make a clear decision on how these products should be considered.

In terms of innovation and new risks, since the LVD uses very general language, most stakeholders were of the opinion that the Directive covers all types of innovation and/or new safety risks. While some argued for using more explicit language, others pointed to the risk that more specifications make it also more likely that you miss something.

2.3.2 Interaction with other legislation

Stakeholders brought up the interaction with the RED and its effect on the scope of the LVD. Differences between the types of products used to be significant but are now increasingly blurred (e.g. home appliances with WIFI connections), making it unclear which directive applies. While the number of these "grey areas" are currently still limited, economic operators foresee more problems 10 years ahead as "eventually all products will be products under RED." Economic operators also raised the related issue that is it is not clear who decides: there is no authority to give a final decision under which Directive the product should fall. There is confusion about why RED covers LVD aspects, as safety is not a main topic of RED. Some attendees stated that directives should be geared at different types of risks rather than being product-specific.

The interaction with the MD was also mentioned. Certain product categories are mentioned in the MD but not defined, which creates some (incidental) confusion as to when to take the end use as domestic or industrial (e.g. with laundry machines or 3d printers).

The standards used for complying with the LVD and RED are "practically the same". The only difference is the declaration of conformity that has to be provided. This creates problems for economic operators because if it is not fully clear under which Directive a product falls (grey area) they have to make a choice, which does not guarantee that all Member States will agree with their interpretation, which may require additional administrative costs.

While the idea of merging directives came up in several rounds there was no consensus, the majority of stakeholders (especially business) dismissed this idea because of the complications it would create (e.g. clarity to economic operators).

2.3.3 Implementation of the LVD

Participants validated that the LVD could be considered as best practice in terms of product legislation. It is considered well-functioning and fit for purpose even if it still can be improved.

Discussions among participants confirmed standards should be considered as key elements in relation to the implementation of the LVD. Recent policy developments including European Court of Justice case law leave room for stakeholders to reinterpret the voluntary characteristic of standards. In this regard, some stakeholders feel the use of standards has actually become mandatory for economic operators willing to ensure compliance of their products with regards to the LVD. In this context, a participative approach to standardisation at EU-level is ever more

crucial to ensure the effectiveness of the standardisation procedures. However, while in theory the delegation principle ensures that any stakeholder may participate in standardisation committees, it appears that in practice this may be hindered by a lack of resources.

The implementation of the current conformity assessment procedure (Module A) was also discussed. Participants highlighted the importance and effectiveness of leaving full responsibility to economic operators to ensure the implementation of the essential safety requirements in practice, even if this implies that there is a possibility of diverging practices among economic operators. Some participants also felt there is a lack of definition of risks and related assessment procedures, which could lead to some not being included in the tests conducted by companies under the current conformity assessment procedure.

In this regard, it was mentioned that no other module[68] would eliminate the issue of uncompliant products or fraudulent economic operators, which depend on the effectiveness of market surveillance activities. The removal of notified bodies from the implementation of the LVD was seen as a positive development, which should not be undone.

Regarding the EU Declaration of Conformity, it was discussed that the interaction of most low voltage products with other legislation, including RED, EMCD and MD, is burdensome without necessarily adding value in terms of safety. As for the CE marking, it was discussed that while it represents the final compliance milestone for industry stakeholders, it is not a label targeted at consumers, and therefore should not be promoted as such.

The implementation of the provisions related to labelling and (technical/safety) documentation were also discussed by participants. While it was confirmed that these are somewhat outdated and not following the current trends in digitalisation, the traceability of products these offer was highlighted as a crucial aspect for national authorities and consumers. However, it was also mentioned that physical marking and documentation may be contain falsified information, e.g. 'letter box' company addresses, which therefore hinder the traceability to the same extent that electronic labelling or marking.

Electronic labelling (on product screens) and marking (through barcodes, DR codes, website addresses, etc.) were discussed as being solutions to cater to issues relating to the smaller and smaller size of products. The establishment of an electronic product record database was discussed in order to resolve the traceability issue related to electronic marking of goods. However, the burden related to its updating, maintenance and governance was raised as a challenge.

Finally, it was highlighted that accompanying goods with their technical documentation and safety instructions is a burden for economic operators and it creates (in some instances, unnecessary) waste. However, it was underlined that this allows consumers to always have direct access to such crucial information (as opposed to having these in an electronic format, which requires ICT literacy from consumers).

Concerning the implementation of low voltage product legislation in third countries (including Argentina, Canada, China, Japan, South Korea and the USA) it was mentioned that international (IEC) standards were referred to and applied broadly all over the world (with some slight national adaptations when necessary).It was mentioned that the culture governing product safety, related legislation and compliance by economic operators differs from country to country. The USA was

[68] E.g. Module B, for which it was underlined that it could not be compared to a bundle of 'Module A topped with notified bodies' as its overall requirements and related burden go far beyond that.

mentioned as an example where the public is incentivised to legally pursue uncompliant economic operators (as there is often large sums of money linked to liability), whereas there a significantly fewer of such cases in Europe.

It was mentioned that China has recently removed notified bodies from the certification processes for some electrical products, and has also moved on with electronic labelling, together with the USA.

2.3.4 Enforcement of the LVD

Discussions provided insights especially about the first two suggested points of discussion. Less was said about market surveillance practices in non-EU countries, however a trade association explained that the US system is not well developed, whereas in the Gulf Region, in Australia and in Asia (especially Japan and South Korea) strict requirements (comparable to the EU ones) are in place.

On products coming in from outside the EU, it was also noted that non-compliant products cannot be effectively stopped at customs for multiple reasons: the customs officers do not have the relevant knowledge/training, their focus is on stopping illegal and unlabelled rather than non-compliant products, and they do not have the capacity to examine the content of every shipment.

About the impact of variances in market surveillance activities across EU Member States, there was an overall consensus from all stakeholders that national budget constraints are a widespread issue across the EU (with the remarkable exceptions of Finland and Denmark). This prevents national market surveillance authorities from performing sufficient in-depth product testing on a large scale, potentially highlighting a gap between formal compliance with the LVD and actual effectiveness of the safety provisions included in the Directive.

A few options have been suggested this; some EU Member States and some (both consumers and industry) associations have suggested more cooperation with the various industry players, in order to efficiently share the burden between the authorities and the manufacturers, as well as efficient sharing on information between Member States. It was also noted that the Goods Package might improve the situation to some degree.

In terms of testing approach, the opinions between EU Member States were somewhat different, with one EU Member State suggesting the implementation of “market share” testing (already compulsory within the scope of the Automotive Directive): the amount of tests to be performed being linked to the market share of the item sold in each country, thus the higher the market share, the higher the number of tests which the product would need to pass. Whereas two Member States proposed a “risk-based” approach towards testing, allocating the limited resources for testing to the higher risk categories of products. The importance of randomised testing was also highlighted.

Another relevant issue is the cooperation and communication at intra-EU borders. Several stakeholders suggested that more efforts should be put in place to avoid the practice by manufacturers of trying to sell non-compliant items at different national borders, after having already been rejected by the customs in one Member State. A push towards e-labelling and the use of an electronic registry for non-compliant products are two encouraged measures to tackle this issue. However, according to a trade association, even with national variances in surveillance, there is no common perception among manufacturers that the single internal market is segmented in “easily accessible” markets (with lower safety standards) and markets “accessible only with difficulty”: the EU single internal market’s safety standards are still considered efficient in the whole area.

Overlapping with the issue of budget constraints, another debated topic was the interaction between the LVD and other similar Directives. One Member State encouraged a reflection about the merger of RED and LVD, while some other Member States as well as associations were in favour of the distinction between LVD and RED. Other Member States also warned about possible administrative burden resulting from a potential new unified Directive.

Some stakeholders also expressed dissatisfaction with the fact that introducing Wi-Fi connection automatically moves an appliance from the LVD scope to RED scope. It was considered that in many cases this does not really make sense, as the potential safety risks of those products remain largely the same, relating to their LVD related aspects rather than IoT aspects.

A final element highlighted was the impact of not having a notified body provision in the LVD text: according to two Member States, Notified Bodies could be a source of support and guidance for SMEs struggling with the conformity assessment process, or in cases of conflict with Market Surveillance Authorities.

It was also suggested that Notified Bodies could be brought back specifically for innovative and/or particularly complicated or high-risk products, or the choice of module could be left to the manufacturer, depending on their need for external support. One industry association also suggested that involvement of Notified Bodies would not improve compliance, as manufacturers willing to comply will do so in any case, and manufacturers not willing to comply will find their ways around.

2.3.5 LVD Working Party attendees

Here below are the LVD Working Party list of attendees.

National authorities	Industry associations	Consumer organisations	Standardisation bodies
✓ Germany ✓ Malta ✓ Norway ✓ Poland ✓ Slovakia ✓ United Kingdom ✓ Belgium ✓ Czech Republic ✓ Denmark ✓ Ireland ✓ Spain ✓ Switzerland ✓ Finland ✓ France ✓ Italy ✓ Lithuania ✓ Netherlands ✓ Sweden	✓ CLEPA ✓ European Cancer Leagues ✓ European Sunlight Association ✓ Lighting Europe ✓ Orgalim ✓ Applia ✓ EGMF ✓ CECAPI ✓ CECIP ✓ EuroCommerce ✓ Digital Europe	✓ ANEC	✓ CEN-CENELEC

ANNEX 3

METHODS AND ANALYTICAL MODELS

The evaluation study was conducted from June 2018 to June 2019, with data collection activities running until April 2019. Data was gathered through the following means:

- Desk research by analysing previous evaluations and impact assessments of the LVD, legislative and guidance documents, LVD working party and AdCo documents, existing reports and studies on the electrical equipment industry and related market trends and database extracts from Eurostat, the Rapid Alert System for Dangerous Non-Food Products (RAPEX) and received from national authorities. (see Annex 6 for more details)

- Interviews with stakeholders such as National authorities, Businesses & industry representatives (incl. innovation hubs), Standardisation bodies, Consumers and Third country stakeholders.

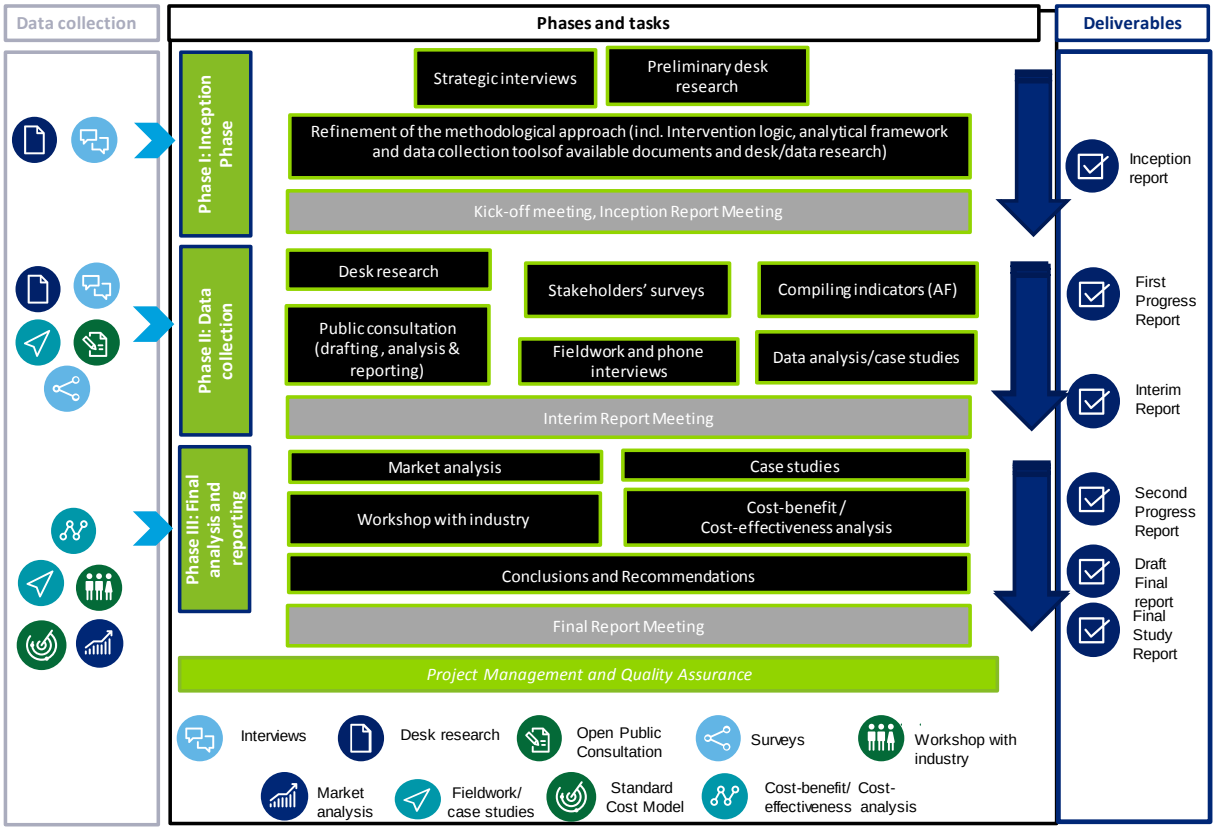
- Public Consultation addressed to all categories of stakeholders and in particular EU citizens and civil society. It was aimed at gathering factual information, data, knowledge and perception by final consumers and citizens across the EU about the LVD.

- Stakeholder surveys targeting notably businesses in all 28 MS, Business and consumer associations, Standardisation bodies, National authorities and consumers.

- Workshop which was organised on 8 February 2019 in Brussels. The purpose was to discuss the preliminary findings around understanding, implementation and enforcement of the LVD.

The figure below provides an overview of the approach to the study

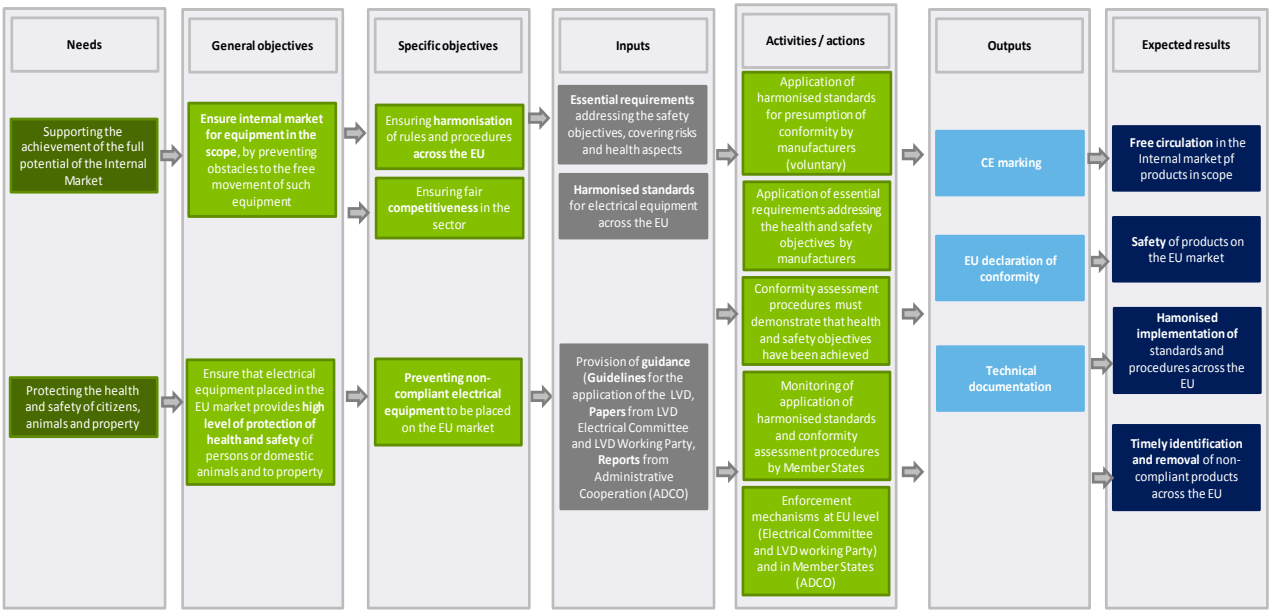
Figure - Approach to the study



Source: Consortium

The figure below provides an overview of the intervention logic of the LVD that was used to identify the evaluation questions

Figure - Intervention logic

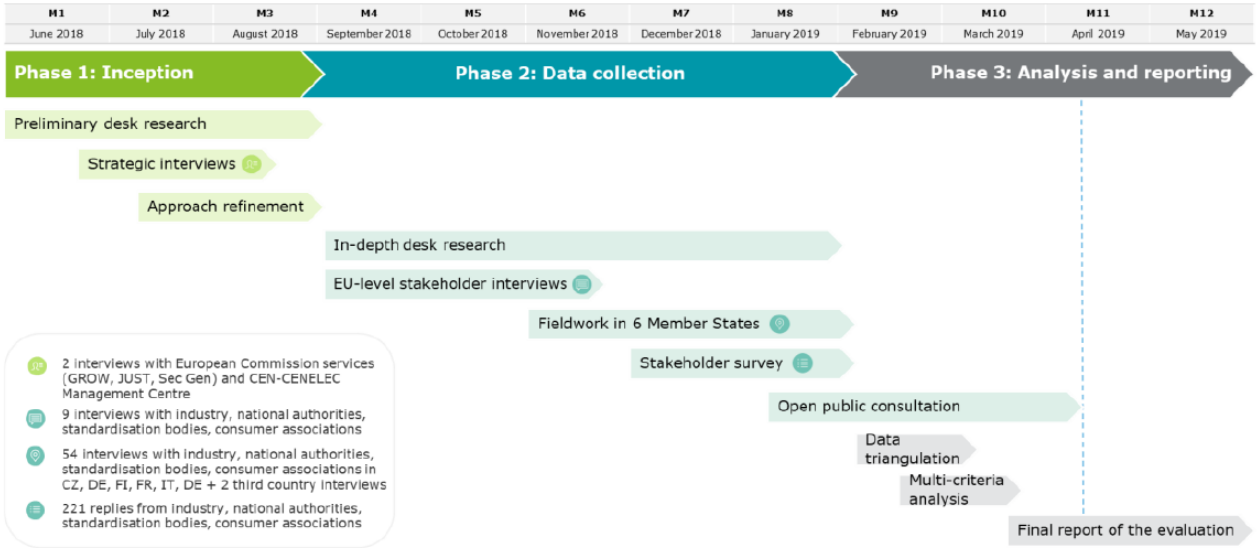


Source: Consortium

3.1 Data collection and consultation strategy

The evaluation study was conducted from June 2018 to June 2019, with data collection activities running until April 2019,

Figure 1 - Timeline of the evaluation study



3.1.1 Desk research

As presented in the figure above, desk research was a continuous activity during the supporting evaluation study. A series of insightful documents were recapped and analysed such as:

- Previous evaluations and impact assessments on the LVD as well as other EU instruments such as the market surveillance Regulation;
- Legislative and guidance documents on LVD and other legislation linked to the scope of this evaluation;
- LVD Working Party and AdCo (public and restricted CIRCAB) documents;
- Existing reports and studies on the electrical equipment industry and related market trends,
- Database extracts from Eurostat, the Rapid Alert System for Dangerous Non-Food Products (Safety Gate/RAPEX) and received from national authorities, etc.

The desk research allowed to gather inputs notably on:

- The functioning of the LVD, its strengths and weaknesses, as well as key topics on the agenda of related working groups.
- The functioning of other instruments applying to products in the scope of the LVD
- The low voltage product market, its economic operators and evolution over the years
- The number of uncompliant products reported over time in the EU.

3.1.2 Interviews

A significant number of interviews were carried out as part of the consultation activities. These were conducted with different types of stakeholders, at both EU and national level. Also stakeholders from third countries were interviewed in order to complement the understanding of legislative systems for low voltage products in other regions of the world, and possibly spot 'best practices' (presented in Annex P of the evaluation study). The table below provides the overview of the types of stakeholders consulted throughout all interviews carried out in the context of this evaluation. Annex D of the evaluation study presents the interview guides for each type of semi-structured conversations and Annex 6 contains the list of interviewees.

Table 1 - Types of stakeholders reached through interviews

Type of interviewee	Total number of interviews conducted	Strategic and EU-level	National-level	Third country
National authorities	13	2	11	
Businesses & industry representatives (incl. innovation hubs)	39	4	35	
Standardisation bodies	8	2	6	
Consumers	3	1	2	
Third country stakeholders	2			2
Total	**65**	**9**	**54**	**2**

3.1.2.1 Strategic and EU-level stakeholders interviews

Between July and November 2018, 9 EU-level stakeholders were interviewed, as presented in Table 1 above. These interviews contributed notably to the mapping of processes related to obligations set by the provisions of LVD to each type of stakeholder, as well as the identification of the type of costs and benefits associated with these processes.

Organisation	Date
LVD AdCo	21/09/2018
ANEC	29/11/2018
APPLIA	11/09/2018
CENELEC - CCMC	19/07/2018
CENELEC – LVD Technical Committee (BTWG143-1)	18/09/2018
Digital Europe	13/09/2018
Lighting Europe	13/09/2018
LV WP chair	25/09/2018
Orgalim	11/09/2018

Moreover, they provided more insights into the safety aspects as well as into the relations between the LVD and other Directives. They also allowed to raise these interviewees' attention to the stakeholder survey and subsequently requesting them to act as multipliers by sharing its link among their relevant contacts. Furthermore, some of these interviewees also provided relevant documentation and potential interview contacts at Member State level for the fieldwork interviews.

During LVD Advisory Committee (AdCo) meeting that took place in Leuven on 5 December 2018, the objectives and focus of the evaluation were presented, an overview of the methodology and the status to date of the assignment. Further, a set of questions and topics were discussed with the AdCo members. The participation to the meeting namely contributed to the better understanding of the views of the EU Member States.

3.1.2.2 National-level stakeholder interviews

Fieldwork was conducted in six selected Member States (Czech Republic, Germany, Finland, France, Italy and Poland) between end November 2018 and early February 2019. Interviews (up to 10 in each country) were organised in order to include the following types of stakeholders:

Results

- Businesses: Businesses were chosen so as to ensure a mix across the value chain and business size (i.e. larger businesses and Small and Medium-sized Enterprises (SMEs) making sure to cover the five main product groups in the scope of the Directive. In particular, two product groups based on the second revision of the Statistical classification of economic activities in the European Community (NACE Rev.2, derived from the French Nomenclature statistique des activités économiques dans la Communauté européenne). NACE Rev.2 per Member State were selected as focus:

  - Czech Republic: C26.2 (Manufacture of computers and peripheral equipment), C27.1 (Electric motors, generators, transformers and electricity distribution and control apparatus)

  - Germany: C26.2 (Manufacture of computers and peripheral equipment), C27.1 (Electric motors, generators, transformers and electricity distribution and control apparatus);

  - Finland: C27.1 (Electric motors, generators, transformers and electricity distribution and control apparatus), C27.5.1 (Electric domestic appliances);

  - France: C27.4 (Electric lighting equipment), C27.5.1 (Electric domestic appliances)

  - Italy: C27.4 (Electric lighting equipment), C27.9 (Other Electronic equipment)

  - Poland: C27.5.1 (Electric domestic appliances, C27.9 (Other Electronic equipment)

First, the stakeholders were mapped to include economic operators from relevant sectors and eventually shortlisted larger businesses and SMEs (at least 1 in each Member State), manufacturers, importers and distributors. The interviews themselves focused on gathering information on the compliance and administrative costs that firms face when complying with LVD-related provisions.

- National authorities: Similarly, in-depth interviews were conducted with the relevant national authorities in charge of monitoring and enforcing the LVD on the national territory. In the case of the Federal State of Germany, where the enforcement of federal legislation and market surveillance is a competence of the subnational administrative units (16 federal states), in addition to the market surveillance central point of contact, an additional contact conveying the subnational priorities and tasks in the field of LVD was interviewed.

- European Committee for Electrotechnical Standardization (CENELEC) Committees: representatives of CENELEC Members of the National Electrotechnical Committees entrusted with electrotechnical standardisation were interviewed.

- National business and consumer associations: of relevance to the study in order to further explore the effects of the LVD on companies and consumers (up to 1 in each Member State).

Overall, this activity allowed to collect information on issues regarding the implementation of the LVD, the current status of the market including any trends, international benchmarks or best practices that the interviewees considered relevant, and to collect additional sources of information. In order to best coordinate the additional data collection activities (e.g. open

stakeholder's survey, fieldwork and phone interviews in six selected Member States), it was made sure to tap into the stakeholders' contacts in EU Member States.

The table below provides an overview of the fieldworks, per country and type of stakeholder:

Table 2 – Fieldwork interviews per country and stakeholder type

Member State	Key stakeholders			Additional stakeholders			Total per Member State
	Businesses	National Authorities	CENELEC	National Business Associations	National Consumer Associations	Other	
Czech Republic	2	1	1	1	N/A	N/A	5
Finland	5	2	1	1	1	N/A	10
France	5	2	1	3	N/A	N/A	11
Germany	5	2	1	2	N/A	N/A	10
Italy	5	2	1	1	1	1	11
Poland	3	2	1	1	N/A	N/A	7
Total	25	11	6	9	2	1	54

3.1.2.3 Third country stakeholder interviews

In order to complement the information available through other data collection activities on the regulatory systems for electrical equipment in third countries two interviews with third country stakeholders were carried out.

These interviewed allowed to:

- Finetune the understanding of regulatory systems in place for low voltage products in USA, Canada, China, South Korea, Japan, Argentina, thereby allowing to compare them with the LVD.
- Understand how third countries deal with aspects that are considered as the shortcomings of LVD, thereby possibly identifying best practices.

3.1.3 Surveys

Two online consultations were carried out as part of the evaluation: the targeted stakeholder survey, with differentiated questions per type of stakeholder, and the Public Consultation (Public Consultation) with one set of questions available for all respondents.

3.1.3.1 Stakeholder survey

The stakeholder survey was set up on EU Survey and launched online on 4 December 2018. Its initial closure data was planned on 15 January 2019, however, it was extended until 31 January 2019 in order to maximise the response rate over the holiday period. The stakeholder survey targeted notably:

- Businesses (both larger businesses and SMEs) in all EU 28 Member States, including manufacturers, importers and distributors of electrical products in the scope of the LVD;
- Business and consumer associations (including innovation hubs and incubators) in EU 28 Member States;
- Standardisation bodies: national standardisation committees for low voltage products in all Member States;
- National authorities in EU 28 Member States: e.g. national authorities that are responsible for the implementation of the LVD and related market surveillance;
- Consumers in all 28 EU Member States.

Dissemination was carried out through several channels, in order to maximise the outreach of the target population and thus the number of answers: the link was shared with all interviewees (EU level stakeholders as well as fieldwork interviewees), asking them to disseminate the survey among their members/contacts, triggering all dissemination channels, including: social media pages (e.g. LinkedIn, Twitter account of those organisations), organisations' websites and newsletters, etc. DG GROW shared the link on its website, and on the respective intranets for the LVD Working Party and AdCo11.

In total, 221 responses were received for this survey. Of these, 116 were manufacturers, 10 importers and distributors, 13 National Authorities including market surveillance authorities, 40 business associations, 4 consumer organisations, and 38 reported as belonging to "others" group. The last category included, among others, testing and standardisation organisations, present and former notification bodies, consultancies and academic and educational organisations. The highest number of stakeholders participating in the survey was from Germany (70), including German manufacturers.

3.1.3.2 Public consultation

As per the Better Regulation Guidelines (BRG), the European Commission launched a Public Consultation on 10 January 2019, which was online for the mandatory period of 12 weeks (closure on 4 April 2019). The Public Consultation questionnaire (provided in Annex H of the evaluation study) included general questions addressed to all EU citizens. It was aimed at gathering factual information, data, knowledge and perception by final consumers and citizens across the EU about the following aspects of the LVD:

- Relevance of the scope and the objectives of the LVD compared to the needs of the consumers;
- Effectiveness of the Directive in ensuring consumers' safety.

The Public Consultation was mainly disseminated through a link on DG GROW's website. The Public Consultation gathered a total of 93 replies across 17 Member States, with the highest number of replies from Germany and the UK.

3.1.4 Workshop

A validation workshop was organised on 8 February 2019 in Brussels. The purpose was to discuss the preliminary findings around the three topics outlined below with the LVD Working Party prior to their validation:

- Understanding of the LVD, i.e. regarding the clarity of the Directive, its objectives and requirements, scope, provisions, etc.;
- Implementation of the LVD, i.e. regarding the day to day functioning of the Directive and the way it is applied (e.g. use of standards, implementation of the conformity assessment procedure and CE marking, labelling requirements, etc.); and,
- Enforcement of the LVD, i.e. regarding the extent to which it is actually adhered to, market surveillance activities at national-level, (e.g. availability of resources, processes, results of market surveillance and safety, etc.).

Annex 5 contains the agenda and list of participants of the workshop and Annex K of the evaluation study reports on the main conclusions of the workshop.

3.2 Methodology to identify the products in the scope of the LVD

The challenge for the data collection and analysis is that low-voltage products are not a defined sector in the industry and are also not recorded as a separate group of products in statistical databases. As a result, assumptions need to be made to define the low voltage sector in relation to market data. This section presents the methodology and main assumptions made for data analysis.

The market analysis is based on a selection of nine NACE Rev.2 categories describing economic activities of the manufacture of electrical equipment. These nine categories are the ones defined in the 2005 Impact Assessment[69] (with the update to NACE Rev.2) and were reviewed by technical experts to ensure these categories still cover the totality of the electrical equipment currently in the market. Table below introduces these specific categories:

Table – NACE categories of products under the scope of the LVD

NACE code	Category name
C26.2	Manufacture of computers and peripheral equipment
C26.3	Manufacture of communication equipment
C26.4	Manufacture of consumer electronics
C27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus
C27.3	Manufacture of wiring and wiring devices
C27.4	Manufacture of electric lighting equipment
C27.5.1	Manufacture of electric domestic appliances
C27.9	Manufacture of other electronic equipment
C29.3.1	Manufacture of electrical and electronic equipment for motor vehicles

The manufactured products described in the NACE categories contain products falling both within and outside the scope of the LVD. Therefore, as a next step, the more detailed Prodcom-level product list for each of these NACE categories were used to apply specific criteria to define whether each product category is likely to fall within the scope of the LVD. To fall within the scope of the LVD, a product category has to comply with the following criteria:

- Product refers to electrical equipment;
- Product falls within the voltage limits set by the LVD;
- Product is not part of the exceptions included in the LVD; and

[69] Impact Assessment of Various Policy Options for a Possible Amendment of the LVD (2005)

- Product that is not excluded from the LVD because it falls under other relevant Directives (such as the Radio Equipment Directive or the Machinery Directive).[70]

Within the nine NACE categories, 188 product categories comply with the criteria set out. It should be noted that it is not possible to have a clear conclusion for each product category. This is because these categories consist of a mix of products, and these products can be within or outside the scope of the LVD, depending on the specific product characteristics. Therefore each product category was assessed for whether the products it contains are likely to be within or outside the scope of the LVD, or whether this depends on product characteristics not reflected in the code's label (mixed). This allows us to present a 'minimum' range of products that are within the scope of the LVD, and an 'additional' range of products that can be either within or outside the scope of the LVD. Together, these categories constitute the maximum range of products that are covered by the LVD.

It should be noted that the analysis of whether a product category classifies as within the scope or not is based on the current state of play (i.e. the situation at the time the study was conducted), both with respect to the product characteristics and the policy and regulatory setting. This assessment could therefore change over time, with developments in technologies and the policy landscape.

For trade data, products are grouped based on Harmonized System codes (the international nomenclature for the classification of product) on a level of six codes. HS6 codes are slightly more general than Prodcom codes but can be matched using conversion tables, with an equivalence of 150 HS codes to 188 Prodcom codes. It is important to highlight some issues related to the underlying data, that should be taken into account in the interpretation of the results. First, many product categories start recording values at different years, and the growth in trade may therefore be partly be due to better data availability in recent years. Secondly, data presented is for all current EU countries over time, to keep the number of countries constant and thus to separate trends in increased trade from EU enlargement. This means that trade with the countries that joined the EU after 2000 can therefore not be considered as intra-EU trade until their actual accession.

3.3 Methodology for the analysis of Safety Gate/RAPEX data

Data on dangerous products falling under the LVD was collected from the Rapid Alert System for dangerous non-food products (Safety Gate/RAPEX) and visualised using Microsoft Excel.

Safety Gate/RAPEX enables a quick exchange between 30 countries and the European Commission on measures taken against dangerous non-food products posing risks to the health and safety or environment or any other aspect of public interest protection of. The system contains all records of notifications since the creation of the system in 2004.

While the public search functionality of Safety Gate/RAPEX[71] does not include a filter to select by Directive, the free text field was used to identify those products that were reported as not

[70] Certain directives which cover equipment that also falls under the scope of the Low Voltage Directive explicitly state the Low Voltage Directive is not applicable for this equipment. For example, the LVD does not apply to products covered by the RED. Products which meet the definition of radio equipment and fall under the scope of the are explicitly excluded from the LVD. Therefore, where RED is applicable to radio equipment, the LVD does not apply.

complying with the LVD (using the search term "Low Voltage Directive") Therefore, the list of alerts did not include any products that would have been reported to be in violation by a particular European standard only.

By 3 December 2018, alerts were submitted for 3,223 products covered by requirements of the LVD. The highest number of such alerts was submitted in 2013 (286 measures reported). It should be noted that the data submitted to Safety Gate/RAPEX depend on surveillance and reporting practices and frequency, which vary between countries and also between years within a given country. Therefore, the data from year to year are not directly comparable.

The categories used by Safety Gate/RAPEX differ from the ones used in the economic analysis of this study. The RAPEX categories coinciding with LVD products for which there were alerts were the following:

- Communication and media equipment
- Electrical appliances and equipment
- Gadgets
- Kitchen/cooking accessories
- Laser pointers
- Lighting chains
- Lighting equipment
- Protective equipment
- Other

The most commonly reported Safety Gate/RAPEX category for which reference to non-compliance with the LVD is made is electrical appliances and equipment (55% of such alerts over 2005-2018), which includes equipment such as small kitchen appliances and home electronics, cables, chargers and adapters, and hand tools. As the type of equipment is manually entered, doing precise calculations per equipment type is practically impossible due to different ways of entering the same type of equipment (e.g. different spellings and misspellings, inclusion or non-inclusion of the specific brand, plural or singular form, use of quotation marks, etc.).

It appears that 76% of the measures on products covered by the requirements of the LVD products reported originated from China across the years. From 2009 onwards, the share of such measures on Chinese products has remained in the range of 79% to 89% each year. China is the EU's largest trade partner of LVD products, which partially explains the prevalence of unsafe faulty Chinese products reported in Safety Gate/RAPEX. However, due to the limitations of data from Safety Gate/RAPEX, these results cannot be extrapolated to the internal market in general.

[71] Search tool available from Safety Gate website on https://ec.europa.eu/consumers/consumers_safety/safety_products/rapex/alerts/?event=main.search&lng=en . Note that this data concerns publicly available information only.

ANNEX 4

ANALYSIS OF THE LVD MARKET

NACE categories of products under the scope of the LVD

NACE code	Category name
C26.2	Manufacture of computers and peripheral equipment
C26.3	Manufacture of communication equipment
C26.4	Manufacture of consumer electronics
C27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus
C27.3	Manufacture of wiring and wiring devices
C27.4	Manufacture of electric lighting equipment
C27.5.1	Manufacture of electric domestic appliances
C27.9	Manufacture of other electronic equipment
C29.3.1	Manufacture of electrical and electronic equipment for motor vehicles

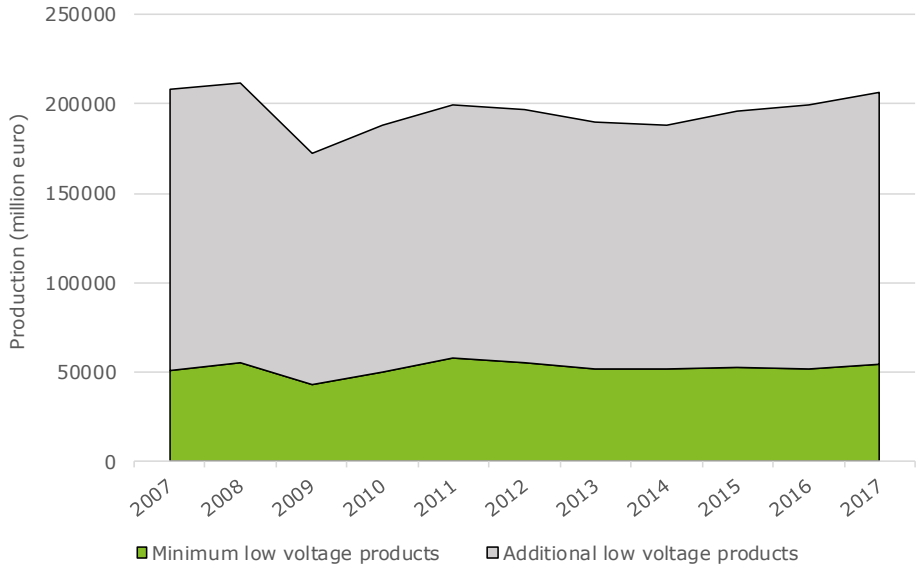
Production of low voltage products (million euro), 2017

NACE code	Category name	Total production	Minimum LVD	Additional LVD
C26.2	Manufacture of computers and peripheral equipment	€ 94,856	€ -	€ 16,819
C26.3	Manufacture of communication equipment	€ 33,346	€ 528	€ 11,751
C26.4	Manufacture of consumer electronics	€ 20,847	€ -	€ 12,143
C27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	€ 136,171	€ 27,713	€ 32,026
C27.3	Manufacture of wiring and wiring devices	€ 49,050	€ 13,469	€ 8,708
C27.4	Manufacture of electric lighting equipment	€ 30,247	€ 358	€ 12,518
C27.5.1	Manufacture of electric domestic appliances	€ 35,237*	€ 1,439	€ 26,340
C27.9	Manufacture of other electronic equipment	€ 30,829	€ 2,353	€ 16,458
C29.3.1	Manufacture of electrical and electronic equipment for motor vehicles	€ 35,578*	€ 8,241	€ 15,204

Note: C27.5.1 and C29.3.1 information for total production from 2016.

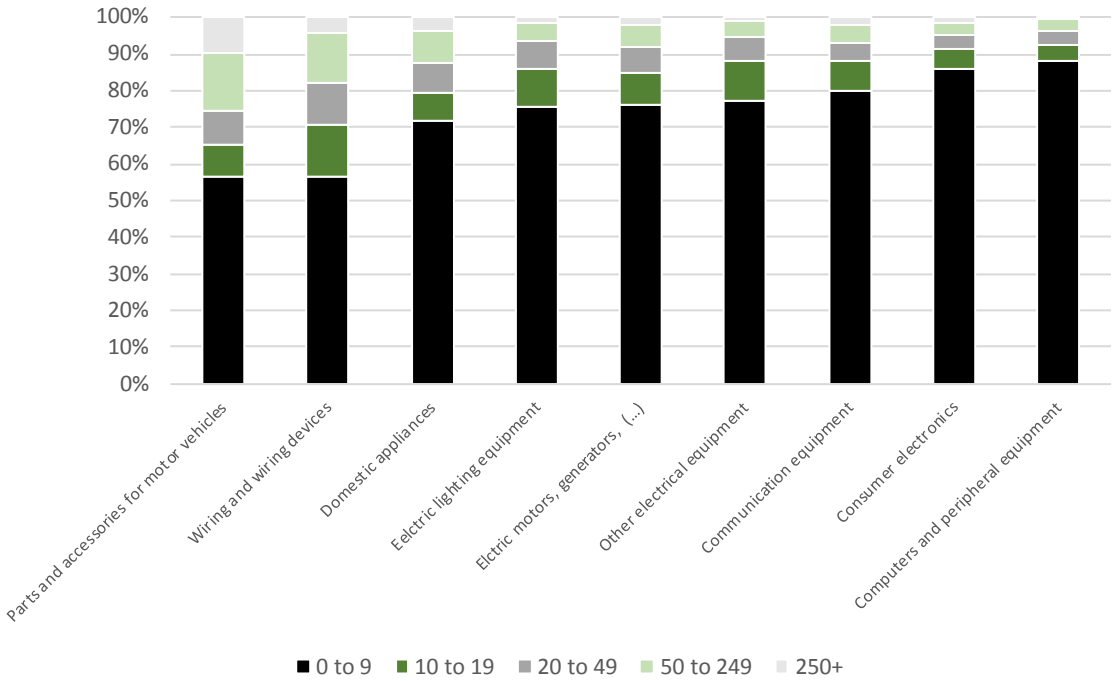
Source: Interim evaluation study calculations based on Eurostat Manufacturing Statistics sbs_na_ind_r2

EU production of low voltage products, 2007-2017



Source: Interim evaluation study calculations based on Eurostat Manufacturing Statistics sbs_na_ind_r2

Industry composition of selected NACE categories by enterprise size, 2017

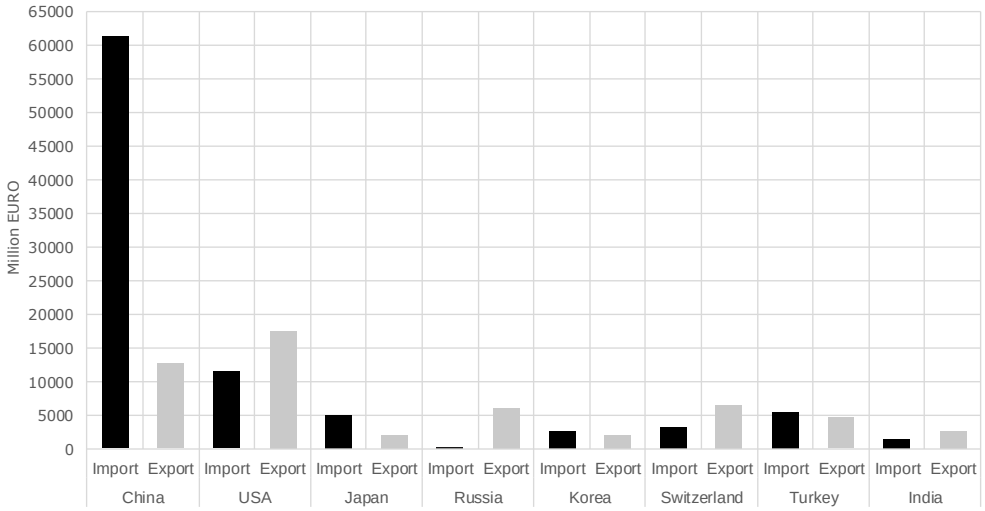


Source: Interim evaluation study calculations based on Eurostat, Industry by employment size class (NACE Rev. 2, B-E) [sbs_sc_ind_r2]

EU trade with RoW in full (minimum and additional) category of low voltage products, 2007-2018

Source: Interim evaluation study calculations based on Easy Comext

EU low voltage trade (maximum range) with extra-EU partners, 2018

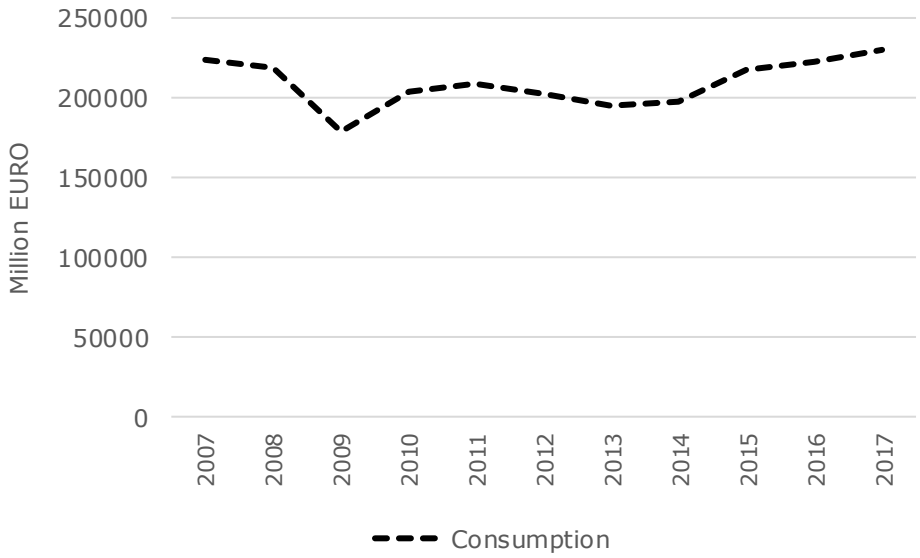


Source: Interim evaluation study calculations based on Easy Comext

EU trade with China in low voltage products (maximum range), 2007-2017

Source: Interim evaluation study calculations based on Easy Comext

EU consumption of low voltage products (maximum range), 2007-2017



Source: Interim evaluation study calculations based on Easy Comext

ANNEX 5

DESK RESEARCHESRESEARCHES

Researches used for Interim evaluation

Category	Subcategory	Title	Author(s)/Org.
Legislation	**Directives**	Directive 93/42/EEC of 14 June 1993 concerning medical devices	EU
		Directive 2001/95/EC of the European Parliament and of the Council on General Product Safety	EU
		Directive 2006/42/EC of the European Parliament and of the Council on machinery, and amending Directive 95/16/EC (recast)	EU
		Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for energy-related products.	EU
		Directive 2014/35/EU on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits	EU
		Directive 2014/32/EU on Measuring Instruments	EU
		Directive 2014/33/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to lifts and safety components for lifts	EU
		Directive 2014/34/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres (recast)	EU
		Directive 2014/53/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC	EU
	Regulations	Regulation (EC/EU) N°244/2009 - Ecodesign requirements for Lighting products	EC
		Regulation (EU) No 801/2013 - ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment	EC
		Regulation (EU) No 66/2014 - ecodesign requirements for domestic ovens, hobs and range hoods	EC
Guidance Docs	**Guidelines**	Guidance document on the low voltage Directive transition	EC
		Manufacturers' guide for lighting products	EC
		Blue guide' on the implementation of the EU product rules	EC
		Low Voltage Directive guidelines	EC
		RoHS 2 FAQ	EC
		Rules of procedure for the committee on electrical equipment	
		List of ecodesign regulations for products	EC
	Opinions	Opinion: toasters, grills, roasters and similar	EC
		Opinion: portable child-appealing luminaires	EC
		Opinion: safety of toasters	EC
		Opinion: safety of cable reels	EC
		Opinion: safety of cosmetic tanning devices	EC
	LVD Working Party Docs	Low Voltage Directive (LVD) - Obligation to put the two digits of the year in the Declaration of Conformity	LVD WP
		Low Voltage Directive (LVD) - New declaration of Administrative Cooperation Working Group (ADCO) on child appealing appliances	LVD WP
		Low Voltage Directive (LVD) - Socket outlet with switch	LVD WP
		Low Voltage Directive (LVD) - Legal Framework for the placing on the market of Electric vehicles and related equipment	LVD WP
		Low Voltage Directive (LVD) - CE marking in cord sets	LVD WP
AdCo Docs		Declaration of the LVD AdCo Group	LVD AdCo
		Final Report - cross Border Market Surveillance	LVD AdCo

		Final report - LVD Market Surveillance Campaign 2007 - Electrical Safety of Cord Extension Sets	LVD AdCo
		Recommendation regarding Child-Appealing Household Appliances	LVD AdCo
		ATLAS to uniformly discriminate between portable luminaries for children and adults	LVD AdCo
		Recommendation on General Issues	LVD AdCo
		Recommendation Hot surfaces	LVD AdCo
		Recommendation on LED replacement tubes	LVD AdCo
		Information Sheet - Pumps and other electrical appliances for mobile swimming pools	LVD AdCo
		Non-functional Hot Surfaces Project	LVD AdCo
		Fusing resistors applications	LVD AdCo
		LED and Compact Fluorescent Lamps Project	LVD AdCo
		ATLAS to uniformly recognize household appliances with child appealing designs	LVD AdCo
		Recommendations of the Administrative Co-operation Working Group	LVD AdCo
		Recommendation on stationary and portable spas, important safety information	LVD AdCo
Evaluation and Impact Assessment Docs		Study on the implementation of the Low Voltage Directive	ERA Technology Ltd
		Impact Assessment of various policy options for a possible amendment of the Low Voltage Directive	Risk & Policy analysts Ltd
		Evaluation of the internal market legislation for industrial products	Panteia
		Evaluation/Fitness Check Roadmap of the Low Voltage Directive 2014/35/EU	EC
		Refit evaluation on the implementation of market surveillance Regulation (EC) No 765/2008 carried	EC
CIRCAB files	**Tests and Certificates**	Principle approval of Sunshower	NEN
		Sunshower Approval by IEC 60364-7-701	NEN
		Fire Investigation Research	LFB
		Test report	NFH
		Certificate of Compliance Sunshower Pure	
		Declaration of conformity	CEO Sunshower
	Rules and Notifications	Rules of procedure for the committee on electrical equipment	
		Safeguard Notification	
		Manufacturers' obligation to ensure conformity in series production	BMWFM
		Notification to Korea	EC
		Relationship LVD and Metrology	EC
		Sunshower case	EC
	Opinions	Opinion from ANEC	ANEC
		Opinion from ANEC	ANEC
		SCENIHR Preliminary Opinion	SCENIHR
		DE Statement on SCHEER Opinion sunbeds	DE
		BfS Statement SCHEER opinion	BfS
		Vitamix position on the formal objection to Standard EN 60335-2-14	Vitamix
	MSs' comments	Position of Slovenia	Ministry of Economic development and technology
		France comments	FR
		UK comments	UK
	Formal objections	Objection from the Federal Republic of Germany	Franz Stelz
		United Kingdom Formal Objection	UK
		Cyprus Formal Objection	CY
		Communication Germany Formal Objection	

	Meetings	Meeting Report	EC
		Minutes meeting on EN 60335-2-14 related to blenders	EC
CIRCAB files Restricted documents	**Guidelines**	A-deviations in CENELEC European Standards	
		A-deviations Annex B	
		Low Voltage Directive - Guidelines on application and recommendations	EC
		Draft guidance document on the low voltage directive transition	EC
		Draft Guidelines Low Voltage Directive	
		Guidelines Low Voltage Directive	
		Common guidelines	EP
		Draft Applicability of the LVD/EMCD/RED to Specific Categories of Products	
		Annex to the Guidelines for the management of the European Union Rapid Information System	EC
	Regulations	Avis aux opérateurs relatif à la classification des lasers et sources assimilées	FR
		Draft decision safety requirements laser products	EC
		CE marking in cord sets	EC
		Exemption in EMCD, LVD and RED	EC
		Several products	
		Draft Exemption in EMCD , LVD and RED	EC
		Transitional agreements	EC
		Draft meeting report	EC
	MSs' comments on A-deviations	Danish reply to the list of standards having A-deviations	Danish Safety Technology Authority
		Situation concerning Finnish A deviations	Safety Technology Authority
		Comments from Norway to the list of A-deviations	DSB
		Swedish A-deviations in standards for LVD	Head of product safety department
		United Kingdom (GB) comments to the “LVD” A-Deviations 2005	GB
		Belgian (BE) comments to the “LVD” A-deviations 2005	BE
		Austrian comments on A-deviations	AT
		German (DE) comments to the “LVD” A-deviations 2005	DE
		Irish (IE) comments to the “LVD” A-deviations 2005	IE
		List of Swedish A-deviations 2005	SE
		Spanish comments to the LVD A-deviations 2005	ES
		Swedish (SE) comments to the “LVD” A-deviations 2005	SE
	Articles	Risks from the use of lasers on human skin	Commission on Radiological Protection
		Special Issue Title: Apoptosis	Journal of Carcinogenesis & Mutagenesis
Other	**Reports and studies**	The Home Appliance Industry in Europe 2017-2016	APPLiA
		Study: competitiveness of the electrical and electronic engineering industry	EC
		Definition of a Research and Innovation Policy Leveraging Cloud Computing and IoT Combination	EC
		What trends offer opportunities on the market for electronics and electrical engineering? (2017)	CBI
		Pulse of the European Shopper - ComScore Survey	UPS
		Global Consumer Insight Survey 2018	PWC
		Reshoring of EU Manufacturing 2014	EPRS
		Literature Overview: Relocation of EU Industries	EP
		Annual report 2016: Globalisation slowdown? Recent evidence of offshoring and reshoring in Europe	ERM

		Real World Consumer Behaviour- Briefing Note 3: Consumer Behaviour and Electronics	EcoLogic
		Navigating the Product Mindset (Survey)	UL

ANNEX 6

EVALUATION QUESTIONS

The evaluation assesses the relevance, effectiveness, efficiency, coherence, and EU added value of the Low Voltage Directive. To this end, a set of questions was defined to guide the data collection and analysis (see tables below), as indicated in the evaluation roadmap.

Table 1 – Evaluation questions: effectiveness

Topic	Evaluation questions
Internal market	To what extent have the specific objectives of the LVD related to the internal market been achieved? What are possible shortcomings in this regard? Are any cases of discrepancies detected in interpreting the requirements of the LVD by the Member States for particular products? To what extent has the LVD contributed to an effectively operating internal market for electrical equipment in its scope? What are possible shortcomings in that regard? Are there any barriers preventing the effective application of the LVD and/or particular situation creating difficulties in achieving the internal market?
Health and safety	To what extent have the specific objectives of the LVD related to the health and safety been achieved? What are possible shortcomings in this regard? How effective are Member States authorities in identifying non-compliant products and to what extent does it affect the effectiveness of the LVD? To what extent has the LVD achieved its aims for the products in its scope with regard to the protection of health and safety of persons, domestic animals and property? Has the LVD enabled the introduction of such equipment on the market by guaranteeing a high degree of safety and protection for the health of persons, domestic animals, and properties? What are possible shortcomings in that regard?
Progress towards the achievement of the objectives	To what extent can the progressing towards the objectives be credited to the LVD or do external factors influence the achievements? To what extent has the development and use of the European harmonised standards contributed to the effectiveness of the LVD? Are there any aspects/means/actors that render certain elements of the LVD more or less effective than other? If there are, what lessons can be drawn from this? Where expectations have not been met, what obstacles hindered their achievement?

Source: European Commission – Terms or Reference

Table 2 – Evaluation questions: efficiency

Topic	Evaluation questions
Costs and benefits for stakeholders	What are the regulatory costs and benefits for the different stakeholders and/or other actors? How affordable were the costs borne by the different stakeholders? What does this represents in terms of administrative and reporting burdens on stakeholders and/or other actors? To what extent discrepancies in interpretation between Member States create burdens for economic operators?
Efficiency of the intervention	To what extent has the LVD been cost-effective? To what extent have the costs of the Directive as a whole been justified, and proportionate, given the benefits that were achieved? Could the objectives be achieved at a lower cost?

Table 3 – Evaluation questions: relevance

Topic	Evaluation questions
Relevance of objectives	To what extent is the objective of ensuring a high level of safety for electrical equipment still in line with the needs at the EU level? To what extent is such objective still relevant today? To what extent is the objective of the functioning of the internal market still in line with the needs at the EU level? To what extent is this objective still relevant today?
Relevance of scope	Is the scope of the Directive still appropriate?
Relevance of articles	Are the Articles of the Directive still relevant today?

Table 4 – Evaluation questions: coherence

Topic	Evaluation questions
The internal coherence of the Directive	To what extent is the intervention coherent internally?
External coherence of the Directive	To what extent are there any issues of coherence with other legislations with similar objectives? Are there overlaps or complementarities between the Low Voltage Directive and any other EU legislations? To what extent is the intervention coherent with wider EU policy?

Table 5 – Evaluation questions: EU added-value

Topic	Evaluation questions
Added value compared to national level action	What is the additional value resulting from the Directive, compared to what could be achieved at national/regional level?
Added value to stakeholders	What is the added value of the Directive for stakeholders?