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Problems Regarding the Calculation of Recycling and Recovery Rates for End-of-life Vehicles in the European Union Member States

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Agnieszka Merkisz-Guranowska[1], Arkadiusz Wrona[2]

Abstract:

Purpose: *The paper discusses the problems of efficiency of implementation of Directive 2000/53/EC treating on end-of-life vehicles.*
Design/Methodology/Approach: *The objective of the Directive was to harmonize the disposal processes of ELVs in the EU member states. At that time, a need existed to unify the recycling systems within the entire EU to avoid unnecessary migration of vehicles to countries of less stringent environmental requirements as well as to assure sufficient environmental performance of the recycling process. The paper discusses the problems that appeared in the European recycling networks and evaluates the environmental performance of the networks based on the recovery and recycling rates obtained in individual member states. The authors did a critical review and identified problems that appeared in the European recycling networks and evaluated the environmental performance of the networks based on the recovery and recycling rates obtained in individual member states.*
Findings: *The authors identified the problems related to the calculation of the vehicle weight when entering the recycling network that translate into the obtained rates.*
Practical implications: *Based on the presented considerations, example actions were presented related to the improvement of the monitoring of the performance of the ELV disposal systems in the EU member states, the purpose of which is the reduction of the gray market and assurance of comparability of the recovery and recycling rates throughout the years and among individual member states.*
Originality/value: *The originality and value of the study are given by the fact that it examines the implications of national approaches to recycling and recovery rates calculation on the performance of recycling networks within EU.*

Keywords: *End-of-life vehicle, recycling rates, recovery rates, ELV treatment, ELV recycling.*

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[1]*Corresponding author, Poznan University of Technology, Faculty of Civil and Transport Engineering, Poznan, Poland, ORCID ID 0000-0003-2039-1806: agnieszka.merkisz-guranowska@put.poznan.pl;*
[2]*AWRO Arkadiusz Wrona, Zawiercie, Poland, arek.wrona@o2.pl;*

1. Introduction

End-of-life vehicles (ELV) constitute waste of the highest recovery rate. It is related to the applicability of Directive 2000/53/EC on end-of-life vehicles in the EU member states for over twenty years (Directive, 2000). The Directive aimed at promoting proper ELV treatment and improvement of the operation of the recycling network entities, particularly in terms of their environmental performance.

The aim of the Directive was to harmonize the measures related to the ELV treatment within the EU member states considering the mass problem of ELV disposal. All EU member states needed to unify the system to avoid migration of ELVs to the member states of less stringent environmental standards.

The Directive aimed at forcing administrative bodies and business entities (car makers importers, central and local government, manufacturers of materials and parts, recycling facilities) to act in favor of recycling. The Directive operates on three levels referring to the manufacturers, end users and dismantlers/recycling facilities. The regulations contained in the legislation are applicable not only to a vehicle but also to its individual components, materials, and spares.

The car makers were required to allow for the need of ELV recycling already at the stage of design. A possibility was considered of charging the car makers with the cost of the collection of ELVs having a negative market value, i.e., vehicles generating lower revenues from the sale of parts than the cost of treatment. The last owners were required to deliver their ELV vehicles to authorized dismantlers or collection points and the recycling operators to comply with the environmental requirements. Each EU member state must:

- create a network of collection points for ELVs and spares disposed of after repairs, to which the last user delivers the vehicle without additional costs irrespective of its market value unless the vehicle is incomplete,
- dispose of vehicles exclusively at authorized entities complying with specific environmental requirements,
- obtain predefined recovery and recycling rates. Starting from 1 January 2015, the member states had to assure a 95% recovery rate and 85% recycling rate (on average per vehicle per year by weight).

2. Problems with the Directive's Implementation

The scope and effects of the Directive implementation are continuously monitored by the European Commission. Pursuant to art. 9 of the Directive, the member states are obliged to report the implementation status in three-year intervals. Despite many years of applicability of the Directive, the objectives have not been entirely fulfilled. These objectives include most of all, directing the entire flow of ELVs to an official recycling network as well as reaching the required recovery and recycling rates.

Upon the evaluation of the implementation of the Directive for years 2011-2014, two main challenges were indicated, entities illegally disposing of ELVs and vehicle migration (Trinomics, 2020; Öko-Institut, 2020). The problem of unidentified flows of ELVs intensified in the coming years, which was confirmed in the report for 2014-2017 published in the beginning of 2020 (European Commission, 2020).

The European Commission is currently reviewing the Directive and, by 26 October 2021, will have performed social consultations among the stakeholders including the citizens as well as business entities, non-governmental organizations, and public administration. A legislative motion related to possible amendments to the Directive shall be presented in 2022. The authorities consider introducing recovery and recycling rates for specific materials and propose actions related to the elimination of possible ELV migration.

From the data provided by the EU member states, it results that in 2018, 7.5 million ELVs were withdrawn in the EU (including Great Britain), i.e., 12% more compared to 2017 when 6.7 million ELVs were delivered to the recycling networks (Table 1). In 2018, ELVs in the EU had a total weight of 8.32 million tons (as per the registration data). This was the highest volume recorded since 2009. The average weight of the ELVs in 2018 was 1.11 tons.

Table 1. *End-of-life vehicles in the EU (including Great Britain), 2010-2018.*

	2010	2011	2012	2013	2014	2015	2016	2017	2018
ELV number	7370438	6775873	6286123	6234459	6149846	5964527	5926050	6686185	7489975
ELV total weight (t)	7219872	6725468	6238392	6448125	6353747	6183657	6374447	7269909	8321882

Source: *Eurostat, 2021.*

A serious problem in the EU are 'lost vehicles' that are never delivered to the recycling network. The scale of this phenomenon is approx. 35% of all deregistered vehicles in the EU. There is a high probability that a large portion of these vehicles is not disposed of according to the requirements of the Directive and other European regulations.

According to the data for 2017, the number of vehicles of the gross vehicle weight (GVW) below 3.5 tons increased by 6.1 million (the total, as at the end of 2017, was 296.2 million vehicles and, as at the end of 2016, 290.1 million vehicles). Registrations of new vehicles and import of used vehicles from outside of the EU constituted a total of 17.31 million units, while 6.7 million ELVs were delivered to the recycling networks and the export of used vehicles constituted 0.87 million. The above renders 3.64 million vehicles outside of the official record (Trinomics, 2020). In 2014, this number was even greater and reached 4.66 million vehicles, which was the highest figure in the years 2008-2017 (Öko-Institut, 2018).

The European Commission indicated errors in the record systems and improper ELV

treatment as the reasons for this situation (Eurostat, 2020; European Commission, 2021). Not all ELVs are transferred to official dismantlers and collection points, which means they are dismantled at unauthorized facilities and, for some of the ELVs, certificates of destruction are never generated. Besides, some of the ELVs illegally migrate as used vehicles to the EU member states as well as outside the EU. ELVs migrating to other member states are either re-registered or disposed of on the gray market. Here, the problem is the disrupted flow of information among the administrative bodies of individual member states. In each of the above-mentioned cases, the said vehicles are consequently not subject to official ELV monitoring.

Information gaps and inconsistencies in the general data for the EU also result from problems in individual member states. In Eastern and Central Europe, the greatest impact on the undervalued official statistics has the gray market of ELV disposal. In Poland, in the years 2012-2020, 350 to 553 thousand ELVs per annum were transferred to the official recycling network. The highest number of ELVs was transferred in 2018 and, in the subsequent years, these values were lower (405 thousand in 2020). Depending on the estimates, half or even two thirds of the ELVs is disposed of outside the network (Golinska, 2014; Hatzi-Hull, 2017).

In Germany, the main problem is the export of used vehicles and a significant gap between the statistical data and estimates. This discrepancy referred to as the statistical gap is attributed to the criteria of export-related reporting, but doubts are also raising as to the adequacy of the monitoring systems of deregistered vehicles and the lack of official data related to the actual number of ELVs (El Halabi *et al.*, 2008).

The statistical gap reached from 0.24 million vehicles in 2009 to as much as 1.38 million vehicles in 2012 and the total for the years 2009-2016 was approx. 7 million vehicles (Umwelbundesamt, 2014; 2018). These deregistered vehicles most likely migrate to Africa, Eastern Europe, and Arab countries via other EU member states. Some of these vehicles are also dismantled for parts for further export.

A similar problem exists in the data related to deregistered vehicles in Great Britain. There is a sizable gap between the official data on the ELVs treated in official recycling networks and the estimates of the total number of end-of-life vehicles. This gap may reach as much as a million vehicles per year (El Halabi *et al.*, 2008).

3. Recycling and Recovery Rates

As per the guidelines contained in the decision of the European Commission no. 2005/293/EC, the recycling and recovery rates stipulated in Directive 2000/53/EC are calculated as follows (European Commission, 2005). The recycling rate is calculated as per the formula:

$$\text{Recycling rate} = \frac{\text{A+B+F1}}{\text{W1}} \tag{1}$$

A – weight of parts for reuse from dismantling ELVs arising in the member state and treated within the member state (in tonnes per year).
B – weight of recycled materials from de-pollution, dismantling and shredding ELVs arising in the member state and treated within the member state.
F1 – weight of recycled materials from ELVs arising in the member state and exported for further treatment (in tonnes per year).

The recovery rate is calculated as per the formula:

$$\text{Recovery rate} = \frac{A+B+C+F2}{W1} \quad (2)$$

C – weight of materials processed as energy recovery from de-pollution, dismantling and shredding ELVs arising in the member state and treated within the member state (in tonnes per year)
F2 – weight of recovered materials from ELVs arising in the member state and exported for further treatment (in tonnes per year).

In 2018, 23 member states reached a minimum objective of reuse and recycling of 85% of the average weight of a vehicle per year, 2 member states failed to reach this objective (Finland and Italy) and for 3 member states the data were unavailable (Malta, Romania, and Slovenia). The average reuse and recycling rate for UE-28 was 86.3% (Table 2, Figure 1).

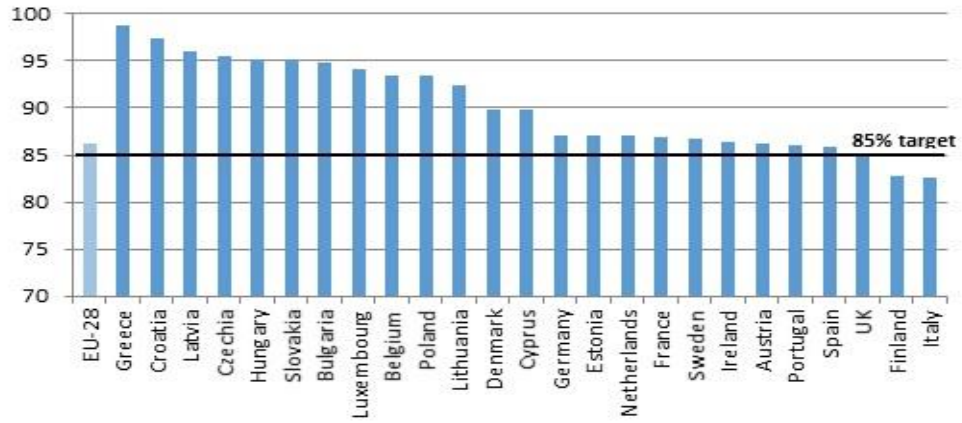
Table 2. *ELV recycling rates (%), 2012-2018.*

Country	2012	2013	2014	2015	2016	2017	2018
Austria	83,4	85	85,8	86,9	87,2	86,6	86,2
Belgium	88,7	88,2	89,2	91,3	92,1	93,2	93,5
Bulgaria	89,5	93,2	94,1	94,4	94,6	97,6	94,8
Czechia	80,3	80,3	80,3	90,2	90,3	91,9	95,5
Croatia	97,2	100	89,5	92,8	93,9	99,3	97,4
Cyprus	84,7	84,3	87,7	89,1	90,3	89,2	89,8
Denmark	92,4	86,6	86	91,2	88,8	91,5	89,9
Estonia	80,9	77,7	87	86	85,8	85,9	87,1
Finland	82,5	82,5	82,8	82,8	82,8	82,8	82,8
France	82,4	85,3	85,9	87,5	86,9	87,4	86,9
Germany	92,3	89,8	89,5	87,7	89,3	89,5	87,1
Greece	82,8	88,8	80,4	64,5	100	91,9	98,7
Hungary	84,4	90,7	90,3	94,6	95,4	95,5	95,1
Ireland	81,8	80,4	82,1	83,3	86	85,9	86,4
Italy	80,8	82,2	83,4	84,6	82,5	83,2	82,6
Latvia	97,6	92,4	92,2	86,6	94,3	84	96,0
Lithuania	89,2	92,1	93,5	94,6	94,9	94,8	92,4
Luxembourg	85	84	87	87	86	94,3	94,1
Malta	95,8	91,9	45	77,7	54,4	-	-
Netherlands	83,7	86	86,1	87,7	88,9	87,1	87,1
Poland	90,4	88,6	85,5	94,7	94,3	95,7	93,4

Portugal	82,7	82,9	83,8	84	83,5	85,2	86,1
Romania	84	83,8	84,1	85,1	85,1	-	-
Slovenia	100	-	85,9	-	-	-	-
Slovakia	89,9	92,5	94,8	88,4	96,1	95,7	95,1
Spain	83	83,6	84,3	85	85,4	85,8	85,9
Sweden	85	84,6	84,4	84,6	86,7	88,2	86,8
United Kingdom	84,1	85,5	86,9	87,3	86,4	86,5	85,2
EU-28	84,4	85,4	86,2	87,2	86,8	87,2	86,3

Source: *Eurostat 2021.*

Figure 1. *ELV recycling rates (%) in 2018.*



Source: *Eurostat 2021.*

The minimum determined recovery rate (95% of the average weight of a vehicle per year) was reached by 19 member states in 2018. Two member states that failed to reach the results of 95% but were close to it (Portugal and France) and four member states had clearly lower recovery rates. Because in 3 markets of high ELV supply the predefined objective was not completed (France, Great Britain and Italy), the average recovery rate for UE-28 as a whole amounted to 92.9%, i.e., more than 2 percent points below the threshold (Table 3, Figure 2).

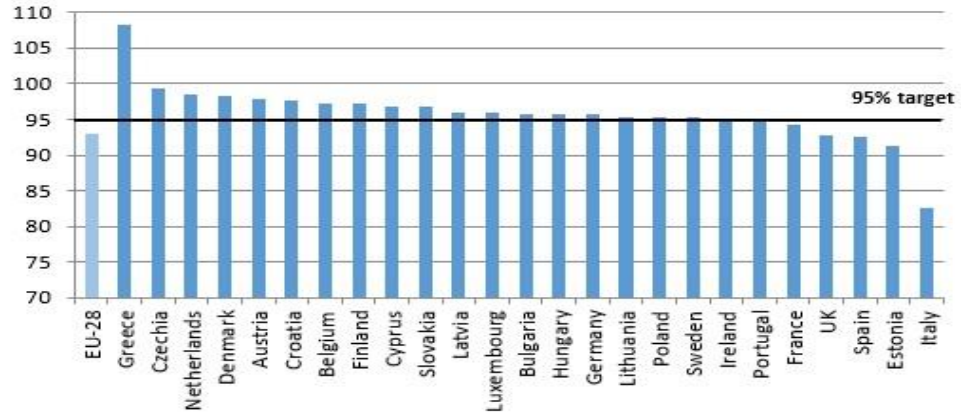
Table 3. *ELV recovery rates, 2012-2018 (%).*

Country	2012	2013	2014	2015	2016	2017	2018
Austria	94,2	96,7	96,1	96,9	96,9	97,9	97,8
Belgium	93	93	94,2	96,7	96,4	97	97,3
Bulgaria	91,3	94,1	95	95,1	95,6	98,8	95,8
Czechia	86,3	86,3	86,3	95,7	95,4	95,6	99,3
Croatia	99,9	100	96,2	99,5	99,5	99,7	97,7
Cyprus	86,9	86,6	90,2	90,7	93,2	91,9	96,8
Denmark	92,6	86,7	86,1	97,6	97,1	99,6	98,2
Estonia	85,1	86,4	88,4	87	89,8	89,9	91,2
Finland	95	95	97,3	97,3	97,3	97,3	97,3
France	87	89,3	91,3	94,3	94,8	94,6	94,2

Germany	106,3	103,8	101,4	95,8	98	98,4	95,7
Greece	90,3	91,5	85,5	68,9	108	99,5	108,3
Hungary	86,2	91,7	95,6	95,2	95,8	96,9	95,8
Ireland	87,8	91,6	90,7	91,8	92,8	94,6	95,2
Italy	82,3	82,8	85,1	84,7	82,6	83,2	82,6
Latvia	97,9	92,6	92,4	87	94,5	84,1	96,0
Lithuania	90,1	92,4	94,4	95	95,4	95,1	95,4
Luxembourg	95	95	95	97	96	96,2	95,9
Malta	96	91,9	45	77,7	54,5	-	-
Netherlands	96,1	95,9	96	97	98,7	98,7	98,4
Poland	92,8	90,3	88	97	96,3	98,6	95,3
Portugal	87,6	90,5	92,7	92,7	92,1	93,8	94,9
Romania	86	87,4	88,5	90,8	92,1	-	-
Slovenia	103	-	91,3	-	-	-	-
Slovakia	91,2	93,7	96	89,4	97,4	97,5	96,8
Spain	88,2	91,5	93,5	95	93,4	94	92,6
Sweden	90,6	91,3	91,3	96,8	94,6	97,2	95,3
United Kingdom	88,1	88,9	90,7	96,9	92,2	94,1	92,8
EU-28	89,0	89,8	91,1	94,9	92,5	93,9	92,9

Source: *Eurostat (2021).*

Figure 2. *ELV recovery rates (%) in 2018.*



Source: *Eurostat (2021).*

When analyzing the recovery and recycling rates of individual countries, we can observe that, in some of them, the values exceed 100%. This is related to the ELV storage and treatment in the following years. The weight of a vehicle transferred to a recycling network is declared in one year and the weight of the recovered materials in the following year. Dismantlers decide to store some of the ELVs for a longer period due to the low market value of metals (Greece in 2015) or due to the impossibility of treatment of many ELVs collected as a result of national incentive programs (delivering vehicles for scrapping). The latter was the case in Germany where in 2009, an incentive program was introduced for vehicle scrapping.

In the years 2009-2010 dismantlers received more vehicles than they were capable of processing. The shift in time of the processing of the stored ELVs has led to recovery declarations exceeding 100% in the years 2010-2014 (the highest rate of 108.2% was recorded in 2011) compared to the number of ELVs declared in the reporting period (Umwelbundesamt, 2017).

In other EU member states, obtaining recovery and recycling rates above 100% is not possible due to the limitations in the ELV storage. For example, in Poland, according to the applicable regulations, when calculating the recycling and recovery rates for a given year, one may include the weight of ELV-derived waste processed at a dismantler until the end of February of the following year if the vehicles were delivered in the period from 1 January through 31 December of a given year (End-of-life Vehicles Recycling Act, 2005). Processing an ELV later means that the recovery and recycling rates for the past year will not be reached by the dismantler, which induces a financial penalty incurred for the non-obtainment of the targets.

4. Identified Inaccuracies in Calculating the ELV Weight

The data pertaining to the ELVs transferred to the authorized dismantlers provided by the EU member states and forwarded to the European Commission, as per the guidelines of the European Commission and Eurostat on the reporting of the Directive fulfillment, should be calculated in the following way (European Commission, 2005; Eurostat, 2019). The total vehicle weight (W1) shall be calculated as the sum of the individual weights of a vehicle delivered to a recycling network. The individual weight of a vehicle is not the measured weight of the ELV but the weight defined in the registration documents, certificate of conformity or the manufacturer´s specifications without the weight of the driver (75 kg) and average fuel (40 kg).

The deducted weight of fuel results from the fact that majority of ELVs do not have their fuel tanks filled at a maximum level when transferred to the dismantler. To validate the correctness of the obtained recovery and recycling rates, the total weight of the ELVs delivered to the dismantler should equal the total weight of the dismantled parts and materials assigned for recovery and disposal (total reuse and recovery + disposal from dismantling + disposal of shredder light fraction + disposal by export) (European Commission, 2005; Umwelbundesamt, 2017).

The results, however, obtained with these two calculation methods may differ, mainly because the ELV weight is assumed based on estimates when entering the network, which impacts the recovery and recycling rates.

Another problem is the fact that, depending on the member state, different methods of declaring the vehicle curb weight in the registration documents apply, which may lead to inaccuracies when calculating the recovery and recycling rates and impact the comparability of data related to the ELV treatment efficiency. In many EU member states, the vehicle curb weight specified in the registration document (item G) allows

for 75 kg as the weight of the driver and in others, it only refers to the mere vehicle curb weight (Table 4).

Table 4. *Methods of determining of the vehicle curb weight in the registration documents in selected EU member states*

Country	Method of determining of the vehicle curb weight
Austria	G: vehicle
Belgium	G: vehicle + driver 75kg
Czech Republic	G: vehicle + driver 75kg
Denmark	G: vehicle + driver 75kg
France	G: vehicle + driver 75kg; G1: vehicle
Spain	G: vehicle + driver 75kg
Holland	G: vehicle + driver 75kg
Germany	G: vehicle + driver 75kg
Poland	G: vehicle
Sweden	G: vehicle + driver 75kg
Italy	Curb weight in [G] for a passenger car is not entered because, as per definition, this weight includes the driver. The vehicle weight excluding the driver is entered as extra information in the registration card.

Source: *Own study.*

Consequently, this leads to erroneous weight determination for vehicles purchased in one member state and disposed of in another, e.g., vehicle purchased in Germany and ending its life in Poland. As understood by the Traffic Law Act (1997), in Poland the definition of the vehicle curb weight is the weight of the vehicle including its regular equipment, fuel, lubricating oils and other consumable fluids in nominal amounts without the driver.

However, if a vehicle is imported and registered in Poland for the first time, it is the practice of diagnostic technicians performing a technical inspection for the first time after import before registration as well as the registering authorities to admit the vehicle curb weight specified in the foreign registration card as the one complying with the Traffic Law Act and transferring the value from item G in the foreign registration card into item G in the Polish one. If, in the country of the vehicle origin, the curb weight includes the weight of the driver (75 kg), the vehicle curb weight is automatically increased.

The above is rather important (the import of used vehicles of the GVW not exceeding 3.5 t to Poland significantly outnumbers the sales of new vehicles) and significantly influences the number of end-of-life vehicles. The average age of vehicles imported to Poland in the years 2019-2020 was 12 years (PZPM, 2021). In the first years after

the accession of Poland to the EU in 2004, the import of pre-owned vehicles exceeded 4 times the number of new vehicles sold and in the years 2017-2020 this excess was 50-80%.

Besides, not all member states apply the ELV weight calculation guidelines provided by the European Commission. In Germany, the ELV weight is the weight of an empty vehicle calculated according to section 2(1), item 23 of the German End-of-life Vehicle Ordinance (2002). According to this Act, the vehicle curb weight is determined as follows:

- for vehicles registered until 31 December 1996, it is the vehicle curb weight as per the specification in the registration card less the weight of the fuel tank at its 90% filling level;
- for vehicles registered from 1 January 1997, it is the vehicle curb weight as per the specification in the registration card less the weight of the fuel tank at its 90% filling level and the weight of the driver (75 kg).

If the fuel tank capacity is 60 dm^3, then if 1 dm^3 of gasoline weighs approx. 0.75 kg, then the weight of the deducted fuel complies with the Commission guidelines and amounts to 40 kg. For diesel fuel (1 dm^3 - 0.84kg) 40 kg will be deducted for the fuel tank of the capacity of 53 dm^3. For other fuel tank capacities, the weight of the deducted fuel will differ. Fuel tanks of urban category vehicles have the capacity from 35 dm^3 to 50 dm^3, but the smallest Smart Fortwo has a fuel tank of merely 28 dm^3.

The fuel tanks of compact vehicles have the capacities from 40 to 62 dm^3 and those of midsize ones – up to 80 dm^3. In vehicles of the E segment, the capacity of the fuel tank may reach 100 dm^3 (Porsche Panamera GTS). In Germany, depending on the vehicle, 19 to 68 kg is deducted from the weight for gasoline engines and 21 to 76 kg for diesel engines, while in Poland or France this is a constant value of 40 kg.

The method of calculating the weight of an ELV is crucial for the determination of the recycling and recovery rates and is extremely impactful on the responsibilities of the dismantlers and other network operators (responsible for the obtainment of the said rates) by limiting the possibility of reaching the recovery and recycling target rates, as required by Directive 2000/53/EC.

If we analyze a case of a passenger vehicle (M1 category) fitted with a gasoline engine and a fuel tank of the capacity of 60 dm^3, registered in Germany and then imported to Poland, whose curb weight specified in the German registration card is 1175 kg, then, at the moment of the vehicle's end of life, the ELV record in Poland will register the weight of 1135 kg, while the same vehicle in Germany will have its ELV weight of 1055 kg (Table 5). The difference is 80 kg, i.e., over 7% of the vehicle weight.

If the recovery will reach 1000 kg, the recovery rate in Germany will be 95%, as required by the legislation, while in Poland, due to the incorrectly recorded vehicle

curb weight and a different method of the fuel weight calculation, the recovery rate will be 88% for the same actual weight of the recovered materials. This problem arises from the earlier-mentioned direct transfer of the vehicle curb weight from foreign registration cards to the Polish ones as well as the fact that for the purposes of ELV records, according to the Polish law, it is assumed that the vehicle curb weight specified in the registration card does not include the weight of the driver, hence is reduced only by the nominal weight of fuel (40 kg). Besides, the difference of the ELV weight is also influenced by the method of calculation of the fuel weight in Germany that is non-compliant with the guidelines of the European Commission.

Table 5. *Methods of ELV weight determination for a selected example*

	Germany	Poland
Car weight according to registration document	1175	1175
Driver weight	75	0
Fuel weight	45	40
ELV weight	1055	1135
Reused parts and recovered materials weight	1000	1000
Recovery rate	95%	88%

Source: *Own calculation.*

Attention to the problem of ELV weight determination on entering the recycling network was also drawn by the Italian Industrial Association of Auto Recyclers (Associazione Industriale Riciclatori Auto – AIRA, 2018). In Italy, it is usually the estimate average vehicle weight that is entered into the ELV register, i.e., 920-950 kg, though some dismantlers enter the vehicle weight as specified in the registration card, which is compliant with the guidelines of the European Commission (European Commission, 2005).

If a flat weight is applied, the actual weight will almost always be different, but even when transferring the weight value from the registration card, AIRA stresses that this weight is overvalued against the actual one, e.g., when the owner removed some of the parts and accessories, when the vehicle had an accident or undervalued when there is less fuel in the vehicle than the deducted flat amount.

Therefore, it is rarely the case when the recorded vehicle weight corresponds to the actual one, which has impact on the reliability of the rate calculation and monitoring of the ELV disposal efficiency. In the example of calculation of the recovery and recycling rates based on the actual ELV weight, as indicated by the Italian Industrial Association of Auto Recyclers, the difference between these rates was 9%, which influences the fulfilment of the levels required by the Directive.

5. Conclusions

From the presented solutions one may indicate the following actions related to the improvement of the monitoring of the ELV recycling network efficiency within the

EU member states. To improve the vehicle trans-border migration monitoring efficiency and reduce the migration of damaged ELVs, the authors propose to introduce the Dutch model that requires producing an up-to-date certificate of technical inspection. Integration of vehicle recording systems or at least an improvement in the flow of information among authorities responsible for registering and deregistering of vehicles within the EU member states also appear necessary.

In some countries such as Poland, diagnostic technicians as well as registering authorities should undergo training in relation to the problem of correct determination of the vehicle curb weight. In this context, it is necessary to unify the principles of defining the vehicle weight in the registration document and, analogically, introducing the same principles of ELV weight determination in all EU member states.

A positively better solution than entering the vehicle curb weight as specified in the registration documents and potential deduction of the weight of driver and fuel, would be keeping a record of the ELV weight at the entrance to the recycling network and introducing the requirement of weighing vehicles at the dismantlers and providing the actual weight of the vehicle to the network efficiency monitoring system when the vehicle is delivered to a dismantler. Therefore, all ELV network entities would have to be equipped with a weighing system and required to weigh and register all waste and spare parts leaving the dismantlers.

Another question is allowing for the ELV weight delivered to a dismantler but stored and left unprocessed each year when calculating the recovery and recycling rates in some UE member states. This leads to undervaluing of the recovery and recycling rates in the year when the vehicle was delivered and overvaluing of the same in the following years. At the end of the day, the vehicle weight and the parts and waste recovered from it will eventually be recorded in the system, but such an approach makes it difficult to look at the recovery and recycling rates obtained each year and country as actual. This renders the analysis of the network efficiency throughout the years (rate changing trends) and comparison among the member states impossible.

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