

**STAKEHOLDER CONSULTATION ON THE REVIEW OF THE
2015-TARGETS ON REUSE, RECOVERY AND RECYCLING OF
END OF LIFE VEHICLES**

FINAL REPORT

VERSION OF 4 NOVEMBER 2005

TABLE OF CONTENT

1. ACKNOWLEDGEMENTS.....	4
2. INTRODUCTION.....	6
3. CONSULTATION OVERVIEW.....	7
4. CURRENT STATUS.....	8
5. BARRIERS TO PROGRESS.....	12
6. FUTURE VEHICLE TECHNOLOGIES.....	19
7. A STRATEGIC SHIFT.....	24
8. WHICH WAY FORWARD.....	25
9. STATISTICAL RELIABILITY.....	32
10. MONITORING AND REPORTING.....	34
11. GENERAL CONCLUSIONS.....	35

USEFUL LINKS

1. Current Status

- 1.1. [ELV Treatment status in the EU 15 Countries \(Norway\) - Country Report Charts](#) - ACEA
- 1.2. [Implementation of the EU ELV Directive in the New Member States](#) - ACEA
- 1.3. [Country Overview](#)- Excel Worksheet, Lennart Scharff
- 1.4. [Current Status / Elements for report](#)- Word Document - Lennart Scharff
- 1.5. [Questionnaire to Member States Summary - Monitoring](#)- Lennart Scharff
- 1.6. [Questionnaire to Member States Summary - Reaching Targets](#)- Lennart Scharff
- 1.7. [Questionnaire to Member States Summary - Selected Waste Streams](#)- Lennart Scharff
- 1.8. [Technology Classification Overview](#)- Excel Worksheet - Lennart Scharff

2. Barriers to Progress

- 2.1. [Extra costs incurred due to the ELV Directive with respect to Annex I requirements](#) - Annex I of Directive 2000/53/EC sets minimum technical requirements for treatment of ELVs
- 2.2. [EU Member State export and import of second-hand cars, end-of-life vehicles, components for re-use from end-of-life vehicles, materials for recovery or disposal from end-of-life vehicles in relation to achieving the re-use, recycling and recovery targets laid down in the Directive 2000/53/EC](#)
- 2.3. [Recycling & Recovery targets and Potential Alternatives](#)
Powerpoint Presentation - Longer version (Shorter version presented at Final Plenary of 17 October)
- 2.4. [Excel spreadsheet Monitoring Matrix \(various Transposition, Definitions, Measuring\) - Wallchart](#)
- 2.5. [Spare Parts Barriers](#) – ppt presentation
- 2.6. [Material Composition](#)- Subgroup 1 - Revised text following 17 June Plenary session
- 2.7. [Recovery Technologies](#)- Subgroup 1 - Revised text following 17 June Plenary session

- 2.8. [2015 Targets - Alternative Approaches?](#) ppt presentation
- 2.9. [2015 Targets - Alternative Approaches - EEB Comments Answers](#)

3. Studies

- 3.1. [Fundamental Limits for the Recycling of End-of-Life Vehicles](#)
M.A. Reuter, A. van Schaik, G-J. de Haan and O. Ignatenko
Delft University of Technology
- 3.2. [Life Cycle Assessment of Lightweight and End-of-Life Scenarios for Generic Compact class Passenger Vehicles \(LIRECAR\) - Abstract](#)
Corresponding Author : Wulf-Peter Schmidt
- 3.3. [Life Cycle Assessment of ELV Treatment - Comparison of the VW-SiCon process and the dismantling of Plastic components followed by mechanical recycling](#)
Volkswagen AG
- 3.4. [Material Projection Analyses - WBCSD Sustainable Mobility Study Support](#)
Camanoe Associates
- 3.5. [Recycling of End-of-Life Vehicle Glazing](#)
European Association of Flat Glass Manufacturers
- 3.6. [Support in the drafting of an ExIA on the Thematic Strategy on the Prevention and Recycling of Waste](#)
EPEC
- 3.7. [Definition of Waste Recovery and Disposal Operations](#), Final Report -
Ökopol GmbH, March 2004

4. Minutes

- 4.1. [Minutes of the Plenary meeting of 1st April 2005](#)
- 4.2. [Minutes of the Plenary meeting of 17th June 2005](#)
- 4.3. [Minutes of the Plenary meeting of 17 October 2005](#)

AUTHOR

Bill DUNCAN, as Chairman of the Stakeholder Working Group.

The text of this report is the responsibility of the author. It neither necessarily reflects the views of all stakeholders, nor of their respective organizations, nor of the Institutions of the European Union.

BALANCE OF REPORT

The degree of consensus between stakeholders in the Working Group varied from issue to issue, but there was a clear majority in support of the need to improve the effectiveness of the Directive through a pragmatic restructuring of the 2015 targets as early as possible.

ACKNOWLEDGEMENTS

The Chair would like to thank the Co-Chairs and all those individuals who contributed substantively to this report, by attending meetings, debating the issues at stake and especially those who provided written input to the process in the sub-groups.

A number of experts were invited, both by industry and the NGO's to share their knowledge and input with the working groups. Their contribution to the process proved extremely valuable and merits particular recognition.

34 organizations took part in the discussions.

Industry represented the biggest sector and made up 71% of the stakeholders.

Member States and Regional Governments made up 21 % while 6 % were NGO's representing civil society.

Within the Industry sector, representation was broadly balanced with

- 30% drawn from the automotive producers/associations;
- 25% from the automotive industry supply chain
- 42% from the waste management companies

Categories of Working group participants	Number of participants	Percentage of all participants
Automotive associations/producers	8	24%
Automotive suppliers	6	18%
Member States and Regional Governments	7	21%
Waste Management Companies	10	29%
NGOs	2	6%
Others	1	3%

For a full list of stakeholders accredited to this consultation process, please [click here](#).

INTRODUCTION

In September 2000, the EU adopted Directive 2000/53/EC on end of life vehicles, with the following objectives stated in Article 1

“This Directive lays down measures which aim, as a first priority, at the prevention of waste from vehicles and, in addition, at the reuse, recycling and other forms of recovery of end-of life vehicles and their components so as to reduce the disposal of waste, as well as at the improvement in the environmental performance of all of the economic operators involved in the life cycle of vehicles and especially the operators directly involved in the treatment of end-of life vehicles.”

The Directive further stated in Article 7.1 that

“Reuse and recovery

Member States shall take the necessary measures to encourage the reuse of components which are suitable for reuse, the recovery of components which cannot be reused and the giving of preference to recycling when environmentally viable, without prejudice to requirements regarding the safety of vehicles and environmental requirements such as air emissions and noise control.”

And in Article 7.2, required that

“Member States shall take the necessary measures to ensure that the following targets are attained by economic operators:

(a) no later than 1 January 2006, for all end-of life vehicles, the reuse and recovery shall be increased to a minimum of 85 % by an average weight per vehicle and year. Within the same time limit the reuse and recycling shall be increased to a minimum of 80 % by an average weight per vehicle and year;

(b) no later than 1 January 2015, for all end-of life vehicles, the reuse and recovery shall be increased to a minimum of 95 % by an average weight per vehicle and year. Within the same time limit, the re-use and recycling shall be increased to a minimum of 85 % by an average weight per vehicle and year.”

However, Article 7 further requires that :

“By 31 December 2005 at the latest the European Parliament and the Council shall re-examine the targets referred to in paragraph (b) on the basis of a report of the Commission, accompanied by a proposal. In its report the Commission shall take into account the development of the material composition of vehicles and any other relevant environmental aspects related to vehicles.”

In order to prepare its report, the Commission’s DG Environment has chosen to consult widely with stakeholders, and a working group was formed early in 2005 to collect, share and analyze data, know how, experience of implementation of the Directive to date and knowledge of new developments since the Directive’s adoption, with a bearing on the 2015 targets.

This final report of the Working Group was completed on 4 November 2005.

CONSULTATION OVERVIEW

The group first met at a plenary “kick off” session on April 1st (for minutes [click here](#)).

There was general agreement to approach the key issues in 3 separate, but nevertheless interconnected steps, each with its own specific subgroup of participants. Stakeholders were free to join the subgroup or subgroups of their choice, which focused on :

Sub-group I

Assessing the current status of implementation of the Directive and progress toward the 2006 targets.

Sub-group II

Identifying barriers to further progress which might impact upon the achievability of the 2006 and eventually the 2015 targets – and developing proposals where appropriate to help overcome these barriers.

Sub-group III

Investigating alternative “smarter” options to meet the objectives of the Directive which might offer comparable levels of environmental protection to those originally envisaged in the Directive (and with broadly equivalent certainty of delivery), but at lower economic cost levels.

A limited-access website was set up on which relevant data, reports, meeting minutes etc. could be uploaded/downloaded to encourage information sharing.

Once the subgroups had met for the first time, some smaller task forces were formed in addition, which investigated and debated specific, individual issues.

A number of teleconferences were also held to facilitate participation and accelerate progress.

A number of experts were invited, both by industry and the NGO's to share their knowledge and input with the working groups.

A second plenary meeting was held at the end of June (for minutes [click here](#)) to review progress to date, and to consider what needed to be done in order to :

- a) Increase the “hard” data inflow needed to provide a more objective basis for analysis.
- b) Improve transparency, access and cohesion of the process, which had become rather fragmented, in order to benefit more from all stakeholders' participation in the later discussions.
- c) Set an action plan and timeline which would underpin on-time delivery of the sub-groups' key deliverables.

It was decided to merge sub-groups I & II into a single subgroup for the completion of the process.

A third and final plenary meeting was held on Monday 17th October where all participants were able to listen to, and were invited to discuss presentations from members of the sub-groups, and then debate which conclusions might be drawn from the work done in the consultation process (for minutes, [click here](#))

CURRENT STATUS

Although most Member States have transposed the Directive and communicated their transpositions to the Commission, steps to achieve effective implementation are far from complete today, even though the first targets set for reuse, recycling and recovery are to be met not later than 1st January 2006.

A questionnaire sent to all 25 Member States by the Stakeholders working group in order to collect feedback on the current status of implementation received only 9 Member States replies. While there may be several reasons for this, it may well be at least in part because the monitoring systems for these sorts of data are simply not yet fully in place and functioning.

Based on the responses we did receive, and on the first hand experience of operators to date across the sector, some key issues are however fairly clear:

- **Waste fractions are differently defined, and treatment methods are differently classified across the Member States**
- Not only does this render the data difficult or even impossible to compare, but could allow some Member States to claim compliance with targets while others with similar practices, but different definitions, would not. Expanding definitions of what operations constitute reuse and recycling at the European level with the intention of nominally satisfying targets is to be avoided, however.
- The Commission's recent Decision (2005/293/EC – April 1st) laying down detailed rules on monitoring and reporting on achievement of the targets set out in the ELV Directive will be helpful but it is questionable if much reliable data will be forthcoming for the years prior to 2006.
- While Member States have flexibility to decide how best to implement the Directive on their territories, it is essential that the Commission moves quickly to harmonize the interpretation of definitions, application of Annex I standards, and application of the Directive in general in order to avoid distortions to the working of the single market and ensure a level playing field for all economic operators across the EU.
- **Not enough ELVs are being captured within the national certified ATF systems. Too many are not being picked up by a functioning deregistration system, and are therefore either being diverted via unauthorized channels, or are simply being dumped illegally.**
- The best information available to the SWG indicates that as many as 50% of ELVs are not being captured (Austria, Italy, Germany Portugal, Poland) – for complete tables – [click here](#)
- Clearly, it defeats the Directives aim of environmental protection if less than the great majority of ELVs enter the certified ATF's. The ambitious target levels set for reuse recycling & recovery by 1/1/2006 will in reality have only half the effect intended if only half the ELVs are captured and in addition the important safe de-pollution procedures prescribed will probably not be undertaken either.

- Member States must be urged to ensure that a system is in place to certify treatment facilities, and in parallel that there is a tight COD procedure in operation, linked to efficient registration / deregistration systems.
- In a number of Member States there is a vibrant trading and brokering of Second-hand Vehicles. Some Member States have determined criteria before allowing Second-hand Cars to be exported. These Criteria may include the roadworthiness or economic reparability of the Second-hand Cars. Some measure of control on the export of Second-hand Cars is therefore possible, without infringing the right to free movement of goods across the EU territory.
- A higher degree of environmental protection can be achieved if the Member States authorities fulfil their obligations of ensuring that all ELVs go to ATFs by effectively “policing” the implementation of the legislation
- Many car manufacturers are signing contracts with certified ATFs for the treatment of their branded models. These business to business agreements will complement, but cannot replace the role of the M.S. authorities.
- A significant knock on effect of inefficient ELV capture is to increase the risk for certified ATF’s as regards planning predictable and economically worthwhile volume throughput for their plants. This in turn could negatively affect the attractiveness of expanding or adding new treatment facilities in anticipation of increased ELV flows over time.
- Those Central and Eastern European countries currently importing high volumes of second hand cars from Northern Europe, in order to satisfy rising domestic demand, will be faced with substantial increases in the size of the ELV fleet requiring treatment by 2015 and beyond. Investment will be required and risks should be minimized.
- ATFs are operating on the assumption that their revenues will exceed or at least cover their costs, in the short to medium term.
- The longer term remains unclear, as volumes increase and treatment costs rise. Entrepreneurs cannot be expected to make further capital investments without an expectation of return, or beyond a reasonable degree of risk.
- Clear allocation of responsibility and definition of the roles of different actors are not in evidence in many Member States. There seems to be a tendency to assume that economic operators will develop these systems despite the lack of economic incentives and the existence of sustainable markets for much beyond the metal fractions, and some valuable component parts.
- In the Netherlands, an economic incentive is provided to dismantlers via a fee levied upon newly registered vehicles, although the level of the fees is considered by some as being high. Nevertheless the Dutch system, now has a basis of experience from which to develop a more sustainable solution.
- **In some countries, an adequate infrastructure does not exist, either for “quality” dismantlers who are or could be certified, or for shredder capacity within the country.**

- The number of ELV collection points needs to be expanded actively in those Member States or regions where their absence is a factor preventing high ELV capture rates.
- Downstream applications for the post shredder recovered non metallic waste fractions, which could serve a useful purpose by substituting other natural resources, are not widely available in all countries, but function well in a few.
- Best available knowledge “on the ground” is more completely described in the ACEA country charts (see [Link 1.1.](#)) Major differences exist between those countries (such as the Netherlands, Denmark, Sweden) which have had systems in place for some time, and those who are only now reacting to the ELV legislation.

CURRENT STATUS – CONCLUSIONS

- Lack of robust monitoring systems makes a really reliable assessment of the status quo difficult (and much of the data comes only from ATF's). However, there is enough evidence to suggest that many countries are struggling with "on the ground" implementation.
- The lack of drivers for change, whether legislative (at the grass roots Member States level), or economic (funding, incentives, profitable markets) will hold back the development of the ELV waste sector.
- The biggest single issue is that 40% or more of ELVs in several Member States are not being captured by the certified systems in place and therefore the Directive is largely failing in its objective of achieving a high level of environmental protection.
- Many cars are being sold and legally exported second hand, in the main to the new Member States. This trend may cause some difficulty in predicting ELV flows in some Member States, but has no impact on the realisation of the ELV Directive targets.
- The complexity of the process chains, as well as the numerous actors involved, makes it difficult to achieve a high degree of data reliability especially in the early phase of implementation.
- Nevertheless, it is probable that many Member States will report reuse, recycling and recovery performances more or less in line with the 2006 targets, based upon those ELVs captured and using their own definitions and interpretations.
- Some of the new Member States may not however be able to develop their systems quickly enough to meet the 2006 targets on time.

BARRIERS TO PROGRESS

- Recycling of the metal waste fraction of ELVs has taken place for many years. This fraction is generally considered to represent around 75% of the vehicle by weight. The challenge posed by the Directive is how to divert the non metallic fractions from disposal in landfills.
- Annex I of the Directive prescribes minimum technical requirements for treatment including sites for storage, sites for treatment, treatment operations for depollution of ELVs and treatment operations in order to promote recycling.
- Setting up to meet these standards requires investment in fixed assets and translates into increased fixed costs (varying perhaps from EUR 40,000 to EUR 300,000) depending on the scale and type of ATF planned.
- The quality standards prescribed for storage, for sites and for depollution of the ELVs are not called into question here.
- The dismantling operations “in order to promote recycling” implicitly require man-hours to be spent per vehicle and these in turn generate explicit variable costs.
- Costs associated with Annex I mandatory treatment operations are quantifiable. Some Ministries, Associations and Companies have evaluated such costs as a function of the time it takes to carry out the individual treatment operation;

Treatment operations mandated in Annex 1,pt.4 in order to promote recycling

removal of:

catalysts	2-10 mins.
tyres	15 – 30 mins.
glass	15- 20 mins.

large plastic components ... if these materials are not segregated in the shredding process

bumpers	5 mins.
dashboard	5 – 20 mins.
fluid containers	5 - 20 min

Note The times shown are illustrative, will vary by make and model and depend heavily on the efficiency of the dismantler.

The costs imposed by Annex 1,pt.4 are not matched by an equivalent environmental benefit, as no recycling markets exist for the bulk of the materials, which can be recovered by post shredder treatment in any event, at much lower costs.

There are also normal business costs associated with administration; ELV reception and supplying Certificates of Destruction ; preparation of the ELV (incl. moving to the depollution station, lifting etc.); removal of depolluted ELV to storage area; costs incurred in data acquisition to demonstrate compliance with targets ; and licensing permitting costs.

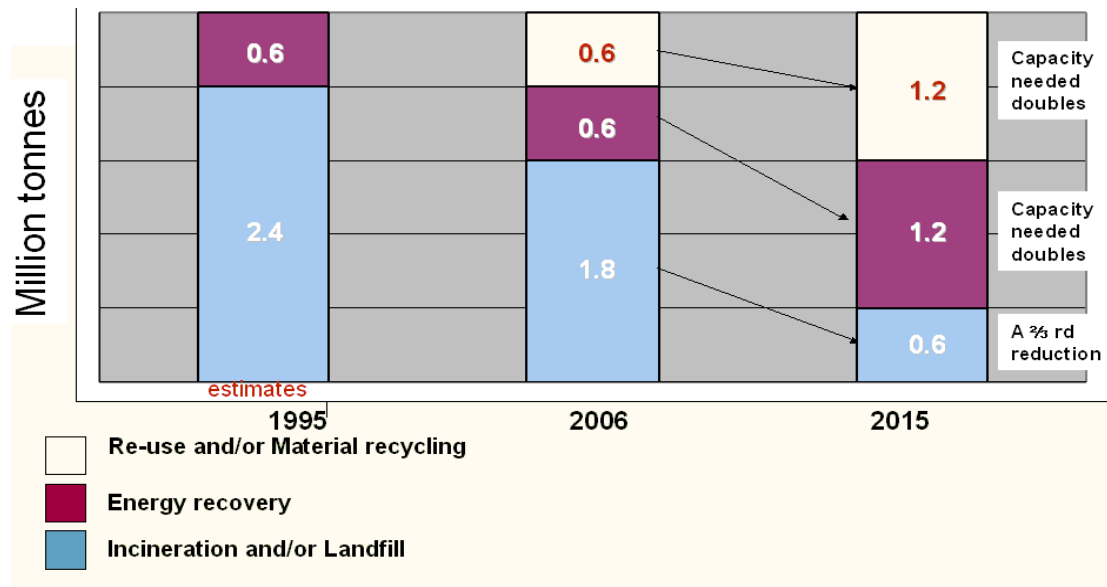
Furthermore, there are also ongoing costs of disposing of both the hazardous and non-hazardous non-recoverable waste fractions (e.g. fluids).

- The total time required for depollution / dismantling, including administration, has been assessed at around 1 hour 30 minutes /vehicle. Whilst times will vary to some extent and labour rates will vary Member State to Member State, an indicative overall extra cost to fulfil the Directive Annex I requirements would be in the approximate range of Euro 45-80/ELV.
- The income of recycling activities is typically a variable of the weight of material treated and mainly stems from the value of certain recovered materials, most notably the ELV hulk and catalytic converter metals. The extra cost of treating the non-metallics is negative and these losses are currently mostly all absorbed by the Shredder Sector, except where more costly pre-shredder dismantling is done.
- **In order to meet the 2015 Reuse and Recycling target of 85% would require as much as 50% of the non metallic rest fraction to find profitable new markets as recycled products** i.e. assuming 75% by weight of ELVs are metals, and accepting that 5% by weight of ELVs can be disposed of in landfills, then 20% of the ELV is the non metallic rest waste fraction. Reuse of spare parts will modify this equation to some degree, of course.

It stands to reason that this will simply not happen as long as the lack of markets and the negative costs remain insurmountable barriers to progress. A more flexible approach is needed to lower costs and facilitate the development of alternative routes to achieve the Directive's key objective of reducing the disposal of waste.

- **If a step up in recycling levels is unlikely based upon today's market realities, it is important to assess the role which recovery technologies could play (whether of materials or of energy) in helping to achieve the Directive's aim of diverting all but 5% of ELV waste from disposal in landfills.**
- A number of studies undertaken since the Directive came into force (see p.30), concur in their conclusions that the positive advantages of landfill avoidance are certainly significant, and far greater than the environmental difference, if indeed any exists, between further increasing recycling compared to improving the take up of effective recovery technologies, where a useful purpose would be served and the substitution of treated wastes could replace the use of other natural resources.
- Progress in this direction would require capital investment to build an adequate post-shredder treatment infrastructure, which in turn would need a stable and predictable investment climate, underpinned by a harmonized recovery technology classification across the EU Member States.
- Different classification systems are used nationally to describe Recovery technologies, and it is understood that not all Member States would agree with the current classifications in use by other Member States. The result of this is that whilst specific Recovery technologies would be accepted in certain Member States as suitable for reaching towards the 2015 targets stipulated in the Directive on End-of-Life Vehicles, these technologies would be denied, whether rightly or wrongly, to economic operators in other Member States.
- As with recycled products, treated separated post-shredder material streams need to find useful and economically sustainable applications. However, in these cases, the economic aim is to reduce the net treatment costs compared to landfill gate fees and taxes or incineration gate fees.
- The amount of Shredder Residue (SR) from End-of-Life Vehicles has been estimated around 3,000,000 tonnes per annum for the EU25. Fig. 1 illustrates the need for technologies and treatment capacities for the Directive targets up to 2006 and then to 2015.

Fig. 1 : Illustration of ELV Directive Target influence on Automotive Shredder Residue recovery and disposal options.



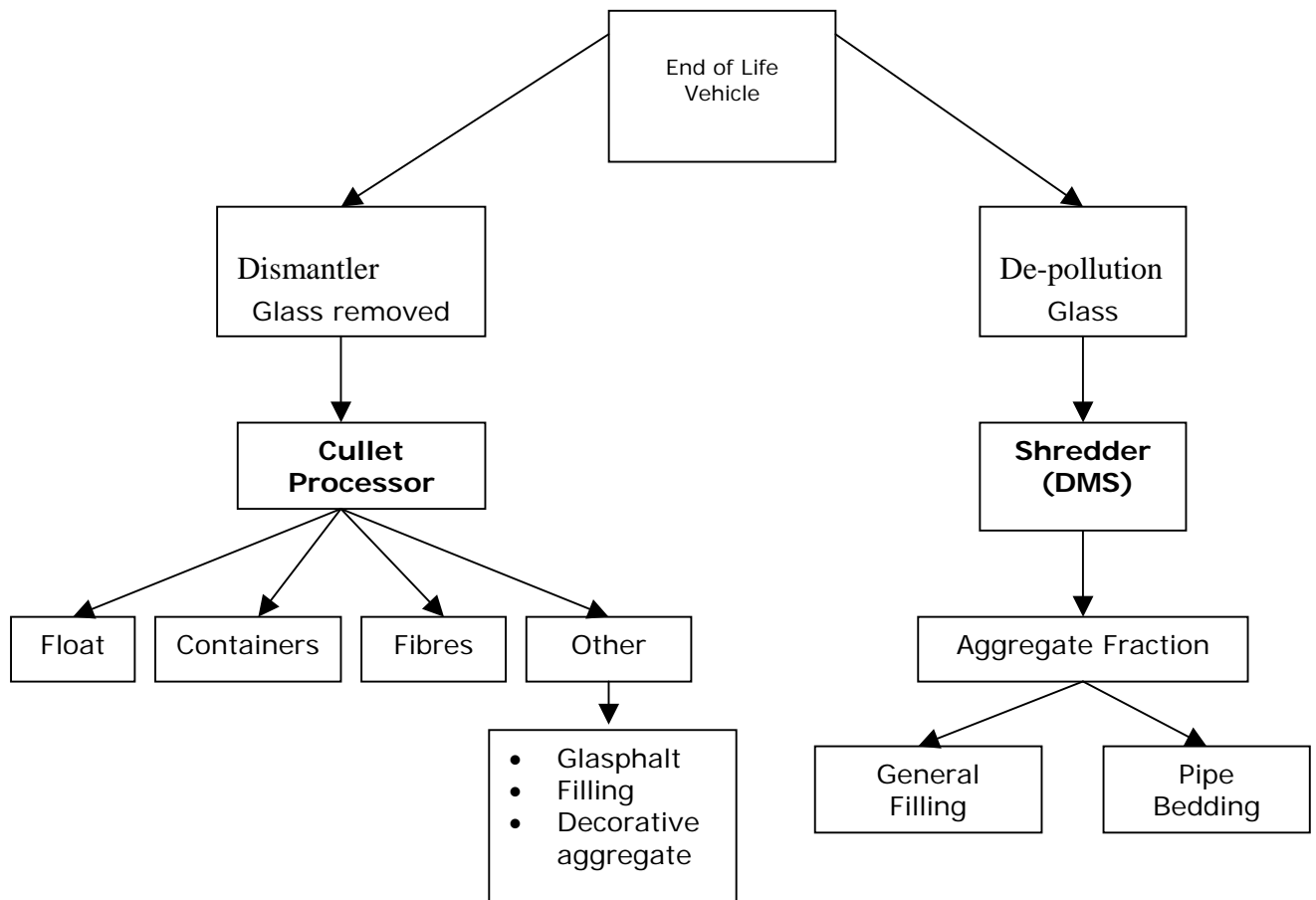
- The drive to find new Post-Shredder Technologies has moved along two distinct avenues: advanced mechanical sorting of Automotive Shredder Residue and/or thermal processing of Automotive Shredder Residue. These technologies have not yet been proven and deployed, either individually or in combination, with enough capacity to reach the 2015 Targets. Nevertheless they represent a real opportunity to improve environmental protection by recovering useful materials from the ELV waste stream.
- In the most recent study comparing pre-treatment operations (dismantling) to post-shredder media and metal separation technologies, it was shown that at this time the 2015 target of 95% was not achievable, though 89.6% was, with 4.1% being sent to cement kilns with a gate fee as an alternate fuel source, and the 4.8% mineral fraction (e.g. sand and glass) proving difficult to dispose. This national experience shows there is a need to find or create new markets for certain separated non-metallic materials.
- However pressure from legislation upon many material and product streams, perhaps particularly in response to the Landfill Directive (99/31/EC) has encouraged a push for innovation as more and more materials will be sorted from mixed waste which would have been lost to landfill, but which will now be available for separate treatment and will need to find an outlet via recycling or recovery channels.
- **In addition, recent studies suggest that the environmental impact of post shredder treatment technology may be at least as good as that of dismantling and recycling for the specific non metallic materials following this treatment route.**
- Changes are underway to add new, efficient post-shredder treatment capacity and move the focus away from dismantling, driven by the dual problems of high costs and the lack of sustainable markets. Even in the Netherlands where very high levels of 83.4% reuse and recycling and 85.4% reuse and recovery were achieved in 2004 by ARN system, these

drivers will see post-shredder technology installed in a new plant expected to come into operation in 2007.

- In most, if not all cases, non metallic wastes dismantled or sorted and separated post shredder cannot be reused for their original purpose but need to find other markets where they displace materials from other sources.
- In order to achieve this market penetration, there are three key requirements:
 - Competitive pricing
 - Comparable or superior quality
 - Stability of volume supply

An example

- Mixtures of glass with differing chemical contents are a cause of defects on re-melting, which makes such mixtures unsuitable for the very high quality flat glass required by the automotive industry.
- For reasons associated with quality and cost, ELV derived cullet is not currently used.
- Contamination issues can potentially lead to a loss of 3 to 7 days flat glass production due to quality failure. This could entail a loss of EUR 400,000 to EUR 900,000 and would lead to severe environmental impact.

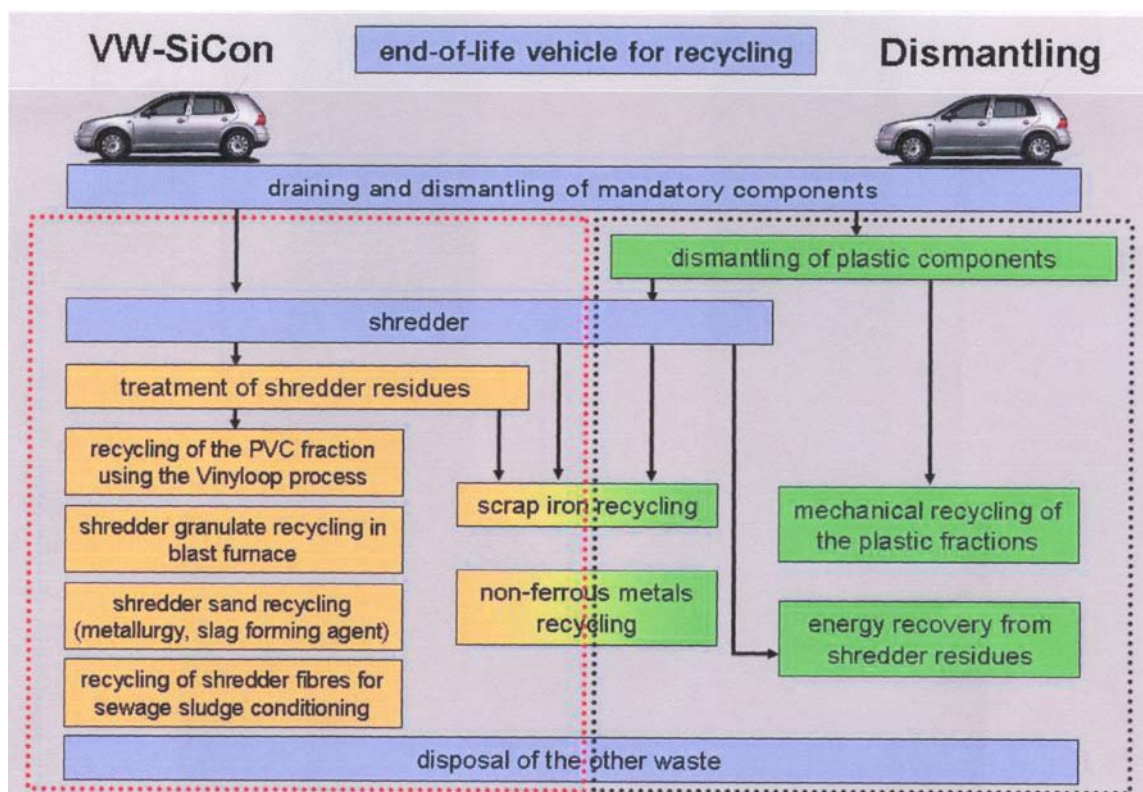


Source: GEPVP

Investigation of potential markets for the non metallic Shredder Light Fraction (SLF) is ongoing by companies with a commercial interest in developing and selling their technology to recovery value from ELVs, as well as from white goods and light mixed scrap which would also benefit from treatment in the same plants.

- In one 2005 case study (VW-SiCon¹), the complete treatment and recovery chain was tested involving 700 ELVs based on a standard market mix. Materials from the Shredder Light Fraction were treated and then used successfully in various industrial applications.

Scope for the life cycle assessment comparison



- It is important to note that the depollution of the ELVs at the ATF's is critical, as it renders the subsequent post-shredder wastes non hazardous. A side benefit of this is the possibility to move these wastes across borders for recovery, and thereby generate economies of scale in established treatment plants elsewhere. However it should be noted that other waste streams than the ELVs also form a significant share of the shredder inputs.

¹ The LCA VW-SiCon is a public study. The executive summary can be downloaded in German and English version via www.volkswagen-umwelt.de (then follow materials/download/Life-Cycle Assessment studies)

BARRIERS TO PROGRESS – CONCLUSIONS

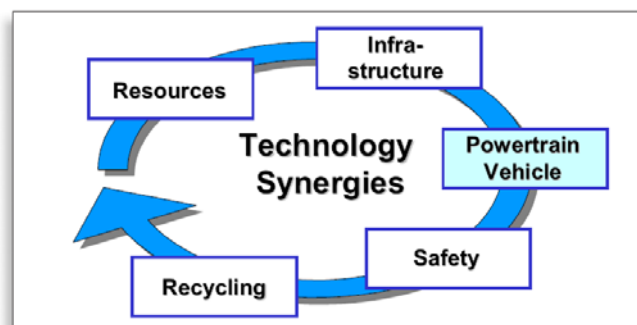
The SWG generally doubted that, under present conditions, with insufficient markets and insufficient treatment infrastructure, without harmonised interpretation of definitions or treatment technologies, and without the fundamental drivers which would deliver change in a stable and predictable investment climate, the probability of meeting the 2015 targets for reuse, recycling and recovery was low for most Member States and NIL in some others.

- Without economically sustainable market outlets other than for the metal fractions and components, little progress can be expected in increasing recycling levels to meet the 2015 target of 85%.
- As recycling activities are pushed beyond pragmatic limits, disregarding the market's fundamental function in balancing supply and demand, the marginal cost tend to rise out of proportion to the real potential for environmental benefit.
- The lack of a homogeneous legal approach across the EU will negatively impact the expansion of post shredder technology and limit it to certain Member States only. Harmonised interpretation of definitions and classification of technologies, together with the correct implementation of existing Directives relating to waste will be important contributors to facilitating increased recovery of wastes which are presently, and will otherwise continue to be consigned to landfill.
- While ATF's and dismantlers may be able to generate sufficient positive revenues from metals to offset disposal costs for rest waste in today's context with ultra high raw and secondary material prices in the world markets, this is not guaranteed to continue.
- Increasing flows of ELVs, triggering increasing disposal costs, with added cost pressure from progressively more limited access to increasingly expensive landfills may threaten the ability of some ATF's to survive.
- Making compliance with Annex 1 pt.4 dismantling procedures optional rather than mandatory would bring some welcome cost relief.

FUTURE VEHICLE TECHNOLOGIES

- Car manufacturers, research institutes and the automotive industry are developing several future technologies for advanced powertrains and vehicles. These technologies show potential for the next generation of vehicles, both with regard to improving environmental indicators such as Green House Gas emissions, toxic emissions, noise and active/passive safety, and with regard to meeting the evolving needs of the markets up to the year 2020 and beyond.
- Future vehicle are likely to require:
 - Increased automation to help drivers cope with increased traffic densities
 - Means of communication to allow drivers to make better informed decisions
 - Means of reduction of energy use and pollution
 - Active safety features e.g. for lightweight vehicles
 - New product design tools to reduce the cost and increase the rate of new product introduction.
 - Extending convenience features in response to changes in the consumers' profile and demands.
- Current vehicle technology areas of research can be summarized as follows:
 - Energy and fuels
 - Powertrain technologies
 - Safety
 - Comfort
 - Exterior and interior noise
 - Vehicle structure : lightweight vehicle concepts / advance multi-material vehicle structures

- It should be noted here that the application of the various technologies can not be seen separate from each other as they sometimes impose conflicts with each other. For example; vehicle weight reduction (using plastics, foam, light metals, composite materials, ...) has a direct positive



influence on fuel consumption while comfort and safety features (e.g. for advance electronics) add weight and complexity. Similarly, inclusion of pedestrian protection requirements could require the use of easily deformable (composite) materials and specific joining technologies.

- The trends toward lighter material structures and to added features both work against the possibilities to dismantle and recycle mono-materials.
- **With an average life length of 15/17,5 years it is clear that the great majority of ELVs in 2015 are in use already, therefore changes in the material composition of these vehicles is unlikely to play any significant part in making The Directive's targets easier or harder to achieve.**
- A study by Camanoe Associates for the WBCSD Sustainable Mobility Project has analysed the trends in raw material use in future years and indicates that while the base model L.D.V (Light Duty Vehicle) is likely to reduce in weight, other factors such as the addition of optional extras and the fleet mix of vehicle models will tend to an absolute increase in material usage.
 - Several important assumptions were made concerning the materials composition of future cars and light trucks. The most important is that ferrous metals (primarily mild steels and cast iron) will be replaced to a considerable extent by lighter, higher specific-performance materials, in particular aluminium and high-strength steel. The larger the vehicle, the greater will be the extent of the replacement.
 - The non-metal percentage was forecast to increase by roughly 1 percentage point every 5 years in new vehicles. This translates to a 3 percentage point change in ELVs around 2030 only.

	2000	2005	2010	2015
Non-metals (%)	16.74	17.79	18.78	19.68

Ref.: Study Camanoe Associates

Ref.: WBCSD Sustainable Mobility Project – December 2003

- Recovered plastics from vehicles (whatever amounts they may be) will not be used in significant amounts in automotive applications. The use of such secondary materials would not have any important effect upon resource availability.
- Another recovery assumption is that no flow of secondary materials from other sectors is assumed into vehicle production, except metals.

- Though the transport sector's consumption of ferrous metals and aluminium is large in absolute terms, the total production of these materials and the ease with which this production can be expanded indicates that there should be no concern about supply availability.
- The situation for PGM² is not as straight-forward. At first glance, the total consumption for vehicles appears to account for almost 85% of world production capacity in 2005. When the recycled materials stream is included, the net consumption of primary PGMs into LDVs is substantially lower at around 30% of world production capacity.
Even so, the results suggest that the global adoption of catalytic converters, coupled with the increase in overall automotive demand, will require substantial increases in platinum and palladium mining, as well as smelting capacity.

² Platinum Group Metals

Material composition of the European car fleet, 2000



MATERIALS	WEIGHT (kg)	%
Steel Sheet	478	40
Plain Steel	209	17
PLASTICS (for parts)	120	10
Aluminium	103	9
Cast Iron	95	8
Rubber	64	5
Zinc, Cooper, Magnesium, Lead	30	2.5
Others (adhesives, paints, glass, textiles, fluids, etc.)	108	9
TOTAL	1 197	100

Slide 1

Material composition of the European car fleet, 2005



MATERIALS	WEIGHT (kg)	%
Steel Sheet	490	38
Plain Steel	216	17
PLASTICS (for parts)	143	11
Aluminium	123	10
Cast Iron	89	7
Rubber	65	5
Zinc, Cooper, Magnesium, Lead	35	3
Others (adhesives, paints, glass, textiles, fluids, etc.)	114	9
TOTAL	1 275	100

Slide 2

FUTURE VEHICLE TECHNOLOGIES - CONCLUSIONS

- The pressure to develop alternative applications for treated ELV non metallic waste will not grow because of significant changes in vehicle design or composition by 2015 but rather as a function of growth in the number of new vehicles entering and ELVs leaving the fleet in the EU.
- With the possible exception of Platinum Group Metals, security of supply is not the critical driving issue, but rather the minimization of environmental impact from ELV waste
- Performance standards for non-metallic vehicle components are too high to permit extensive "closed loop" recycling applications in new vehicles.
- Society is expecting many innovative performance enhanceing solutions in future vehicles. The more flexible the material recovery obligations, the lower the risk for the innovator in vehicle design and material composition.

A STRATEGIC SHIFT

The ELV Directive precedes the Commission Action Plan for Better Regulation COM(2002)278 and therefore was not the object of an extended impact assessment.

Under present commission practice, this would have been an obligatory step “to ensure that all new policy proposals are assessed according to their economic, social and environmental impact”.

In a recent report for DG Environment, providing support in the drafting of an extended impact assessment of the Thematic Strategy on the Prevention and recycling of Waste (click link to P.150) the consultants observe from their related case study on ELVs “ The main problem with ELV treatment and recycling is that there is no economic incentive to recycle other materials than steel and some valuable components, because these materials have a negative market value and no market exists”

The re-examination of the 2015 targets, as required by Art.7 of the Directive, provides an unique opportunity to adjust our ambitions to a more achievable level and refocus our efforts in the transport sector to areas where greater long term potential exists to contribute to raising environmental performance standards far beyond what could ever be realised by concentrating on the treatment of ELV waste streams

The ELV Directive was conceived and completed as part of the so-called “priority product stream” approach, focused on regulating waste management.

The Commission has subsequently broadened its policy scope from targeting end of pipe, pollution control, in order to give greater strategic consideration to the prevention and reduction of environmental impacts across the full life cycle of resource use.

This shift in strategic thinking is to be found throughout the 6th EC Environment Programme (2002-2012) which calls for seven new Thematic Strategies.

An improved understanding of resource use throughout life cycles should lead to improved prioritisation. Sometimes, in the past, considerable effort has been invested in dealing with environmental issues, certain waste issues, for example, that make a relatively small contribution to overall environmental degradation. A better understanding of the environmental impacts of resources use throughout life cycles will allow policy makers to better prioritise and concentrate on areas where they can really make a difference.

The aim is to reduce negative environmental impacts generated by use of resources in a growing economy.

This requires breaking the link between impacts and resource use, a process referred to as decoupling. In practical terms this means reducing the environmental impacts per unit of resource use (**in the car example this would be fewer CO₂ emission per km travelled**), and improving resource productivity, i.e. using fewer resources for the same economic output (**a car that is produced using less material, for instance**)

WHICH WAY FORWARD

- Since the adoption of the Directive in 2000, a number of initiatives have been undertaken with a view to meeting the 2006 targets as prescribed.
 - In parallel with these efforts, a number of technical studies have been conducted which have investigated how reductions in the environmental impact of ELVs can be delivered in reality, including pragmatic assessments of the economic impacts of doing so.
 - In addition, some studies have considered other possibilities of reducing the environmental impact of vehicles across various phases of the full life cycle, i.e. from extraction or production of the raw materials, vehicle construction, the use phase, and the ELV waste management phase.
 - **While these studies vary in scope**, i.e. the boundaries of the systems studied and consequently the data included for analysis, **they nevertheless concur and confirm unanimously that the potential for environmental impact reduction from increasing recycling of materials in the ELV phase of the life-cycle beyond the 2006 target levels is of low significance or value, when compared to the use phase of the vehicle life cycle.**
 - This is in no way to suggest that recycling and recovery of ELV waste is without value, or to argue for these goals to be abandoned.
 - Rather it argues for an intelligent application of the proportionality principle (Treaty Article 5), so that **efforts made (both economic and social) should not be disproportionate to the environmental benefit which can reasonably be obtained.**
 - The SWG therefore examined several “alternative” approaches to achieving the ELV Directive’s objective of minimizing the environmental impact of ELV waste by mandating a significant reduction in the disposal of ELV wastes to landfill by increasing levels of reuse, recycling and recovery of both material and energy.
 - It was decided to focus on:
 - the three dimensions of sustainability
 - to include a Member State specific/regional aspect, and
 - to fully integrate the life cycle perspective as outlined in the EU thematic strategies (e.g. Sustainable Use of Natural Resources) and policies (e.g. Integrated Product Policy).
- A prerequisite for the environmental evaluation was to only use up-to-date, high profile studies (e.g. ISO14040 reviewed).
- **The SWG set itself the objective of looking for eco-efficient alternative approaches which would offer broadly equivalent environmental benefits, more affordable economics and a higher probability of implementation across all Member States, hopefully with less administrative burden.**

- A number of alternative approaches were identified and assessed, which are summarized in Figures 1 and 2 and expanded upon in the working document "[Current EU 2015 Recycling and Recovery Targets and Potential Alternatives](#)"³

DESCRIPTION OF OPTIONS

- **Base** (leave current 2015 recycling/recovery targets - 85/95%)
- **Postponement** (leave recycling/recovery targets at 85/95% but postpone e.g. to 2020)
- **Implement 2006** (delete ELV directive Article 7.2(b) and focus on the implementation of current targets and landfill directive)
- **Adjustment1** (adjust recycling/recovery targets to e.g. 80/90%)
- **Adjustment2** (adjust recycling/recovery targets to e.g. 80/95%)
- **Material targets** (recycling of all metals, recycling targets for glass and plastics; 95% recovery)
- **Simplification** (ensure 95% recovery target)
- **Disposal cap** (no landfilling of high calorific materials, best recovery mix)
- **Accepted techniques** (EOL only in recognized processes, no landfilling of high calorific materials, best recovery mix)

Note: Cost-free take back for all options

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29th of September 2015 3

THE ALTERNATIVES – MASS FLOW ASSUMPTIONS



³ Other than scientific studies clearly referenced, the input is based on the sector's broad experience and knowledge allowing a good conceptual appreciation of the probable impacts of each alternative considered.

LET'S THEN CONSIDER THE RELATIVE STRENGTHS AND WEAKNESSES OF THE ALTERNATIVES DESCRIBED

1. Base (leave current 2015 recycling/recovery targets – 85/95%)

Pro:

- ✓ is a known quantity towards which actions have already been taken in many Member States.

Con:

- ✓ Sets increased recycling targets for 2015
- ✓ Targets set without benefit of Impact Assessment
- ✓ Is very prescriptive, resulting in high costs
- ✓ Implementation is already encountering several barriers to progress
- ✓ Will probably not be effectively complied with fully in many, if any, Member States

2. Postponement (leave recycling/recovery targets at 85/95% but postpone e.g. to 2020)

Pro:

- ✓ Allows investments and expenditures to be spread over a longer period
- ✓ Allows a longer learning curve for developing markets and/or technologies

Con:

- ✓ As in option 1, plus postponement does nothing to create drivers for investment or increase flexibility to reduce environmental impact.
- ✓ Time will be lost before fundamental problems are tackled and urgency for improvements will be lost.
- ✓ High costs remain as barrier to progress

3. Implement 2006 targets only (delete ELV directive Article 7.2(b) and focus on the implementation of current targets and landfill directive)

Generally not seen as an option deserving support.

Con:

- ✓ No drivers for innovation
- ✓ Potentially 15% of landfill unacceptable
- ✓ As access to landfilling will become difficult-to-impossible without pre-treatment, alternative treatment options will have to be developed in any event for many waste streams.

4. Adjustment 1 (adjust recycling/recovery targets to e.g. 80/90%)

Pro:

- ✓ Holding reuse and recycling target at 80% (target 2006) is still ambitious, but closer to reality and avoids the generation of disproportionate costs in pursuit of marginal environmental gains.

Con

- ✓ Less ambitious target for recovery would mean higher on-going landfill use with consequent negative environmental impacts.

5. Adjustment 2 (adjust recycling/recovery targets to e.g. 80/95%)

Pro:

- ✓ As for option 4, this is still ambitious, but more realistic and introduces greater flexibility to achieve environmental protection beyond the 2006 recycling target levels.
- ✓ Keeps pressure in the system to encourage reuse and recycling at high levels of efficiency
- ✓ Does not prejudice investments already made or underway to develop effective ELV collection, depollution and treatment systems
- ✓ No compromise of the reuse and recovery goals set in the Directive to minimize landfill by 2015.

Con:

- ✓ May nevertheless prove difficult to reach in new Member States, or in sparsely populated regions, which lack infrastructure.

Note: Not all Member States will reach the 2006 reuse and recycling targets on time; therefore this option still represents a "stretch" for some.

In low labour cost countries, dismantling for recycling to these levels may still represent an acceptable economic cost until such time as alternative treatment infrastructures are established and proven to be reliable.

6. Material targets (recycling of all metals, recycling targets for glass and plastics: 95% recovery)

In this option specific targets would be established per material, with material recovery and energy recovery of rest waste to 95% and landfilling of 5% as in the 2015 targets.

Pro:

- ✓ Changes in vehicle design and material composition would not affect the Member States ability to meet a material specific target.

Con:

- ✓ It might prove difficult to reach agreement on the individual material specific target levels, based upon environmental protection criteria.
- ✓ A precise approach would have to clarify whether it would follow :
 - Isolated waste-stream (fraction) oriented approach (e.g. plastics from dismantling; SLF from shredding),
 - Comprehensive waste-stream oriented approach (e.g. plastics from ELV & plastics from WEEE + plastics from packaging could be within the scope of this approach
 - An isolated material oriented approach (e.g. plastics (from ELV))
- ✓ Because fewer materials would be covered by these kinds of approaches, monitoring efforts would be reduced compared to approaches where all the different materials in a complex product must be monitored.
- ✓ Assessment of environmental impact as a basis for setting targets would take time and oblige further consultations.
- ✓ Significantly different recycling levels would generate treatment costs differently for specific materials, creating the potential for competitive advantages/disadvantages.

7.

7.a. Simplification (ensure 95% recovery target)

Pro:

- ✓ Greatest flexibility in choice of available, affordable treatment methods for recycling and recovery of materials and energy whilst still maintaining minimization of landfill.
- ✓ As innovation is able to offer smarter choices, operators can move to take advantage of these without "failing" against prescriptive subtargets.
- ✓ No compromise of the reuse and recovery goals set in the Directive to minimize landfill by 2015

Con:

- ✓ The possibility would exist for Member States to roll back efforts to maintain the reuse and recycling levels set as targets in the Directive for achievement by 2006.

Note: Close monitoring of progress in recycling, material recovery and energy recovery levels, and in use of landfill would be essential for progress towards the 95% target to be measured. Transparency in tracking and reporting would be critical for the credibility of this new approach.

7.b. No quota solution – disposal cap (no landfilling of high calorific materials, best recovery mix)

Pro:

- ✓ As for 7a.
- ✓ Monitoring could conceivably be limited to controlling landfilling
- ✓ In that case would avoid the need for intensive efforts to collect imprecise data elsewhere in the process chains
- ✓ In that case reduces the scope for dishonest operators to abuse the reporting systems for financial gain

Con:

- ✓ Lack of comprehensive reporting would limit understanding by all stakeholders of developments over time at all stages of the process chains responsible for delivering this option's objectives.

7.c. No quota solution - Accepted techniques (treatment only in accredited processes, no landing of high calorific materials, best recovery mix)

Pro:

- ✓ As for 7a and 7B

Con:

- ✓ Attempts to certify and approve "good" techniques may have difficulty finding acceptance across 25+ Member States with very different options at their disposal
- ✓ As for 7b

Note: Accepted techniques would not just have to be acceptable to Member States, but provide a sufficiently high level of environmental protection to satisfy the requirements of the Directive.

Issues common to all options.

- ✓ Proposed changes to the WFD (75/442/EC) would, if adopted, improve the ability of Member States to control the compliance of “recovery” operations with harmonized EU definitions and criteria including an assessment of their efficiency if required.
- ✓ In addition, proposals being considered within the Commission to reclassify Energy-from-Waste treatment in Municipal incinerators as recovery operations provided they could demonstrate high levels of energy efficiency, would help to provide a sound recovery route for materials such as mixed plastic scrap, fundamentally unsuited to recycling or reuse.

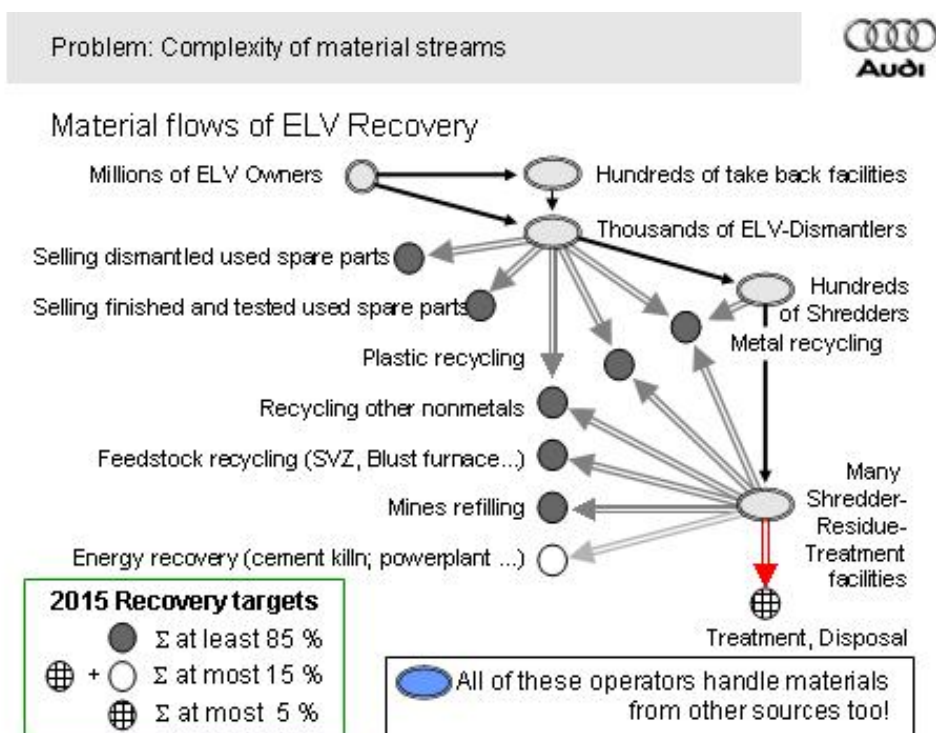
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STATISTICAL RELIABILITY

The targets set in the Directive are precise single values. We need to consider however the process industry value chain across which ELVs and their related waste materials flow. While vehicles are assembled using brand new components on purpose built model specific production lines using skilled workers who must follow very specific procedures and instructions, the treatment of ELVs has nothing in common with this “hi tech” approach.

ELVs coming into the ATF's vary as to model, age and condition. Skill and equipment levels will vary from ATF to ATF as a function of experience and capital investment. Transfer to shredder operators introduces another set of variables, and transfer to post shredder operators, where this takes place, will introduce further variables.



- Experts share concerns about the ability of such a diversified process chain to establish precise verifiable data except within a rough statistical range. The reality of these statistical spreads should be accepted as inevitable and acceptable to Member States and to the Commission alike.
- **A healthy approach to targets should be to use them to facilitate monitoring of progress over time towards higher levels of environmental protection which can be sustained. The perception of targets as providing a basis for legal action and penalty fines when not achieved despite reasonable efforts gives a negative signal, and could in some cases lead to less transparent and constructive reporting.**

- For a plus/minus 5% precision of both numerator and denominator of an 85% quota the result spreads between 77 and 94%. This spread has to be accepted as equating to fulfilling the 85% quota!
- Example 1: *"Based on a recycling experiment with 1153 ELV the statistical spreads within the chain of recovery processes between dismantling and reuse resp. landfill have been investigated.
Findings:
- statistical spreads within the recovery processes are essential,
- significant effort would be necessary for respecting statistical spreads in order to achieve legal certainty of monitoring results"* TU Delft 2004
- Example 2 : *"In our opinion it can well be questioned, whether recovery quotas for waste mixtures of differing origin over a sequence of process steps can be determined and verified with acceptable effort and sufficient precision"* VdTÜV 2005
- Example 3 :
*"- The possibilities to achieve a regular quota implementation seem to be questionable (WG 13 & 16).
- By the recovery quota provisions of article 7 paragraph 2 of ELV directive problems arise for both the economy involved and for the execution authorities (WG 16)."* NiSa WG 13&16

MONITORING AND REPORTING

In all options considered a level of monitoring is understood to be necessary in order to track compliance and measure progress.

There is a general desire for the administrative burden of tracking, monitoring and reporting data to be as low as possible.

There was an expectation that more flexibility would require less administrative tracking eg. Option 7.b. – with a landfill disposal cap of 5% - could theoretically measure just ELV tonnes deregistered and subtract ELV waste tonnes going to landfill.

However, as the shredder light fraction is not exclusively from ELVs, but from white goods and light scrap as well (in fact representing the majority share of this waste) this would seem perhaps too approximate.

- In practice it is unlikely that monitoring would, or should be much less for any option chosen. How do we manage what we do not measure?
- However, although collection of data by the operators would be ongoing, the reporting obligation could be biennial rather than annual perhaps (2006-2008-2010-2012-2014)

If reporting across the processing chain was kept to a simple series of mass flow balance checks reflecting each operators own area of responsibility, then this should avoid duplications and extra administrative steps being added to these systems.

- Member States could then easily aggregate the data and for their reports.

GENERAL CONCLUSIONS

- The high reuse and recycling targets set in the Directive will, in all probability, not be achieved by many, if any Member States by 2015.
- Key barriers to progress are high treatment costs driven by the prescriptive nature of the legislation and the lack of economically viable markets for secondary materials, with the exception of the metals.
- In addition the lack of adequate governance infrastructure in place to date in many Member States is allowing far too many ELVs to evade delivery to certified ATFs, resulting in a considerable loss of environmental protection for the Member State's citizens and an unpredictable investment climate for waste treatment operators.
- It is now essential to shift the focus of Member States and industry stakeholders alike, away from the pursuit of what now, with experience, look to be unrealistically high recycling targets.
- If the Directive's objective of reducing waste disposal of ELV waste to landfill is to be achieved on time, a more flexible approach will be required to facilitate the rapid development of secondary material recovery and the recovery of energy with high environmental standards.
- To support good recovery practice, a level playing field needs to be created across the EU territory through the harmonization of definition interpretations affecting the classification of ELV relevant waste treatment processes and their outputs. Recycling and post shredder recovery operations could be covered by an approximated certification process, with some scope to accommodate regional differences, in order to ensure good environmental standards of operation across the full EU territory.
- We need to recognise that sizeable markets for post shredder residue are not yet developed enough, but broader acceptance and accreditation of the technologies would provide a positive stimulus, as would treatment capacity expansion.
- Insufficient availability of post shredder treatment capacity in many Member States could be expanded with fairly modest capital investment and without unduly long lead times. Drivers of expansion would be a clear and predictable increase in demand so as to reduce investment risk and to provide economies of scale, as well as technological innovations, which would deliver improved economics and thereby encourage uptake.
- Consideration should be given to readjusting the 2015 reuse and recycling target from 85% and freezing it at 80% in line with the 2006 target level as established by the Directive. The 2015 target for reuse and recovery should be maintained at 95%. (See Option 5) This is still ambitious but closer to reality and avoids the generation of disproportionate costs in pursuit of marginal environmental gains.
- This approach would continue to encourage and underpin reuse and recycling at efficient levels, while at the same time, increasing the scope to deploy material recovery technologies meeting high environmental standards.

- A few stakeholders questioned whether enough certainty of success existed to support taking a new approach at this stage. However the barriers to reaching the Directive's 2015 targets are fundamental and will not change with time alone. Postponement of action would only create uncertainty. Doing nothing is not an option.
- Some stakeholders, but certainly not all, believe that even more flexibility is needed and that this would be provided by repealing the reuse and recycling target for 2015 completely and regrouping reuse and recycling with material recovery and energy recovery under a single 95% target for reuse and recovery. (See Options 7,abc)
- Such a radically different approach is without precedent and not aligned with any other EU waste stream legislation for end of life products, or materials. Close monitoring of progress and strict enforcement would be critical to ensure that measurable progress was being made towards the reduction of environmental impacts and that the level of risk implicit in this new approach was well managed.
- It should be noted that this approach would open the possibility for Member States to roll back their efforts to maintain, or ever reach the reuse and recycling target levels set by the Directive for 1st January 2006.
- In all cases the dismantling of non metallic components and materials (such as glass, plastics and textiles) should become optional rather than mandatory as at present under Annex I pt.4, which would reduce costs, without in any way preventing dismantling where judged to be beneficial. Since these materials could be recovered by post shredder technologies, including the small metal fraction, there would be no loss of environmental benefit.
- Common Decision 2005/293/EC would need to be modified to include the specific reporting of material recovery.
- None of the alternative options explored present the possibility of an "overnight success" , but facilitating the deployment of material recovery technologies by setting clear policy goals would encourage innovation and investment and create a positive climate for continuous improvement in the reduction of environmental impacts from ELV waste.