



# HEAVY METALS RESTRICTIONS OF EU ELV DIRECTIVE RECENT DEVELOPMENTS.

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# HEAVY METALS RESTRICTIONS OF ELV DIRECTIVE. ORIGIN & RECENT DEVELOPMENTS.

- Introduction
- ELV directive heavy metals ban and Annex II
- Annex II revisions
- Achievements
- Summary and Conclusions

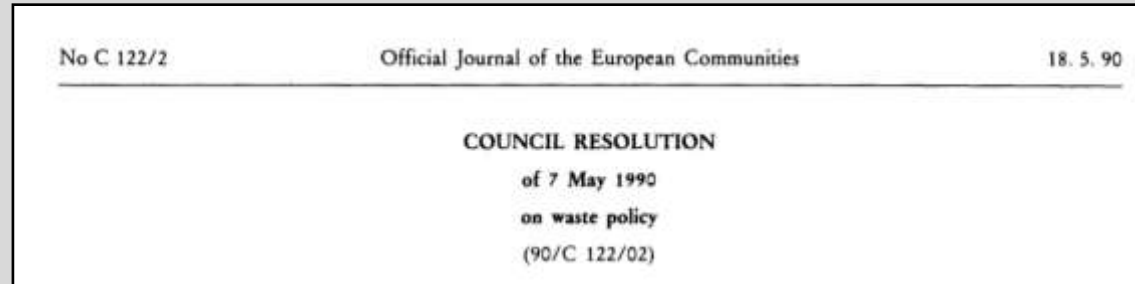


# HISTORY OF ELV DIRECTIVE & ANNEX II. END OF LIFE VEHICLES IN SCOPE OF WASTE STRATEGY.



1990

## 1990 Priority waste stream strategy of COMM



OJ C122/2, 18.5.1990

**Council** and Parliament approved this strategy in their respective **Resolutions** “that both the **quantity** and **the toxicity of waste for landfill** should be reduced where appropriate and to this end pretreatment processes should be encouraged“

Six **priority waste streams** identified (**end-of-life-vehicles** included).

In the following specific waste stream projects were initiated. July 1997 the first draft of ELV directive was published.

# ELV DIRECTIVE & ANNEX II. BASED ON ARTICLES 174,175 OF EU TREATY \*.

\*) Treaty of Amsterdam (1997) amending the Treaty of the European Union

Art.174

extract

1. Union **policy on the environment shall contribute** to pursuit of the following objectives:

- preserving, protecting and improving the quality of the environment,
- **protecting human health,**
- **prudent and rational utilisation of natural resources,**
- promoting measures at international level ... in particular combating climate change.

2. ...**precautionary principle, ... preventive action should be taken, ...at source, ...polluter should pay. ...**

3. In preparing its policy on the environment, the **Community shall take account of:**

- **available scientific and technical data,**
- environmental conditions in the various regions of the Community,
- **the potential benefits and costs of action or lack of action,**
- the economic and social development of the Community as a whole and the balanced development of its regions.

# ELV DIRECTIVE 2000/53 EC. ARTICLE 4.2 MATERIAL RESTRICTIONS.



1990

1992

1994

1997

2000



Mercury in HID bulbs



Lead in solder



Lead as additive  
in elastomers



Cr(VI) coating

§ 4.2a

... Member States shall ensure that **materials and components of vehicles put on the market after 1 July 2003 do not contain lead, hexavalent chromium, cadmium and mercury** other than in cases listed in Annex II under the conditions specified therein;

# ELV DIRECTIVE 2000/53 EC. ARTICLE 4.2 MATERIAL RESTRICTIONS.



1990	1992	1994	1997	2000															
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## § 4.2 b

...the Commission shall **on a regular basis**, according to technical and scientific progress, **amend Annex II**, in order to:

- (i) as necessary, **establish maximum concentration values** up to which the existence of the substances referred to in subparagraph (a) in specific materials and components of vehicles shall be tolerated;
- (ii) **exempt** certain materials and components of vehicles from the provisions of subparagraph (a) if the use of these substances is unavoidable;

(iii) **delete** materials and components of vehicles from Annex II if the use of these substances is avoidable;

(iv) under points (i) and (ii) **designate** those materials and components of vehicles that can be stripped before further treatment; they shall be labelled or made identifiable by other appropriate means;

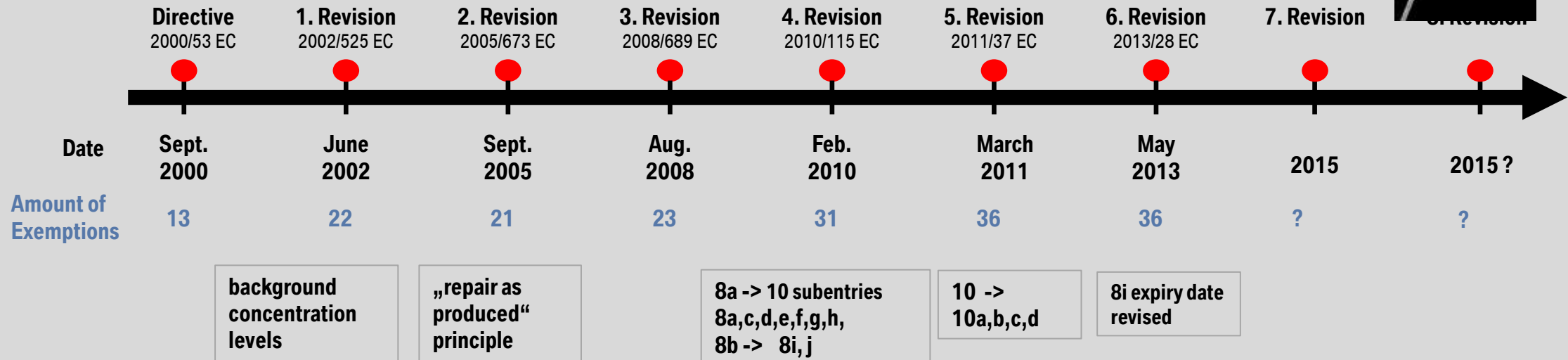
## § 4.2 c

the Commission shall **amend Annex II** for the first time **not later than 21 October 2001**. In any case none of the exemptions listed therein shall be deleted from the Annex before 1 January 2003.

# REVIEWS ELV ANNEX II. 2000 TO 2015.



2015



# REVIEWS ELV ANNEX II. 2000 TO 2015 - CONSEQUENCE.

Thousands of parts per OEM changed, tested and redesigned ...



# IMPLEMENTING LEGAL REQUIREMENTS. DEVELOPMENT OF SUBSTITUTES.

## Some Conclusions

- Substitution by validated materials takes at least 3 to 5 years
- Development & implementation of new materials > 10 years
- Average timeline of a vehicle mass production 5 to 8 years

➔ The enforcement of material restrictions for ‘in production vehicles’ is economically and ecologically in general not viable.

➔ Validation of substitutes can best be done during vehicle development phase.

## 7. REVIEW ELV ANNEX II. STAKEHOLDER CONSULTATION FROM 09.09.2013 TO 04.11.2013.

**Exemption 8(e):** "Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead)"

**Exemption 8(f):** "Lead in compliant pin connector systems"

**Exemption 8(g):** "Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages"

**Exemption 8(h):** "Lead in solder to attach heat spreaders to the heat sink in power semiconductor assemblies with a chip size of at least 1 cm<sup>2</sup> of projection area and a nominal current density of at least 1 A/mm<sup>2</sup> of silicon chip area"

**Exemption 8(j):** "Lead in solders for soldering in laminated glazing"

**Exemption 10(d):** "Lead in the dielectric ceramic materials of capacitors compensating the temperature-related deviations of sensors in ultrasonic sonar systems"

Consultant report published on Nov. 21. 2014

[http://elv.exemptions.oeko.info/fileadmin/user\\_upload/Final\\_Report/20141105\\_ELV-Exemptions\\_Final\\_20141121.pdf](http://elv.exemptions.oeko.info/fileadmin/user_upload/Final_Report/20141105_ELV-Exemptions_Final_20141121.pdf)

# 7. REVIEW ELV ANNEX II. WTO NOTIFICATION G/TBT/N/EU/278 STARTED 30.03.2015.

## Proposed changes

**Exemption 8(e)**: "Lead in high melting temperature type solders..."

review 2019

**Exemption 8(f)**: "Lead in compliant pin connector systems"

review 2019

**Exemption 8(g)**: "Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages"

review 2019

**Exemption 8(h)**: "Lead in solder to attach heat spreaders to the heat sink in power semiconductor assemblies with a chip size of at least 1 cm<sup>2</sup> of projection area ...."

Expires 1.1.2016 (new type approval)

**Exemption 8(j)**: "Lead in solders for soldering of laminated glazing"

Expires 1.1.2020 (new type approval)

**Exemption 10(d)**: "Lead in the dielectric ceramic materials of capacitors compensating the temperature-related deviations of sensors in ultrasonic sonar ..."

Expires 1.1.2017 (new type approval)

## 7. REVIEW ELV ANNEX II. NEXT STEPS.

- WTO notification ends May 30 2015.

Next steps of legislative procedures after successful WTO notification

- OK from Council / Member states needed
- OK from Parliament needed

~ 5 month required

Therefore a publication of the amended Annex II can not be expected before October.

# AMOUNTS OF LEAD IN SCOPE OF 7TH REVISION OF ANNEX II.

Exemption	Pb / vehicle [g]	Pb in 2012 [t]
8e	0,47	6,3
8f	0,014	0,2
8g	0,015 - 0,045	0,2 – 0,6
8h	11,6	0,12
8j	1,97 - 5,53	0,6 – 1,5
10d	0,036	0,096
<b>Sum (max)</b>	<b>17,7</b>	<b>8,8 *</b>



\* 8,8 tonnes of lead are equivalent to a volume of 770 l

## 8. REVIEW ELV ANNEX II. 3 ENTRIES IN REVIEW.

- Consultant: EUNOMIA with subcontractor OEKO Institute, Freiburg /Germany.
- Start of consultation: 24.09. 2014 End of consultation: 17.12. 2014

<http://elv.exemptions.oeko.info/index.php?id=58>

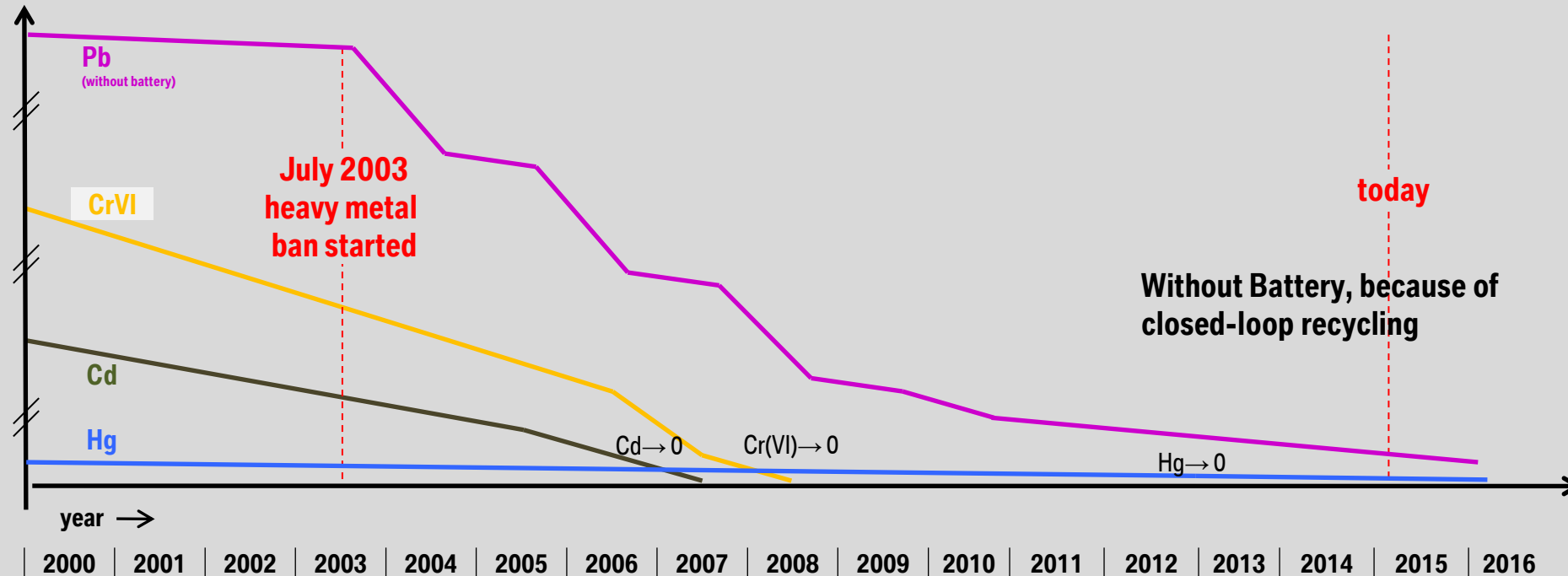
### **Scope: Revision of**

- Entry 2 (c) Aluminum with a lead content up to 0.4% by weight ( -> recycling)
- Entry 3 Copper alloy containing up to 4% lead by weight (“brass” 1-2 kg /car)
- Entry 5 lead in batteries

Industry applied for extension of these exemptions

- 10.04.2015 Stakeholder meeting at OEKO Institute, Darmstadt for entries 3 & 5.
- After public consultation 2 to 4 additional questionnaires from OEKO for each entry.

# LEAD, CHROMIUM (VI), CADMIUM AND MERCURY PHASE OUT. ACHIEVEMENTS PER CAR.



Note: Phase out triggered by technology changes, innovations, economics or End of life vehicle directive 2000/53/EC

# LEAD, CHROMIUM (VI), CADMIUM AND MERCURY PHASE OUT. ACHIEVEMENTS OF AUTOMOTIVE INDUSTRY.

- Phase out of Cadmium, Cr(VI) finished.
- Phase out of Mercury completely finished soon.
- Yet in 2009 life cycle related lead emissions have been reduced by 99,6 % (Oeko Institut study).  
Lead in batteries is used in a closed loop system.

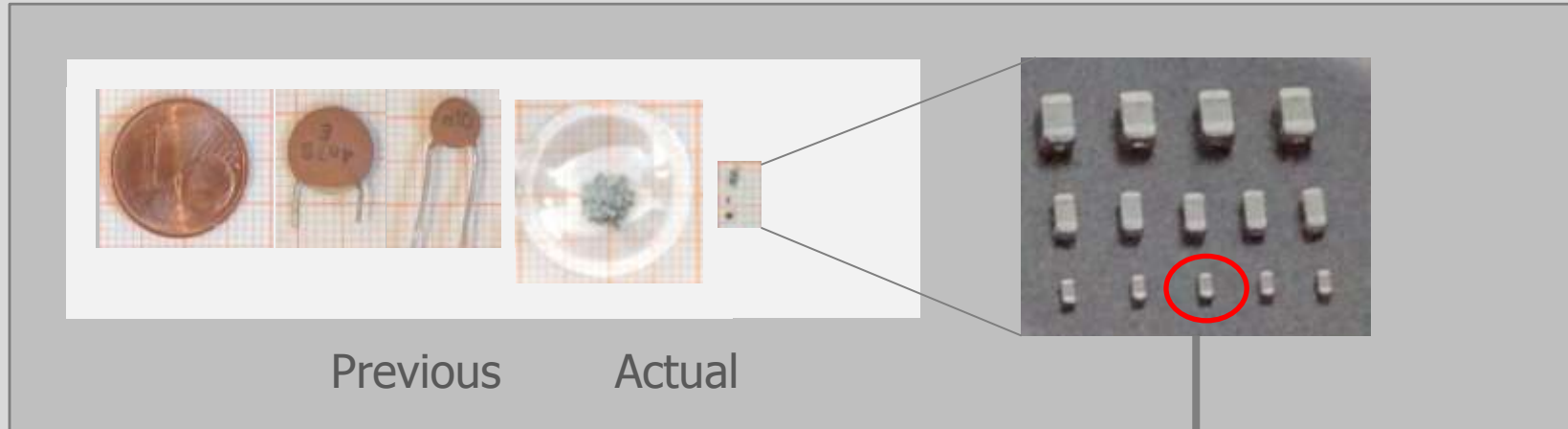
The potentials to contribute to heavy metals reductions have been realized successfully.

30 exemptions \*) in current annex II grant specific exemptions for lead applications still necessary for technical reasons. E.g. entry 8f enables specific use of 0,2 t Pb/a for in total 12 Mio. vehicles.

\*) 21 for current models and 9 exemptions enabling spare parts production



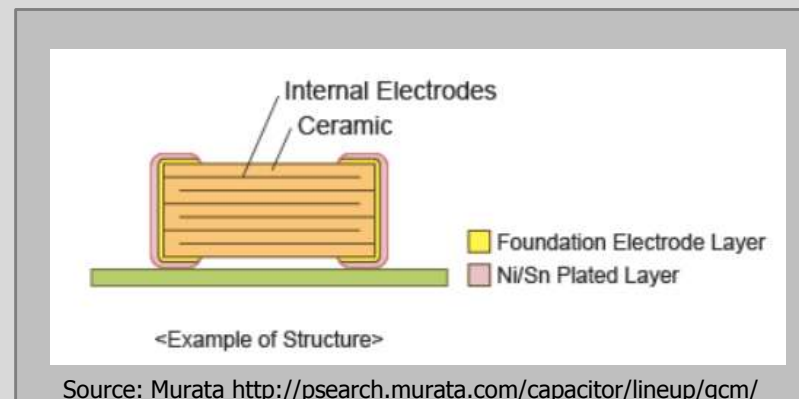
# TECHNOLOGY PROGRESS. EXAMPLE CAPACITORS.



Size of a functional unit is going down due to technical progress – example capacitors

But also very small components consist of numerous thin layers and microstructures.

-> Adapting of homogenous material scope in annex II recommended.



# ANUAL LIMIT VALUES FOR PROTECTION OF HUMAN HEALTH. REPORTED SITUATION FOR LEAD EU 2006 AND 2012.



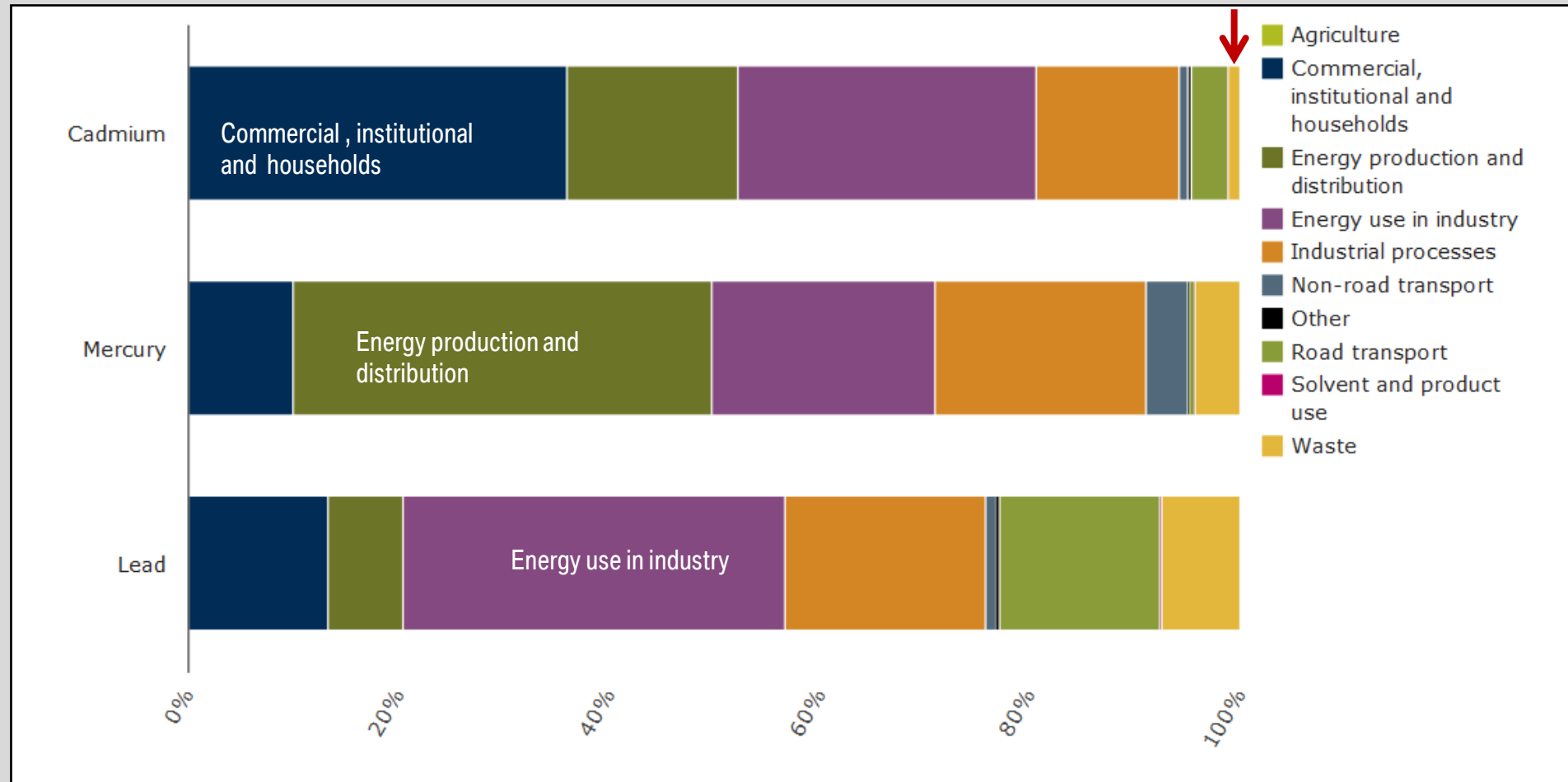
- Non-Reporting Countries
- Zone designated, data missing
- Area not designated
- $\leq$  limit value
- $>$  limit value

Pb annual mean value  $< 0,5 \text{ mg / m}^3$   
specific notified sources  $< 1,0 \text{ mg / m}^3$

Phase out of leaded fuel in Europe had most significant effect on lower lead concentration in European environment.

Source: <http://www.eea.europa.eu/data-and-maps/figures/lead-annual-limit-value-for-the-protection-of-human-health>; Last accessed 2015 01 05; last upload 22.Aug 2014; Rights: EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (<http://www.eea.europa.eu/legal/copyright>). Copyright holder: European Environment Agency (EEA).

# SECTOR SPLIT OF EMISSIONS OF SELECTED HEAVY METALS. ACTUAL EEA FIGURES.



ELV's contribute  
< 1% to waste

Effects are limited.

Source [http://www.eea.europa.eu/data-and-maps/daviz/sector-split-of-emissions-of-6#tab-chart\\_1](http://www.eea.europa.eu/data-and-maps/daviz/sector-split-of-emissions-of-6#tab-chart_1); last accessed 15.1.2015

# SUMMARY.

- As defined in article 174 treaty in environmental policy the Community shall take account of the potential benefits and costs of action or lack of action.
- EEA figures show that the general measures for lead emission reduction fulfill their intention.

# CONCLUSIONS.

- The automotive industry took the challenge and has realized their contribution to the heavy metal reductions.
- A further reduction triggered by policy measures is inappropriate. Status of exemptions in Annex II should be retained.
- Any further reduction should be based on economic & technical progress.
- Information on materials being used for parts production are essential for compliance issues.



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