

## Stakeholder Consultation Questionnaire: Exemption No. 5

### *Lead and lead compounds in components: „Batteries“*

#### Background

The Oeko-Institut has been appointed by the European Commission within a framework contract<sup>1</sup> for the review of exemptions in Annex II of Directive 2000/53/EC (ELV). The aim of this project is to evaluate whether the use of lead in the above mentioned exemption is still unavoidable and if the continuation of the exemption is therefore justified in line with Art. (4)(2)(b)(ii) of the ELV Directive.

Lead based batteries are commonly used in the automotive sector, both in conventional vehicles and in the various types of hybrid and electric vehicles. In conventional vehicles, main functions of lead based batteries include the use for starting the internal combustion engine, lighting and ignition (SLI functions). Though the various types of hybrid and electric vehicles use other battery types for most functions (i.e., nickel-metal hydride, lithium-ion, etc.), they also utilise a second lead based battery for certain electric features, for redundancy and more importantly for safety features.

The legal text of the ELV Directive published in 2000 required in Article 4(2)(b), that the Commission shall evaluate the need for exempting the use of the ELV substances in a number of applications. This included evaluations for a number of specific applications including the use of lead in batteries. In light of this requirement, an evaluation was carried out, results of which recommended an exemption, subsequently added to Annex II. Exemption 5 has been available for such applications as early as the first amendment of Annex II to the Directive. It was last reviewed in 2009/2010, at which time it was recommended to extend the exemption, scheduling a review within five years. Based on evidence available at the time, the main rationale behind the recommendation was that substitution with the available lead-free alternatives would reduce the functionality and reliability of vehicles. The requirement to review Exemptions 5 in 2015 was published in the fifth revision of Annex II in 2011<sup>2</sup> and has led to the current evaluation.

This questionnaire has been prepared for the stakeholder consultation held as part of the evaluation. The objective of this consultation and the review process is to collect and to evaluate information and evidence according to the criteria listed in Art. (4)(2)(b)(ii) of Directive 2000/53/EC (ELV), which you can download from here:

<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0053>

If you would like to contribute to the stakeholder consultation, please answer the following questions:

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<sup>1</sup> Contract is implemented through Framework Contract No. ENV.C.2/FRA/2011/0020 led by Eunomia

<sup>2</sup> Commission Directive 2011/37/EU of 30 March 2011 amending Annex II to Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles

## Questions

1. Please explain whether the use of lead in the application addressed under Exemption 5 of the ELV Directive is still unavoidable so that Art. 4(2)(b)(ii) of the ELV Directive would justify the continuation of the exemption. Please clarify what types of vehicles your answer refers to, i.e., conventional vehicles and various types of hybrid and electric vehicles and which functionalities are covered (starting, ignition, lighting and other points of consumption).
  
2. If the substitution of lead is still not possible, please explain the efforts your organisation has undertaken to find and implement the use of lead-free alternatives in the manufacture of batteries for automotive uses. In your answers please refer to alternatives, which reduce the amount of lead applied or, which eliminate its necessity altogether. Please refer among others to candidates identified in the past such as:
  - Lithium-ion batteries;
  - Supercapacitors coupled with a lead-acid battery;
  - Hybrid lead-acid batteries such as the PbC® battery or the UltraBattery™;
  - a. Please compare alternatives with lead based batteries to clarify on a quantitative basis how alternatives perform in relation to the lead based batteries currently in use in various vehicles in respect of requirements such as:
    - Energy density;
    - Power density;
    - Typical weight and content of ELV restricted substances;
    - Typical service life;
    - Self-discharge rate;
    - Temperature range;
    - Cold cranking;
    - Average cost per vehicle (for battery system and over the vehicle lifetime, i.e., where the average number of battery replacements is included in calculation);
    - Reliability requirements;
    - other
  - b. For alternatives, which still have the potential to develop into a viable candidate, please provide information as to the various research and development stages that are still needed as well as a time range estimation for each stages.
  - c. Please clarify what types of vehicles your answer refers to as well as if lead free alternatives could be used to replace the auxiliary 12V lead-based battery used as the secondary battery in hybrid and electric vehicles at present.
  
3. Eurobat (2014), evaluates the utilisation of lead based batteries as a possible option for use as the primary battery in hybrid electric vehicles (micro hybrid, mild hybrid and full hybrid) and in plugin-in-hybrid electric vehicles and electric vehicles. Please state, if to your

knowledge, lead based batteries are currently utilised as the primary battery<sup>3</sup>, in such vehicles which are marketed on the European market.

4. Eurobat (2014), quotes a 2007 Fraunhofer-Institut für Chemische Technologie report, which confirmed that at end-of-life, the vast majority (>95%) of lead-based batteries in Europe are collected and recycled by the battery industry and other smelters in a closed-loop system. Please provide information as to the current recycling rates of batteries covered under Ex.
5. Please explain what the denominator is for such information, specifying if recycled amounts refer for example to all batteries placed on the EU market / to batteries that are coming the market through the sales of new vehicles / to batteries used to replace faulty batteries in automobiles etc.

## References

EUROBAT et. Al. (2014), EUROBAT, ILA, ACEA, JAMA and KAMA, A Review of Battery Technologies for Automotive Applications, available under:

[http://ewfa.org/sites/default/files/rev\\_of\\_battery\\_executive\\_web\\_1.pdf](http://ewfa.org/sites/default/files/rev_of_battery_executive_web_1.pdf) last accessed 29.08.2014

Oeko-Institut (2010), Stéphanie Zangl et al., Oeko-Institut; Otmar Deubzer, Fraunhofer IZM: Adaptation to scientific and technical progress of Annex II to Directive 2000/53/EC (ELV) and of the Annex to Directive 2002/95/EC (RoHS), final report; Freiburg, 28 July 2010;

[http://elv.exemptions.oeko.info/fileadmin/user\\_upload/Final\\_Report/Corr\\_Final\\_report\\_ELV\\_RoHS\\_28\\_07\\_2010.pdf](http://elv.exemptions.oeko.info/fileadmin/user_upload/Final_Report/Corr_Final_report_ELV_RoHS_28_07_2010.pdf)

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<sup>3</sup> It is understood that the primary battery in such vehicles is involved in the electric drive train system, whereas the secondary battery is utilised for a second electrical system, intended to operate comfort features, provide redundancy and operate safety features.