



Sustainable Electrical & Electronic System for the Automotive Sector

<http://www.sees.eu.com>

1st SEES Newsletter

October 2005

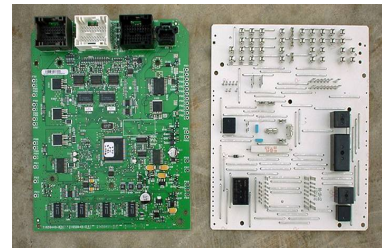
Introduction

SEES is an acronym for:

Sustainable Electrical & Electronic System for the Automotive Sector

The SEES project deals with the electrical & electronic system (EES) of automobiles in order to develop new design concepts and dismantling/ recycling technologies. Project Duration is from 1st of February 2004 to 31st of January 2007.

This newsletter presents an overview of the objectives and current state of the SEES project. The project consortium would appreciate any feedback on our research. Please find contact information at the end of this newsletter.



Project Objective and Approach

The SEES project aims at the development of prototypes and dismantling/recycling processes for a sustainable, clean, cost- and eco-effective EES in order to increase the recovery and reuse rate of vehicles.

Within the SEES project the whole life cycle of EES is studied (including design, assembly, disassembly and recycling) to meet this objective. The project approach includes integrated assessment of environmental and economic aspects and development of software tools for assessment of recyclability potential and simulation of end-of-life scenarios. An improved EES design concept will be developed and prototyped. New EES and plastic recycling technologies will be developed and demonstrated.

Figure 1 gives an overview of the project approach. For more information see the **SEES Homepage** (www.sees.eu.com) and download the **SEES project flyer**.

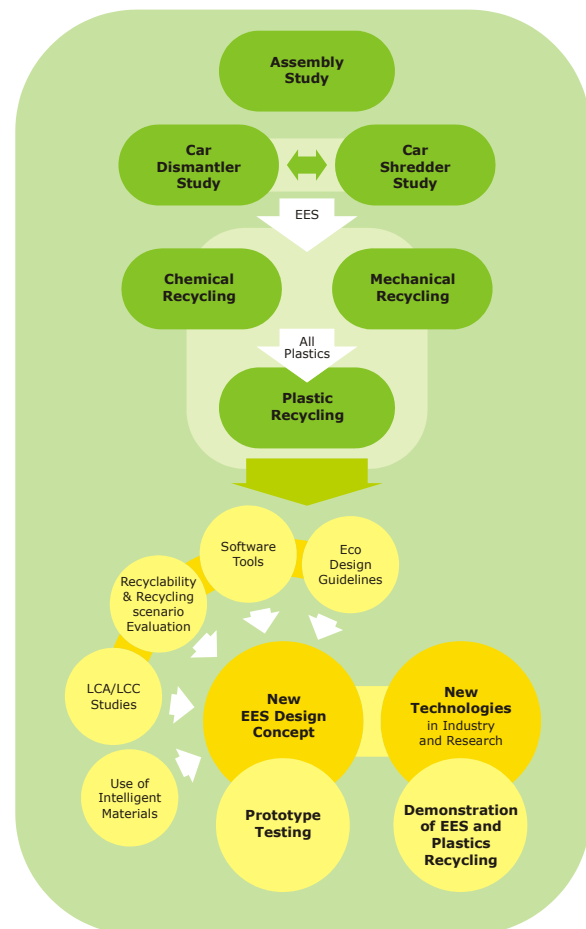


Figure 1: SEES project approach

Project Partners

The SEES consortium involves 10 partners (four SME) covering all the life cycle of the EES products. It includes one car manufacturer, one EES designer/manufacturer, one car dismantler, one car shredder, two EES recyclers, two universities, one research centre/plastic recycler and one consultant. The consortium covers 5 EU member states.

The partners' skills cover the complete life-cycle of the EES, from design and manufacturing (LEAR, Ford), assembly and use (Ford), dismantling (Müller-Guttenbrunn & Ford), shredding (Müller-Guttenbrunn), speciality chemicals (Rohm and Haas), electronics recycling (Indumetal Recycling), and plastic recycling (GAIKER).

These partners are supported by environmental experts (TU Berlin, URV Simple and CIMA), a waste and plastics expert (GAIKER) and a software developer (CIMA).

Links to Partner Web Sites:

- ☞ [Technical University Berlin](#)
- ☞ [Lear Automotive Spain \(EEDS\)](#)
- ☞ [Ford Forschungszentrum Aachen GmbH](#)
- ☞ [Rohm & Haas](#)
- ☞ [Indumetal Recycling SA](#)
- ☞ [GAIKER Centro Tecnológico](#)
- ☞ [CIMA KFT](#)
- ☞ [Universitat Rovira i Virgili](#)
- ☞ [Müller-Guttenbrunn GmbH](#)
- ☞ [Mü-Gu Kft](#)



The country distribution guarantees diverse points of view and technologies from throughout Europe.

Funding

The SEES project is funded by the European Commission under the Sixth Framework Programme, Priority 6.2 Sustainable surface transport, Contract No. TST3-CT-2003-506075.

The Commission's funding is gratefully acknowledged by the SEES consortium.

Interim Results of the SEES project

Integrated Assessment of Automotive EES (WP1)

Within this workpackage the partners assessed and integrated the existing knowledge about Electrical and Electronic Systems (EES) used in cars considering their characteristics, design, manufacture, assembly, dismantling, separation and recycling in order to provide a basis for deciding which EES elements will be examined in more detail in the SEES Project.

An assessment scheme was developed for selecting the EES to be studied in the project (legal, economic, environmental, dismantling, recycling and feasibility considerations). This scheme considers 14 different groups of EES components and it uses an iterative approach, with pre-defined criteria and weighting factors, to finally select the most relevant, representative and feasible EES components to be studied within the project.

The evolution and future trends in technology and strategies in design, manufacture, assembly and disassembly processes of automotive EES have been described. Current end-of-life processes of vehicles and their EES in Europe have been studied (collection, disassembly, material separation and recovery of end-of-life vehicles with focus on the EES materials).

Link: [Results of Work Package 1 – Integrated Assessment of Automotive EES \(Deliverable D1\)](#)

Assembly Study (WP 2)

This internal study included an analysis of the EES assembly process at the car producer to facilitate disassembly and/or recycling processes without compromises for assembly requirements. This includes the description of relevant parameters of the EES assembly steps; the study of possible chances and limitations and requirements for future car electrical & electronic system designs, the analysis of present assembly process and the impact of the potential Design for Disassembly solutions on cost, time and quality targets of the assembly process.

Environmental & Economic Studies (WP7)

Life Cycle Assessment and Life Cycle Costing Studies have been carried out to analyse the potential environmental impacts and costs of different design and end-of-life scenarios of EES. Two representative components have been analysed, an engine wire harness and a smart junction box, both produced by LEAR and assembled in a Ford car model.

These results will be used for development of eco-design guidelines in the SEES project considering improvement potentials along the whole life cycle.

Furthermore, two new methodologies have been developed to quantify the recyclability and recoverability potential of EES products and to simulate end-of-life scenarios. The two developed methodologies will be further refined and implemented in software tools during the course of the project.

Link: [Results of Work Package 7 – Environmental and Economic Studies \(Deliverable D7\)](#)

Ongoing and Upcoming Research within the SEES project

Disassembly Study (WP3)

This study includes analyses to detect problems associated to the disassembly of the present EES used in cars, including logistic aspects, accessibility and tools. Destructive and non-destructive dismantling tests have been performed to analyse the dismantling process of the EES for different automobile sections and different types of vehicles and to identify improvement potentials.

Shredding Study (WP 6)

The shredding study is based on the quantification and characterisation of the fractions obtained in the shredding process (vehicles including the electrical & electronic systems as well as vehicles where these systems are dismantled) and the definition of the quantity of the material from the E&E system that goes to the each shredder fraction

E&E System Recycling (WP 4)

To improve the recycling of E&E components, the project undertakes the identification and evaluation of new and emerging mechanical and chemical recycling technologies for the treatment of EES components previously identified. The analysis includes the identification of valued-added end-use applications and define market acceptance of the recovered fractions.

Link: [Further information on SEES recycling studies](#)

Plastic Recycling (WP 5)

This workpackage aims to optimise the recycling of the plastic fraction obtained during the recycling process – both from mechanical recycling of EES components and mixed plastics from automotive shredding residues. On one hand, the different methods of plastic separation are tested and new proposals for both kinds of input material to be developed to obtain recycled plastics of high quality. On the other hand, the obtained plastic mixtures will be evaluated for their quality, to define the grade and application possibilities of the recycled polymeric fractions and their compounding needs.

Eco-Design Guidelines (WP 8)

This work includes an analysis of existing eco-design guidelines for E&E equipment as well as specific guidelines for automotive electronics. Findings from previous and ongoing SEES workpackages have been collected to identify improvement potentials over the whole EES life cycle. Groups of EES components have been studied in a simplified MET approach to identify main fields of environmental concern. In the end, eco-design guidelines that could be applied to automotive EES and other types of electrical & electronic equipment will be developed.

Development and Testing of a New E&E System Concept (WP 9 and 10)

This work will focus on the application of the eco-design guidelines and previous SEES findings for development of a new E&E system concept which will be partially prototyped. Intelligent materials will be studied whether they could be applied to automotive EES to facilitate disassembly without compromising other requirements such as reliability. Currently, several commercially available types of intelligent materials are investigated to define possible applications within the new EES concept.

The redesigned prototype parts of the new E&E system concept will be tested and assessed with regard to benefits or drawbacks on assembly, disassembly, environmental & economic profile and recyclability potential.

Software Development (WP 11)

Two user-friendly software tools will be developed that could be used by small and medium recycling enterprises to help them in their day-to-day decisions (recycling scenario simulation) and to support E&E system designers (software for product recyclability index).

A first prototype of the software tool to assess the product recyclability index has been developed.

SEES Presentations and Publications

The **SEES project flyer** ([PDF-Download](#)) contains a quick overview on the SEES project objectives and approach.

SEES partners actively participated in several conferences. Please find below some presentations and publications.

Electronics Goes Green 2004+ Conference, Berlin (September 6-8, 2004):

- J.C. Alonso (LEAR), K. Lichtenvort (TUB), S. Arnaiz (GAIKER): SEES Project – How to improve the recyclability potential of automotive electronics. ([PDF-Download](#))

Eco-X Conference, Vienna (June 8-10, 2005):

- Sixto Arnaiz (GAIKER), Kate Geraghty (RHEMEL), Martin Goosey (RHEMEL), André Greif (TUB), Mercedes Malaina (IRSA): SEES Project – Chemical and Mechanical Recycling Techniques for end-of-life Automotive Electronic Devices. ([PDF-Download](#))
- Juan Carlos Alonso (Lear), Roland Poxhofer (Mügu1), André Greif (TUB) and Sebastian Alber (CIMA): Car Electronics Recycling - The SEES Project approach. Poster Presentation. ([PDF-Download](#))

1. Ökobilanz-Werkstatt, Bad Urach, Germany (June,15-16, 2005):

- Julia Dose, André Greif, (TUB), Juan Carlos Alonso (LEAR), Kate Geraghty (Rohm and Haas): LCA-studies of electrical and electronic components in the automotive sector. ([PDF-Download](#))

SusRec & Green Electronics, Praha (June 20-22, 2005):

- Heiko Maas (Ford), Juan Carlos Alonso (Lear), André Greif (TUB): “Sustainable Electrical & Electronic System for the Automotive Sector (SEES)” (poster presentation) ([PDF-Download](#))

LCM 2005 Conference, Barcelona (September 5-7, 2005):

- Julio Rodrigo, Francesc Castells (URV), Juan Carlos Alonso (LEAR), André Greif, Julia Dose and Kerstin Lichtenvort (TUB), Sebastian Alber: Quantitative methodology for assessing recyclability potential of automotive electrical and electronic systems (EES) in the design step. Application example to a Smart Junction Box. ([PDF-Download](#))
- Julia Dose, Günter Fleischer, André Greif (TUB), Juan Carlos Alonso (LEAR) and Kate Geraghty (RHEMEL): Electrical and Electronic Components in the Automotive Sector: LCA and LCC Studies. ([PDF-Download](#))
- Miren Larrañaga (GAIKER), Kate Geraghty (RHEMEL), Roland Poxhofer (Mügu1): First approach to the specific recycling technologies for the plastic containing devices in the automotive E&E systems" (poster presentation). ([PDF-Download](#))

Planned SEES Dissemination Activities

The SEES consortium intends to present further results at the following upcoming events:

- International Automobile Recycling Congress IARC (March 15-17, 2006), Amsterdam, The Netherlands (http://www.icm.ch/index_auto06.htm)
- Transport Research Arena Europe 2006 (June 12-16, 2006), Göteborg, Sweden (<http://www.traconference.com>)

Please watch out at our SEES homepage for more announcements of upcoming SEES activities and presentations.

Contact

For all questions concerning the SEES project and if you are interested in continuous information about SEES please visit our homepage (<http://www.sees.eu.com/>) or contact directly:

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