GENESI

Methodology and Software Platform for Green Engineering and Design

The Project Brochure

Integrating Eco-design and Lifecycle Thinking

Reducing Electromechanical Impacts

Introducing Environmental Data to CAD/PLM

www.genesi-fp7.eu **info@genesi-fp7.eu**

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 280371.

The G.EN.ESI Consortium

The G.EN.ESI Team brings together eight partners from industry and research throughout Europe. These partners have been selected due to their environmental product development knowledge, industrial experience and lifecycle awareness.

The project is co-ordinated both technically and financially by the Department of Industrial Engineering and Mathematical Science at the Università Politecnica delle Marche. This team also contribute significantly to the concept and development of the software platform.

The other academic partners contribute a wealth of eco-design experience. Within the project Grenoble INP are the primary developers of the methodology, while Bath are in charge of project dissemination.

In addition to the project co-ordinators, Granta and ENEA are in charge of developing software tools as part of the platform. They also contribute their experience of conducting and supporting eco-design in industry.

Our industrial partners (motor development, product development and product recycling) provide lifecycle data for electromechanical products and allow industrial testing of the project outcomes.

Why is Eco-design Important?

If eco-design is an *additional* design consideration, why are companies interested in it? First of all there is a pressing need for industry to tackle their current environmental impacts and help reduce the environmental cost of consumption. In addition to this eco-design has also been found to:

Support legislative compliance and reduce legislative burden

Reduce costs in product development and product use

Increase competitive advantage and improve market reputation

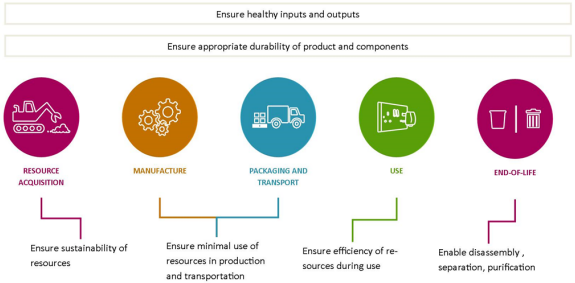
Encourage innovation and increase staff retention within companies

The Education Centre - Training on the job

The GEN.ESI project team has developed the Eco-design Education Centre. This includes a series of downloadable guides to support you in your eco-design learning and development on the job, such as:

- Environmental Legislation and Regulation
- Involving your Suppliers in Eco-design
- Eco-design Case Studies

Training materials on the methodology and software tools are also available at **www.genesi-fp7.eu/educationcentre**

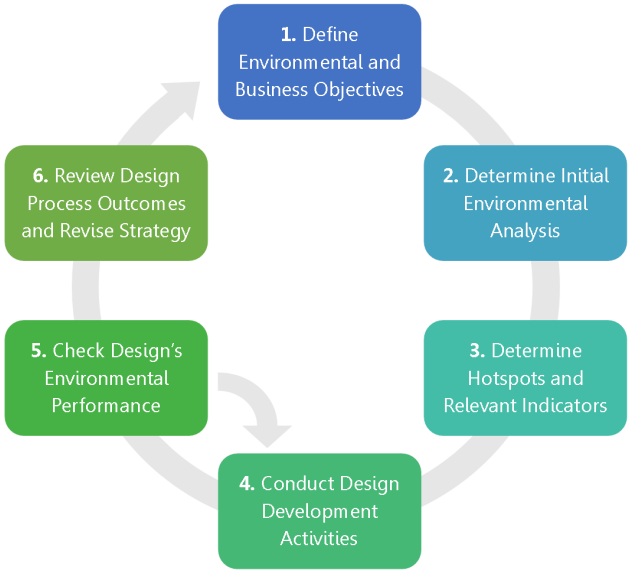


The G.EN.ESI Methodology

The G.EN.ESI Methodology provides a simple six step process that supports streamlined eco-design and the integration of new environmental information within an existing design and development processes.

The Methodology has been developed to help companies integrate eco-design systematically and with strategic intent. As such this methodology will be of most use to design management teams, whether they are introducing eco-design for the first time or attempting to improve their existing eco-design efforts.

The Six Steps



The Six Step Continuous Improvement G.EN.ESI Methodology

1. Define the environmental objectives in accordance with the company strategy.

2. Perform a simplified life cycle assessment (SLCA) of the product, collecting data to calculate the lifecycle inputs and outputs.

3. Use SLCA to determine environmental 'hotspots' and translate these into design targets and indicators.

4. Redesign the product, in line with indicators, to meet new targets.

5. Check design changes to determine improvements. As shown, stages 4 and 5 are iterative to ensure that improvements are made and targets are reached.

6. Assess and document the project's success and challenges to capitalise on learning and experience. Use learning to define objectives for the next redesign cycle.

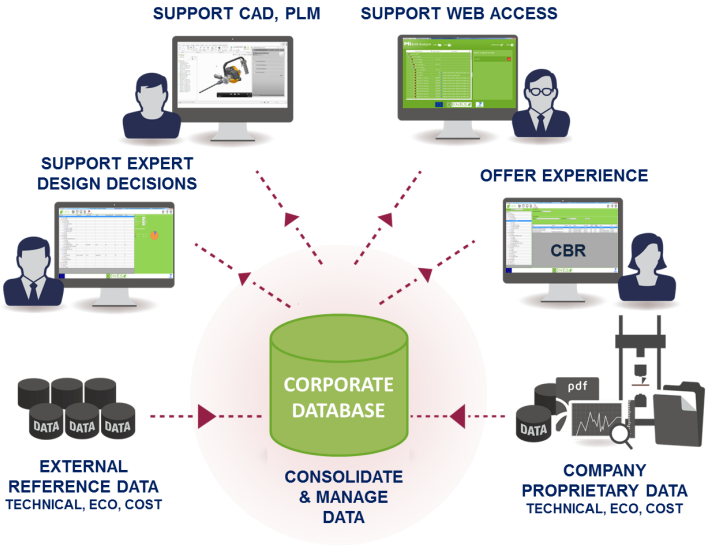
The G.EN.ESI Software Platform

The G.EN.ESI Software Platform takes a bottom up approach, supporting the practical application of eco-design, through the efficient provision of environmental data and design decision support. This information is fully integrated with traditional design tools such as CAD and PLM, helping ensure a streamlined integration within existing design practice.

The G.EN.ESI software platform tools allow product development managers and designers to assess and address the environmental life cycle impacts of their design, from early stage design efforts to product manufacture.

By using the G.EN.ESI software platform, design teams are able to:

- efficiently collate and store environmental data from throughout the supply chain;
- use real time environmental data and life cycle assessment to support design decisions;
- practically implement the G.EN.ESI methodology, supporting the management of eco-design and the development of a continuous improvement approach.



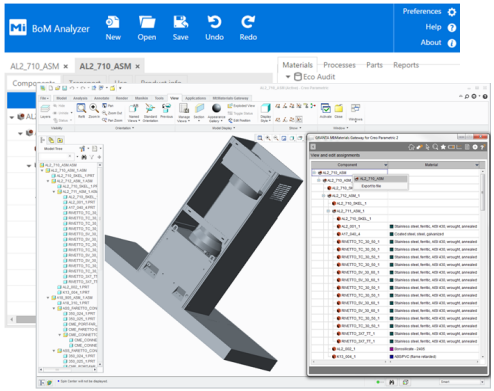
The Tools and Data Management Provided by the G.EN.ESI Software Platform

The G.EN.ESI Software Tools

GRANTA Platform:

This software platform is the gateway to early environmental assessment based on CAD or PLM product information. It includes the following components:

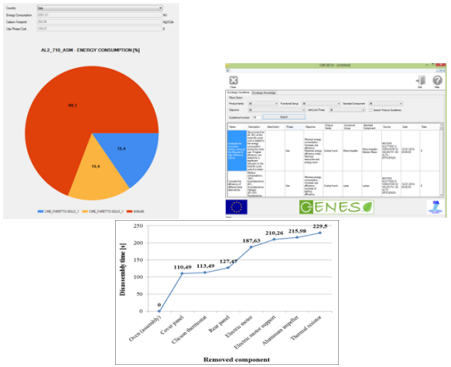
- GRANTA MI: enterprise database for materials and life cycle information
- MI:BoMAnalyzer - Web Interface
- MI:Materials Gateway, notably for PLM (Teamcenter, Windchill), and CAD (NX, Creo, ProE, Catia, Autodesk)



UNIVPM Tools:

Three specific tools for environmental improvement of mechatronic products are available:

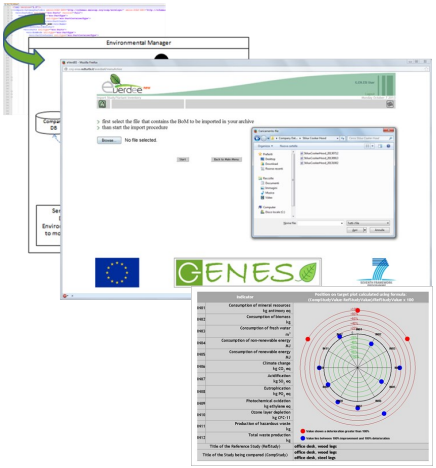
- DfEE: Design for Energy Efficiency provides detailed information on energy consumption in use.
- LeanDfD: Design for Disassembly evaluates the disassembleability and recyclability of the product at end of life
- CBR: Case Base Reasoning provides contextualised guidelines for product redesign



eVerdEE:

A detailed life cycle assessment (LCA) can be performed at the end of a design project using the eVerdEE web based environmental assessment.

eVerdEE retrieves information from the other G.EN.ESI tools in order to create a consolidated and up-to-date LCA at the end of the design project.



Product Eco-design through G.EN.ESI

To retain their competitive edge Faber, a cooker hood manufacturer, decided to create a new product range that had been eco-designed. They have redesigned their product using the G.EN.ESI methodology, platform and tools.

Eco-design at Faber

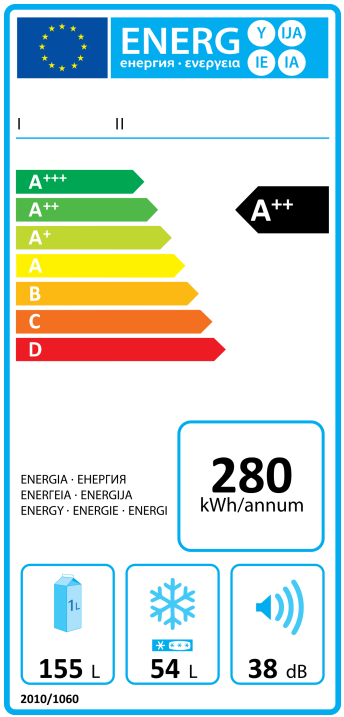
By evaluating their product environmental impacts, they identified the hotspots for re-design.

To be able to reach class A of the energy label scheme, they decided to implement two major eco -design solutions:

- Modify the lighting system to use LED instead of halogen lamps
- Redesign the motor block by integrating a brushless motor and reshaping the blower

After a disassembly analysis, they decided to improve the end-of-life performance of their product by:

- Decreasing the number of parts that have to be screwed together and
- Improving glued materials' compatibility



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Would you like up-to-date news on the G.EN.ESI project's progress?

Join our LinkedIn group 'Green Engineering and Product Sustainability Group' or sign up for our quarterly newsletter by visiting www.genesi-fp7.eu/contacts and filling out the relevant form.

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