

# CAF & The Environment

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# Scope

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1. Green technologies
2. CAF environmental management system
3. CAF research and methodological projects



# Green Product technologies



## Committed to providing sustainable transport solutions

As part of the design process, CAF's engineering area applies the state of the art in analysis and simulation tools also testing systems, oriented to define and configure the optimum values for each train, minimize energy consumption during operation, in order to reach a perfect operation and thus extend the service life.

Optimized energy saving methods

Light and recyclable materials

Vibrations and noise free trains

Braking energy recovery and accumulation

Auxiliary systems consumption reduction

Fleet efficient driving



# Environmental Management System



ISO 14.001:2004 first certificate was obtained in 2001

CAF's **Environmental Management System** is applied to Design and Manufacture. Aspects such as environmental policy, organizational structure, definition of procedures for proper management in environmental aspects, and the control of the different activities, are defined and managed.

- ▶ Production indicators
- ▶ Consumption indicators
- ▶ Emission indicators
- ▶ Waste indicators
- ▶ Sewage indicators
- ▶ Noise indicators



Along 2008 and 2009, the CO2 emissions verified by the Controlling Organization Lloyd's Register, have been lower than the established by the Environment Ministry in his Second National Assignment Plan (2008-2012).

Solar panels and 2 hydroelectric plants at our factories to use sustainable energy

# Research projects

## EcoTrans: The transport for the future

Ecotrans from Cenit program is a research project oriented to the main focus in develop technologies required to provide passengers with more attractive public urban transport in a near future (comfortable, punctual, fast, safe, reliable) with less environmental impact (low energy consumption, low visual impact, low noise impact).

- ▶ Rapid Charge Accumulator (Catenary-less systems)
- ▶ Battery and Ultracaps accumulation (Energy Braking Recovery)
- ▶ Silent wheels
- ▶ Hybridization
- ▶ Energy Simulation Tools
- ▶ Reversible substations
- ▶ Driver assistant systems & train infrastructure communications

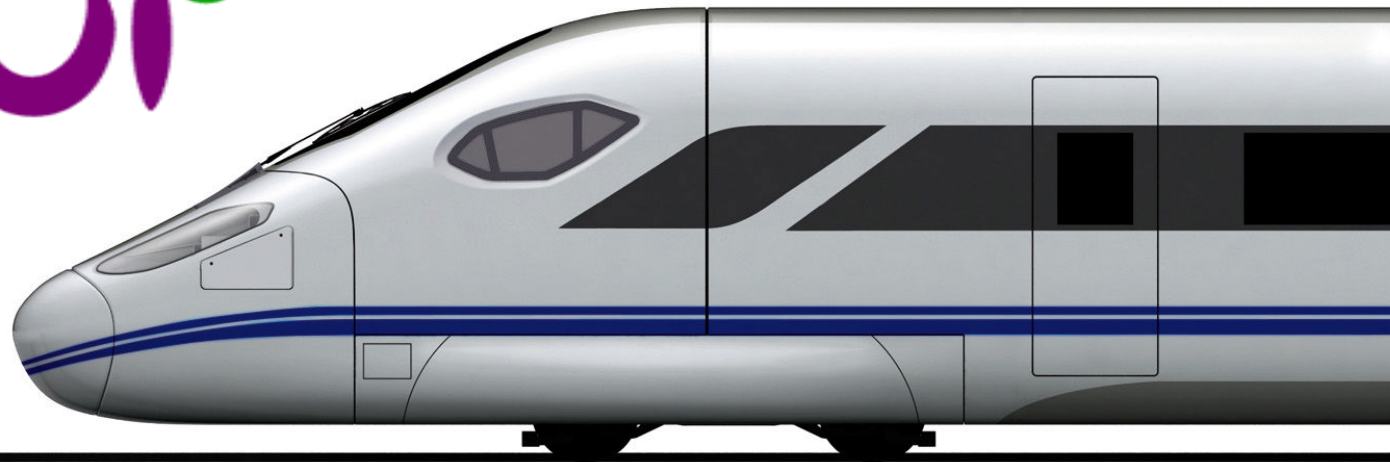


## Research projects

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### AVI 2015: The near future from High Speed Trains on Interoperable Railway Sustainable Networks

AVI 2015 is a Cenit research project to develop sustainable technologies needed to be able to link Gibraltar with Moscow continuously without breaks, at lower as possible cost and shortest journey time, compatible with the railway infrastructure in each different location and without any safety decrease.



# Research projects

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## AVI 2015: High Speed with less energy consumption

Applying sustainable technologies to the new interoperable trains reduces energy by 10%, by means of:



- More efficient traction systems
- Less aerodynamic resistance to forward motion
- Lighter materials
- New greases and lubrication fluids
- Project funded by CDTI through the CENIT Plan program

# Ecodesign Methodologies

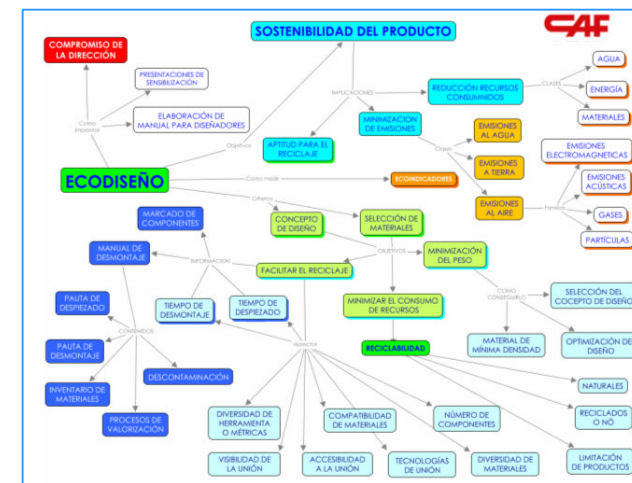
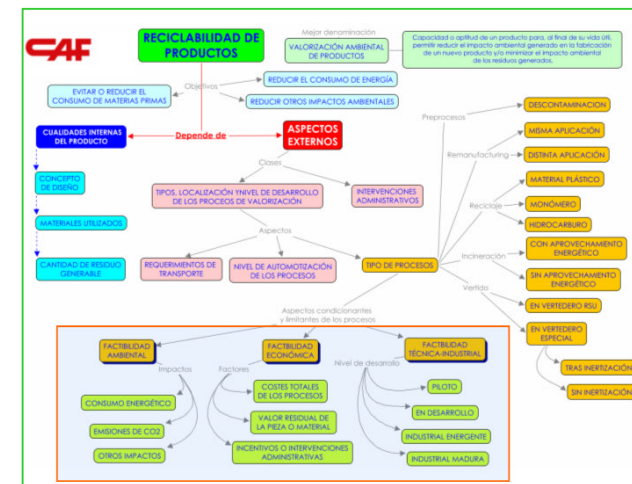
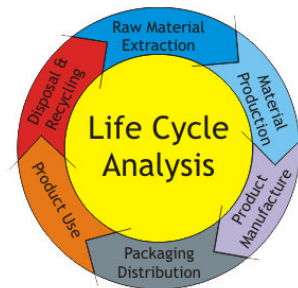
The EcoDesign methodology applied by CAF, allows use all the technology developed, optimize and manage the products design through their calculations, and also the estimation from different alternative solution and configuration.

## Product **Recyclability** :

Calculations about product recyclability made to support the material and components selection.



**LCA** environmental product Life Cycle Assesment : Calculation made from product environmental impact each of different life status from construction to scrap times.



## Railways and the environment. On track for efficiency

On route to a sustainable future, with railway's green tracks, CAF is making balanced progress: Clean, ecological and emission free.

Sustainable solutions





# CAF, the industrial railway group building future

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