Environmental Product Declaration.

Plugs and sockets.

The company.

ABB Cewe AB, Nyköping, Sweden, develops, manufactures and markets products for the low-voltage electrical material market within electrical distribution, industry, housing and construction. ABB Cewe belongs to the business area BA IPS, LV Products and Systems.

The company's quality system is certified acc. to ISO 9001 since 1993.

The company's product group Plugs & Sockets accounts for a major part of the turnover, and the plug 416P6 is the most common and the biggest selling individual product.
The 416P6 plug was chosen to represent the entire product group in this LCA due to the facts written above and also because all the products within the product group are very similar.

ISO 14000 status.

In order to guarantee an organised and efficient work within the company, ABB Cewe has a third party certified Environmental Management System (EMS) according to ISO 14001.

Assumptions.

Following assumptions have been made during the LCA study.

- The average transports to customers are 400 km by road.
- The socket is in use two hours per day with an average load of 8A.
- The average lifetime for one socket is 15 years.
- Swedish mix of energy is used for calculating energy consumption during manufacturing and European mix of energy is used for calculating energy consumption during use and disposal.

Life cycle assessment study.

This environmental product declaration is based on a life cycle assessment study, performed at ABB Cewe. It has been conducted according to ISO 14040-43 series.
Life cycle assessments are carried out by studying the environmental impact of products during their lifetime. This is done by quantifying the input of energy and raw materials needed and the emissions and waste generated throughout the products life cycle.

The life cycle is divided into three phases.
1. Manufacture
2. Use
3. Waste

The total environmental effect has been calculated with the evaluation method EPS.*

As can be seen from the EPS values diagram below most impacts occurs during manufacturing, but with proper recycling during the waste face a large portion can be "given back".
A more detailed study shows that most of the emissions come from transport related substances.

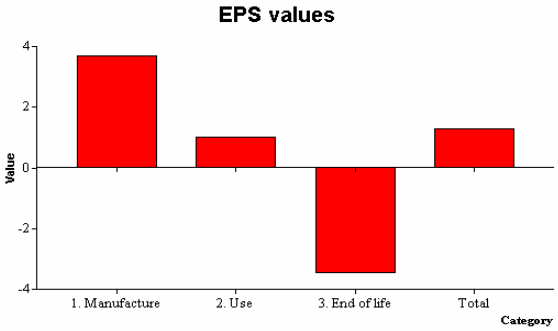

Figure 1. EPS diagram for LCA of plug 416P6

Boundaries within the life cycle.

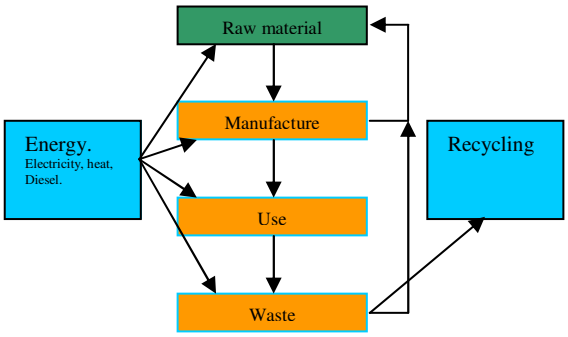

Figure 2. Life cycle of plugs and sockets.

Boundaries for this LCA have been set to include supplier's production and all of the transports to and from them.
During the waste face boundaries have been set to the recycling and incineration of the product.

The production face.

Material contents

Enclosures	Polyamide or blend PBT/PC
Inserts	Polyamide
Package	Cardboard box and polyethene bag
Pin and sleeves	Brass
Fixing/clamping screws	Steel

During the production face, heat and electricity is also added as well as transports from suppliers.

The production face of plugs and sockets consists of detail manufacturing, assembling and packaging. During this face, there is no material waste except for some brass chip that occurs during tuning and is being returned to the supplier for remelting to new brass wires. Waste from plastic material is recycled in the production process.

The using face.

During the using face of 416P6, effect losses in the socket are the only thing that has any environmental impact.
During its lifetime this loss is roughly 13,6 kWh when calculated according to previously described assumptions.

The end-of-life face.

Almost one hundred percent of the metals in the socket are being recycled during the end-of-life face. Both brass and steel screws are being recycled and all of the plastics go to incineration and heat production or can be recycled.

Eco-efficient design.

Eco-efficient design.	Yes	No	Not relevant
Materials			
Plastic parts do not contain flame retardant containing bromine or chlorine.	X		
Plastic parts do not contain cadmium or lead.	X		
Plastic parts consists no more than 2 types of polymers	X		
Usage			
An energy saving design of electrical connections .	X		
Recycling/disassembly			
Fasteners are easily accessible, where disassembly can be carried out using standard tools.	X		
The fasteners used facilitate non-destructive disassembly to be carried out.	X		
The product is highly modularised, where modules easily can be separated.	X		
Plastic parts are marked with recycling symbol.	X		
Plastic parts do not contain any metal inlays.	X		
Labels are not easily removed.	X		

Information to customer.

As can be seen from the EPS diagram there is a very small environmental impact from the 416P6 plug during its lifetime.
Apart from the emissions from transports of raw material to the production as well as transports of the finished product to the customers there is hardly no measurable amounts of any other environmental impact over a time period of fifteen years. (See figure 3 below).

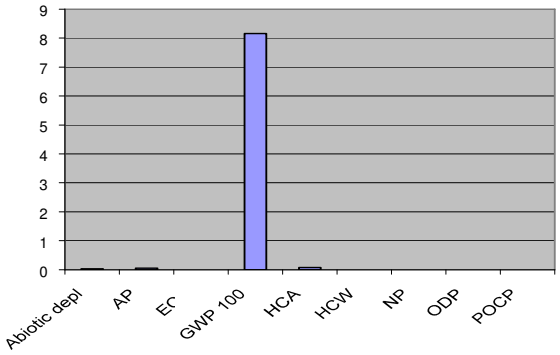

Figure 3. Environmental impact from LCA of 416P6 plug devided into impact categories (GWP=Global Warming Potential)

Comments.

As the EPS diagram clearly shows the dominant environmental load relates to the manufacturing of the product. This is due to the many transports of raw materials as well as the heat and electricity consumption required producing the different parts. About ninety percent of the GWP 100 value is transport related and the remaining ten percent comes from manufacturing of the plastics.

During the use face the only impact is the power dissipation that occurs when the products are in use. Since the electricity production in Europe mostly rely on fossil fuel the impact would have been severely reduced if other fuels were used.

All parts of the product can be recycled. The plastic parts are marked with recycling symbols according to ISO 1043-2.

Continuous improvements

In order to improve the environmental impact from the products and the production thereof objectives are set up in all relevant areas.
Special focus is on the choice of materials and different transportation solutions.

* EPS evaluation method.

The EPS indicator stands for the damage that is caused by the effects of the production of a material or by a process. This damage is expressed in financial terms. One ELU (Environmental Load Unit) corresponds approximately to one ECU.

Safeguard subjects

The EPS indicator includes damage done to five safeguard subjects:
Resources: or depletion of resources.
Human health: or the loss of health and the number of extra deaths as a result of the environmental effects.
Production: or the economic damage of the environmental effects (particularly in agriculture).
Biodiversity: or the disappearance of plant or animal species.
Aesthetic values: the perception of natural beauty.

Calculation of the EPS indicator

The valuation is based on three different principles:

1. Raw materials depletion is valuated by looking at the future extraction costs for raw materials. These are the costs that must be expended in order to extract the "last" raw materials resources.
2. The production losses are measured directly from the estimated reduction in agricultural yields and industrial damage (for instance corrosion).
3. The other three safeguard subjects are valuated in terms of the willingness-to-pay principle. The sums that a society is prepared to pay for ill health or the death of its citizens, the extinction of plants and animals and impairment of natural beauty are examined.

The total score is found by totaling up the financial sums of the five safeguard subjects.

ABB Cewe AB
Box 1005
SE-611 29 Nyköping, Sweden
Tel. +46 155 29 50 00