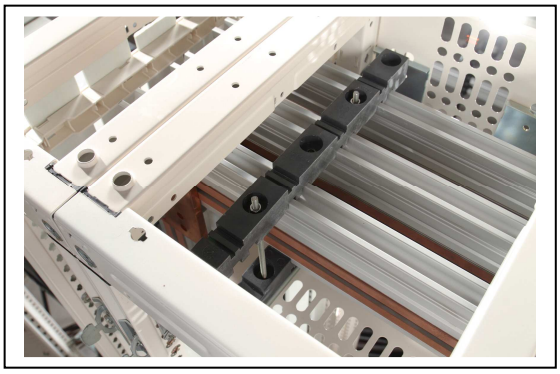
# Product Environmental Profile

## Linergy Evolution Busbars



Schneider Electric

## Product Environmental Profile - PEP

# Product overview

**The main purpose of Linergy Evolution Busbars is to conduct current.**

**This range consists of: horizontal busbars rating from 630 to 4000 A.**

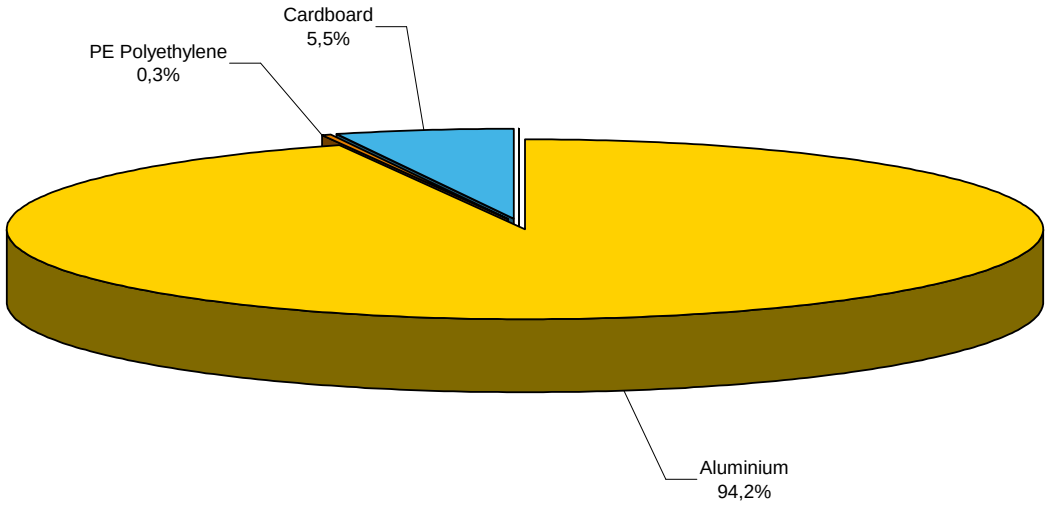
**The representative product used for this analysis is Linergy Evolution 1600A (Ref 04564). The analysis considers the use of 3 Linergy Evolution 1600A (2 meters long) in Prisma.**

**The environmental impacts of this referenced product are representative of the impacts of the other products of the range which are developed with a similar technology.**

**The environmental analysis was performed in conformity with ISO 14040.**

# Constituent materials

The mass of Linergy Evolution Busbars is from 2 169 g and 22 333 g including packaging. It is 3 x 5 203 g for 3 Linergy Evolution 1600A (ref 04564).
The constituent materials are distributed as follows:




# Substance assessment

Products of this range are designed in conformity with the requirements of the RoHS directive (European Directive 2002/95/EC of 27 January 2003) and do not contain, or only contain in the authorised proportions, lead, mercury, cadmium, hexavalent chromium or flame retardants (polybrominated biphenyls - PBB, polybrominated diphenyl ethers - PBDE) as mentioned in the Directive

# Manufacturing

Linergy Evolution 1600 A is manufactured at a production site which complies with the regulations governing industrial sites.

# Distribution

The weight and volume of the packaging have been optimized, based on the European Union's packaging directive.
For 3x Linergy Evolution Busbars packaging weight is 3x 302 g. It consists of cardboard (3x 287 g) and PE (3x 15 g).

The product distribution flows have been optimised by setting up local distribution centres close to the market areas.

# Product Environmental Profile - PEP

## Use

The products of the Linergy Evolution Busbars range do not generate environmental pollution (noise, emissions) requiring special precautionary measures in standard use.

The dissipated power depends on the conditions under which the product is implemented and used.
At nominal rating, 3 x Linergy Evolution 800A busbar have a dissipation of.310W.
At nominal rating, 3 x Linergy Evolution 1600A busbar have a dissipation of 580W.
Including the 30% loading rate, 3 x Linergy Evolution 1600A have a dissipation of 52 W.
This thermal dissipation represents less than 0.02% of the power which passes through the product.

The product does not require special maintenance operations

## End of life

At end of life, the Linergy Evolution Busbars have been optimized to decrease the amount of waste and allow recovery of the product components and materials.
This product range doesn't need any special end-of-life treatment. According to countries' practices this product can enter the usual end-of-life treatment process.
The recyclability potential of the products has been evaluated using the "ECO DEEE recyclability and recoverability calculation method" (version V1, 20 Sep. 2008 presented to the French Agency for Environment and Energy Management: ADEME).
According to this method, the potential recyclability ratio is: 88%.
As described in the recyclability calculation method this ratio includes only metals and plastics which have proven industrial recycling processes.

## Environmental impacts

Life cycle assessment has been performed on the following life cycle phases: Materials and Manufacturing (M), Distribution (D), Installation (I) Use (U), and End of life (E).
Modelling hypothesis and method:
- The calculation was performed on 3 x Linergy Evolution 1600A (ref 04564).
- Product packaging: is included.
- Installation components: no special components included.
- Scenario for the Use phase: this product range is included in the category energy passing product: (assumed service life is 20 years and use scenario is: product dissipation is 52 W for an applied loading rate of 30% and service uptime percentage of 100%).
- Geographical and technological representativity: the assessment is achieved for the European zone.

The electrical power model used for calculation is European model.
End of life impacts are based on a worst case transport distance to the recycling plant (1000km)

**Presentation of the product environmental impacts**

| Environmental indicators | Unit | For 3 x Linergy Evolution 1600A (ref 04564) | | | | | |
|---|---|---|---|---|---|---|---|
| | | S = M + D + I + U + E | M | D | I | U | E |
| **Raw Material Depletion** | **Y-1** | 1,3E-13 | 1,1E-14 | 2,5E-17 | 0,0E+00 | 1,2E-13 | 3,2E-17 |
| **Energy Depletion** | **MJ** | 1,1E+05 | 4,5E+03 | 1,9E+01 | 0,0E+00 | 1,0E+05 | 2,3E+01 |
| **Water depletion** | **$dm^3$** | 1,6E+04 | 5,1E+02 | 1,8E+00 | 0,0E+00 | 1,5E+04 | 2,2E+00 |
| **Global Warming** | **g≈$CO_2$** | 5,5E+06 | 2,2E+05 | 1,5E+03 | 0,0E+00 | 5,3E+06 | 1,8E+03 |
| **Ozone Depletion** | **g≈CFC-11** | 3,2E-01 | 3,6E-02 | 1,0E-03 | 0,0E+00 | 2,9E-01 | 1,3E-03 |
| **Air Toxicity** | **$m^3$** | 9,3E+08 | 6,0E+07 | 2,8E+05 | 0,0E+00 | 8,7E+08 | 3,5E+05 |
| **Photochemical Ozone Creation** | **g≈$C_2H_4$** | 1,9E+03 | 8,9E+01 | 1,3E+00 | 0,0E+00 | 1,8E+03 | 1,6E+00 |
| **Air acidification** | **g≈$H^+$** | 7,6E+02 | 4,9E+01 | 1,9E-01 | 0,0E+00 | 7,1E+02 | 2,4E-01 |
| **Water Toxicity** | **$dm^3$** | 1,6E+06 | 5,0E+04 | 1,8E+02 | 0,0E+00 | 1,5E+06 | 2,3E+02 |
| **Water Eutrophication** | **g≈$PO_4$** | 1,3E+01 | 9,7E-01 | 2,5E-02 | 0,0E+00 | 1,2E+01 | 3,1E-02 |
| **Hazardous waste production** | **kg** | 1,1E+02 | 2,4E+01 | 5,5E-04 | 0,0E+00 | 8,7E+01 | 6,9E-04 |

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 4.0, and with its database version 11.
The use phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.

According to this environmental analysis, the environmental indicators (except RMD) of other products in this family may be proportional extrapolated by power dissipation of the product.
The RMD impact of the other products of the family may be proportional extrapolated by product mass.

# Product Environmental Profile - PEP

**Environmental comparison between Linergy Evolution 1600A and regular flat copper busbar 1400A:**

Inside a low voltage panel based on a 1600A power protection, Linergy Evolution 1600A can be used as replacement of regular flat copper busbar 1400A* (60x10 mm) provided with previous offer.

* 1400A assigned current in Prisma P IP30

For modelization purpose in our comparison, we consider working conditions at In =1600A for the regular flat copper busbar. Dissipation is 47 W when applying the loading rate of 30%.

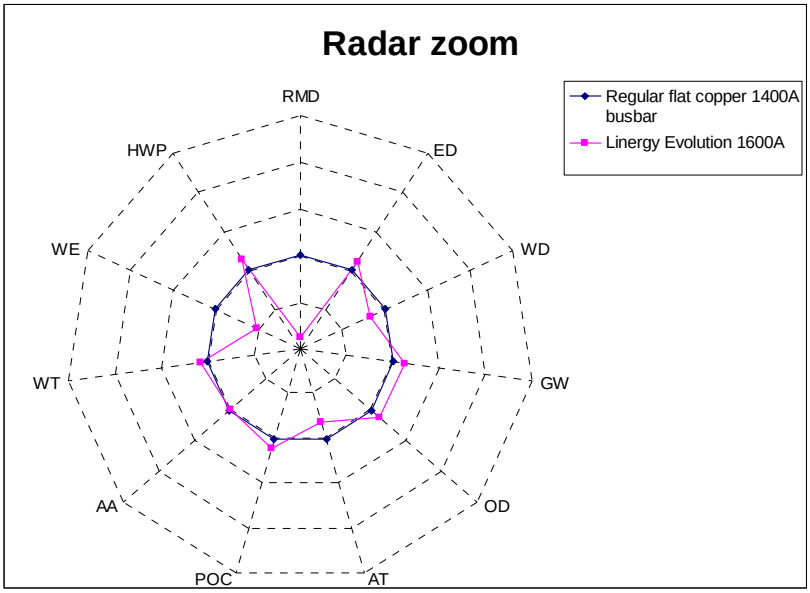
Presentation of the environmental impacts for regular flat copper busbar 1400A:

| Environmental indicators | Unit | For 3 x regular flat copper busbar 1400A | | | | | |
|---|---|---|---|---|---|---|---|
| | | S = M + D + I + U + E | M | D | I | U | E |
| **Raw Material Depletion** | **Y-1** | 1,0E-12 | 9,4E-13 | 5,4E-17 | 0,0E+00 | 1,1E-13 | 6,7E-17 |
| **Energy Depletion** | **MJ** | 9,8E+04 | 2,9E+03 | 3,9E+01 | 0,0E+00 | 9,5E+04 | 4,9E+01 |
| **Water depletion** | **$dm^3$** | 1,9E+04 | 5,1E+03 | 3,7E+00 | 0,0E+00 | 1,4E+04 | 4,7E+00 |
| **Global Warming** | **g≈$CO_2$** | 4,9E+06 | 8,5E+04 | 3,1E+03 | 0,0E+00 | 4,8E+06 | 3,9E+03 |
| **Ozone Depletion** | **g≈CFC-11** | 2,9E-01 | 2,3E-02 | 2,2E-03 | 0,0E+00 | 2,6E-01 | 2,8E-03 |
| **Air Toxicity** | **$m^3$** | 1,1E+09 | 3,5E+08 | 5,9E+05 | 0,0E+00 | 8,0E+08 | 7,3E+05 |
| **Photochemical Ozone Creation** | **g≈$C_2H_4$** | 1,7E+03 | 4,1E+01 | 2,7E+00 | 0,0E+00 | 1,6E+03 | 3,3E+00 |
| **Air acidification** | **g≈$H^+$** | 7,6E+02 | 1,1E+02 | 4,0E-01 | 0,0E+00 | 6,5E+02 | 5,0E-01 |
| **Water Toxicity** | **$dm^3$** | 1,4E+06 | 7,1E+04 | 3,9E+02 | 0,0E+00 | 1,4E+06 | 4,9E+02 |
| **Water Eutrophication** | **g≈$PO_4$** | 2,6E+01 | 1,4E+01 | 5,2E-02 | 0,0E+00 | 1,1E+01 | 6,5E-02 |
| **Hazardous waste production** | **kg** | 9,8E+01 | 1,8E+01 | 1,2E-03 | 0,0E+00 | 8,0E+01 | 1,4E-03 |

Comparison of environmental impacts:

For the 3 x Linergy Evolution 1600A dissipation is 52 W.

For the 3 x regular flat copper busbar 1400, dissipation is 47 W.




Energy depletion (ED): energy depletion is higher of 15% for Linergy Evolution 1600A compare to regular flat copper busbar 1400A.

Global Warming (GW): Linergy Evolution 1600A compare to regular flat copper busbar 1400A increases of 15% the impact on global warming.

Raw Material Depletion (RMD): Linergy Evolution 1600A compare to regular flat copper busbar 1400A reduces of 90% the impact on raw material depletion.

# System approach

As the products of the range are designed in accordance with the RoHS Directive (European Directive 2002/95/EC of 27 January 2003), they can be incorporated without any restriction in an assembly or an installation subject to this Directive.

Please note that the values given above are only valid within the context specified and cannot be used directly to draw up the environmental assessment of an installation.

# Glossary

**Raw Material Depletion (RMD)**

This indicator quantifies the consumption of raw materials during the life cycle of the product. It is expressed as the fraction of natural resources that disappear each year, with respect to all the annual reserves of the material.

**Energy Depletion (ED)**

This indicator gives the quantity of energy consumed, whether it is from fossil, hydroelectric, nuclear or other sources.
This indicator takes into account the energy from the material produced during combustion. It is expressed in MJ.

**Water Depletion (WD)**

This indicator calculates the volume of water consumed, including drinking water and water from industrial sources. It is expressed in $dm^3$.

**Global Warming (GW)**

The global warming of the planet is the result of the increase in the greenhouse effect due to the sunlight reflected by the earth's surface being absorbed by certain gases known as "greenhouse-effect" gases. The effect is quantified in gram equivalent of $CO_2$.

**Ozone Depletion (OD)**

This indicator defines the contribution to the phenomenon of the disappearance of the stratospheric ozone layer due to the emission of certain specific gases. The effect is expressed in gram equivalent of CFC-11.

**Air Toxicity (AT)**

This indicator represents the air toxicity in a human environment. It takes into account the usually accepted concentrations for several gases in the air and the quantity of gas released over the life cycle. The indication given corresponds to the air volume needed to dilute these gases down to acceptable concentrations.

**Photochemical Ozone Creation (POC)**

This indicator quantifies the contribution to the "smog" phenomenon (the photochemical oxidation of certain gases which generates ozone) and is expressed in gram equivalent of ethylene ($C_2H_4$).

**Air Acidification (AA)**

The acid substances present in the atmosphere are carried by rain.
A high level of acidity in the rain can cause damage to forests.
The contribution of acidification is calculated using the acidification potentials of the substances concerned and is expressed in mode equivalent of $H^+$.

**Water Toxicity (WT)**

This indicator represents the water toxicity. It takes into account the usually accepted concentrations for several substances in water and the quantity of substances released over the life cycle. The indication given corresponds to the water volume needed to dilute these substances down to acceptable concentrations.

**Hazardous Waste Production (HWP)**

This indicator calculates the quantity of specially treated waste created during all the life cycle phases (manufacturing, distribution and utilization). For example, special industrial waste in the manufacturing phase, waste associated with the production of electrical power, etc.
It is expressed in kg.

PEP in compliance with Schneider-Electric TT01 V4.8 and TT02 V15 procedures

PEP established according to PCR PEPecopassport 2010:1.0 rules

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Published by: Schneider Electric