



ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

TownTune Asymmetric Lyre BDP270

Signify N.V.



EPD HUB, HUB-5293

Published on 06.02.2026, last updated on 06.02.2026, valid until 06.02.2031

MANUFACTURER AND SITE

Manufacturer	Signify N.V.
Address	High Tech Campus 48, 5656 AE Eindhoven, The Netherlands
Contact details	sustainability@signify.com
Website	https://www.signify.com/global
Place of production	VALLADOLID, SPAIN
Place(s) of raw material origin	APAC, EU
Place(s) of installation and use	EU
Period for data	Calendar Year 2023

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR version 1.2, 24 Mar 2025
Sector	Electrical product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, B6, and modules C1-C4, D
EPD author	Signify / Sustainability
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification
EPD verifier	Imane Uald Lamkaddam as an authorized verifier for EPD Hub

PRODUCT SPECIFICATION

Product name	TownTune Asymmetric Lyre BDP270
Product number / reference	912300024206 / BDP270 LED40-4S/830 DM50 DDF3 62P
GTIN (Global Trade Item Number)	Not applicable
NOBB (Norwegian Building Product Database)	Not applicable
A1-A3 Specific data (%)	2.41

PRODUCT DESCRIPTION

Designed to enhance existing and scalable urban spaces, the TownTune family offers all the latest lighting innovations in terms of performance, quality of light and connectivity. The family consists of four solutions: a Central Post Top (CPT), an Asymmetric Spigot Post Top / Side Entry version (ASY), a version with an extending Lyre post top bracket (Lyre), and a Central Post Top with a Conical Comfort Bowl (CCB). Each TownTune luminaire can be customized with a choice of different shapes on top of the housing, plus there's the option to add a decorative ring, which comes in two colors (excluding CCB). Design options that enable you to create your very own lighting signature and bring a distinctive identity to districts and cities. In addition, every luminaire in the TownTune family is uniquely identifiable, thanks to the Signify Service tag app. By simply scanning a QR code, placed inside the door of the mast or directly on the luminaire, you can instantly access the configuration of the luminaire. This makes maintenance and programming operations faster and easier and enables you to create your digital library of lighting assets and spare parts. TownTune also uses the Philips LEDGINE-O lighting platform, ensuring you always have the right amount and direction of light on your street. Furthermore, thanks to being system ready (SR), TownTune is also future proof. A solution that's ready to be paired with both standalone and advanced control and lighting software applications such as Interact City.

This EPD is intended for business-to-business and/or business-to-consumer communication. Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT CLASSIFICATION

Declared operating voltage, Volt	220 to 240 V
Light source colour temperature, Kelvin	3000K
Protection index for water and dust (IP)	66
Impact resistance index (IK)	10
Luminous flux, Lumens	3080
Electrical power, Watt	28.5
Luminous efficiency, Lm/W	108
Additional characteristic	Not applicable

ABOUT THE MANUFACTURER

Signify is the world leader in lighting for professionals, consumers and lighting for the Internet of Things. Our energy efficient lighting products, systems and services enable our customers to enjoy a superior quality of light, and make people’s lives safer and more comfortable, businesses more productive and cities more liveable.

For more information, please visit: <https://www.signify.com/global>

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	80.51	APAC , EU
Minerals	0	
Fossil materials	19.49	APAC , EU
Bio-based materials	0	

BIOGENIC CARBON CONTENT

Product’s biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.599

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass, kg	7.826
Mass of packaging, kg	1.513
Functional unit (from PEP PSR0014)	Provide lighting that delivers an outgoing artificial luminous flux of 1000 lumens during a reference lifetime of 35000 hours
Reference service life (years)	25
Assigned lifetime (hours)	100000
GWP-total, A1-A3 (kg CO ₂ e)	68
GWP-fossil, A1-A3 (kg CO ₂ e)	69.5
Secondary material, inputs (%)	56.4
Secondary material, outputs (%)	56.7
Total energy use, A1-A3 (kWh)	241
Net freshwater use, A1-A3 (m ³)	2.85E-01

LIFE CYCLE ASSESSMENT

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Installation stage		Use stage							End of life stage				Beyond the system
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	ND	ND	ND	ND	ND	X	ND	X	X	X	X	X
Raw materials	Transport	Manufacturing	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demo.	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling

Modules not declared = ND.

CUT - OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. There is no neglected unit process more than 1% of total mass or energy flows. The module-specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product’s manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, ancillary materials, energy & water consumption, material loss and waste generation at the manufacturing site are attributed to the bill of materials of the products, therefore, they are allocated by partitioning the quantities on the base of the total production in kg throughout the year. Thus, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	Allocated by mass
Manufacturing energy and waste	Allocated by mass

Proxy data is used for certain materials due to their unavailability in the database. Conservative choices have been adopted when exact information was missing. Regarding module C1-C4: EOL scenarios are based on default values from EN 50693. For stages description please refer to section Product life cycle in this EPD report.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA Luminaire EPD Generator v2.2.7. The LCA and EPD have been prepared according to the reference standards, EN 50693, and ISO 14040/14044. Ecoinvent v 3.10.1 and One Click LCA databases were used as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology 'allocation, cut-off, EN 15804+A2'.

No other sources were used in the modelling of this EPD.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	Not applicable

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production. The material losses occurring during the manufacturing processes are treated as per the waste handling practices in the factory, while scenario assumptions are made in the absence of exact data. The study also considers the fuels used by machines as well as losses during electricity transmission.

The product is made of metals, plastics, and electronic components. All components are transported to the production facility, where the main manufacturing processes primarily are associated with assembly. A2 transport distances are calculated always taking the capital city of component country of origin as a starting point and exact manufacturing location as destination. The finished product can be packaged with polyethylene, cardboard, and/or paper as packaging material before shipment to customers. Manufacturing loss, ancillaries and wastes are calculated according to the data that each manufacturing site is sharing with Signify. The total annual amount of waste in kg is allocated to the total annual production in kg at the specific manufacturing site responsible to produce the studied product. Thus, it is possible to allocate it according to the weight of the product analysed in this study.

Co-product allocation is neglected as revenue of co-product is very low, hence, the waste undergoes a conservative waste treatment.

The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc), and its use is ensured throughout the validity period of this EPD.

TRANSPORT AND INSTALLATION (A4-A5)

A4 transport distances are calculated always taking the exact manufacturing location to customer location. If the customer's location is defined as a country or its capital city, the calculation is made to the respective capital city. If the

customer's location is specified as a region, the distance is calculated to the capital city of the best-performing sales country within that region. The transportation method is a combination of lorry and container ship where needed. To be conservative, empty returns are included in this study as implemented through an average load factor in the Ecoinvent transport datapoints. Environmental impacts from installation include waste packaging materials (A5). The packaging waste treatment is assumed to be conservative with incineration without energy recovery. The impacts of energy consumption and the used ancillary materials during installation are considered negligible.

PRODUCT USE AND MAINTENANCE (B1-B7)

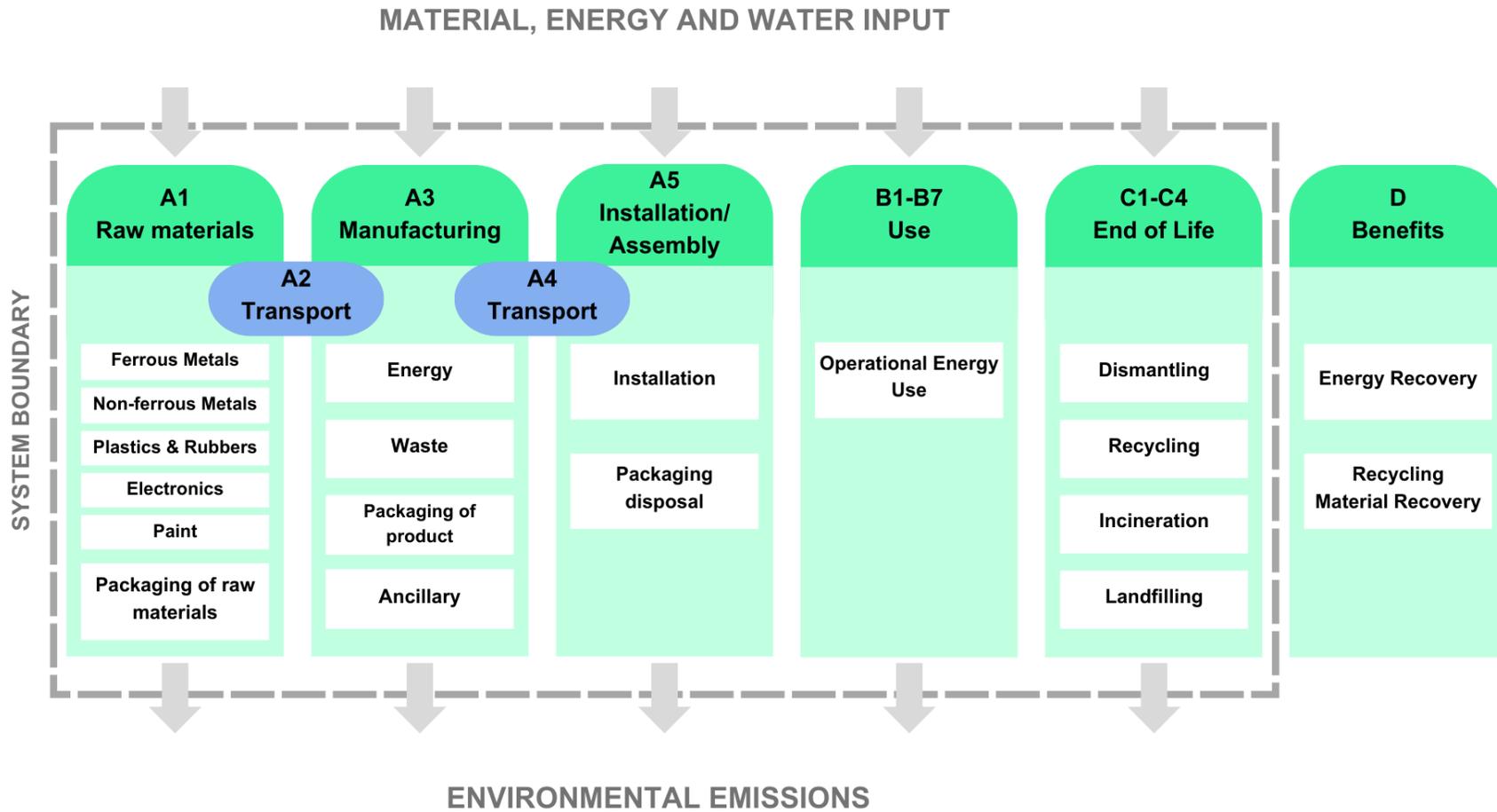
During the use phase, the product consumes electricity (B6), which is calculated multiplying the Wattage x Assigned lifetime (hours) x Country energy mix factor. To know which Country energy mix was used in this EPD, please refer to Annex 2.

The Reference service life in years is calculated according to the main application type of the product, based on annual operating hours. Impacts due to electricity production include direct emissions to air, transformation, and transmission losses.

PRODUCT END OF LIFE (C1-C4, D)

Consumption of energy and natural resources in demolition process is assumed to be negligible. It is assumed that the waste is collected separately and transported to the waste treatment centre. The transport distance is 150 km while the transportation method is assumed to be lorry (C2). According to EN 50693:2019, the sequence of treatment operations occurring to the product shall include de-pollution, fractions separation and preparation (dismantling, crushing, shredding, sorting), recycling, other material recovery, energy recovery and disposal. In this study, the default values from table G.4 of EN 50693 is used for treating materials in different waste treatment methods. Due to the material and energy recovery potential of parts in the lighting system, the end-of-life product is converted into recycled raw materials, while the energy recovered from incineration displaces electricity and heat production (D). The benefits and loads of incineration and recycling are included in Module D.

LIFE CYCLE FLOW DIAGRAM - SYSTEM BOUNDARY



ENVIRONMENTAL IMPACT DATA, RESULTS PER DECLARED UNIT

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	6.65E+01	3.74E-01	1.08E+00	6.80E+01	2.78E+00	2.29E+00	ND	ND	ND	ND	ND	9.38E+02	ND	0.00E+00	2.29E-01	1.78E+00	9.09E-01	-2.50E+00
GWP – fossil	kg CO ₂ e	6.62E+01	3.73E-01	2.98E+00	6.95E+01	2.77E+00	9.83E-02	ND	ND	ND	ND	ND	9.33E+02	ND	0.00E+00	2.29E-01	1.78E+00	9.09E-01	-2.49E+00
GWP – biogenic	kg CO ₂ e	2.40E-01	8.40E-05	-1.95E+00	-1.71E+00	6.28E-04	2.19E+00	ND	ND	ND	ND	ND	2.09E+00	ND	0.00E+00	5.01E-05	-5.36E-04	-1.59E-04	-3.33E-03
GWP – LULUC	kg CO ₂ e	1.00E-01	1.68E-04	4.98E-02	1.50E-01	1.24E-03	3.50E-05	ND	ND	ND	ND	ND	2.86E+00	ND	0.00E+00	1.02E-04	1.76E-04	8.63E-05	-4.69E-03
Ozone depletion pot.	kg CFC-11e	7.45E-07	5.51E-09	7.03E-08	8.21E-07	4.10E-08	1.30E-09	ND	ND	ND	ND	ND	1.72E-05	ND	0.00E+00	3.21E-09	1.97E-09	1.29E-09	-1.52E-08
Acidification potential	mol H ⁺ e	4.08E-01	1.47E-03	1.26E-02	4.22E-01	9.46E-03	5.64E-04	ND	ND	ND	ND	ND	5.48E+00	ND	0.00E+00	7.64E-04	1.72E-03	5.45E-04	-2.54E-02
EP-freshwater ²⁾	kg Pe	2.52E-02	2.87E-05	1.08E-03	2.63E-02	2.16E-04	9.53E-06	ND	ND	ND	ND	ND	8.68E-01	ND	0.00E+00	1.78E-05	7.51E-05	1.15E-05	-1.69E-03
EP-marine	kg Ne	6.95E-02	4.65E-04	5.51E-03	7.55E-02	3.11E-03	2.63E-04	ND	ND	ND	ND	ND	8.60E-01	ND	0.00E+00	2.48E-04	5.11E-04	1.09E-03	-2.73E-03
EP-terrestrial	mol Ne	7.24E-01	5.07E-03	3.50E-02	7.64E-01	3.38E-02	2.40E-03	ND	ND	ND	ND	ND	7.71E+00	ND	0.00E+00	2.69E-03	5.15E-03	2.41E-03	-3.03E-02
POCP (“smog”) ³⁾	kg NMVOCe	2.44E-01	2.00E-03	1.34E-02	2.59E-01	1.39E-02	6.83E-04	ND	ND	ND	ND	ND	2.54E+00	ND	0.00E+00	1.06E-03	1.44E-03	7.01E-04	-9.03E-03
ADP-minerals & metals ⁴⁾	kg Sbe	1.50E-03	1.03E-06	1.52E-05	1.52E-03	7.74E-06	2.82E-07	ND	ND	ND	ND	ND	1.26E-02	ND	0.00E+00	7.53E-07	7.28E-06	2.01E-07	-2.38E-04
ADP-fossil resources	MJ	7.95E+02	5.40E+00	3.99E+01	8.40E+02	4.03E+01	9.81E-01	ND	ND	ND	ND	ND	2.17E+04	ND	0.00E+00	3.22E+00	1.88E+00	1.06E+00	-3.11E+01
Water use ⁵⁾	m ³ e depr.	1.82E+01	2.65E-02	1.12E+00	1.94E+01	1.99E-01	1.14E-01	ND	ND	ND	ND	ND	5.92E+02	ND	0.00E+00	1.49E-02	1.34E-01	6.80E-02	-6.31E-01

1) GWP = Global Warming Potential. 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO₄e. 3) POCP = Photochemical ozone formation. 4) ADP = Abiotic depletion potential. 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4.94E-06	3.69E-08	2.23E-07	5.20E-06	2.78E-07	7.03E-09	ND	ND	ND	ND	ND	1.96E-05	ND	0.00E+00	1.82E-08	2.05E-08	7.88E-09	-1.80E-07
Ionizing radiation ⁶⁾	kBq U235e	3.10E+00	4.67E-03	1.31E-01	3.24E+00	3.51E-02	1.19E-03	ND	ND	ND	ND	ND	6.00E+02	ND	0.00E+00	2.60E-03	7.08E-03	1.63E-03	-2.95E-01
Ecotoxicity (freshwater)	CTUe	6.82E+02	7.58E-01	1.39E+01	6.97E+02	5.70E+00	2.72E+00	ND	ND	ND	ND	ND	3.31E+03	ND	0.00E+00	5.09E-01	4.10E+00	1.65E+02	-1.78E+01
Human toxicity, cancer	CTUh	5.35E-08	6.20E-11	1.43E-09	5.50E-08	4.58E-10	1.31E-10	ND	ND	ND	ND	ND	3.15E-07	ND	0.00E+00	3.90E-11	2.41E-10	1.11E-10	-2.22E-09
Human tox. non-cancer	CTUh	1.30E-06	3.46E-09	3.80E-08	1.34E-06	2.61E-08	5.34E-09	ND	ND	ND	ND	ND	1.63E-05	ND	0.00E+00	2.01E-09	1.14E-08	7.58E-09	-2.18E-07
SQP ⁷⁾	-	2.33E+02	5.35E+00	1.43E+02	3.82E+02	4.05E+01	4.80E-01	ND	ND	ND	ND	ND	4.83E+03	ND	0.00E+00	1.92E+00	2.82E+00	1.35E+00	-1.23E+01

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ	7.05E+01	7.35E-02	9.67E+00	8.02E+01	5.52E-01	-2.68E+01	ND	ND	ND	ND	ND	5.96E+03	ND	0.00E+00	4.41E-02	2.53E-01	2.77E-02	-4.69E+00
Renew. PER as material	MJ	2.32E+00	0.00E+00	1.70E+01	1.93E+01	0.00E+00	-1.93E+01	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-4.10E-03	-7.62E-03	0.00E+00
Total use of renew. PER	MJ	7.28E+01	7.35E-02	2.67E+01	9.96E+01	5.52E-01	-4.62E+01	ND	ND	ND	ND	ND	5.96E+03	ND	0.00E+00	4.41E-02	2.49E-01	2.01E-02	-4.69E+00
Non-re. PER as energy	MJ	7.50E+02	5.40E+00	3.26E+01	7.88E+02	4.03E+01	9.26E-01	ND	ND	ND	ND	ND	2.17E+04	ND	0.00E+00	3.22E+00	-2.36E+01	-2.63E+01	-3.09E+01
Non-re. PER as material	MJ	4.17E+01	0.00E+00	-1.56E+00	4.01E+01	0.00E+00	-2.34E-01	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-2.01E+01	-1.99E+01	0.00E+00
Total use of non-re. PER	MJ	7.92E+02	5.40E+00	3.11E+01	8.28E+02	4.03E+01	6.93E-01	ND	ND	ND	ND	ND	2.17E+04	ND	0.00E+00	3.22E+00	-4.36E+01	-4.62E+01	-3.09E+01
Secondary materials	kg	4.41E+00	0.00E+00	0.00E+00	4.41E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renew. secondary fuels	MJ	3.18E-02	2.88E-05	1.61E-01	1.93E-01	2.18E-04	1.22E-05	ND	ND	ND	ND	ND	2.87E-02	ND	0.00E+00	1.84E-05	9.03E-05	1.63E-05	-4.10E-04
Non-ren. secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m ³	2.59E-01	7.91E-04	2.55E-02	2.85E-01	5.95E-03	1.84E-03	ND	ND	ND	ND	ND	1.88E+01	ND	0.00E+00	4.26E-04	2.55E-03	-3.79E-03	-2.21E-02

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1.10E+01	9.12E-03	1.64E-01	1.12E+01	6.82E-02	2.99E-02	ND	ND	ND	ND	ND	5.49E+01	ND	0.00E+00	5.61E-03	4.04E-02	4.12E-02	-2.45E-01
Non-hazardous waste	kg	2.41E+02	1.68E-01	1.04E+01	2.52E+02	1.26E+00	1.62E+00	ND	ND	ND	ND	ND	4.25E+03	ND	0.00E+00	1.05E-01	1.11E+00	9.26E+00	-8.88E+00
Radioactive waste	kg	7.72E-04	1.14E-06	3.13E-05	8.05E-04	8.58E-06	2.98E-07	ND	ND	ND	ND	ND	1.54E-01	ND	0.00E+00	6.38E-07	1.74E-06	4.02E-07	-7.25E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	9.43E-02	9.43E-02	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	4.44E+00	0.00E+00	0.00E+00
Materials for energy rec	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	7.91E+00	0.00E+00	0.00E+00
Exported energy – Electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	3.33E+00	0.00E+00	0.00E+00
Exported energy – Heat	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	4.58E+00	0.00E+00	0.00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	6.62E+01	3.71E-01	3.19E+00	6.98E+01	2.76E+00	9.76E-02	ND	ND	ND	ND	ND	9.33E+02	ND	0.00E+00	2.28E-01	1.78E+00	9.07E-01	-2.48E+00
Ozone depletion Pot.	kg CFC-11e	6.66E-07	4.40E-09	7.05E-08	7.41E-07	3.27E-08	1.11E-09	ND	ND	ND	ND	ND	1.44E-05	ND	0.00E+00	2.56E-09	1.67E-09	1.07E-09	-1.28E-08
Acidification	kg SO ₂ e	3.41E-01	1.13E-03	8.88E-03	3.51E-01	7.22E-03	4.14E-04	ND	ND	ND	ND	ND	4.67E+00	ND	0.00E+00	5.85E-04	1.35E-03	3.94E-04	-2.19E-02
Eutrophication	kg PO ₄ ³ e	9.21E-02	2.51E-04	6.00E-03	9.84E-02	1.76E-03	1.29E-04	ND	ND	ND	ND	ND	6.05E-01	ND	0.00E+00	1.42E-04	2.49E-04	2.06E-04	-1.91E-03
POCP ("smog")	kg C ₂ H ₄ e	2.84E-02	9.36E-05	1.00E-03	2.95E-02	6.44E-04	3.16E-05	ND	ND	ND	ND	ND	2.55E-01	ND	0.00E+00	5.24E-05	8.16E-05	3.62E-05	-1.06E-03
ADP-elements	kg Sbe	1.48E-03	1.00E-06	1.49E-05	1.50E-03	7.55E-06	2.36E-07	ND	ND	ND	ND	ND	1.26E-02	ND	0.00E+00	7.35E-07	7.22E-06	1.78E-07	-2.38E-04
ADP-fossil	MJ	7.44E+02	5.33E+00	3.78E+01	7.87E+02	3.97E+01	9.62E-01	ND	ND	ND	ND	ND	1.11E+04	ND	0.00E+00	3.18E+00	1.77E+00	1.03E+00	-2.64E+01

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG 9)	kg CO ₂ e	6.63E+01	3.74E-01	3.03E+00	6.97E+01	2.78E+00	9.84E-02	ND	ND	ND	ND	ND	9.36E+02	ND	0.00E+00	2.29E-01	1.78E+00	9.09E-01	-2.50E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows - CH₄ fossil, CH₄ biogenic and Dinitrogen monoxide - were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO₂ is set to zero.

ENVIRONMENTAL IMPACT DATA, RESULTS PER FUNCTIONAL UNIT

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ éq/FU	7.56E+00	4.25E-02	1.22E-01	7.73E+00	3.15E-01	2.60E-01	ND	ND	ND	ND	ND	1.07E+02	ND	0.00E+00	2.61E-02	2.02E-01	1.03E-01	-2.84E-01
GWP – fossil	kg CO ₂ éq/FU	7.52E+00	4.24E-02	3.39E-01	7.90E+00	3.15E-01	1.12E-02	ND	ND	ND	ND	ND	1.06E+02	ND	0.00E+00	2.61E-02	2.02E-01	1.03E-01	-2.83E-01
GWP – biogenic	kg CO ₂ éq/FU	2.73E-02	9.55E-06	-2.22E-01	-1.95E-01	7.14E-05	2.49E-01	ND	ND	ND	ND	ND	2.38E-01	ND	0.00E+00	5.69E-06	-6.09E-05	-1.81E-05	-3.79E-04
GWP – LULUC	kg CO ₂ éq/FU	1.14E-02	1.91E-05	5.66E-03	1.71E-02	1.41E-04	3.98E-06	ND	ND	ND	ND	ND	3.25E-01	ND	0.00E+00	1.15E-05	2.00E-05	9.80E-06	-5.33E-04
Ozone depletion pot.	kg CFC _{11e} /FU	8.47E-08	6.26E-10	7.99E-09	9.33E-08	4.65E-09	1.48E-10	ND	ND	ND	ND	ND	1.95E-06	ND	0.00E+00	3.64E-10	2.24E-10	1.47E-10	-1.73E-09
Acidification potential	mole H ⁺ e/FU	4.64E-02	1.67E-04	1.43E-03	4.80E-02	1.08E-03	6.41E-05	ND	ND	ND	ND	ND	6.23E-01	ND	0.00E+00	8.69E-05	1.95E-04	6.19E-05	-2.89E-03
EP-freshwater ²⁾	kg Pe/FU	2.86E-03	3.26E-06	1.23E-04	2.99E-03	2.45E-05	1.08E-06	ND	ND	ND	ND	ND	9.87E-02	ND	0.00E+00	2.03E-06	8.54E-06	1.31E-06	-1.92E-04
EP-marine	kg Ne/FU	7.90E-03	5.28E-05	6.26E-04	8.58E-03	3.53E-04	2.99E-05	ND	ND	ND	ND	ND	9.78E-02	ND	0.00E+00	2.81E-05	5.81E-05	1.23E-04	-3.11E-04
EP-terrestrial	mol Ne/FU	8.22E-02	5.76E-04	3.97E-03	8.68E-02	3.84E-03	2.73E-04	ND	ND	ND	ND	ND	8.76E-01	ND	0.00E+00	3.06E-04	5.86E-04	2.74E-04	-3.45E-03
POCP (“smog”) ³⁾	kg NMVOCe/	2.77E-02	2.28E-04	1.52E-03	2.94E-02	1.58E-03	7.76E-05	ND	ND	ND	ND	ND	2.89E-01	ND	0.00E+00	1.21E-04	1.63E-04	7.97E-05	-1.03E-03
ADP-minerals & metals ⁴⁾	kg Sbe/FU	1.71E-04	1.17E-07	1.73E-06	1.72E-04	8.80E-07	3.21E-08	ND	ND	ND	ND	ND	1.43E-03	ND	0.00E+00	8.56E-08	8.27E-07	2.29E-08	-2.70E-05
ADP-fossil resources	MJ/FU	9.04E+01	6.14E-01	4.54E+00	9.55E+01	4.58E+00	1.11E-01	ND	ND	ND	ND	ND	2.47E+03	ND	0.00E+00	3.66E-01	2.13E-01	1.20E-01	-3.53E+00
Water use ⁵⁾	m ³ e priv. /FU	2.07E+00	3.01E-03	1.28E-01	2.20E+00	2.26E-02	1.29E-02	ND	ND	ND	ND	ND	6.72E+01	ND	0.00E+00	1.70E-03	1.52E-02	7.73E-03	-7.17E-02

1) GWP = Global Warming Potential. 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e. 3) POCP = Photochemical ozone formation. 4) ADP = Abiotic depletion potential. 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence /FU	5.62E-07	4.19E-09	2.53E-08	5.91E-07	3.16E-08	7.98E-10	ND	ND	ND	ND	ND	2.22E-06	ND	0.00E+00	2.07E-09	2.32E-09	8.95E-10	-2.04E-08
Ionizing radiation ⁶⁾	kBq U235e/FU	3.52E-01	5.30E-04	1.49E-02	3.68E-01	3.98E-03	1.35E-04	ND	ND	ND	ND	ND	6.82E+01	ND	0.00E+00	2.96E-04	8.04E-04	1.85E-04	-3.36E-02
Ecotoxicity (freshwater)	CTUe/FU	7.76E+01	8.61E-02	1.58E+00	7.92E+01	6.47E-01	3.09E-01	ND	ND	ND	ND	ND	3.76E+02	ND	0.00E+00	5.78E-02	4.66E-01	1.87E+01	-2.03E+00
Human toxicity, cancer	CTUh/FU	6.08E-09	7.04E-12	1.63E-10	6.25E-09	5.20E-11	1.49E-11	ND	ND	ND	ND	ND	3.58E-08	ND	0.00E+00	4.43E-12	2.74E-11	1.26E-11	-2.53E-10
Human tox. non-cancer	CTUh/FU	1.48E-07	3.93E-10	4.32E-09	1.52E-07	2.96E-09	6.07E-10	ND	ND	ND	ND	ND	1.86E-06	ND	0.00E+00	2.29E-10	1.29E-09	8.62E-10	-2.48E-08
SQP ⁷⁾	-/FU	2.65E+01	6.08E-01	1.63E+01	4.34E+01	4.61E+00	5.45E-02	ND	ND	ND	ND	ND	5.49E+02	ND	0.00E+00	2.18E-01	3.20E-01	1.53E-01	-1.40E+00

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ/FU	8.01E+00	8.35E-03	1.10E+00	9.12E+00	6.27E-02	-3.05E+00	ND	ND	ND	ND	ND	6.77E+02	ND	0.00E+00	5.01E-03	2.88E-02	3.15E-03	-5.33E-01
Renew. PER as material	MJ/FU	2.64E-01	0.00E+00	1.94E+00	2.20E+00	0.00E+00	-2.20E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-4.66E-04	-8.66E-04	0.00E+00
Total use of renew. PER	MJ/FU	8.27E+00	8.35E-03	3.03E+00	1.13E+01	6.27E-02	-5.25E+00	ND	ND	ND	ND	ND	6.77E+02	ND	0.00E+00	5.01E-03	2.83E-02	2.28E-03	-5.33E-01
Non-re. PER as energy	MJ/FU	8.52E+01	6.14E-01	3.71E+00	8.96E+01	4.58E+00	1.05E-01	ND	ND	ND	ND	ND	2.47E+03	ND	0.00E+00	3.66E-01	-2.68E+00	-2.99E+00	-3.51E+00
Non-re. PER as material	MJ/FU	4.74E+00	0.00E+00	-1.77E-01	4.56E+00	0.00E+00	-2.66E-02	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-2.28E+00	-2.26E+00	0.00E+00
Total use of non-re. PER	MJ/FU	9.00E+01	6.14E-01	3.53E+00	9.41E+01	4.58E+00	7.87E-02	ND	ND	ND	ND	ND	2.47E+03	ND	0.00E+00	3.66E-01	-4.96E+00	-5.25E+00	-3.51E+00
Secondary materials	kg/FU	5.01E-01	0.00E+00	0.00E+00	5.01E-01	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renew. secondary fuels	MJ/FU	3.62E-03	3.27E-06	1.83E-02	2.19E-02	2.47E-05	1.39E-06	ND	ND	ND	ND	ND	3.26E-03	ND	0.00E+00	2.09E-06	1.03E-05	1.85E-06	-4.66E-05
Non-ren. secondary fuels	MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m ³ /FU	2.94E-02	8.99E-05	2.89E-03	3.24E-02	6.76E-04	2.09E-04	ND	ND	ND	ND	ND	2.13E+00	ND	0.00E+00	4.84E-05	2.89E-04	-4.31E-04	-2.51E-03

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg/FU	1.25E+00	1.04E-03	1.87E-02	1.27E+00	7.75E-03	3.39E-03	ND	ND	ND	ND	ND	6.24E+00	ND	0.00E+00	6.37E-04	4.60E-03	4.68E-03	-2.78E-02
Non-hazardous waste	kg/FU	2.74E+01	1.91E-02	1.18E+00	2.86E+01	1.43E-01	1.84E-01	ND	ND	ND	ND	ND	4.83E+02	ND	0.00E+00	1.19E-02	1.26E-01	1.05E+00	-1.01E+00
Radioactive waste	kg/FU	8.78E-05	1.30E-07	3.55E-06	9.14E-05	9.75E-07	3.38E-08	ND	ND	ND	ND	ND	1.75E-02	ND	0.00E+00	7.25E-08	1.98E-07	4.57E-08	-8.24E-06

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	1.07E-02	1.07E-02	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	5.04E-01	0.00E+00	0.00E+00
Materials for energy rec	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	8.99E-01	0.00E+00	0.00E+00
Exported energy – Electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	3.79E-01	0.00E+00	0.00E+00
Exported energy – Heat	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	5.21E-01	0.00E+00	0.00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ eq./FU	7.53E+00	4.22E-02	3.62E-01	7.93E+00	3.14E-01	1.11E-02	ND	ND	ND	ND	ND	1.06E+02	ND	0.00E+00	2.59E-02	2.02E-01	1.03E-01	-2.82E-01
Ozone depletion Pot.	kg CFC ₁₁ /FU	7.57E-08	4.99E-10	8.01E-09	8.42E-08	3.71E-09	1.26E-10	ND	ND	ND	ND	ND	1.63E-06	ND	0.00E+00	2.91E-10	1.90E-10	1.21E-10	-1.45E-09
Acidification	kg SO ₂ e/FU	3.87E-02	1.28E-04	1.01E-03	3.99E-02	8.21E-04	4.71E-05	ND	ND	ND	ND	ND	5.31E-01	ND	0.00E+00	6.65E-05	1.53E-04	4.48E-05	-2.49E-03
Eutrophication	kg PO ₄ ³ e/FU	1.05E-02	2.86E-05	6.82E-04	1.12E-02	2.00E-04	1.46E-05	ND	ND	ND	ND	ND	6.87E-02	ND	0.00E+00	1.62E-05	2.83E-05	2.34E-05	-2.17E-04
POCP (“smog”)	kg C ₂ H ₄ e/FU	3.23E-03	1.06E-05	1.14E-04	3.35E-03	7.32E-05	3.59E-06	ND	ND	ND	ND	ND	2.89E-02	ND	0.00E+00	5.96E-06	9.27E-06	4.12E-06	-1.20E-04
ADP-elements	kg Sbe/FU	1.68E-04	1.14E-07	1.70E-06	1.70E-04	8.58E-07	2.68E-08	ND	ND	ND	ND	ND	1.43E-03	ND	0.00E+00	8.35E-08	8.21E-07	2.02E-08	-2.70E-05
ADP-fossil	MJ/FU	8.45E+01	6.05E-01	4.30E+00	8.94E+01	4.51E+00	1.09E-01	ND	ND	ND	ND	ND	1.27E+03	ND	0.00E+00	3.61E-01	2.01E-01	1.17E-01	-3.00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ⁹⁾	kg CO ₂ e/FU	7.53E+00	4.24E-02	3.44E-01	7.92E+00	3.15E-01	1.12E-02	ND	ND	ND	ND	ND	1.06E+02	ND	0.00E+00	2.61E-02	2.02E-01	1.03E-01	-2.84E-01

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows - CH₄ fossil, CH₄ biogenic and Dinitrogen monoxide - were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO₂ is set to zero.

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation – A3 (Energy data source)

1. Energy supply, electricity production, co-generation oil and gas, Heat and power co-generation, natural gas, combined cycle power plant, 400MW electrical, Spain, ecoinvent 3.10.1, 0.0249 kgCO₂e/MJ
2. Energy supply, electricity production, solar photovoltaic, Electricity production, photovoltaic, 570kWp open ground installation, multi-Si, Spain, ecoinvent 3.10.1, 0.0673 kgCO₂e/kWh

Transport scenario documentation - A4

1. Transport, freight, lorry >32 metric ton, EURO5, 2760.17 km
2. Transport, freight, sea, container ship, 0.0 km

Installation scenario documentation - A5 (Waste materials data source)

1. Market for corrugated board box, 1.458 kg
2. Market for printed paper, offset, 0.0537 kg
3. Market for packaging film, low density polyethylene, 0.0015 kg

Use stages scenario documentation - B6-B7 (Energy data source)

1. Energy supply, electricity transformation and distribution, distribution low voltage, Market group for electricity, low voltage, Europe, 2850.0 kWh

TRANSPORT SCENARIO DOCUMENTATION - A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50 %
Bulk density of transported products / kg/m ³	9.63E+01
Volume capacity utilization factor (factor: =1 or <1 or ≥1 for compressed or nested packaged products)	1

INSTALLATION SCENARIO DOCUMENTATION - A5

Scenario parameter	Value
Ancillary materials for installation (specified by material) / kg or other units as appropriate	0
Water use / m ³	0
Other resource use / kg	0
Direct emissions to ambient air, soil and water / kg	0

USE STAGES SCENARIO DOCUMENTATION - B6-B7 USE OF ENERGY AND WATER

Scenario information	Value
Ancillary materials specified by material / kg or units as appropriate	Not applicable
Net fresh water consumption / m ³	0
Power output of equipment / kW	28.5
Characteristic performance, e.g., energy efficiency, emissions, variation of performance with capacity utilization, etc. / Units as appropriate	For more details see product classification table and product description.
Further assumptions for scenario development, e.g., frequency and period of use, number of occupants / Units as appropriate	For more details see product classification table and product description.

END OF LIFE SCENARIO DOCUMENTATION

Scenario information	Value
Collection process – kg collected separately	7.826
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	4.44E+00
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	2.67E+00
Scenario assumptions e.g. transportation	Lorry, 16-32 metric ton, EURO5; 150 km

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.



Program assistant: Xinyuan Zhang



The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

[Verified tools](#)

Tool verifier: Hai Ha Nguyen

Tool verification validity: 28 March 2025 - 27 March 2028

APPENDIX 1

MATERIAL COMPOSITION

The product material composition is illustrated in the table below. The material weight is given in grams and in percentage on total product weight.

Table 1: Material composition

Material	Weight (g)	Weight-%
Aluminium	6023	76.96
Copper	12.68	0.16
Other Plastics	1190.82	15.22
Paint	186	2.38
PCB Alu	27.9	0.36
PCB Copper	32.08	0.41
PCB Iron	28.05	0.36
PCB Non-ferrous metal	0.01	0
PCB Support	112.4	1.44
PCB Tin	1.94	0.02
PP / PS-High Impact PS / ABS	36	0.46
Stainless Steel	2	0.03
Steel	171.99	2.2
Tin	1.35	0.02

APPENDIX 2

USE PHASE (B6) VALUES FOR DIFFERENT COUNTRY MIX

In this EPD the B6 impact has been calculated using the energy mix of EU. The table in this appendix is useful for conversion and comparison of B6 values with other country energy mix. The Global Warming Potential Total (GWP tot) value is illustrated for each country. The value refers to 1 kwh.

Example on how to use the table:

If for example this EPD was done according to EU energy mix and you want to see how the GWP total changes according to a Finland country energy mix, you can take the original value in the results table here highlighted in yellow:

ENVIRONMENTAL IMPACT DATA, RESULTS PER DECLARED UNIT

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	1.08E+01	2.33E-01	5.06E-01	1.15E+01	3.27E+00	1.68E+00	ND	ND	ND	ND	ND	4.06E-02	ND	0.00E+00	2.88E-02	5.13E-01	2.80E-01	-9.88E-01

Divide that value according to the EU value from the following table (EU = 3.30E-01) and then multiplying for the Finland value from the same table (FINLAND = 1.54E-01).

Thus, the calculation of this example would be:

New B6 GWP tot for Finland = $(4.06E-02 / 3.30E-01) \times 1.54E-01 = 1.89E-02$.

Country	GWP tot (kg CO2 eq. per kwh)		
AFRICA	7.30E-01	GERMANY	3.90E-01
APAC	9.50E-01	INDIA	1.50E+00
AUSTRALIA	8.40E-01	ITALY	3.50E-01
AUSTRIA	2.30E-01	LATAM	3.90E-01
BELGIUM	2.00E-01	NAM	4.50E-01
CHINA	1.02E+00	NETHERLANDS	3.90E-01
DENMARK	1.60E-01	NORWAY	4.50E-02
EU	3.30E-01	ROW	7.30E-01
FINLAND	1.54E-01	SPAIN	2.10E-01
FRANCE	8.70E-02	SWEDEN	3.70E-02
		UK	2.60E-01

Source Ecoinvent 3.10.1

APPENDIX 3 - EPD HUB ALIGNED

This section represents the scaling method for the **B6 module**, following the PEP EcoPassport PSR for luminaries (PSR-0014-ed2.0-EN-2023 07 13). The GWP results were scaled from a reference variant of a product family, based on various light management scenarios and power inputs of the luminaires within the same product family.

To calculate the Scaled Impact (*SI*), we have followed the below methods:

1. Calculate the power scaling factor (PSF), which is the ratio of the power input of the variant in questions P_{in} and the power input of the base variant P_{base} .

$$PSF = \frac{P_{in}}{P_{base}}$$

2. Calculate the Total Scaling factor by multiplying the PSF by the control scaling factor (CSF), where the CSF is determined according the relevant control factor scenario (e.g. if the luminaire has a presence detection system). The presented controls factors values in Table A1 are based on BS EN 15193-1:2017. Please refer to this publication or contact Signify directly for more information.

$$TSF = PSF * CSF$$

Table 1: Light management function (PEP EcoPassport aligned)

Scenario	Abbrev.	CSF
No control	NC	1
Daylight dependency factor	DD	0.75
Presence sensing	PS	0.75
Daylight dependency and presence sensing	DD+PS	0.55

3. Lastly, the GWP of the base variant is then scaled by the TSF.

$$\text{Scaled Impact} = \text{GWP}_{\text{case}} * \text{TSF}$$

The following list of product configurations is not exhaustive. Please use the formula defined in point 1 above to calculate the exact power scaling factor (PSF) for any specific configuration.

Table 2: GWP per scaling factor (EPD Hub aligned)

	12NC or Product Family Code	Description	Flux [lm]	Power [W]	Efficacy [lm/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
							NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
1	BDP270	BDP270LED8-4S740DM50	624	5.6	111.4	0.196	0.196	0.147	0.147	0.108	184.2	138.2	138.2	101.3
2	BDP270	BDP270LED10-4S740DM50	780	6.8	114.7	0.239	0.239	0.179	0.179	0.131	223.7	167.8	167.8	123.0
3	BDP270	BDP270LED12-4S740DM50	936	7.7	121.6	0.270	0.270	0.203	0.203	0.149	253.3	190.0	190.0	139.3
4	BDP270	BDP270LED14-4S740DM50	1092	8.9	122.7	0.312	0.312	0.234	0.234	0.172	292.8	219.6	219.6	161.0
5	BDP270	BDP270LED16-4S740DM50	1248	10.0	124.8	0.351	0.351	0.263	0.263	0.193	329.0	246.8	246.8	181.0
6	BDP270	BDP270LED18-4S740DM50	1404	11.2	125.4	0.393	0.393	0.295	0.295	0.216	368.5	276.4	276.4	202.7
7	BDP270	BDP270LED20-4S740DM50	1560	12.4	125.8	0.435	0.435	0.326	0.326	0.239	408.0	306.0	306.0	224.4
8	BDP270	BDP270LED22-4S740DM50	1694	13.6	124.6	0.477	0.477	0.358	0.358	0.262	447.4	335.6	335.6	246.1
9	BDP270	BDP270LED24-4S740DM50	1848	15.0	123.2	0.526	0.526	0.395	0.395	0.289	493.5	370.1	370.1	271.4
10	BDP270	BDP270LED27-4S740DM50	2079	17.0	122.3	0.596	0.596	0.447	0.447	0.328	559.3	419.5	419.5	307.6
11	BDP270	BDP270LED30-4S740DM50	2310	19.0	121.6	0.667	0.667	0.500	0.500	0.367	625.1	468.8	468.8	343.8
12	BDP270	BDP270LED34-4S740DM50	2618	20.0	130.9	0.702	0.702	0.526	0.526	0.386	658.0	493.5	493.5	361.9
13	BDP270	BDP270LED35-4S740DM50	2695	20.5	131.5	0.719	0.719	0.539	0.539	0.396	674.5	505.8	505.8	370.9
14	BDP270	BDP270LED39-4S740DM50	3003	23.0	130.6	0.807	0.807	0.605	0.605	0.444	756.7	567.5	567.5	416.2
15	BDP270	BDP270LED40-4S740DM50	3080	23.5	131.1	0.825	0.825	0.618	0.618	0.454	773.2	579.9	579.9	425.2
16	BDP270	BDP270LED44-4S740DM50	3388	26.0	130.3	0.912	0.912	0.684	0.684	0.502	855.4	641.6	641.6	470.5

17	BDP270	BDP270LED45-4S740DM50	3465	27.0	128.3	0.947	0.947	0.711	0.711	0.521	888.3	666.2	666.2	488.6
18	BDP270	BDP270LED50-4S740DM50	3850	28.5	135.1	1.000	1.000	0.750	0.750	0.550	937.7	703.2	703.2	515.7
19	BDP270	BDP270LED55-4S740DM50	4312	31.5	136.9	1.105	1.105	0.829	0.829	0.608	1036.4	777.3	777.3	570.0
20	BDP270	BDP270LED59-4S740DM50	4620	33.5	137.9	1.175	1.175	0.882	0.882	0.646	1102.2	826.6	826.6	606.2
21	BDP270	BDP270LED64-4S740DM50	4864	37.0	131.5	1.298	1.298	0.974	0.974	0.714	1217.3	913.0	913.0	669.5
22	BDP270	BDP270LED69-4S740DM50	5320	40.0	133.0	1.404	1.404	1.053	1.053	0.772	1316.0	987.0	987.0	723.8
23	BDP270	BDP270LED74-4S740DM50	5624	43.0	130.8	1.509	1.509	1.132	1.132	0.830	1414.7	1061.0	1061.0	778.1
24	BDP270	BDP270LED79-4S740DM50	5928	44.5	133.2	1.561	1.561	1.171	1.171	0.859	1464.1	1098.0	1098.0	805.2
25	BDP270	BDP270LED84-4S740DM50	6384	47.5	134.4	1.667	1.667	1.250	1.250	0.917	1562.8	1172.1	1172.1	859.5
26	BDP270	BDP270LED90-4S740DM50	6840	51.0	134.1	1.789	1.789	1.342	1.342	0.984	1677.9	1258.4	1258.4	922.8
27	BDP270	BDP270LED94-4S740DM50	7144	54.0	132.3	1.895	1.895	1.421	1.421	1.042	1776.6	1332.5	1332.5	977.1
28	BDP270	BDP270LED109-4S740DM50	8250	63.0	131.0	2.211	2.211	1.658	1.658	1.216	2072.7	1554.5	1554.5	1140.0
29	BDP270	BDP270LED120-4S740DM50	9000	71.0	126.8	2.491	2.491	1.868	1.868	1.370	2335.9	1751.9	1751.9	1284.7
30	BDP270	BDP270LED130-4S740DM50	9750	77.0	126.6	2.702	2.702	2.026	2.026	1.486	2533.3	1900.0	1900.0	1393.3
31	BDP270	BDP270LED8-4S730DM50	624	5.9	105.8	0.207	0.207	0.155	0.155	0.114	194.1	145.6	145.6	106.8
32	BDP270	BDP270LED10-4S730DM50	780	7.1	109.9	0.249	0.249	0.187	0.187	0.137	233.6	175.2	175.2	128.5
33	BDP270	BDP270LED12-4S730DM50	936	8.2	114.1	0.288	0.288	0.216	0.216	0.158	269.8	202.3	202.3	148.4
34	BDP270	BDP270LED14-4S730DM50	1092	9.4	116.2	0.330	0.330	0.247	0.247	0.181	309.3	231.9	231.9	170.1
35	BDP270	BDP270LED16-4S730DM50	1248	10.6	117.7	0.372	0.372	0.279	0.279	0.205	348.7	261.6	261.6	191.8
36	BDP270	BDP270LED18-4S730DM50	1404	11.8	119.0	0.414	0.414	0.311	0.311	0.228	388.2	291.2	291.2	213.5
37	BDP270	BDP270LED20-4S730DM50	1540	13.2	116.7	0.463	0.463	0.347	0.347	0.255	434.3	325.7	325.7	238.9
38	BDP270	BDP270LED22-4S730DM50	1694	14.6	116.0	0.512	0.512	0.384	0.384	0.282	480.3	360.3	360.3	264.2
39	BDP270	BDP270LED24-4S730DM50	1848	16.0	115.5	0.561	0.561	0.421	0.421	0.309	526.4	394.8	394.8	289.5
40	BDP270	BDP270LED27-4S730DM50	2079	18.0	115.5	0.632	0.632	0.474	0.474	0.347	592.2	444.2	444.2	325.7
41	BDP270	BDP270LED30-4S730DM50	2310	20.5	112.7	0.719	0.719	0.539	0.539	0.396	674.5	505.8	505.8	370.9
42	BDP270	BDP270LED34-4S730DM50	2618	21.0	124.7	0.737	0.737	0.553	0.553	0.405	690.9	518.2	518.2	380.0
43	BDP270	BDP270LED35-4S730DM50	2695	22.0	122.5	0.772	0.772	0.579	0.579	0.425	723.8	542.9	542.9	398.1
44	BDP270	BDP270LED39-4S730DM50	3003	24.5	122.6	0.860	0.860	0.645	0.645	0.473	806.1	604.5	604.5	443.3

45	BDP270	BDP270LED40-4S730DM50	3080	25.0	123.2	0.877	0.877	0.658	0.658	0.482	822.5	616.9	616.9	452.4
46	BDP270	BDP270LED44-4S730DM50	3388	28.0	121.0	0.982	0.982	0.737	0.737	0.540	921.2	690.9	690.9	506.7
47	BDP270	BDP270LED45-4S730DM50	3465	28.5	121.6	1.000	1.000	0.750	0.750	0.550	937.7	703.2	703.2	515.7
48	BDP270	BDP270LED50-4S730DM50	3850	30.0	128.3	1.053	1.053	0.789	0.789	0.579	987.0	740.3	740.3	542.9
49	BDP270	BDP270LED55-4S730DM50	4312	33.5	128.7	1.175	1.175	0.882	0.882	0.646	1102.2	826.6	826.6	606.2
50	BDP270	BDP270LED59-4S730DM50	4620	36.0	128.3	1.263	1.263	0.947	0.947	0.695	1184.4	888.3	888.3	651.4
51	BDP270	BDP270LED64-4S730DM50	4864	39.0	124.7	1.368	1.368	1.026	1.026	0.753	1283.1	962.3	962.3	705.7
52	BDP270	BDP270LED69-4S730DM50	5320	42.5	125.2	1.491	1.491	1.118	1.118	0.820	1398.3	1048.7	1048.7	769.0
53	BDP270	BDP270LED74-4S730DM50	5624	46.0	122.3	1.614	1.614	1.211	1.211	0.888	1513.4	1135.1	1135.1	832.4
54	BDP270	BDP270LED79-4S730DM50	6080	47.5	128.0	1.667	1.667	1.250	1.250	0.917	1562.8	1172.1	1172.1	859.5
55	BDP270	BDP270LED84-4S730DM50	6384	51.0	125.2	1.789	1.789	1.342	1.342	0.984	1677.9	1258.4	1258.4	922.8
56	BDP270	BDP270LED90-4S730DM50	6840	55.0	124.4	1.930	1.930	1.447	1.447	1.061	1809.5	1357.1	1357.1	995.2
57	BDP270	BDP270LED94-4S730DM50	7144	57.0	125.3	2.000	2.000	1.500	1.500	1.100	1875.3	1406.5	1406.5	1031.4
58	BDP270	BDP270LED109-4S730DM50	8250	68.0	121.3	2.386	2.386	1.789	1.789	1.312	2237.2	1677.9	1677.9	1230.5
59	BDP270	BDP270LED120-4S730DM50	9000	76.0	118.4	2.667	2.667	2.000	2.000	1.467	2500.4	1875.3	1875.3	1375.2
60	BDP270	BDP270LED8-4S727DM50	624	6.5	96.0	0.228	0.228	0.171	0.171	0.125	213.9	160.4	160.4	117.6
61	BDP270	BDP270LED10-4S727DM50	780	7.9	98.7	0.277	0.277	0.208	0.208	0.152	259.9	194.9	194.9	143.0
62	BDP270	BDP270LED12-4S727DM50	936	9.1	102.9	0.319	0.319	0.239	0.239	0.176	299.4	224.5	224.5	164.7
63	BDP270	BDP270LED14-4S727DM50	1092	10.4	105.0	0.365	0.365	0.274	0.274	0.201	342.2	256.6	256.6	188.2
64	BDP270	BDP270LED16-4S727DM50	1248	11.8	105.8	0.414	0.414	0.311	0.311	0.228	388.2	291.2	291.2	213.5
65	BDP270	BDP270LED18-4S727DM50	1386	13.2	105.0	0.463	0.463	0.347	0.347	0.255	434.3	325.7	325.7	238.9
66	BDP270	BDP270LED20-4S727DM50	1540	14.8	104.1	0.519	0.519	0.389	0.389	0.286	486.9	365.2	365.2	267.8
67	BDP270	BDP270LED22-4S727DM50	1694	16.4	103.3	0.575	0.575	0.432	0.432	0.316	539.6	404.7	404.7	296.8
68	BDP270	BDP270LED24-4S727DM50	1848	18.0	102.7	0.632	0.632	0.474	0.474	0.347	592.2	444.2	444.2	325.7
69	BDP270	BDP270LED27-4S727DM50	2079	20.5	101.4	0.719	0.719	0.539	0.539	0.396	674.5	505.8	505.8	370.9
70	BDP270	BDP270LED30-4S727DM50	2310	21.0	110.0	0.737	0.737	0.553	0.553	0.405	690.9	518.2	518.2	380.0
71	BDP270	BDP270LED34-4S727DM50	2618	24.0	109.1	0.842	0.842	0.632	0.632	0.463	789.6	592.2	592.2	434.3
72	BDP270	BDP270LED35-4S727DM50	2695	24.5	110.0	0.860	0.860	0.645	0.645	0.473	806.1	604.5	604.5	443.3

73	BDP270	BDP270LED39-4S727DM50	3003	27.5	109.2	0.965	0.965	0.724	0.724	0.531	904.8	678.6	678.6	497.6
74	BDP270	BDP270LED40-4S727DM50	3080	28.5	108.1	1.000	1.000	0.750	0.750	0.550	937.7	703.2	703.2	515.7
75	BDP270	BDP270LED44-4S727DM50	3344	31.5	106.2	1.105	1.105	0.829	0.829	0.608	1036.4	777.3	777.3	570.0
76	BDP270	BDP270LED45-4S727DM50	3420	32.0	106.9	1.123	1.123	0.842	0.842	0.618	1052.8	789.6	789.6	579.0
77	BDP270	BDP270LED50-4S727DM50	3850	34.0	113.2	1.193	1.193	0.895	0.895	0.656	1118.6	839.0	839.0	615.2
78	BDP270	BDP270LED55-4S727DM50	4256	37.5	113.5	1.316	1.316	0.987	0.987	0.724	1233.8	925.3	925.3	678.6
79	BDP270	BDP270LED59-4S727DM50	4560	40.5	112.6	1.421	1.421	1.066	1.066	0.782	1332.5	999.3	999.3	732.8
80	BDP270	BDP270LED64-4S727DM50	4864	44.5	109.3	1.561	1.561	1.171	1.171	0.859	1464.1	1098.0	1098.0	805.2
81	BDP270	BDP270LED69-4S727DM50	5250	48.0	109.4	1.684	1.684	1.263	1.263	0.926	1579.2	1184.4	1184.4	868.6
82	BDP270	BDP270LED74-4S727DM50	5550	52.0	106.7	1.825	1.825	1.368	1.368	1.004	1710.8	1283.1	1283.1	940.9
83	BDP270	BDP270LED79-4S727DM50	6080	54.0	112.6	1.895	1.895	1.421	1.421	1.042	1776.6	1332.5	1332.5	977.1
84	BDP270	BDP270LED84-4S727DM50	6384	57.0	112.0	2.000	2.000	1.500	1.500	1.100	1875.3	1406.5	1406.5	1031.4
85	BDP270	BDP270LED90-4S727DM50	6750	62.0	108.9	2.175	2.175	1.632	1.632	1.196	2039.8	1529.9	1529.9	1121.9
86	BDP270	BDP270LED94-4S727DM50	7050	65.0	108.5	2.281	2.281	1.711	1.711	1.254	2138.5	1603.9	1603.9	1176.2
87	BDP270	BDP270LED109-4S727DM50	8250	77.0	107.1	2.702	2.702	2.026	2.026	1.486	2533.3	1900.0	1900.0	1393.3
88	BDP270	BDP270LED6-4S722DM50	468	5.6	83.6	0.196	0.196	0.147	0.147	0.108	184.2	138.2	138.2	101.3
89	BDP270	BDP270LED8-4S722DM50	624	7.1	87.9	0.249	0.249	0.187	0.187	0.137	233.6	175.2	175.2	128.5
90	BDP270	BDP270LED10-4S722DM50	770	8.8	87.5	0.309	0.309	0.232	0.232	0.170	289.5	217.1	217.1	159.2
91	BDP270	BDP270LED12-4S722DM50	936	10.0	93.6	0.351	0.351	0.263	0.263	0.193	329.0	246.8	246.8	181.0
92	BDP270	BDP270LED14-4S722DM50	1092	11.6	94.1	0.407	0.407	0.305	0.305	0.224	381.6	286.2	286.2	209.9
93	BDP270	BDP270LED16-4S722DM50	1232	13.2	93.3	0.463	0.463	0.347	0.347	0.255	434.3	325.7	325.7	238.9
94	BDP270	BDP270LED18-4S722DM50	1386	14.8	93.6	0.519	0.519	0.389	0.389	0.286	486.9	365.2	365.2	267.8
95	BDP270	BDP270LED20-4S722DM50	1540	16.6	92.8	0.582	0.582	0.437	0.437	0.320	546.1	409.6	409.6	300.4
96	BDP270	BDP270LED22-4S722DM50	1694	18.4	92.1	0.646	0.646	0.484	0.484	0.355	605.4	454.0	454.0	332.9
97	BDP270	BDP270LED24-4S722DM50	1848	20.5	90.1	0.719	0.719	0.539	0.539	0.396	674.5	505.8	505.8	370.9
98	BDP270	BDP270LED27-4S722DM50	2079	21.0	99.0	0.737	0.737	0.553	0.553	0.405	690.9	518.2	518.2	380.0
99	BDP270	BDP270LED30-4S722DM50	2310	23.5	98.3	0.825	0.825	0.618	0.618	0.454	773.2	579.9	579.9	425.2
100	BDP270	BDP270LED34-4S722DM50	2618	27.0	97.0	0.947	0.947	0.711	0.711	0.521	888.3	666.2	666.2	488.6

PEP ECOPASSPORT ALIGNED

This section represents the scaling method for the **B6 module**, following the PEP EcoPassport PSR for luminaries (PSR-0014-ed2.0-EN-2023 07 13). The GWP results were scaled from a reference variant of a product family, based on various light management functions, the lumen output (O_{lum}) and reference service life (RSL) of each product within the same product family.

To calculate the Scaled Impact ($S_{I_{pep}}$), we have followed the below methods:

1. Calculate the power scaling factor (PSF), which is the ratio of the power input of the variant in questions P_{in} and the power input of the base variant P_{base} .

$$PSF = \frac{P_{in}}{P_{base}}$$

2. Using this scaled GWP, we then can apply the PEP Ecopassport method for calculating the environmental impact of the functional unit for a luminary (1000 lumens over 35000 hours), applied to B6, where the Functional Unit application considers the lumen output (O_{lum}) and reference service lifetime (RSL) of the product to estimate the final environmental impact. The scaled impact ($S_{I_{pep}}$) is presented in Table A4.

$$GSF = \frac{FU_{pep}}{FU_p} = \frac{1,000}{O_{lum}} * \frac{35,000}{RSL}$$

3. Calculate the GWP scaling factor ($PGSF$), by multiplying the PSF by the GSF.

$$PGSF = PSF * GSF$$

- Calculate the Total Scaling factor by multiplying the PSF by the control scaling factor (CSF), where the CSF is determined according the relevant control factor scenario (e.g. if the luminaire has a presence detection system), as presented in Table A1.

$$TSF = PGSF * CSF$$

Table 3: Light management functions (PEP EcoPassport aligned)

Scenario	Abbrev.	CSF
No control	NC	1
Daylight dependency factor	DD	0.75
Presence sensing	PS	0.75
Daylight dependency and presence sensing	DD+PS	0.55

- Lastly, the GWP of the base variant is then scaled by the TSF.

$$Scaled\ GWP = GWP_{case} * TSF$$

Table 4: Impact per scaling factor (PEP EcoPassport aligned)

	12NC or Product Family Code	Description	Flux [lm]	Power [W]	Efficacy [lm/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
							NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
1	BDP270	BDP270LED8-4S740DM50	624	5.6	111.4	0.196	0.110	0.083	0.083	0.061	103.3	77.5	77.5	56.8
2	BDP270	BDP270LED10-4S740DM50	780	6.8	114.7	0.239	0.107	0.080	0.080	0.059	100.4	75.3	75.3	55.2
3	BDP270	BDP270LED12-4S740DM50	936	7.7	121.6	0.270	0.101	0.076	0.076	0.056	94.7	71.0	71.0	52.1
4	BDP270	BDP270LED14-4S740DM50	1092	8.9	122.7	0.312	0.100	0.075	0.075	0.055	93.8	70.4	70.4	51.6
5	BDP270	BDP270LED16-4S740DM50	1248	10.0	124.8	0.351	0.098	0.074	0.074	0.054	92.3	69.2	69.2	50.7
6	BDP270	BDP270LED18-4S740DM50	1404	11.2	125.4	0.393	0.098	0.073	0.073	0.054	91.9	68.9	68.9	50.5
7	BDP270	BDP270LED20-4S740DM50	1560	12.4	125.8	0.435	0.098	0.073	0.073	0.054	91.5	68.6	68.6	50.3
8	BDP270	BDP270LED22-4S740DM50	1694	13.6	124.6	0.477	0.099	0.074	0.074	0.054	92.4	69.3	69.3	50.8
9	BDP270	BDP270LED24-4S740DM50	1848	15.0	123.2	0.526	0.100	0.075	0.075	0.055	93.5	70.1	70.1	51.4
10	BDP270	BDP270LED27-4S740DM50	2079	17.0	122.3	0.596	0.100	0.075	0.075	0.055	94.2	70.6	70.6	51.8
11	BDP270	BDP270LED30-4S740DM50	2310	19.0	121.6	0.667	0.101	0.076	0.076	0.056	94.7	71.0	71.0	52.1
12	BDP270	BDP270LED34-4S740DM50	2618	20.0	130.9	0.702	0.094	0.070	0.070	0.052	88.0	66.0	66.0	48.4
13	BDP270	BDP270LED35-4S740DM50	2695	20.5	131.5	0.719	0.093	0.070	0.070	0.051	87.6	65.7	65.7	48.2
14	BDP270	BDP270LED39-4S740DM50	3003	23.0	130.6	0.807	0.094	0.071	0.071	0.052	88.2	66.1	66.1	48.5
15	BDP270	BDP270LED40-4S740DM50	3080	23.5	131.1	0.825	0.094	0.070	0.070	0.052	87.9	65.9	65.9	48.3
16	BDP270	BDP270LED44-4S740DM50	3388	26.0	130.3	0.912	0.094	0.071	0.071	0.052	88.4	66.3	66.3	48.6
17	BDP270	BDP270LED45-4S740DM50	3465	27.0	128.3	0.947	0.096	0.072	0.072	0.053	89.7	67.3	67.3	49.4
18	BDP270	BDP270LED50-4S740DM50	3850	28.5	135.1	1.000	0.091	0.068	0.068	0.050	85.2	63.9	63.9	46.9
19	BDP270	BDP270LED55-4S740DM50	4312	31.5	136.9	1.105	0.090	0.067	0.067	0.049	84.1	63.1	63.1	46.3
20	BDP270	BDP270LED59-4S740DM50	4620	33.5	137.9	1.175	0.089	0.067	0.067	0.049	83.5	62.6	62.6	45.9
21	BDP270	BDP270LED64-4S740DM50	4864	37.0	131.5	1.298	0.093	0.070	0.070	0.051	87.6	65.7	65.7	48.2
22	BDP270	BDP270LED69-4S740DM50	5320	40.0	133.0	1.404	0.092	0.069	0.069	0.051	86.6	64.9	64.9	47.6
23	BDP270	BDP270LED74-4S740DM50	5624	43.0	130.8	1.509	0.094	0.070	0.070	0.052	88.0	66.0	66.0	48.4
24	BDP270	BDP270LED79-4S740DM50	5928	44.5	133.2	1.561	0.092	0.069	0.069	0.051	86.4	64.8	64.8	47.5

25	BDP270	BDP270LED84-4S740DM50	6384	47.5	134.4	1.667	0.091	0.069	0.069	0.050	85.7	64.3	64.3	47.1
26	BDP270	BDP270LED90-4S740DM50	6840	51.0	134.1	1.789	0.092	0.069	0.069	0.050	85.9	64.4	64.4	47.2
27	BDP270	BDP270LED94-4S740DM50	7144	54.0	132.3	1.895	0.093	0.070	0.070	0.051	87.0	65.3	65.3	47.9
28	BDP270	BDP270LED109-4S740DM50	8250	63.0	131.0	2.211	0.094	0.070	0.070	0.052	87.9	65.9	65.9	48.4
29	BDP270	BDP270LED120-4S740DM50	9000	71.0	126.8	2.491	0.097	0.073	0.073	0.053	90.8	68.1	68.1	50.0
30	BDP270	BDP270LED130-4S740DM50	9750	77.0	126.6	2.702	0.097	0.073	0.073	0.053	90.9	68.2	68.2	50.0
31	BDP270	BDP270LED8-4S730DM50	624	5.9	105.8	0.207	0.116	0.087	0.087	0.064	108.9	81.7	81.7	59.9
32	BDP270	BDP270LED10-4S730DM50	780	7.1	109.9	0.249	0.112	0.084	0.084	0.061	104.8	78.6	78.6	57.6
33	BDP270	BDP270LED12-4S730DM50	936	8.2	114.1	0.288	0.108	0.081	0.081	0.059	100.9	75.7	75.7	55.5
34	BDP270	BDP270LED14-4S730DM50	1092	9.4	116.2	0.330	0.106	0.079	0.079	0.058	99.1	74.3	74.3	54.5
35	BDP270	BDP270LED16-4S730DM50	1248	10.6	117.7	0.372	0.104	0.078	0.078	0.057	97.8	73.4	73.4	53.8
36	BDP270	BDP270LED18-4S730DM50	1404	11.8	119.0	0.414	0.103	0.077	0.077	0.057	96.8	72.6	72.6	53.2
37	BDP270	BDP270LED20-4S730DM50	1540	13.2	116.7	0.463	0.105	0.079	0.079	0.058	98.7	74.0	74.0	54.3
38	BDP270	BDP270LED22-4S730DM50	1694	14.6	116.0	0.512	0.106	0.079	0.079	0.058	99.2	74.4	74.4	54.6
39	BDP270	BDP270LED24-4S730DM50	1848	16.0	115.5	0.561	0.106	0.080	0.080	0.058	99.7	74.8	74.8	54.8
40	BDP270	BDP270LED27-4S730DM50	2079	18.0	115.5	0.632	0.106	0.080	0.080	0.058	99.7	74.8	74.8	54.8
41	BDP270	BDP270LED30-4S730DM50	2310	20.5	112.7	0.719	0.109	0.082	0.082	0.060	102.2	76.6	76.6	56.2
42	BDP270	BDP270LED34-4S730DM50	2618	21.0	124.7	0.737	0.099	0.074	0.074	0.054	92.4	69.3	69.3	50.8
43	BDP270	BDP270LED35-4S730DM50	2695	22.0	122.5	0.772	0.100	0.075	0.075	0.055	94.0	70.5	70.5	51.7
44	BDP270	BDP270LED39-4S730DM50	3003	24.5	122.6	0.860	0.100	0.075	0.075	0.055	93.9	70.5	70.5	51.7
45	BDP270	BDP270LED40-4S730DM50	3080	25.0	123.2	0.877	0.100	0.075	0.075	0.055	93.5	70.1	70.1	51.4
46	BDP270	BDP270LED44-4S730DM50	3388	28.0	121.0	0.982	0.101	0.076	0.076	0.056	95.2	71.4	71.4	52.3
47	BDP270	BDP270LED45-4S730DM50	3465	28.5	121.6	1.000	0.101	0.076	0.076	0.056	94.7	71.0	71.0	52.1
48	BDP270	BDP270LED50-4S730DM50	3850	30.0	128.3	1.053	0.096	0.072	0.072	0.053	89.7	67.3	67.3	49.4
49	BDP270	BDP270LED55-4S730DM50	4312	33.5	128.7	1.175	0.095	0.072	0.072	0.052	89.5	67.1	67.1	49.2
50	BDP270	BDP270LED59-4S730DM50	4620	36.0	128.3	1.263	0.096	0.072	0.072	0.053	89.7	67.3	67.3	49.4
51	BDP270	BDP270LED64-4S730DM50	4864	39.0	124.7	1.368	0.098	0.074	0.074	0.054	92.3	69.2	69.2	50.8
52	BDP270	BDP270LED69-4S730DM50	5320	42.5	125.2	1.491	0.098	0.074	0.074	0.054	92.0	69.0	69.0	50.6

53	BDP270	BDP270LED74-4S730DM50	5624	46.0	122.3	1.614	0.100	0.075	0.075	0.055	94.2	70.6	70.6	51.8
54	BDP270	BDP270LED79-4S730DM50	6080	47.5	128.0	1.667	0.096	0.072	0.072	0.053	90.0	67.5	67.5	49.5
55	BDP270	BDP270LED84-4S730DM50	6384	51.0	125.2	1.789	0.098	0.074	0.074	0.054	92.0	69.0	69.0	50.6
56	BDP270	BDP270LED90-4S730DM50	6840	55.0	124.4	1.930	0.099	0.074	0.074	0.054	92.6	69.4	69.4	50.9
57	BDP270	BDP270LED94-4S730DM50	7144	57.0	125.3	2.000	0.098	0.073	0.073	0.054	91.9	68.9	68.9	50.5
58	BDP270	BDP270LED109-4S730DM50	8250	68.0	121.3	2.386	0.101	0.076	0.076	0.056	94.9	71.2	71.2	52.2
59	BDP270	BDP270LED120-4S730DM50	9000	76.0	118.4	2.667	0.104	0.078	0.078	0.057	97.2	72.9	72.9	53.5
60	BDP270	BDP270LED8-4S727DM50	624	6.5	96.0	0.228	0.128	0.096	0.096	0.070	119.9	90.0	90.0	66.0
61	BDP270	BDP270LED10-4S727DM50	780	7.9	98.7	0.277	0.124	0.093	0.093	0.068	116.6	87.5	87.5	64.1
62	BDP270	BDP270LED12-4S727DM50	936	9.1	102.9	0.319	0.119	0.090	0.090	0.066	112.0	84.0	84.0	61.6
63	BDP270	BDP270LED14-4S727DM50	1092	10.4	105.0	0.365	0.117	0.088	0.088	0.064	109.7	82.3	82.3	60.3
64	BDP270	BDP270LED16-4S727DM50	1248	11.8	105.8	0.414	0.116	0.087	0.087	0.064	108.9	81.7	81.7	59.9
65	BDP270	BDP270LED18-4S727DM50	1386	13.2	105.0	0.463	0.117	0.088	0.088	0.064	109.7	82.3	82.3	60.3
66	BDP270	BDP270LED20-4S727DM50	1540	14.8	104.1	0.519	0.118	0.089	0.089	0.065	110.7	83.0	83.0	60.9
67	BDP270	BDP270LED22-4S727DM50	1694	16.4	103.3	0.575	0.119	0.089	0.089	0.065	111.5	83.6	83.6	61.3
68	BDP270	BDP270LED24-4S727DM50	1848	18.0	102.7	0.632	0.120	0.090	0.090	0.066	112.2	84.1	84.1	61.7
69	BDP270	BDP270LED27-4S727DM50	2079	20.5	101.4	0.719	0.121	0.091	0.091	0.067	113.5	85.2	85.2	62.4
70	BDP270	BDP270LED30-4S727DM50	2310	21.0	110.0	0.737	0.112	0.084	0.084	0.061	104.7	78.5	78.5	57.6
71	BDP270	BDP270LED34-4S727DM50	2618	24.0	109.1	0.842	0.113	0.084	0.084	0.062	105.6	79.2	79.2	58.1
72	BDP270	BDP270LED35-4S727DM50	2695	24.5	110.0	0.860	0.112	0.084	0.084	0.061	104.7	78.5	78.5	57.6
73	BDP270	BDP270LED39-4S727DM50	3003	27.5	109.2	0.965	0.112	0.084	0.084	0.062	105.4	79.1	79.1	58.0
74	BDP270	BDP270LED40-4S727DM50	3080	28.5	108.1	1.000	0.114	0.085	0.085	0.063	106.6	79.9	79.9	58.6
75	BDP270	BDP270LED44-4S727DM50	3344	31.5	106.2	1.105	0.116	0.087	0.087	0.064	108.5	81.4	81.4	59.7
76	BDP270	BDP270LED45-4S727DM50	3420	32.0	106.9	1.123	0.115	0.086	0.086	0.063	107.7	80.8	80.8	59.3
77	BDP270	BDP270LED50-4S727DM50	3850	34.0	113.2	1.193	0.108	0.081	0.081	0.060	101.7	76.3	76.3	55.9
78	BDP270	BDP270LED55-4S727DM50	4256	37.5	113.5	1.316	0.108	0.081	0.081	0.060	101.5	76.1	76.1	55.8
79	BDP270	BDP270LED59-4S727DM50	4560	40.5	112.6	1.421	0.109	0.082	0.082	0.060	102.3	76.7	76.7	56.2
80	BDP270	BDP270LED64-4S727DM50	4864	44.5	109.3	1.561	0.112	0.084	0.084	0.062	105.3	79.0	79.0	57.9

81	BDP270	BDP270LED69-4S727DM50	5250	48.0	109.4	1.684	0.112	0.084	0.084	0.062	105.3	79.0	79.0	57.9
82	BDP270	BDP270LED74-4S727DM50	5550	52.0	106.7	1.825	0.115	0.086	0.086	0.063	107.9	80.9	80.9	59.3
83	BDP270	BDP270LED79-4S727DM50	6080	54.0	112.6	1.895	0.109	0.082	0.082	0.060	102.3	76.7	76.7	56.2
84	BDP270	BDP270LED84-4S727DM50	6384	57.0	112.0	2.000	0.110	0.082	0.082	0.060	102.8	77.1	77.1	56.5
85	BDP270	BDP270LED90-4S727DM50	6750	62.0	108.9	2.175	0.113	0.085	0.085	0.062	105.8	79.3	79.3	58.2
86	BDP270	BDP270LED94-4S727DM50	7050	65.0	108.5	2.281	0.113	0.085	0.085	0.062	106.2	79.6	79.6	58.4
87	BDP270	BDP270LED109-4S727DM50	8250	77.0	107.1	2.702	0.115	0.086	0.086	0.063	107.5	80.6	80.6	59.1
88	BDP270	BDP270LED6-4S722DM50	468	5.6	83.6	0.196	0.147	0.110	0.110	0.081	137.8	103.3	103.3	75.8
89	BDP270	BDP270LED8-4S722DM50	624	7.1	87.9	0.249	0.140	0.105	0.105	0.077	131.0	98.3	98.3	72.1
90	BDP270	BDP270LED10-4S722DM50	770	8.8	87.5	0.309	0.140	0.105	0.105	0.077	131.6	98.7	98.7	72.4
91	BDP270	BDP270LED12-4S722DM50	936	10.0	93.6	0.351	0.131	0.098	0.098	0.072	123.0	92.3	92.3	67.7
92	BDP270	BDP270LED14-4S722DM50	1092	11.6	94.1	0.407	0.130	0.098	0.098	0.072	122.3	91.7	91.7	67.3
93	BDP270	BDP270LED16-4S722DM50	1232	13.2	93.3	0.463	0.132	0.099	0.099	0.072	123.4	92.5	92.5	67.9
94	BDP270	BDP270LED18-4S722DM50	1386	14.8	93.6	0.519	0.131	0.098	0.098	0.072	123.0	92.2	92.2	67.6
95	BDP270	BDP270LED20-4S722DM50	1540	16.6	92.8	0.582	0.132	0.099	0.099	0.073	124.1	93.1	93.1	68.3
96	BDP270	BDP270LED22-4S722DM50	1694	18.4	92.1	0.646	0.133	0.100	0.100	0.073	125.1	93.8	93.8	68.8
97	BDP270	BDP270LED24-4S722DM50	1848	20.5	90.1	0.719	0.136	0.102	0.102	0.075	127.7	95.8	95.8	70.3
98	BDP270	BDP270LED27-4S722DM50	2079	21.0	99.0	0.737	0.124	0.093	0.093	0.068	116.3	87.2	87.2	64.0
99	BDP270	BDP270LED30-4S722DM50	2310	23.5	98.3	0.825	0.125	0.094	0.094	0.069	117.1	87.9	87.9	64.4
100	BDP270	BDP270LED34-4S722DM50	2618	27.0	97.0	0.947	0.127	0.095	0.095	0.070	118.8	89.1	89.1	65.3