ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Copenhagen LED gen2 mega BRS/BDS/BSS563

Signify N.V.

EPD HUB, HUB-5590

Published on 03.03.2026, last updated on 03.03.2026, valid until 03.03.2031

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	COPENHAGEN, DENMARK
Place(s) of raw material origin	APAC, EU
Place(s) of installation and use	DENMARK
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: ☐ Internal verification ☑ External verification
EPD verifier	Imane Uald Lamkaddam as an authorized verifier for EPD Hub

PRODUCT SPECIFICATION

Product name	Copenhagen LED gen2 mega BRS/BDS/BSS563
Product number / reference	919008636331 / BRS563 LED220/830IIDX10 CLO_x0002_SRTB C10K60S
GTIN (Global Trade Item Number)	Not applicable
NOBB (Norwegian Building Product Database)	Not applicable
A1-A3 Specific data (%)	9.37

PRODUCT DESCRIPTION

The original Copenhagen luminaire was co-designed with Copenhagen's Office of City Architecture in the 1960s. This timeless luminaire design comes in three types: Copenhagen LED gen2, which delivers high performance for road lighting applications; Copenhagen City LED gen2, which is for city and residential areas where balanced light comfort and cohesive design language are appreciated; Copenhagen City Comfort LED, which caters to the needs of sensitive inner-city areas with high demand for spill light control and high comfort. The second generation of Copenhagen LED is available in a range of sizes, from mini to mega. This makes it suitable for any type of application while ensuring the dimensions of the luminaire and pole are well balanced, so every installation blends harmoniously into its surroundings. Various suspensions are available, allowing a variety of mounting options to provide maximum freedom during installation. Thanks to the built in LEDGINE-O engine, and the wide range of application-tailored optics, Copenhagen LED luminaires deliver the right amount of light and in the right direction on your street, enabling important energy savings. In order to reduce the carbon footprint of the luminaires, the iconic canopy is made of bio-based plastic and main metal parts manufactured from recycled aluminium. The luminaire is available with one or two Zhaga-D4i (ZD4i) system ready sockets, which makes the luminaire future ready, ready to pair with advanced control and lighting software applications such as Interact. Due to the plastic material usage,

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.

the top socket can be integrated into the canopy without impacting the clean design of the luminaire.

PRODUCT CLASSIFICATION

Declared operating voltage, Volt	220-240
Light source colour temperature, Kelvin	3000
Protection index for water and dust (IP)	66
Impact resistance index (IK)	8
Luminous flux, Lumens	17010
Electrical power, Watt	162
Luminous efficiency, Lm/W	105
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	39.24	APAC , EU
Minerals	19.48	APAC , EU
Fossil materials	12.44	APAC , EU
Bio-based materials	28.84	EU

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	3.686
Biogenic carbon content in packaging, kg C	0.804

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 unit
Declared unit mass, kg	13.73
Mass of packaging, kg	2.028
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_2e)	97.8
GWP-fossil, A1-A3 (kg CO_2e)	117
Secondary material, inputs (%)	15.7
Secondary material, outputs (%)	36.8
Total energy use, A1-A3 (kWh)	389
Net freshwater use, A1-A3 (m^3)	8.90E-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, %	-

SUBSTANCES, REACH - VERY HIGH CONCERN

Substances of very high concern	EC	CAS
Lead	231-100-4	7439-92-1

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 renewable 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)

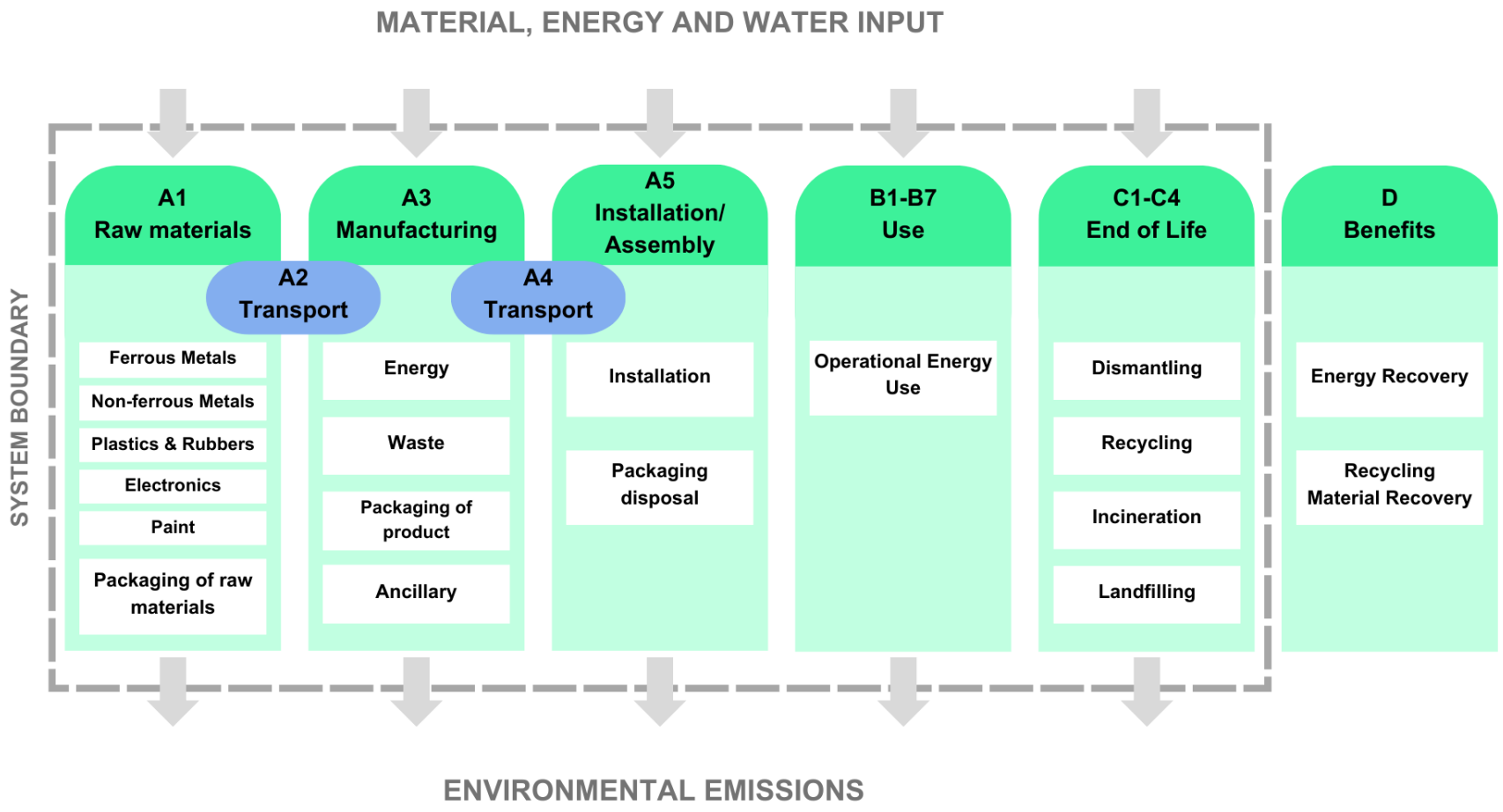
During the use phase, the product consumes electricity (B6), which is calculated multiplying the Wattage x Assigned lifetime (hours) x Country energy mix factor. To know which Country energy mix was used in this EPD, please refer to Annex 2.

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_2e	9.49E+01	4.98E-01	2.48E+00	9.78E+01	1.27E-01	3.06E+00	ND	ND	ND	ND	ND	2.53E+03	ND	0.00E+00	4.02E-01	6.58E+00	3.44E+00	-3.19E+01
GWP – fossil	kg CO_2e	1.11E+02	4.97E-01	4.62E+00	1.17E+02	1.27E-01	1.27E-01	ND	ND	ND	ND	ND	2.51E+03	ND	0.00E+00	4.02E-01	6.58E+00	3.44E+00	-3.18E+01
GWP – biogenic	kg CO_2e	-1.94E+01	8.97E-05	-2.21E+00	-2.16E+01	2.88E-05	2.94E+00	ND	ND	ND	ND	ND	1.08E+01	ND	0.00E+00	8.78E-05	-2.70E-04	-4.14E-04	-1.88E-02
GWP – LULUC	kg CO_2e	2.79E+00	2.53E-04	6.72E-02	2.86E+00	5.69E-05	4.69E-05	ND	ND	ND	ND	ND	1.08E+01	ND	0.00E+00	1.78E-04	3.29E-04	1.28E-04	-2.25E-02
Ozone depletion pot.	kg CFC_{-11}e	1.55E-06	7.21E-09	1.94E-07	1.75E-06	1.88E-09	1.75E-09	ND	ND	ND	ND	ND	5.37E-05	ND	0.00E+00	5.62E-09	4.06E-09	2.83E-09	-1.41E-07
Acidification potential	mol H^+e	1.09E+00	1.02E-02	1.84E-02	1.12E+00	4.34E-04	7.55E-04	ND	ND	ND	ND	ND	1.51E+01	ND	0.00E+00	1.34E-03	2.94E-03	1.25E-03	-3.66E-01
EP-freshwater[2)]	kg Pe	4.96E-02	2.36E-05	1.56E-03	5.12E-02	9.90E-06	1.28E-05	ND	ND	ND	ND	ND	1.84E+00	ND	0.00E+00	3.13E-05	1.09E-04	2.14E-05	-2.07E-02
EP-marine	kg Ne	2.69E-01	2.57E-03	7.85E-03	2.80E-01	1.43E-04	3.53E-04	ND	ND	ND	ND	ND	2.71E+00	ND	0.00E+00	4.34E-04	1.15E-03	4.70E-03	-4.03E-02
EP-terrestrial	mol Ne	2.25E+00	2.85E-02	5.12E-02	2.33E+00	1.55E-03	3.21E-03	ND	ND	ND	ND	ND	3.26E+01	ND	0.00E+00	4.73E-03	1.06E-02	5.66E-03	-4.30E-01
POCP ("smog")[3)]	kg NMVOCe	5.11E-01	8.03E-03	1.71E-02	5.36E-01	6.39E-04	9.15E-04	ND	ND	ND	ND	ND	8.15E+00	ND	0.00E+00	1.87E-03	2.83E-03	1.62E-03	-1.29E-01
ADP-minerals & metals[4)]	kg Sbe	5.24E-03	7.96E-07	2.95E-05	5.27E-03	3.55E-07	3.78E-07	ND	ND	ND	ND	ND	7.90E-02	ND	0.00E+00	1.32E-06	6.81E-06	4.32E-07	-1.71E-03
ADP-fossil resources	MJ	1.24E+03	6.48E+00	6.53E+01	1.31E+03	1.85E+00	1.31E+00	ND	ND	ND	ND	ND	4.03E+04	ND	0.00E+00	5.64E+00	3.46E+00	2.08E+00	-3.43E+02
Water use[5)]	m^3e depr.	3.79E+01	2.34E-02	2.03E+00	4.00E+01	9.12E-03	1.52E-01	ND	ND	ND	ND	ND	4.53E+03	ND	0.00E+00	2.62E-02	4.58E-01	2.25E-01	-4.24E+00

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	9.69E-06	2.68E-08	3.22E-07	1.00E-05	1.27E-08	9.41E-09	ND	ND	ND	ND	ND	9.90E-05	ND	0.00E+00	3.19E-08	2.66E-08	1.53E-08	-1.90E-06
Ionizing radiation[6)]	kBq U235e	5.08E+00	3.96E-03	1.92E-01	5.27E+00	1.61E-03	1.59E-03	ND	ND	ND	ND	ND	8.96E+02	ND	0.00E+00	4.57E-03	1.58E-02	2.89E-03	-2.39E+00
Ecotoxicity (freshwater)	CTUe	1.57E+03	6.46E-01	2.03E+01	1.59E+03	2.61E-01	3.64E+00	ND	ND	ND	ND	ND	1.41E+04	ND	0.00E+00	8.92E-01	1.36E+01	1.22E+02	-1.51E+02
Human toxicity, cancer	CTUh	8.13E-08	9.74E-11	2.03E-09	8.34E-08	2.10E-11	1.75E-10	ND	ND	ND	ND	ND	1.57E-06	ND	0.00E+00	6.84E-11	6.51E-10	3.65E-10	-2.16E-08
Human tox. non-cancer	CTUh	2.30E-06	2.58E-09	5.86E-08	2.36E-06	1.20E-09	7.15E-09	ND	ND	ND	ND	ND	8.36E-05	ND	0.00E+00	3.53E-09	2.64E-08	1.85E-08	-1.61E-06
SQP[7)]	-	1.40E+03	2.82E+00	2.33E+02	1.64E+03	1.86E+00	6.43E-01	ND	ND	ND	ND	ND	7.03E+04	ND	0.00E+00	3.37E+00	2.98E+00	2.75E+00	-1.00E+02

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	1.01E+02	6.46E-02	1.93E+01	1.20E+02	2.53E-02	-3.60E+01	ND	ND	ND	ND	ND	6.23E+04	ND	0.00E+00	7.73E-02	3.63E-01	5.40E-02	-2.33E+01
Renew. PER as material	MJ	7.03E+00	0.00E+00	1.91E+01	2.61E+01	0.00E+00	-2.60E+01	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-3.13E-02	-5.81E-02	0.00E+00
Total use of renew. PER	MJ	1.08E+02	6.46E-02	3.84E+01	1.46E+02	2.53E-02	-6.20E+01	ND	ND	ND	ND	ND	6.23E+04	ND	0.00E+00	7.73E-02	3.31E-01	-4.12E-03	-2.33E+01
Non-re. PER as energy	MJ	1.21E+03	6.48E+00	6.47E+01	1.28E+03	1.85E+00	1.31E+00	ND	ND	ND	ND	ND	4.03E+04	ND	0.00E+00	5.64E+00	-9.44E+01	-1.19E+02	-3.43E+02
Non-re. PER as material	MJ	5.56E+01	0.00E+00	-8.07E-01	5.48E+01	0.00E+00	-2.42E-01	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-2.72E+01	-2.74E+01	0.00E+00
Total use of non-re. PER	MJ	1.27E+03	6.48E+00	6.39E+01	1.34E+03	1.85E+00	1.07E+00	ND	ND	ND	ND	ND	4.03E+04	ND	0.00E+00	5.64E+00	-1.22E+02	-1.46E+02	-3.43E+02
Secondary materials	kg	2.16E+00	0.00E+00	0.00E+00	2.16E+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	9.83E-02	1.76E-05	2.10E-01	3.08E-01	9.98E-06	1.64E-05	ND	ND	ND	ND	ND	1.55E-01	ND	0.00E+00	3.23E-05	1.37E-04	3.69E-05	-2.17E-03
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	8.43E-01	6.39E-04	4.62E-02	8.90E-01	2.73E-04	2.47E-03	ND	ND	ND	ND	ND	1.48E+02	ND	0.00E+00	7.47E-04	7.58E-03	-7.33E-03	-1.70E-01

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	1.77E+01	9.50E-03	2.55E-01	1.80E+01	3.13E-03	4.00E-02	ND	ND	ND	ND	ND	2.46E+02	ND	0.00E+00	9.83E-03	1.26E-01	1.69E-01	-5.61E+00
Non-hazardous waste	kg	3.03E+02	1.49E-01	1.91E+01	3.22E+02	5.79E-02	2.17E+00	ND	ND	ND	ND	ND	8.99E+03	ND	0.00E+00	1.84E-01	4.28E+00	1.97E+01	-8.79E+01
Radioactive waste	kg	1.26E-03	9.68E-07	4.58E-05	1.31E-03	3.94E-07	3.99E-07	ND	ND	ND	ND	ND	2.04E-01	ND	0.00E+00	1.12E-06	3.89E-06	7.19E-07	-5.81E-04

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	1.17E-01	1.17E-01	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	5.05E+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	3.07E+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	1.29E+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	1.78E+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_2e	1.11E+02	4.95E-01	4.89E+00	1.16E+02	1.27E-01	1.26E-01	ND	ND	ND	ND	ND	2.51E+03	ND	0.00E+00	4.00E-01	6.58E+00	3.43E+00	-3.17E+01
Ozone depletion Pot.	kg CFC_{-11}e	9.52E-07	5.73E-09	1.80E-07	1.14E-06	1.50E-09	1.48E-09	ND	ND	ND	ND	ND	4.92E-05	ND	0.00E+00	4.49E-09	3.51E-09	2.37E-09	-1.26E-07
Acidification	kg SO_2e	7.14E-01	8.09E-03	1.31E-02	7.35E-01	3.31E-04	5.55E-04	ND	ND	ND	ND	ND	1.21E+01	ND	0.00E+00	1.03E-03	2.24E-03	8.98E-04	-3.16E-01
Eutrophication	kg PO_4^3e	1.72E-01	9.48E-04	8.15E-03	1.81E-01	8.07E-05	1.72E-04	ND	ND	ND	ND	ND	2.18E+00	ND	0.00E+00	2.50E-04	5.44E-04	5.13E-04	-2.00E-02
POCP (“smog”)	kg C_2H_4e	5.16E-02	4.19E-04	1.54E-03	5.36E-02	2.95E-05	4.23E-05	ND	ND	ND	ND	ND	7.80E-01	ND	0.00E+00	9.19E-05	1.39E-04	9.34E-05	-1.71E-02
ADP-elements	kg Sbe	5.22E-03	7.81E-07	2.91E-05	5.25E-03	3.46E-07	3.16E-07	ND	ND	ND	ND	ND	7.88E-02	ND	0.00E+00	1.29E-06	6.65E-06	3.54E-07	-1.70E-03
ADP-fossil	MJ	1.15E+03	6.42E+00	6.21E+01	1.22E+03	1.82E+00	1.29E+00	ND	ND	ND	ND	ND	2.74E+04	ND	0.00E+00	5.57E+00	3.21E+00	2.03E+00	-3.04E+02

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 CO2e	1.14E+02	4.98E-01	4.69E+00	1.19E+02	1.27E-01	1.27E-01	ND	ND	ND	ND	ND	2.52E+03	ND	0.00E+00	4.02E-01	6.58E+00	3.44E+00	-3.19E+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.

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	1.95E+00	1.02E-02	5.10E-02	2.01E+00	2.62E-03	6.31E-02	ND	ND	ND	ND	ND	5.21E+01	ND	0.00E+00	8.28E-03	1.35E-01	7.08E-02	-6.56E-01
GWP – fossil	kg CO_2 éq/FU	2.29E+00	1.02E-02	9.51E-02	2.40E+00	2.62E-03	2.61E-03	ND	ND	ND	ND	ND	5.16E+01	ND	0.00E+00	8.27E-03	1.35E-01	7.08E-02	-6.55E-01
GWP – biogenic	kg CO_2 éq/FU	-3.99E-01	1.85E-06	-4.55E-02	-4.45E-01	5.93E-07	6.04E-02	ND	ND	ND	ND	ND	2.21E-01	ND	0.00E+00	1.81E-06	-5.56E-06	-8.52E-06	-3.86E-04
GWP – LULUC	kg CO_2 éq/FU	5.74E-02	5.21E-06	1.38E-03	5.88E-02	1.17E-06	9.64E-07	ND	ND	ND	ND	ND	2.21E-01	ND	0.00E+00	3.66E-06	6.77E-06	2.63E-06	-4.62E-04
Ozone depletion pot.	kg CFC_{-11}e/FU	3.19E-08	1.48E-10	3.99E-09	3.60E-08	3.86E-11	3.59E-11	ND	ND	ND	ND	ND	1.11E-06	ND	0.00E+00	1.16E-10	8.35E-11	5.82E-11	-2.90E-09
Acidification potential	mole H^+e/FU	2.24E-02	2.09E-04	3.79E-04	2.30E-02	8.92E-06	1.55E-05	ND	ND	ND	ND	ND	3.10E-01	ND	0.00E+00	2.76E-05	6.06E-05	2.56E-05	-7.53E-03
EP-freshwater[2)]	kg Pe/FU	1.02E-03	4.85E-07	3.22E-05	1.05E-03	2.04E-07	2.63E-07	ND	ND	ND	ND	ND	3.79E-02	ND	0.00E+00	6.43E-07	2.24E-06	4.40E-07	-4.26E-04
EP-marine	kg Ne/FU	5.54E-03	5.30E-05	1.61E-04	5.75E-03	2.93E-06	7.25E-06	ND	ND	ND	ND	ND	5.58E-02	ND	0.00E+00	8.94E-06	2.37E-05	9.68E-05	-8.30E-04
EP-terrestrial	mol Ne/FU	4.63E-02	5.87E-04	1.05E-03	4.80E-02	3.19E-05	6.61E-05	ND	ND	ND	ND	ND	6.71E-01	ND	0.00E+00	9.72E-05	2.19E-04	1.16E-04	-8.84E-03
POCP ("smog")[3)]	kg NMVOCe/	1.05E-02	1.65E-04	3.52E-04	1.10E-02	1.32E-05	1.88E-05	ND	ND	ND	ND	ND	1.68E-01	ND	0.00E+00	3.84E-05	5.82E-05	3.34E-05	-2.65E-03
ADP-minerals & metals[4)]	kg Sbe/FU	1.08E-04	1.64E-08	6.07E-07	1.08E-04	7.30E-09	7.78E-09	ND	ND	ND	ND	ND	1.63E-03	ND	0.00E+00	2.72E-08	1.40E-07	8.89E-09	-3.51E-05
ADP-fossil resources	MJ/FU	2.54E+01	1.33E-01	1.34E+00	2.69E+01	3.80E-02	2.70E-02	ND	ND	ND	ND	ND	8.30E+02	ND	0.00E+00	1.16E-01	7.11E-02	4.28E-02	-7.05E+00
Water use[5)]	m^3e priv. /FU	7.81E-01	4.82E-04	4.18E-02	8.23E-01	1.88E-04	3.13E-03	ND	ND	ND	ND	ND	9.32E+01	ND	0.00E+00	5.38E-04	9.43E-03	4.63E-03	-8.72E-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	1.99E-07	5.52E-10	6.62E-09	2.07E-07	2.62E-10	1.94E-10	ND	ND	ND	ND	ND	2.04E-06	ND	0.00E+00	6.57E-10	5.48E-10	3.14E-10	-3.91E-08
Ionizing radiation[6)]	kBq U235e/FU	1.05E-01	8.15E-05	3.94E-03	1.09E-01	3.31E-05	3.28E-05	ND	ND	ND	ND	ND	1.84E+01	ND	0.00E+00	9.39E-05	3.25E-04	5.95E-05	-4.92E-02
Ecotoxicity (freshwater)	CTUe/FU	3.22E+01	1.33E-02	4.18E-01	3.26E+01	5.37E-03	7.48E-02	ND	ND	ND	ND	ND	2.90E+02	ND	0.00E+00	1.84E-02	2.79E-01	2.51E+00	-3.11E+00
Human toxicity, cancer	CTUh/FU	1.67E-09	2.00E-12	4.18E-11	1.72E-09	4.32E-13	3.61E-12	ND	ND	ND	ND	ND	3.24E-08	ND	0.00E+00	1.41E-12	1.34E-11	7.51E-12	-4.44E-10
Human tox. non-cancer	CTUh/FU	4.73E-08	5.32E-11	1.20E-09	4.86E-08	2.46E-11	1.47E-10	ND	ND	ND	ND	ND	1.72E-06	ND	0.00E+00	7.27E-11	5.42E-10	3.80E-10	-3.31E-08
SQP[7)]	-/FU	2.88E+01	5.80E-02	4.79E+00	3.37E+01	3.83E-02	1.32E-02	ND	ND	ND	ND	ND	1.45E+03	ND	0.00E+00	6.93E-02	6.13E-02	5.67E-02	-2.06E+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	2.07E+00	1.33E-03	3.98E-01	2.47E+00	5.21E-04	-7.41E-01	ND	ND	ND	ND	ND	1.28E+03	ND	0.00E+00	1.59E-03	7.46E-03	1.11E-03	-4.80E-01
Renew. PER as material	MJ/FU	1.45E-01	0.00E+00	3.92E-01	5.37E-01	0.00E+00	-5.35E-01	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-6.44E-04	-1.20E-03	0.00E+00
Total use of renew. PER	MJ/FU	2.21E+00	1.33E-03	7.90E-01	3.00E+00	5.21E-04	-1.28E+00	ND	ND	ND	ND	ND	1.28E+03	ND	0.00E+00	1.59E-03	6.82E-03	-8.48E-05	-4.80E-01
Non-re. PER as energy	MJ/FU	2.49E+01	1.33E-01	1.33E+00	2.64E+01	3.80E-02	2.70E-02	ND	ND	ND	ND	ND	8.30E+02	ND	0.00E+00	1.16E-01	-1.94E+00	-2.44E+00	-7.05E+00
Non-re. PER as material	MJ/FU	1.14E+00	0.00E+00	-1.66E-02	1.13E+00	0.00E+00	-4.99E-03	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	-5.60E-01	-5.63E-01	0.00E+00
Total use of non-re. PER	MJ/FU	2.60E+01	1.33E-01	1.32E+00	2.75E+01	3.80E-02	2.21E-02	ND	ND	ND	ND	ND	8.30E+02	ND	0.00E+00	1.16E-01	-2.50E+00	-3.00E+00	-7.05E+00
Secondary materials	kg/FU	4.45E-02	0.00E+00	0.00E+00	4.45E-02	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	2.02E-03	3.62E-07	4.32E-03	6.35E-03	2.05E-07	3.37E-07	ND	ND	ND	ND	ND	3.20E-03	ND	0.00E+00	6.64E-07	2.82E-06	7.60E-07	-4.47E-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	1.73E-02	1.32E-05	9.50E-04	1.83E-02	5.62E-06	5.07E-05	ND	ND	ND	ND	ND	3.04E+00	ND	0.00E+00	1.54E-05	1.56E-04	-1.51E-04	-3.50E-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	3.64E-01	1.95E-04	5.24E-03	3.70E-01	6.44E-05	8.23E-04	ND	ND	ND	ND	ND	5.06E+00	ND	0.00E+00	2.02E-04	2.59E-03	3.48E-03	-1.16E-01
Non-hazardous waste	kg/FU	6.23E+00	3.07E-03	3.93E-01	6.62E+00	1.19E-03	4.46E-02	ND	ND	ND	ND	ND	1.85E+02	ND	0.00E+00	3.79E-03	8.80E-02	4.05E-01	-1.81E+00
Radioactive waste	kg/FU	2.59E-05	1.99E-08	9.42E-07	2.69E-05	8.10E-09	8.21E-09	ND	ND	ND	ND	ND	4.20E-03	ND	0.00E+00	2.30E-08	8.00E-08	1.48E-08	-1.19E-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	2.41E-03	2.41E-03	0.00E+00	0.00E+00	ND	ND	ND	ND	ND	0.00E+00	ND	0.00E+00	0.00E+00	1.04E-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	6.31E-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	2.66E-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	3.65E-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 éq./FU	2.28E+00	1.02E-02	1.01E-01	2.39E+00	2.60E-03	2.59E-03	ND	ND	ND	ND	ND	5.17E+01	ND	0.00E+00	8.23E-03	1.35E-01	7.06E-02	-6.52E-01
Ozone depletion Pot.	kg CFC_{-11}e/FU	1.96E-08	1.18E-10	3.69E-09	2.34E-08	3.08E-11	3.06E-11	ND	ND	ND	ND	ND	1.01E-06	ND	0.00E+00	9.24E-11	7.23E-11	4.88E-11	-2.59E-09
Acidification	kg SO_2e/FU	1.47E-02	1.66E-04	2.70E-04	1.51E-02	6.82E-06	1.14E-05	ND	ND	ND	ND	ND	2.49E-01	ND	0.00E+00	2.11E-05	4.60E-05	1.85E-05	-6.50E-03
Eutrophication	kg PO_4^3e/FU	3.53E-03	1.95E-05	1.68E-04	3.72E-03	1.66E-06	3.55E-06	ND	ND	ND	ND	ND	4.49E-02	ND	0.00E+00	5.14E-06	1.12E-05	1.06E-05	-4.12E-04
POCP (“smog”)	kg C_2H_4e/FU	1.06E-03	8.61E-06	3.18E-05	1.10E-03	6.07E-07	8.70E-07	ND	ND	ND	ND	ND	1.61E-02	ND	0.00E+00	1.89E-06	2.86E-06	1.92E-06	-3.52E-04
ADP-elements	kg Sbe/FU	1.07E-04	1.61E-08	5.99E-07	1.08E-04	7.12E-09	6.50E-09	ND	ND	ND	ND	ND	1.62E-03	ND	0.00E+00	2.65E-08	1.37E-07	7.28E-09	-3.51E-05
ADP-fossil	MJ/FU	2.37E+01	1.32E-01	1.28E+00	2.51E+01	3.75E-02	2.65E-02	ND	ND	ND	ND	ND	5.65E+02	ND	0.00E+00	1.15E-01	6.60E-02	4.18E-02	-6.26E+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_2e/FU	2.35E+00	1.02E-02	9.65E-02	2.46E+00	2.62E-03	2.62E-03	ND	ND	ND	ND	ND	5.18E+01	ND	0.00E+00	8.28E-03	1.35E-01	7.08E-02	-6.56E-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, Denmark, ecoinvent 3.10.1, 0.0267 kgCO2e/MJ
2. Energy supply, electricity production, solar photovoltaic, Electricity production, photovoltaic, 570kWp open ground installation, multi-Si, World, ecoinvent 3.10.1, 0.0829 kgCO2e/kWh

Transport scenario documentation - A4

1. Transport, freight, lorry >32 metric ton, EURO5, 75.0 km
2. Transport, freight, sea, container ship, 0.0 km

Installation scenario documentation - A5 (Waste materials data source)

1. Market for corrugated board box, 1.9 kg
2. Market for printed paper, offset, 0.128 kg

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

1. Energy supply, electricity transformation and distribution, distribution low voltage, Market for electricity, low voltage, Denmark, 16200.0 kWh

TRANSPORT SCENARIO DOCUMENTATION - A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50 %
Bulk density of transported products / kg/m3	9.85E+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 / m³	0
Power output of equipment / kW	162
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	13.73
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	5.05E+00
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	5.67E+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	3700	26.95
Bio Plastics	3960	28.84
Copper	190.79	1.39
Glass	2300	16.75
Other Plastics	1457.03	10.61
PCB Alu	231.67	1.69
PCB Copper	204.11	1.49
PCB Iron	188.84	1.38
PCB Non-ferrous metal	1.29	0.01
PCB Support	250.44	1.82
PCB Tin	16.28	0.12
Silica Sand	374.92	2.73
Stainless Steel	30	0.22
Steel	815.03	5.94
Tin	9.51	0.07

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 highlighed 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_2e	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 multilplying 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) x 1.54E-01 = 1.89E-02.

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

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.

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

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 [L/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
							NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
1	BRS/BDS/BSS563	LED93-CLO-4S/740	7728	53.0	145.8	0.327	0.327	0.245	0.245	0.180	826.8	620.1	620.1	454.7
2	BRS/BDS/BSS563	LED96-CLO-4S/740	7896	55.0	143.6	0.340	0.340	0.255	0.255	0.187	858.0	643.5	643.5	471.9
3	BRS/BDS/BSS563	LED100-CLO-4S/740	8232	58.0	141.9	0.358	0.358	0.269	0.269	0.197	904.8	678.6	678.6	497.6
4	BRS/BDS/BSS563	LED104-CLO-4S/740	8400	60.0	140.0	0.370	0.370	0.278	0.278	0.204	936.0	702.0	702.0	514.8
5	BRS/BDS/BSS563	LED110-CLO-4S/740	9240	63.0	146.7	0.389	0.389	0.292	0.292	0.214	982.8	737.1	737.1	540.5
6	BRS/BDS/BSS563	LED116-CLO-4S/740	9660	66.0	146.4	0.407	0.407	0.306	0.306	0.224	1029.6	772.2	772.2	566.3
7	BRS/BDS/BSS563	LED120-CLO-4S/740	9660	68.0	142.1	0.420	0.420	0.315	0.315	0.231	1060.8	795.6	795.6	583.4
8	BRS/BDS/BSS563	LED125-CLO-4S/740	10080	71.0	142.0	0.438	0.438	0.329	0.329	0.241	1107.6	830.7	830.7	609.2

9	BRS/BDS/BSS563	LED130-CLO-4S/740	10500	74.0	141.9	0.457	0.457	0.343	0.343	0.251	1154.4	865.8	865.8	634.9
10	BRS/BDS/BSS563	LED135-CLO-4S/740	10920	77.0	141.8	0.475	0.475	0.356	0.356	0.261	1201.2	900.9	900.9	660.7
11	BRS/BDS/BSS563	LED140-CLO-4S/740	11205	80.0	140.1	0.494	0.494	0.370	0.370	0.272	1248.0	936.0	936.0	686.4
12	BRS/BDS/BSS563	LED145-CLO-4S/740	11620	83.0	140.0	0.512	0.512	0.384	0.384	0.282	1294.8	971.1	971.1	712.1
13	BRS/BDS/BSS563	LED150-CLO-4S/740	12035	86.0	139.9	0.531	0.531	0.398	0.398	0.292	1341.6	1006.2	1006.2	737.9
14	BRS/BDS/BSS563	LED160-CLO-4S/740	12865	92.0	139.8	0.568	0.568	0.426	0.426	0.312	1435.2	1076.4	1076.4	789.4
15	BRS/BDS/BSS563	LED170-CLO-4S/740	13695	98.0	139.7	0.605	0.605	0.454	0.454	0.333	1528.8	1146.6	1146.6	840.8
16	BRS/BDS/BSS563	LED180-CLO-4S/740	14525	104.0	139.7	0.642	0.642	0.481	0.481	0.353	1622.4	1216.8	1216.8	892.3
17	BRS/BDS/BSS563	LED190-CLO-4S/740	15355	110.0	139.6	0.679	0.679	0.509	0.509	0.373	1716.0	1287.0	1287.0	943.8
18	BRS/BDS/BSS563	LED200-CLO-4S/740	16185	114.0	142.0	0.704	0.704	0.528	0.528	0.387	1778.4	1333.8	1333.8	978.1
19	BRS/BDS/BSS563	LED210-CLO-4S/740	16600	120.0	138.3	0.741	0.741	0.556	0.556	0.407	1872.0	1404.0	1404.0	1029.6
20	BRS/BDS/BSS563	LED220-CLO-4S/740	17430	126.0	138.3	0.778	0.778	0.583	0.583	0.428	1965.6	1474.2	1474.2	1081.1
21	BRS/BDS/BSS563	LED230-CLO-4S/740	18260	132.0	138.3	0.815	0.815	0.611	0.611	0.448	2059.2	1544.4	1544.4	1132.6
22	BRS/BDS/BSS563	LED240-CLO-4S/740	18860	138.0	136.7	0.852	0.852	0.639	0.639	0.469	2152.8	1614.6	1614.6	1184.0
23	BRS/BDS/BSS563	LED250-CLO-4S/740	19680	142.0	138.6	0.877	0.877	0.657	0.657	0.482	2215.2	1661.4	1661.4	1218.4

24	BRS/BDS/BSS563	LED260-CLO-4S/740	20500	148.0	138.5	0.914	0.914	0.685	0.685	0.502	2308.8	1731.6	1731.6	1269.8
25	BRS/BDS/BSS563	LED270-CLO-4S/740	21320	152.0	140.3	0.938	0.938	0.704	0.704	0.516	2371.2	1778.4	1778.4	1304.2
26	BRS/BDS/BSS563	LED280-CLO-4S/740	22140	158.0	140.1	0.975	0.975	0.731	0.731	0.536	2464.8	1848.6	1848.6	1355.6
27	BRS/BDS/BSS563	LED290-CLO-4S/740	22960	164.0	140.0	1.012	1.012	0.759	0.759	0.557	2558.4	1918.8	1918.8	1407.1
28	BRS/BDS/BSS563	LED300-CLO-4S/740	23780	170.0	139.9	1.049	1.049	0.787	0.787	0.577	2652.0	1989.0	1989.0	1458.6
29	BRS/BDS/BSS563	LED310-CLO-4S/740	24600	174.0	141.4	1.074	1.074	0.806	0.806	0.591	2714.4	2035.8	2035.8	1492.9
30	BRS/BDS/BSS563	LED320-CLO-4S/740	25110	180.0	139.5	1.111	1.111	0.833	0.833	0.611	2808.0	2106.0	2106.0	1544.4
31	BRS/BDS/BSS563	LED330-CLO-4S/740	25920	186.0	139.4	1.148	1.148	0.861	0.861	0.631	2901.6	2176.2	2176.2	1595.9
32	BRS/BDS/BSS563	LED340-CLO-4S/740	26730	192.0	139.2	1.185	1.185	0.889	0.889	0.652	2995.2	2246.4	2246.4	1647.4
33	BRS/BDS/BSS563	LED350-CLO-4S/740	27540	198.0	139.1	1.222	1.222	0.917	0.917	0.672	3088.8	2316.6	2316.6	1698.8
34	BRS/BDS/BSS563	LED360-CLO-4S/740	28350	205.0	138.3	1.265	1.265	0.949	0.949	0.696	3198.0	2398.5	2398.5	1758.9
35	BRS/BDS/BSS563	LED370-CLO-4S/740	28350	210.0	135.0	1.296	1.296	0.972	0.972	0.713	3276.0	2457.0	2457.0	1801.8
36	BRS/BDS/BSS563	LED380-CLO-4S/740	29160	215.0	135.6	1.327	1.327	0.995	0.995	0.730	3354.0	2515.5	2515.5	1844.7
37	BRS/BDS/BSS563	LED390-CLO-4S/740	29970	220.0	136.2	1.358	1.358	1.019	1.019	0.747	3432.0	2574.0	2574.0	1887.6
38	BRS/BDS/BSS563	LED88-CLO-4S/730	7224	53.0	136.3	0.327	0.327	0.245	0.245	0.180	826.8	620.1	620.1	454.7

39	BRS/BDS/BSS563	LED93-CLO-4S/730	7728	57.0	135.6	0.352	0.352	0.264	0.264	0.194	889.2	666.9	666.9	489.1
40	BRS/BDS/BSS563	LED96-CLO-4S/730	7896	58.0	136.1	0.358	0.358	0.269	0.269	0.197	904.8	678.6	678.6	497.6
41	BRS/BDS/BSS563	LED100-CLO-4S/730	8232	61.0	135.0	0.377	0.377	0.282	0.282	0.207	951.6	713.7	713.7	523.4
42	BRS/BDS/BSS563	LED104-CLO-4S/730	8400	63.0	133.3	0.389	0.389	0.292	0.292	0.214	982.8	737.1	737.1	540.5
43	BRS/BDS/BSS563	LED110-CLO-4S/730	8820	66.0	133.6	0.407	0.407	0.306	0.306	0.224	1029.6	772.2	772.2	566.3
44	BRS/BDS/BSS563	LED116-CLO-4S/730	9660	70.0	138.0	0.432	0.432	0.324	0.324	0.238	1092.0	819.0	819.0	600.6
45	BRS/BDS/BSS563	LED120-CLO-4S/730	9660	73.0	132.3	0.451	0.451	0.338	0.338	0.248	1138.8	854.1	854.1	626.3
46	BRS/BDS/BSS563	LED125-CLO-4S/730	10080	75.0	134.4	0.463	0.463	0.347	0.347	0.255	1170.0	877.5	877.5	643.5
47	BRS/BDS/BSS563	LED130-CLO-4S/730	10375	79.0	131.3	0.488	0.488	0.366	0.366	0.268	1232.4	924.3	924.3	677.8
48	BRS/BDS/BSS563	LED135-CLO-4S/730	10920	82.0	133.2	0.506	0.506	0.380	0.380	0.278	1279.2	959.4	959.4	703.6
49	BRS/BDS/BSS563	LED140-CLO-4S/730	11205	85.0	131.8	0.525	0.525	0.394	0.394	0.289	1326.0	994.5	994.5	729.3
50	BRS/BDS/BSS563	LED145-CLO-4S/730	11620	88.0	132.0	0.543	0.543	0.407	0.407	0.299	1372.8	1029.6	1029.6	755.0
51	BRS/BDS/BSS563	LED150-CLO-4S/730	12035	91.0	132.3	0.562	0.562	0.421	0.421	0.309	1419.6	1064.7	1064.7	780.8
52	BRS/BDS/BSS563	LED160-CLO-4S/730	12865	98.0	131.3	0.605	0.605	0.454	0.454	0.333	1528.8	1146.6	1146.6	840.8
53	BRS/BDS/BSS563	LED170-CLO-4S/730	13695	104.0	131.7	0.642	0.642	0.481	0.481	0.353	1622.4	1216.8	1216.8	892.3

54	BRS/BDS/BSS563	LED180-CLO-4S/730	14525	110.0	132.0	0.679	0.679	0.509	0.509	0.373	1716.0	1287.0	1287.0	943.8
55	BRS/BDS/BSS563	LED190-CLO-4S/730	15355	116.0	132.4	0.716	0.716	0.537	0.537	0.394	1809.6	1357.2	1357.2	995.3
56	BRS/BDS/BSS563	LED200-CLO-4S/730	16185	122.0	132.7	0.753	0.753	0.565	0.565	0.414	1903.2	1427.4	1427.4	1046.8
57	BRS/BDS/BSS563	LED210-CLO-4S/730	16600	128.0	129.7	0.790	0.790	0.593	0.593	0.435	1996.8	1497.6	1497.6	1098.2
58	BRS/BDS/BSS563	LED220-CLO-4S/730	17220	134.0	128.5	0.827	0.827	0.620	0.620	0.455	2090.4	1567.8	1567.8	1149.7
59	BRS/BDS/BSS563	LED230-CLO-4S/730	18040	140.0	128.9	0.864	0.864	0.648	0.648	0.475	2184.0	1638.0	1638.0	1201.2
60	BRS/BDS/BSS563	LED240-CLO-4S/730	18860	146.0	129.2	0.901	0.901	0.676	0.676	0.496	2277.6	1708.2	1708.2	1252.7
61	BRS/BDS/BSS563	LED250-CLO-4S/730	19680	152.0	129.5	0.938	0.938	0.704	0.704	0.516	2371.2	1778.4	1778.4	1304.2
62	BRS/BDS/BSS563	LED260-CLO-4S/730	20500	158.0	129.7	0.975	0.975	0.731	0.731	0.536	2464.8	1848.6	1848.6	1355.6
63	BRS/BDS/BSS563	LED270-CLO-4S/730	21320	162.0	131.6	1.000	1.000	0.750	0.750	0.550	2527.2	1895.4	1895.4	1390.0
64	BRS/BDS/BSS563	LED280-CLO-4S/730	22140	168.0	131.8	1.037	1.037	0.778	0.778	0.570	2620.8	1965.6	1965.6	1441.4
65	BRS/BDS/BSS563	LED290-CLO-4S/730	22960	172.0	133.5	1.062	1.062	0.796	0.796	0.584	2683.2	2012.4	2012.4	1475.8
66	BRS/BDS/BSS563	LED300-CLO-4S/730	23490	178.0	132.0	1.099	1.099	0.824	0.824	0.604	2776.8	2082.6	2082.6	1527.2
67	BRS/BDS/BSS563	LED310-CLO-4S/730	24300	184.0	132.1	1.136	1.136	0.852	0.852	0.625	2870.4	2152.8	2152.8	1578.7
68	BRS/BDS/BSS563	LED320-CLO-4S/730	25110	192.0	130.8	1.185	1.185	0.889	0.889	0.652	2995.2	2246.4	2246.4	1647.4

69	BRS/BDS/BSS563	LED330-CLO-4S/730	25920	198.0	130.9	1.222	1.222	0.917	0.917	0.672	3088.8	2316.6	2316.6	1698.8
70	BRS/BDS/BSS563	LED340-CLO-4S/730	26730	205.0	130.4	1.265	1.265	0.949	0.949	0.696	3198.0	2398.5	2398.5	1758.9
71	BRS/BDS/BSS563	LED350-CLO-4S/730	27540	210.0	131.1	1.296	1.296	0.972	0.972	0.713	3276.0	2457.0	2457.0	1801.8
72	BRS/BDS/BSS563	LED360-CLO-4S/730	27540	215.0	128.1	1.327	1.327	0.995	0.995	0.730	3354.0	2515.5	2515.5	1844.7
73	BRS/BDS/BSS563	LED75-CLO-4S/727	6216	51.0	121.9	0.315	0.315	0.236	0.236	0.173	795.6	596.7	596.7	437.6
74	BRS/BDS/BSS563	LED80-CLO-4S/727	6552	54.0	121.3	0.333	0.333	0.250	0.250	0.183	842.4	631.8	631.8	463.3
75	BRS/BDS/BSS563	LED88-CLO-4S/727	7224	59.0	122.4	0.364	0.364	0.273	0.273	0.200	920.4	690.3	690.3	506.2
76	BRS/BDS/BSS563	LED93-CLO-4S/727	7728	63.0	122.7	0.389	0.389	0.292	0.292	0.214	982.8	737.1	737.1	540.5
77	BRS/BDS/BSS563	LED96-CLO-4S/727	7896	64.0	123.4	0.395	0.395	0.296	0.296	0.217	998.4	748.8	748.8	549.1
78	BRS/BDS/BSS563	LED100-CLO-4S/727	8134	67.0	121.4	0.414	0.414	0.310	0.310	0.227	1045.2	783.9	783.9	574.9
79	BRS/BDS/BSS563	LED104-CLO-4S/727	8300	70.0	118.6	0.432	0.432	0.324	0.324	0.238	1092.0	819.0	819.0	600.6
80	BRS/BDS/BSS563	LED110-CLO-4S/727	8715	74.0	117.8	0.457	0.457	0.343	0.343	0.251	1154.4	865.8	865.8	634.9
81	BRS/BDS/BSS563	LED116-CLO-4S/727	9545	78.0	122.4	0.481	0.481	0.361	0.361	0.265	1216.8	912.6	912.6	669.2
82	BRS/BDS/BSS563	LED120-CLO-4S/727	9545	80.0	119.3	0.494	0.494	0.370	0.370	0.272	1248.0	936.0	936.0	686.4
83	BRS/BDS/BSS563	LED125-CLO-4S/727	9960	84.0	118.6	0.519	0.519	0.389	0.389	0.285	1310.4	982.8	982.8	720.7

84	BRS/BDS/BSS563	LED130-CLO-4S/727	10375	87.0	119.3	0.537	0.537	0.403	0.403	0.295	1357.2	1017.9	1017.9	746.5
85	BRS/BDS/BSS563	LED135-CLO-4S/727	10660	91.0	117.1	0.562	0.562	0.421	0.421	0.309	1419.6	1064.7	1064.7	780.8
86	BRS/BDS/BSS563	LED140-CLO-4S/727	11070	95.0	116.5	0.586	0.586	0.440	0.440	0.323	1482.0	1111.5	1111.5	815.1
87	BRS/BDS/BSS563	LED145-CLO-4S/727	11480	98.0	117.1	0.605	0.605	0.454	0.454	0.333	1528.8	1146.6	1146.6	840.8
88	BRS/BDS/BSS563	LED150-CLO-4S/727	11890	100.0	118.9	0.617	0.617	0.463	0.463	0.340	1560.0	1170.0	1170.0	858.0
89	BRS/BDS/BSS563	LED160-CLO-4S/727	12710	108.0	117.7	0.667	0.667	0.500	0.500	0.367	1684.8	1263.6	1263.6	926.6
90	BRS/BDS/BSS563	LED170-CLO-4S/727	13530	114.0	118.7	0.704	0.704	0.528	0.528	0.387	1778.4	1333.8	1333.8	978.1
91	BRS/BDS/BSS563	LED180-CLO-4S/727	14350	122.0	117.6	0.753	0.753	0.565	0.565	0.414	1903.2	1427.4	1427.4	1046.8
92	BRS/BDS/BSS563	LED190-CLO-4S/727	15170	128.0	118.5	0.790	0.790	0.593	0.593	0.435	1996.8	1497.6	1497.6	1098.2
93	BRS/BDS/BSS563	LED200-CLO-4S/727	15990	136.0	117.6	0.840	0.840	0.630	0.630	0.462	2121.6	1591.2	1591.2	1166.9
94	BRS/BDS/BSS563	LED210-CLO-4S/727	16200	140.0	115.7	0.864	0.864	0.648	0.648	0.475	2184.0	1638.0	1638.0	1201.2
95	BRS/BDS/BSS563	LED220-CLO-4S/727	17010	148.0	114.9	0.914	0.914	0.685	0.685	0.502	2308.8	1731.6	1731.6	1269.8
96	BRS/BDS/BSS563	LED230-CLO-4S/727	17820	156.0	114.2	0.963	0.963	0.722	0.722	0.530	2433.6	1825.2	1825.2	1338.5
97	BRS/BDS/BSS563	LED240-CLO-4S/727	18630	162.0	115.0	1.000	1.000	0.750	0.750	0.550	2527.2	1895.4	1895.4	1390.0
98	BRS/BDS/BSS563	LED250-CLO-4S/727	19440	170.0	114.4	1.049	1.049	0.787	0.787	0.577	2652.0	1989.0	1989.0	1458.6

99	BRS/BDS/BSS563	LED260-CLO-4S/727	20250	178.0	113.8	1.099	1.099	0.824	0.824	0.604	2776.8	2082.6	2082.6	1527.2
100	BRS/BDS/BSS563	LED270-CLO-4S/727	21060	178.0	118.3	1.099	1.099	0.824	0.824	0.604	2776.8	2082.6	2082.6	1527.2

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 refernce 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 familiy.

To calculate the Scaled Impact (SI_{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 (Olum) and reference service lifetime (RSL) of the product to estimate the final environmental impact. The scaled impact (SIpep) 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 (P*GSF*), by multiplying the PSF by the GSF.

$$PGSF = PSF * GSF$$

4. 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

5. 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 [L/W]	PSF	Total Scaling Factor (TSF)				Scaled Impacts (GWP100 B6 - kg CO2eq.)			
							NC	DD	PS	DD+PS	NC	DD	PS	DD+PS
1	BRS/BDS/BSS563	LED93-CLO-4S/740	7728	53.0	145.8	0.327	0.015	0.011	0.011	0.008	37.4	28.1	28.1	20.6
2	BRS/BDS/BSS563	LED96-CLO-4S/740	7896	55.0	143.6	0.340	0.015	0.011	0.011	0.008	38.0	28.5	28.5	20.9
3	BRS/BDS/BSS563	LED100-CLO-4S/740	8232	58.0	141.9	0.358	0.015	0.011	0.011	0.008	38.5	28.9	28.9	21.2
4	BRS/BDS/BSS563	LED104-CLO-4S/740	8400	60.0	140.0	0.370	0.015	0.012	0.012	0.008	39.0	29.3	29.3	21.5
5	BRS/BDS/BSS563	LED110-CLO-4S/740	9240	63.0	146.7	0.389	0.015	0.011	0.011	0.008	37.2	27.9	27.9	20.5
6	BRS/BDS/BSS563	LED116-CLO-4S/740	9660	66.0	146.4	0.407	0.015	0.011	0.011	0.008	37.3	28.0	28.0	20.5
7	BRS/BDS/BSS563	LED120-CLO-4S/740	9660	68.0	142.1	0.420	0.015	0.011	0.011	0.008	38.4	28.8	28.8	21.1
8	BRS/BDS/BSS563	LED125-CLO-4S/740	10080	71.0	142.0	0.4	0.0	0.0	0.0	0.0	38.5	28.8	28.8	21.2
9	BRS/BDS/BSS563	LED130-CLO-4S/740	10500	74.0	141.9	0.5	0.0	0.0	0.0	0.0	38.5	28.9	28.9	21.2
10	BRS/BDS/BSS563	LED135-CLO-4S/740	10920	77.0	141.8	0.5	0.0	0.0	0.0	0.0	38.5	28.9	28.9	21.2
11	BRS/BDS/BSS563	LED140-CLO-4S/740	11205	80.0	140.1	0.5	0.0	0.0	0.0	0.0	39.0	29.2	29.2	21.4
12	BRS/BDS/BSS563	LED145-CLO-4S/740	11620	83.0	140.0	0.5	0.0	0.0	0.0	0.0	39.0	29.3	29.3	21.5

13	BRS/BDS/BSS563	LED150-CLO-4S/740	12035	86.0	139.9	0.5	0.0	0.0	0.0	0.0	39.0	29.3	29.3	21.5
14	BRS/BDS/BSS563	LED160-CLO-4S/740	12865	92.0	139.8	0.6	0.0	0.0	0.0	0.0	39.0	29.3	29.3	21.5
15	BRS/BDS/BSS563	LED170-CLO-4S/740	13695	98.0	139.7	0.6	0.0	0.0	0.0	0.0	39.1	29.3	29.3	21.5
16	BRS/BDS/BSS563	LED180-CLO-4S/740	14525	104.0	139.7	0.6	0.0	0.0	0.0	0.0	39.1	29.3	29.3	21.5
17	BRS/BDS/BSS563	LED190-CLO-4S/740	15355	110.0	139.6	0.7	0.0	0.0	0.0	0.0	39.1	29.3	29.3	21.5
18	BRS/BDS/BSS563	LED200-CLO-4S/740	16185	114.0	142.0	0.7	0.0	0.0	0.0	0.0	38.5	28.8	28.8	21.2
19	BRS/BDS/BSS563	LED210-CLO-4S/740	16600	120.0	138.3	0.7	0.0	0.0	0.0	0.0	39.5	29.6	29.6	21.7
20	BRS/BDS/BSS563	LED220-CLO-4S/740	17430	126.0	138.3	0.8	0.0	0.0	0.0	0.0	39.5	29.6	29.6	21.7
21	BRS/BDS/BSS563	LED230-CLO-4S/740	18260	132.0	138.3	0.8	0.0	0.0	0.0	0.0	39.5	29.6	29.6	21.7
22	BRS/BDS/BSS563	LED240-CLO-4S/740	18860	138.0	136.7	0.9	0.0	0.0	0.0	0.0	40.0	30.0	30.0	22.0
23	BRS/BDS/BSS563	LED250-CLO-4S/740	19680	142.0	138.6	0.9	0.0	0.0	0.0	0.0	39.4	29.5	29.5	21.7
24	BRS/BDS/BSS563	LED260-CLO-4S/740	20500	148.0	138.5	0.9	0.0	0.0	0.0	0.0	39.4	29.6	29.6	21.7
25	BRS/BDS/BSS563	LED270-CLO-4S/740	21320	152.0	140.3	0.9	0.0	0.0	0.0	0.0	38.9	29.2	29.2	21.4
26	BRS/BDS/BSS563	LED280-CLO-4S/740	22140	158.0	140.1	1.0	0.0	0.0	0.0	0.0	39.0	29.2	29.2	21.4
27	BRS/BDS/BSS563	LED290-CLO-4S/740	22960	164.0	140.0	1.0	0.0	0.0	0.0	0.0	39.0	29.3	29.3	21.5

28	BRS/BDS/BSS563	LED300-CLO-4S/740	23780	170.0	139.9	1.0	0.0	0.0	0.0	0.0	39.0	29.3	29.3	21.5
29	BRS/BDS/BSS563	LED310-CLO-4S/740	24600	174.0	141.4	1.1	0.0	0.0	0.0	0.0	38.6	29.0	29.0	21.2
30	BRS/BDS/BSS563	LED320-CLO-4S/740	25110	180.0	139.5	1.1	0.0	0.0	0.0	0.0	39.1	29.4	29.4	21.5
31	BRS/BDS/BSS563	LED330-CLO-4S/740	25920	186.0	139.4	1.1	0.0	0.0	0.0	0.0	39.2	29.4	29.4	21.5
32	BRS/BDS/BSS563	LED340-CLO-4S/740	26730	192.0	139.2	1.2	0.0	0.0	0.0	0.0	39.2	29.4	29.4	21.6
33	BRS/BDS/BSS563	LED350-CLO-4S/740	27540	198.0	139.1	1.2	0.0	0.0	0.0	0.0	39.3	29.4	29.4	21.6
34	BRS/BDS/BSS563	LED360-CLO-4S/740	28350	205.0	138.3	1.3	0.0	0.0	0.0	0.0	39.5	29.6	29.6	21.7
35	BRS/BDS/BSS563	LED370-CLO-4S/740	28350	210.0	135.0	1.3	0.0	0.0	0.0	0.0	40.4	30.3	30.3	22.2
36	BRS/BDS/BSS563	LED380-CLO-4S/740	29160	215.0	135.6	1.3	0.0	0.0	0.0	0.0	40.3	30.2	30.2	22.1
37	BRS/BDS/BSS563	LED390-CLO-4S/740	29970	220.0	136.2	1.4	0.0	0.0	0.0	0.0	40.1	30.1	30.1	22.0
38	BRS/BDS/BSS563	LED88-CLO-4S/730	7224	53.0	136.3	0.3	0.0	0.0	0.0	0.0	40.1	30.0	30.0	22.0
39	BRS/BDS/BSS563	LED93-CLO-4S/730	7728	57.0	135.6	0.4	0.0	0.0	0.0	0.0	40.3	30.2	30.2	22.1
40	BRS/BDS/BSS563	LED96-CLO-4S/730	7896	58.0	136.1	0.4	0.0	0.0	0.0	0.0	40.1	30.1	30.1	22.1
41	BRS/BDS/BSS563	LED100-CLO-4S/730	8232	61.0	135.0	0.4	0.0	0.0	0.0	0.0	40.5	30.3	30.3	22.3
42	BRS/BDS/BSS563	LED104-CLO-4S/730	8400	63.0	133.3	0.4	0.0	0.0	0.0	0.0	41.0	30.7	30.7	22.5

43	BRS/BDS/BSS563	LED110-CLO-4S/730	8820	66.0	133.6	0.4	0.0	0.0	0.0	0.0	40.9	30.6	30.6	22.5
44	BRS/BDS/BSS563	LED116-CLO-4S/730	9660	70.0	138.0	0.4	0.0	0.0	0.0	0.0	39.6	29.7	29.7	21.8
45	BRS/BDS/BSS563	LED120-CLO-4S/730	9660	73.0	132.3	0.5	0.0	0.0	0.0	0.0	41.3	30.9	30.9	22.7
46	BRS/BDS/BSS563	LED125-CLO-4S/730	10080	75.0	134.4	0.5	0.0	0.0	0.0	0.0	40.6	30.5	30.5	22.3
47	BRS/BDS/BSS563	LED130-CLO-4S/730	10375	79.0	131.3	0.5	0.0	0.0	0.0	0.0	41.6	31.2	31.2	22.9
48	BRS/BDS/BSS563	LED135-CLO-4S/730	10920	82.0	133.2	0.5	0.0	0.0	0.0	0.0	41.0	30.8	30.8	22.6
49	BRS/BDS/BSS563	LED140-CLO-4S/730	11205	85.0	131.8	0.5	0.0	0.0	0.0	0.0	41.4	31.1	31.1	22.8
50	BRS/BDS/BSS563	LED145-CLO-4S/730	11620	88.0	132.0	0.5	0.0	0.0	0.0	0.0	41.3	31.0	31.0	22.7
51	BRS/BDS/BSS563	LED150-CLO-4S/730	12035	91.0	132.3	0.6	0.0	0.0	0.0	0.0	41.3	31.0	31.0	22.7
52	BRS/BDS/BSS563	LED160-CLO-4S/730	12865	98.0	131.3	0.6	0.0	0.0	0.0	0.0	41.6	31.2	31.2	22.9
53	BRS/BDS/BSS563	LED170-CLO-4S/730	13695	104.0	131.7	0.6	0.0	0.0	0.0	0.0	41.5	31.1	31.1	22.8
54	BRS/BDS/BSS563	LED180-CLO-4S/730	14525	110.0	132.0	0.7	0.0	0.0	0.0	0.0	41.3	31.0	31.0	22.7
55	BRS/BDS/BSS563	LED190-CLO-4S/730	15355	116.0	132.4	0.7	0.0	0.0	0.0	0.0	41.2	30.9	30.9	22.7
56	BRS/BDS/BSS563	LED200-CLO-4S/730	16185	122.0	132.7	0.8	0.0	0.0	0.0	0.0	41.2	30.9	30.9	22.6
57	BRS/BDS/BSS563	LED210-CLO-4S/730	16600	128.0	129.7	0.8	0.0	0.0	0.0	0.0	42.1	31.6	31.6	23.2

58	BRS/BDS/BSS563	LED220-CLO-4S/730	17220	134.0	128.5	0.8	0.0	0.0	0.0	0.0	42.5	31.9	31.9	23.4
59	BRS/BDS/BSS563	LED230-CLO-4S/730	18040	140.0	128.9	0.9	0.0	0.0	0.0	0.0	42.4	31.8	31.8	23.3
60	BRS/BDS/BSS563	LED240-CLO-4S/730	18860	146.0	129.2	0.9	0.0	0.0	0.0	0.0	42.3	31.7	31.7	23.2
61	BRS/BDS/BSS563	LED250-CLO-4S/730	19680	152.0	129.5	0.9	0.0	0.0	0.0	0.0	42.2	31.6	31.6	23.2
62	BRS/BDS/BSS563	LED260-CLO-4S/730	20500	158.0	129.7	1.0	0.0	0.0	0.0	0.0	42.1	31.6	31.6	23.1
63	BRS/BDS/BSS563	LED270-CLO-4S/730	21320	162.0	131.6	1.0	0.0	0.0	0.0	0.0	41.5	31.1	31.1	22.8
64	BRS/BDS/BSS563	LED280-CLO-4S/730	22140	168.0	131.8	1.0	0.0	0.0	0.0	0.0	41.4	31.1	31.1	22.8
65	BRS/BDS/BSS563	LED290-CLO-4S/730	22960	172.0	133.5	1.1	0.0	0.0	0.0	0.0	40.9	30.7	30.7	22.5
66	BRS/BDS/BSS563	LED300-CLO-4S/730	23490	178.0	132.0	1.1	0.0	0.0	0.0	0.0	41.4	31.0	31.0	22.8
67	BRS/BDS/BSS563	LED310-CLO-4S/730	24300	184.0	132.1	1.1	0.0	0.0	0.0	0.0	41.3	31.0	31.0	22.7
68	BRS/BDS/BSS563	LED320-CLO-4S/730	25110	192.0	130.8	1.2	0.0	0.0	0.0	0.0	41.7	31.3	31.3	23.0
69	BRS/BDS/BSS563	LED330-CLO-4S/730	25920	198.0	130.9	1.2	0.0	0.0	0.0	0.0	41.7	31.3	31.3	22.9
70	BRS/BDS/BSS563	LED340-CLO-4S/730	26730	205.0	130.4	1.3	0.0	0.0	0.0	0.0	41.9	31.4	31.4	23.0
71	BRS/BDS/BSS563	LED350-CLO-4S/730	27540	210.0	131.1	1.3	0.0	0.0	0.0	0.0	41.6	31.2	31.2	22.9
72	BRS/BDS/BSS563	LED360-CLO-4S/730	27540	215.0	128.1	1.3	0.0	0.0	0.0	0.0	42.6	32.0	32.0	23.4

73	BRS/BDS/BSS563	LED75-CLO-4S/727	6216	51.0	121.9	0.3	0.0	0.0	0.0	0.0	44.8	33.6	33.6	24.6
74	BRS/BDS/BSS563	LED80-CLO-4S/727	6552	54.0	121.3	0.3	0.0	0.0	0.0	0.0	45.0	33.8	33.8	24.8
75	BRS/BDS/BSS563	LED88-CLO-4S/727	7224	59.0	122.4	0.4	0.0	0.0	0.0	0.0	44.6	33.4	33.4	24.5
76	BRS/BDS/BSS563	LED93-CLO-4S/727	7728	63.0	122.7	0.4	0.0	0.0	0.0	0.0	44.5	33.4	33.4	24.5
77	BRS/BDS/BSS563	LED96-CLO-4S/727	7896	64.0	123.4	0.4	0.0	0.0	0.0	0.0	44.3	33.2	33.2	24.3
78	BRS/BDS/BSS563	LED100-CLO-4S/727	8134	67.0	121.4	0.4	0.0	0.0	0.0	0.0	45.0	33.7	33.7	24.7
79	BRS/BDS/BSS563	LED104-CLO-4S/727	8300	70.0	118.6	0.4	0.0	0.0	0.0	0.0	46.0	34.5	34.5	25.3
80	BRS/BDS/BSS563	LED110-CLO-4S/727	8715	74.0	117.8	0.5	0.0	0.0	0.0	0.0	46.4	34.8	34.8	25.5
81	BRS/BDS/BSS563	LED116-CLO-4S/727	9545	78.0	122.4	0.5	0.0	0.0	0.0	0.0	44.6	33.5	33.5	24.5
82	BRS/BDS/BSS563	LED120-CLO-4S/727	9545	80.0	119.3	0.5	0.0	0.0	0.0	0.0	45.8	34.3	34.3	25.2
83	BRS/BDS/BSS563	LED125-CLO-4S/727	9960	84.0	118.6	0.5	0.0	0.0	0.0	0.0	46.0	34.5	34.5	25.3
84	BRS/BDS/BSS563	LED130-CLO-4S/727	10375	87.0	119.3	0.5	0.0	0.0	0.0	0.0	45.8	34.3	34.3	25.2
85	BRS/BDS/BSS563	LED135-CLO-4S/727	10660	91.0	117.1	0.6	0.0	0.0	0.0	0.0	46.6	35.0	35.0	25.6
86	BRS/BDS/BSS563	LED140-CLO-4S/727	11070	95.0	116.5	0.6	0.0	0.0	0.0	0.0	46.9	35.1	35.1	25.8
87	BRS/BDS/BSS563	LED145-CLO-4S/727	11480	98.0	117.1	0.6	0.0	0.0	0.0	0.0	46.6	35.0	35.0	25.6

88	BRS/BDS/BSS563	LED150-CLO-4S/727	11890	100.0	118.9	0.6	0.0	0.0	0.0	0.0	45.9	34.4	34.4	25.3
89	BRS/BDS/BSS563	LED160-CLO-4S/727	12710	108.0	117.7	0.7	0.0	0.0	0.0	0.0	46.4	34.8	34.8	25.5
90	BRS/BDS/BSS563	LED170-CLO-4S/727	13530	114.0	118.7	0.7	0.0	0.0	0.0	0.0	46.0	34.5	34.5	25.3
91	BRS/BDS/BSS563	LED180-CLO-4S/727	14350	122.0	117.6	0.8	0.0	0.0	0.0	0.0	46.4	34.8	34.8	25.5
92	BRS/BDS/BSS563	LED190-CLO-4S/727	15170	128.0	118.5	0.8	0.0	0.0	0.0	0.0	46.1	34.6	34.6	25.3
93	BRS/BDS/BSS563	LED200-CLO-4S/727	15990	136.0	117.6	0.8	0.0	0.0	0.0	0.0	46.4	34.8	34.8	25.5
94	BRS/BDS/BSS563	LED210-CLO-4S/727	16200	140.0	115.7	0.9	0.0	0.0	0.0	0.0	47.2	35.4	35.4	26.0
95	BRS/BDS/BSS563	LED220-CLO-4S/727	17010	148.0	114.9	0.9	0.0	0.0	0.0	0.0	47.5	35.6	35.6	26.1
96	BRS/BDS/BSS563	LED230-CLO-4S/727	17820	156.0	114.2	1.0	0.0	0.0	0.0	0.0	47.8	35.8	35.8	26.3
97	BRS/BDS/BSS563	LED240-CLO-4S/727	18630	162.0	115.0	1.0	0.0	0.0	0.0	0.0	47.5	35.6	35.6	26.1
98	BRS/BDS/BSS563	LED250-CLO-4S/727	19440	170.0	114.4	1.0	0.0	0.0	0.0	0.0	47.7	35.8	35.8	26.3
99	BRS/BDS/BSS563	LED260-CLO-4S/727	20250	178.0	113.8	1.1	0.0	0.0	0.0	0.0	48.0	36.0	36.0	26.4
100	BRS/BDS/BSS563	LED270-CLO-4S/727	21060	178.0	118.3	1.1	0.0	0.0	0.0	0.0	46.1	34.6	34.6	25.4