



ECO•RAYS

ENVIRONMENTAL PRODUCT DECLARATION

according to: ISO 14025:2010, EN 50693:2019

Program Operator:	EPDItaly
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Publisher:	EPDItaly
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Declaration number:	EPD_AEC_005
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EPDItaly – Registration number:	EPDITALY0975
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Publication date:	28.05.2025
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Valid until:	28.05.2030
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Product name:

ECO RAYS TP, ECO RAYS TS,
ECO RAYS S, ECO RAYS BR

Product family:

ECO RAYS

Model:

ECO RAYS TP XXX YYY-Y WWZZ.040-1M
ECO RAYS TP XXX YYY-Y WWZZ.180-2M
ECO RAYS TS XXX YYY-Y WWZZ.040-1M
ECO RAYS TS XXX YYY-Y WWZZ.200-2M
ECO RAYS BR XXX YYY-Y WWZZ.040-1M
ECO RAYS BR XXX YYY-Y WWZZ.200-2M
ECO RAYS S XXX YYY-Y WWZZ.040-1M
ECO RAYS S XXX YYY-Y WWZZ.200-2M

Manufacturing plant:

AEC Illuminazione SRL
Via A. Righi, n.4 Subbiano (AR) 52010
Via E. Fermi, n.93 Subbiano (AR) 52010

GENERAL INFORMATION

EPD owner:	AEC Illuminazione S.r.l. Headquarters: Via A. Righi, 4 – Z.I. Castelnuovo – 52010 – Subbiano, Arezzo (IT)
Production site:	Headquarters: Via A. Righi, 4 – Z.I. Castelnuovo – 52010 – Subbiano, Arezzo (IT) Pole Division: Via E. Fermi, 93 – Z.I. Castelnuovo – 52010 – Subbiano, Arezzo (IT)
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Program Operator:	EPDItaly (www.epditaly.it) via Gaetano De Castillia n° 10 - 20124 Milano, Italia
Scope of application:	Outdoor lighting
Product reference standards:	EN 60598-1, EN 60598-2-3, EN 62471, EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3
CPC code:	465 “Electric filament or discharge lamps; arc lamps; lighting equipment; parts thereof”.
PCR:	CORE PCR – EPDItaly007 – “Electronic and electrical products and systems” – Rev. 3.1 – 12/11/2024. Sub PCR – EPDItaly020 – “Electronic and electrical products and systems public lighting equipment” – Rev.2 – 03/10/2024”
EPDItaly Regulation:	Regolamento EPDItaly 6.0 version of 30/10/2023, available at www.epditaly.it
Project report LCA:	M-LCA-004 LCA-Tool - Report LCA_AEC Illuminazione
Statement independent verification:	Independent verification of the declaration and data performed according to ISO 14025:2010. <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External Third party verification performed by: ICMQ S.p.A., via Gaetano De Castillia n° 10 - 20124 Milan, Italy. Accredited by Accredia.
Statement comparability:	Environmental Declarations published within the same product category, but from different programmes, may not be comparable.
Statement responsibility:	AEC Illuminazione S.r.l. releases EPDItaly from any non-compliance with environmental legislation. The holder of the declaration shall be responsible for the supporting information and evidence; EPDItaly accepts no responsibility for the information, data and results provided by the EPD Owner for the life cycle assessment.
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SUMMARY

THE COMPANY	3
SUSTAINABILITY	4
EPD SCOPE AND TYPE	5
LCA GENERAL INFORMATIONS	6
PRODUCT DESCRIPTION.....	7
MATERIC TABLES	8
DESCRIPTION OF THE PRODUCTION PROCESS	16
SCENARIOS	17
ECO RAYS TP RESULTS	18
ECO RAYS TS RESULTS	22
ECO RAYS S RESULTS	26
ECO RAYS BR RESULTS.....	30
SUMMARY TABLES.....	34
BYBLIOGRAPHY & REFERENCES	35

THE COMPANY



AEC Illuminazione is a luminaire manufacturer with an approach based on a combination of product quality and environmental responsibility. Today the company is an important example of Italian industrial excellence, known and appreciated all over the world. The company's awareness is such that its every effort is aimed at reducing its impacts towards the environment. This commitment translates into designing increasingly efficient and sustainable products, which therefore go to minimize energy consumption and resource use, promoting new technologies to protect the environment.

An aerial photograph of a two-lane asphalt road with white dashed center and edge lines, stretching horizontally across the middle of the frame. The road is flanked by dense, lush green trees and foliage. The lighting is soft, creating a serene and natural atmosphere.

SUSTAINABILITY

Our progress toward the environment is the result of innovations in design, technologies and business organization. Our goal is to share what we have already done and how we will meet the challenges of the coming years, with the aim of ensuring greater sustainability and reducing our environmental impact.

We are confident that through continuous efforts and close cooperation with our employees and stakeholders, we can contribute to sustainable development, giving value to our company, people and the local area.

EPD SCOPE AND TYPE

This Environmental Product Declaration is of the 'from cradle to grave' type and analyses all phases of the product life cycle, from the extraction of raw materials to the decommissioning and disposal of the product once it has reached the end of its life. As dictated by the PCR itself, the UPSTREAM phases of procurement (A1) and transport of raw materials (A2), the CORE phase of internal production (A3), the DOWNSTREAM phases of distribution (A4 - A5), use (B1 - B7), end-of-life of the product (C1-C4) and the resource recovery phase (D) were considered for the evaluation.

Production Stage			Distribution Stage	Use Stage								End-of-life Stage				Resource recovery Stage
Upstream Module	Core Module	Downstream Module														
Raw material procurement	Raw material transport	Production	Transport	Installation	Use	Maintenance	Ripair	Replacement	Rehabilitation	Energy use	Water use	Disassembly	Transport	Recycling process	Disposal process	Reuse, recovery, recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Legend: X = included in the LCA, MND = the module is not included in the LCA and is not declared.

LCA GENERAL INFORMATIONS

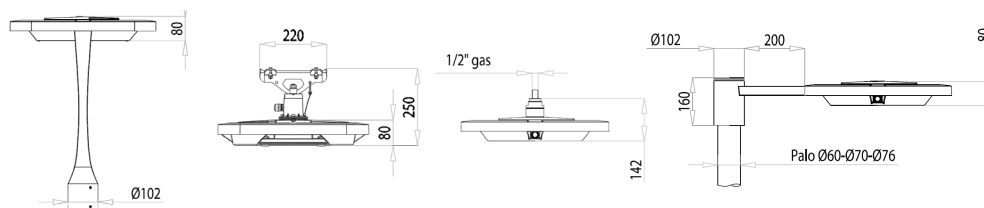
EPD type	Product EPD
System boundaries	From Cradle to grave and benefits beyond product life cycle.
Declared unit	The declared unit taken into consideration is a single street luminaire belonging to the ECO RAYS TP, ECO RAYS TS, ECO RAYS S and ECO RAYS BR series respectively, operating during a reference life of 40,000 operating hours in accordance with Sub PCR 020 "Electronic and electrical products and systems - Home appliances".
Temporal validity	The reference period is the calendar year 2023.
Geographical validity	The performances have been calculated with reference to the main plant of AEC Illuminazione S.r.l. in via A. Righi, n.4 Subbiano, Arezzo - 52010 (IT) and the Pole Division branch in Via E. Fermi, 93 - Z.I. Castelnuovo - 52010 - Subbiano, Arezzo (IT). The reference market is the global one.
Database used	Ecoinvent 3.9.1
LCA software	SimaPro 9.5.0.1
LCA Tool	M-LCA-018-Tool AEC_01, 16/12/24
Exclusion criteria	They were excluded from the following study: <ul style="list-style-type: none"> employee travel. the packaging of the auxiliary material. replacement parts for machinery used during routine and extraordinary maintenance.
Data quality	All data related to the company's CORE activities and therefore falling under A3, were derived directly from the company's databases and are therefore site-specific. The UPSTREAM data, linked to phases A1 and A2 (for which the standard envisages the use of generic data), the data relating to weight, quantity, raw materials, and waste are derived from the company's databases or from reprocessing supplied directly and summarised in a 'Data Collection Checklist' and are therefore to be understood as site-specific.
Generic data	Criteria were applied throughout the analysis: <ul style="list-style-type: none"> geographical equivalence, considering similar Italian or at most European systems. technological equivalence, considering comparable technological systems through literature research. equivalence with respect to system boundaries, considering systems that take similar inputs, outputs and stages. Site-specific data refer to the year 2023, while for generic data, information between 2010 and 2020 was considered.
Cut-off rules	As stipulated in EN 15804:2012 + A2:2019, the cut-off criterion must be a maximum of: <ul style="list-style-type: none"> 1% on the use of primary energy from renewable and non-renewable sources, and 1% of the total mass of each process unit. 5% on the total flows for each unit (both in terms of energy and mass). The following inputs were cut-off in this study: <ul style="list-style-type: none"> Galvanising treatment carried out on hardware, small parts and bolts.
Data validation	The check of the validity and correctness of the specific data used for the CORE phases (phases A2 and A3) supplied by AEC Illuminazione S.r.l. was carried out through the punctual verification of the mass balances and the plant authorisation documentation, as well as the critical consultation of other EPD studies produced in compliance with the reference PCR. About the generic data used for the UPSTRESAM (A1) and DOWNSTREAM (C1, C2, C3, C4) phases, on the other hand, reference was made to the validation models required in Annex E of standard EN 15804:2012 + A2:2019.

PRODUCT DESCRIPTION

CHARACTERISTICS

ECO RAYS Series

DIMENSIONS



PRODUCT DESCRIPTION

ECO RAYS series luminaires consist of:
Aluminium housing, LED modules, LED driver, reflector optical modules for light distribution, electrical cables, connectors, SPDs (optional), screws and whatever else is needed for correct electrical connection and installation.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

Luminaire:	Power:	Weight:
ECO RAYS TP XXX YYY-Y WWZZ.040-1M	8.5 W	7.4 kg
ECO RAYS TP XXX YYY-Y WWZZ.180-2M	67.7 W	8.1 kg
ECO RAYS TS XXX YYY-Y WWZZ.040-1M	8.5 W	6.3 kg
ECO RAYS TS XXX YYY-Y WWZZ.200-2M	75.6 W	7.0 kg
ECO RAYS S XXX YYY-Y WWZZ.040-1M	8.5 W	6.4 kg
ECO RAYS S XXX YYY-Y WWZZ.200-2M	75.6 W	7.1 kg
ECO RAYS BR XXX YYY-Y WWZZ.040-1M	8.5 W	6.4 kg
ECO RAYS BR XXX YYY-Y WWZZ.200-2M	75.6 W	7.1 kg

Rated voltage: 220÷240V.

Rated frequency: 50/60Hz.

040 ÷ 200: LED current range (mA).

LED MODULE

XXX: 5P5, 4P4.

1M ÷ 2M: number of LED module.

AVAILABLE OPTICS (YYY-Y)

STE-M/S



Asymmetrical optics suburban street lighting.

SV



Asymmetrical optics for lighting very narrow urban streets.

STU-M/S



Asymmetrical optics street, urban and cycle lane lighting.

S05/S07



Symmetrical optics for street, urban and green area lighting.

STW



Asymmetrical optics lighting of wide, urban and suburban roads.

S



Symmetrical optics for urban lighting and green areas.

STA



Asymmetrical optics lighting of wide urban streets and very narrow pedestrian and cycle paths.

TS



Symmetrical optics for centre-street lighting.

N.B. other optics available on request.

COLOUR TEMPERATURE

CRI (WW): 70 = CRI70, 80 = CRI80, 90 = CRI90

CCT (ZZ): 18 = 1800K, 22 = 2200K, 27 = 2700K, 30 = 3000K, 40 = 4000K, 57 = 5700K

INSULATION CLASS



CONTROL SYSTEM

F DA DAC FLC DALI Nema ZHAGA

CERTIFICATIONS



MATERIC TABLES

ECO RAYS TP XXX YYY-Y WWZZ.040-1M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	2,0%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,4%
Optical modules	Polycarbonate + Aluminium	0,4%
Luminaire body	Die-Cast Aluminium	47,6%
Post-top	Die-Cast Aluminium	19,7%
Wiring plate	Aluminium	1,4%
Gasket	Polyurethane	0,4%
Plastic fixing/support accessories	PA	1,7%
Steel fixing/support accessories	Stainless steel/Galvanised steel	2,8%
Aluminium fixing/support accessories	Aluminium	2,5%
Internal wiring	Copper - FEP	0,1%
Supply cable	Copper - FEP	2,4%
Cable gland	PA	0,1%
Screws	Stainless steel/Galvanised steel	0,7%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	17,7%

ECO RAYS TP XXX YYY-Y WWZZ.180-2M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	6,5%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,7%
Optical modules	Polycarbonate + Aluminium	0,7%
SPD	WEEE compliant electronic device	0,4%
Luminaire body	Die-Cast Aluminium	43,6%
Post-top	Die-Cast Aluminium	18,0%
Wiring plate	Aluminium	1,2%
Telecontrol device	WEEE compliant electronic device	0,7%
Gasket	Polyurethane	0,4%
Plastic fixing/support accessories	PA	1,8%
Steel fixing/support accessories	Stainless steel/Galvanised steel	2,5%
Aluminium fixing/support accessories	Aluminium	2,2%
Internal wiring	Copper - FEP	0,1%
Supply cable	Copper - FEP	4,0%
Cable gland	PA	0,1%
Screws	Stainless steel/Galvanised steel	0,7%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	16,3%

ECO RAYS TS XXX YYY-Y WWZZ.040-1M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	2,3%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,5%
Optical modules	Polycarbonate + Aluminium	0,4%
Luminaire body	Die-Cast Aluminium	55,6%
TS Accessories	Aluminium	2,1%
TS Bracket	Stainless steel	6,6%
Wiring plate	Aluminium	1,9%
Fall arrest hook	Stainless steel	0,1%
Gasket	Polyurethane	0,6%
Aluminium fixing/support accessories	Aluminium	1,2%
Steel fixing/support accessories	Stainless steel/Galvanised steel	3,6%
Internal wiring	Copper - FEP	0,1%
Supply cable	Copper - FEP	2,8%
Screws	Stainless steel/Galvanised steel	1,4%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	20,7%

ECO RAYS TS XXX YYY-Y WWZZ.200-2M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	7,4%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,9%
Optical modules	Polycarbonate + Aluminium	0,8%
SPD	WEEE compliant electronic device	0,5%
Luminaire body	Die-Cast Aluminium	50,1%
TS Accessories	Aluminium	1,8%
TS Bracket	Stainless steel	6,0%
Wiring plate	Aluminium	1,7%
Falle arrest hook	Stainless steel	0,1%
Telecontrol device	WEEE compliant electronic device	0,9%
Terminal block	PA - Nickel/Brass terminals	0,5%
Gasket	Polyurethane	1,1%
Aluminium fixing/support accessories	Aluminium	3,3%
Steel fixing/support accessories	Stainless steel/Galvanised steel	0,2%
Internal wiring	Copper - FEP	4,6%
Supply cable	Copper - FEP	1,3%
Screws	Stainless steel/Galvanised steel	< 0,1%
Compensation valve	PBT	18,7%
Optical screen	Tempered glass	7,4%

ECO RAYS S XXX YYY-Y WWZZ.040-1M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	2,3%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,5%
Optical modules	Polycarbonate + Aluminium	0,4%
Luminaire body	Die-Cast Aluminium	55,4%
Wiring plate	Aluminium	1,9%
Gasket	Polyurethane	0,5%
Plastic fixing/support accessories	PA	0,2%
Steel fixing/support accessories	Stainless steel/Galvanised steel	12,7%
Aluminium fixing/support accessories	Aluminium	1,3%
Internal wiring	Copper - FEP	0,1%
Supply cable	Copper - FEP	2,8%
Screws	Stainless steel/Galvanised steel	1,2%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	20,6%

ECO RAYS S XXX YYY-Y WWZZ.200-2M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	7,4%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,9%
Optical modules	Polycarbonate + Aluminium	0,8%
SPD	WEEE compliant electronic device	0,5%
Luminaire body	Die-Cast Aluminium	49,9%
Wiring plate	Aluminium	1,7%
Telecontrol device	WEEE compliant electronic device	0,9%
Gasket	Polyurethane	0,4%
Plastic fixing/support accessories	PA	0,4%
Steel fixing/support accessories	Stainless steel/Galvanised steel	11,4%
Aluminium fixing/support accessories	Aluminium	1,1%
Internal wiring	Copper - FEP	0,1%
Supply cable	Copper - FEP	4,6%
Screws	Stainless steel/Galvanised steel	1,2%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	18,6%

ECO RAYS BR XXX YYY-Y WWZZ.040-1M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	2,3%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,5%
Optical modules	Polycarbonate + Aluminium	0,4%
Luminaire body	Die-Cast Aluminium	55,1%
Bracket arm	Aluminium	10,9%
Wiring plate	Aluminium	1,9%
Gasket	Polyurethane	0,5%
Plastic fixing/support accessories	PA	0,9%
Steel fixing/support accessories	Stainless steel/Galvanised steel	0,5%
Aluminium fixing/support accessories	Aluminium	1,3%
Internal wiring	Copper - FEP	0,1%
Supply cable	Copper - FEP	2,8%
Cable gland	Nickel-plated brass	1,4%
Screws	Stainless steel/Galvanised steel	0,8%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	20,5%

ECO RAYS BR XXX YYY-Y WWZZ.200-2M

Components	Materials (input)	% Weight
LED driver	WEEE compliant electronic device	2,3%
LED	WEEE compliant electronic device	< 0,1%
PCB	Aluminium - Ceramic - Copper	0,5%
Optical modules	Polycarbonate + Aluminium	0,4%
SPD	WEEE compliant electronic device	55,1%
Luminaire body	Die-Cast Aluminium	10,9%
Bracket arm	Die-Cast Aluminium	1,9%
Wiring plate	Aluminium	0,5%
Telecontrol device	WEEE compliant electronic device	0,9%
Terminal block	PA - Nickel/Brass terminals	0,5%
Gasket	Polyurethane	1,3%
Plastic fixing/support accessories	PA	0,1%
Steel fixing/support accessories	Stainless steel/Galvanised steel	2,8%
Aluminium fixing/support accessories	Aluminium	1,4%
Internal wiring	Copper - FEP	0,8%
Supply cable	Copper - FEP	< 0,1%
Cable gland	Nickel-plated brass	20,5%
Screws	Stainless steel/Galvanised steel	2,3%
Compensation valve	PBT	< 0,1%
Optical screen	Tempered glass	0,5%

N.B. The components indicated in the material balance table and their weight percentages may be subject to change if configurations other than those indicated are considered.

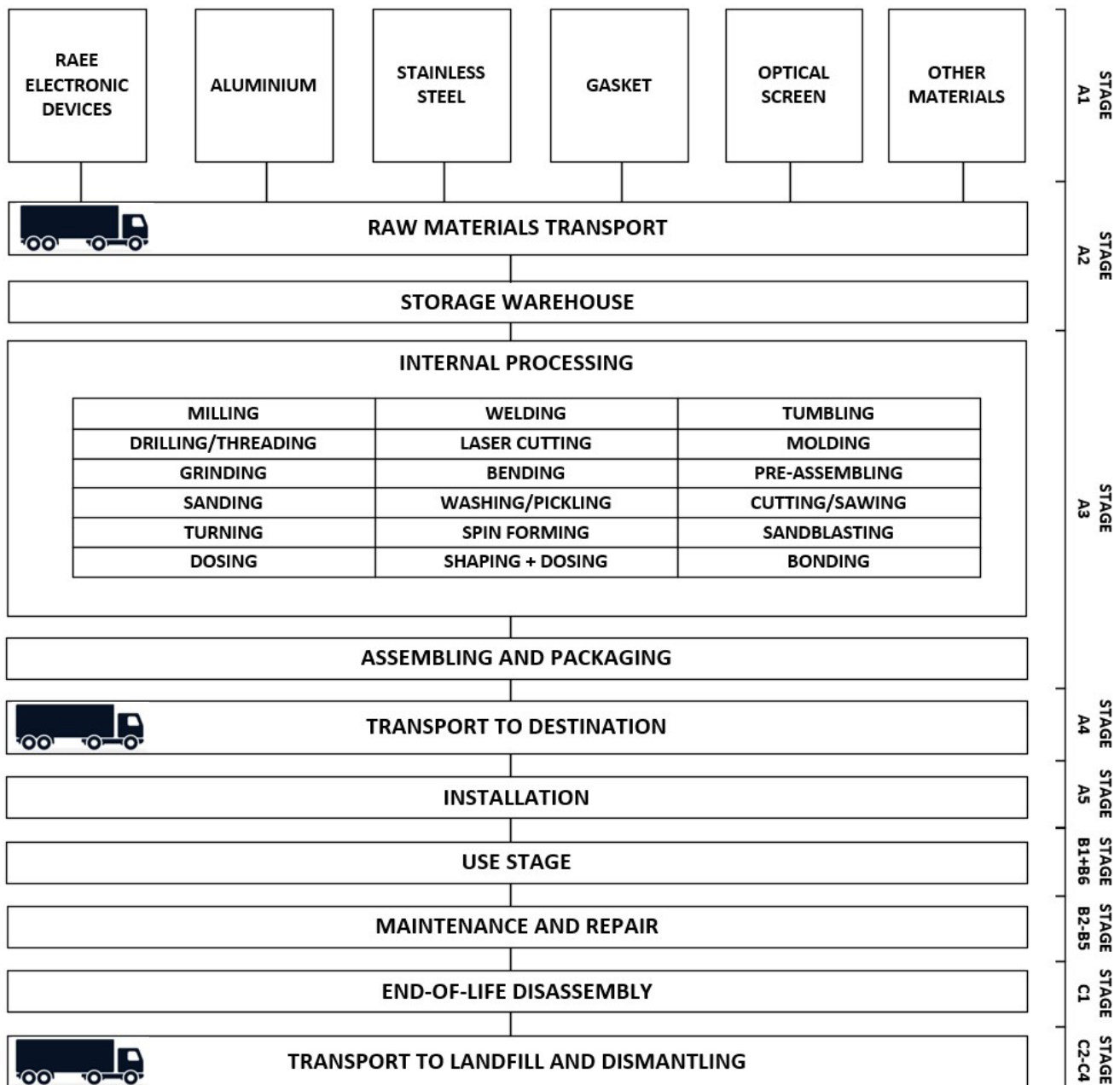
DESCRIPTION OF THE PRODUCTION PROCESS

The reality of AEC Illuminazione S.r.l. is highly technological thanks to the investments made in recent years in brand new machinery, collaborative robots, automated plants, and digital data transmission technologies, guaranteeing greater production efficiency and industrial competitiveness.

The design and production processes take place within the company headquarters and begin with the receipt of raw materials (metals) and semi-finished products (electrical and electronic components, glass, and crystal), which undergo quality control before being stored in the automated warehouse.

The production of an appliance is made up of various internal and external phases at subcontractors, in particular, the internal phases include:

- Production processes of cast iron components.
- Production processes of steel and aluminium components.
- Pre-assembly of components and assembly of the finished product.
- Testing: safety and functionality tests of the luminaire.
- Finished product packaging.



SCENARIOS

MODULES

Production Stage

Distribution Stage

Installation Stage

Use Stage

End-of-life Stage

Resource recovery Stage

SCENARIOS USED

A2.Transport of raw materials. For the component transport phase, the distances and relative quantities transported from the production site to the AEC Illuminazione S.r.l. factory were considered. For the calculation of distances by road, the distance between the company headquarters and the address of the various suppliers was used. For air and sea routes, the Ecotransit website (<https://www.ecotransit.org/en/>) was used instead.

A4.Transport. For the distribution phase, a distance of **839 km** by road and **821 km** by ship was considered based on a weighted average of the countries of installation during the reference year.

A5.Installation process. For the installation of the luminaires, the use of a diesel lifting platform was considered for a time of 20 min, considering both the movement of the vehicle and the actual installation time of the luminaire. For fixing the luminaire to the pole, on the other hand, the use of an electric screwdriver was considered. During the installation phase, the disposal of the final packaging materials is considered by identifying a disposal scenario in European and non-European territory, based on the weighted average of the devices sold by AEC during the reference year.

B1.Use. This phase has already been accounted for in B6.

B2.Maintenance. No ordinary maintenance of the product by the company was considered during its useful life.

B3.Repair. Routine repairs of the product during its useful life are not considered. The operations relating to the LED power supply were accounted for in phase B4.

B4.Replacement. It's planned to replace LED driver at a rate of 5% based on the respective failure rates defined in the data sheets.

B5.Rehabilitation. Rehabilitation operations of the product or its components by the company during its useful life are not considered.

B6.Energy used. During the use phase the devices are powered by low voltage electricity. As indicated in the reference PCR 020 Sub-category, a Reference Life Service (RLS) of 40,000h and the nominal power of the appliance are considered. The energy mix considered for the consumption analysis is a weighted average of the countries of installation for the reference year, with an effective value equal to **0.411 kgCO₂/kWh**. The input data used comes from the Ecoinvent 3.9.1 database.

B7.Water used. No water consumption is expected from the product during its lifetime.

C1.Disassembly. For the disassembly phase, the same impacts were considered as for the installation phase (operation of the diesel lifting platform and electric screwdriver).

C2.Transport. For the transport phase of the equipment to specialised treatment plants, reference was made to a precautionary default average distance of 100 km.

C3.Recycling Processes. For all information related to the treatment process of end-of-life appliances, reference has been made to Table G.4 in Annex G of EN 50693:2019.

C4.Disposal processes. For disposal processes, as for the previous paragraph, reference has been made to the same Annex G of EN 50693:2019.

D. Re-use, recovery, recycling potential. They were considered the C3 phase waste flows sent for recycling as recovered materials matter.

ECO RAYS TP RESULTS

The following tables summarize the total environmental impacts calculated through AEC Illuminazione proprietary LCA-Tool for the ECO RAYS TP street luminaire.

Size: **ECO RAYS TP XXX YYY-Y WWZZ.040-1M**

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	4,39E+01	3,35E+00	1,86E+00	1,58E+00	1,32E+02	2,26E+00	-4,33E+00
GWP-Biogenic	kg CO2 eq.	8,73E-01	-2,67E+00	1,59E-03	5,78E-01	7,39E+00	7,78E-02	-1,30E-02
GWP-Land use	kg CO2 eq.	9,55E-02	4,03E-02	9,37E-04	3,21E-04	1,98E-01	5,40E-04	-8,62E-02
GWP Total	kg CO2 eq.	4,49E+01	7,20E-01	1,86E+00	2,16E+00	1,40E+02	2,34E+00	-4,43E+00
ODP	kg CFC 11 eq.	1,05E-06	8,66E-08	4,01E-08	2,48E-08	2,66E-06	2,92E-08	-1,21E-07
AP	mol H+ eq.	3,86E-01	1,54E-02	1,01E-02	7,56E-03	6,84E-01	8,78E-03	-6,68E-02
EP-Freshwater	kg P eq.	2,33E-02	1,51E-03	1,28E-04	7,22E-05	6,18E-02	1,45E-04	-5,27E-03
EP-Marine	kg N eq.	4,78E-02	7,70E-03	3,49E-03	3,35E-03	1,03E-01	3,96E-03	-5,93E-03
EP-Terrestrial	mol N eq.	5,25E-01	4,78E-02	3,75E-02	3,45E-02	1,07E+00	3,80E-02	-6,63E-02
POCP	kg NMVOC eq.	1,81E-01	1,76E-02	1,28E-02	1,15E-02	4,01E-01	1,24E-02	-2,29E-02
ADPE ⁽²⁾	kg Sb eq.	3,64E-03	1,57E-05	5,81E-06	1,57E-06	1,52E-03	3,11E-06	-4,59E-04
ADPF ⁽²⁾	MJ	5,51E+02	4,71E+01	2,64E+01	2,07E+01	2,17E+03	2,33E+01	-6,32E+01
WDP ⁽²⁾	m³	2,05E+01	1,51E+00	1,05E-01	7,05E-02	5,67E+01	2,23E-01	-4,77E-01

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	2,82E-06	2,38E-07	9,03E-02	2,25E-07	2,07E-02	7,19E-02	-3,20E-01
IRP ⁽¹⁾	kBq U235 eq.	3,50E+00	3,04E-01	3,43E-02	1,43E-02	2,96E+01	3,69E-02	-9,96E-01
ETP-FW ⁽²⁾	CTUe	5,61E+02	4,43E+01	1,30E+01	1,11E+01	4,25E+02	4,44E+01	-5,48E+01
HTP-NC ⁽²⁾	CTUh	2,19E-06	4,41E-08	1,24E+00	1,43E+00	1,23E-02	5,29E+00	-1,23E+00
HTP-C ⁽²⁾	CTUh	9,25E-08	7,49E-06	8,49E-10	2,02E-09	5,54E-08	1,81E-09	-1,62E-08
SQP ⁽²⁾	Pt	2,33E+02	2,82E+02	1,51E+01	3,34E+00	5,45E+02	9,57E+00	-1,50E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	9,68E+01	5,15E+00	4,00E-01	2,14E-01	6,76E+02	4,92E-01	-2,39E+01
PERM	MJ	1,10E+00	4,97E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	9,79E+01	5,49E+01	4,00E-01	2,14E-01	6,76E+02	4,92E-01	-2,39E+01
PENRE	MJ	5,38E+02	-1,48E+00	2,64E+01	2,07E+01	2,17E+03	2,33E+01	-6,32E+01
PENRM	MJ	1,28E+01	4,87E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	5,51E+02	3,39E+00	2,64E+01	2,07E+01	2,17E+03	2,33E+01	-6,32E+01
SM	kg	3,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	6,84E-01	4,51E-02	3,69E-03	2,39E-03	2,53E+00	7,20E-03	-1,61E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	4,14E-02	1,73E-04	1,66E-04	1,37E-04	7,16E-03	1,45E-04	3,69E-03
NHWD	kg	6,67E+00	8,00E-01	1,24E+00	1,43E+00	1,06E+01	5,29E+00	0,00E+00
RWD	kg	8,91E-04	7,73E-05	8,32E-06	3,38E-06	7,47E-03	9,06E-06	-2,64E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	5,85E-01	0,00E+00	2,24E+00	0,00E+00	4,81E+00	1,45E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,72E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

Size: ECO RAYS TP XXX YYY-Y WWZZ.180-2M

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	4,79E+01	3,41E+00	1,98E+00	1,58E+00	1,05E+03	2,99E+00	-4,82E+00
GWP-Biogenic	kg CO2 eq.	8,83E-01	-2,67E+00	1,69E-03	5,78E-01	5,88E+01	7,85E-02	-1,28E-02
GWP-Land use	kg CO2 eq.	1,06E-01	4,03E-02	9,95E-04	3,21E-04	1,58E+00	5,86E-04	-9,00E-02
GWP Total	kg CO2 eq.	4,89E+01	7,76E-01	1,98E+00	2,16E+00	1,11E+03	3,07E+00	-4,92E+00
ODP	kg CFC 11 eq.	3,63E-06	8,71E-08	4,26E-08	2,48E-08	2,12E-05	3,12E-08	-1,29E-07
AP	mol H+ eq.	4,91E-01	1,55E-02	1,07E-02	7,56E-03	5,44E+00	9,10E-03	-1,00E-01
EP-Freshwater	kg P eq.	3,01E-02	1,51E-03	1,36E-04	7,22E-05	4,91E-01	1,56E-04	-8,11E-03
EP-Marine	kg N eq.	5,52E-02	7,72E-03	3,71E-03	3,35E-03	8,21E-01	4,62E-03	-7,65E-03
EP-Terrestrial	mol N eq.	6,15E-01	4,80E-02	3,99E-02	3,45E-02	8,52E+00	3,92E-02	-9,02E-02
POCP	kg NMVOC eq.	2,09E-01	1,79E-02	1,36E-02	1,15E-02	3,19E+00	1,28E-02	-2,97E-02
ADPE ⁽²⁾	kg Sb eq.	4,88E-03	1,61E-05	6,17E-06	1,57E-06	1,17E-02	3,25E-06	-8,78E-04
ADPF ⁽²⁾	MJ	6,12E+02	4,74E+01	2,80E+01	2,07E+01	1,73E+04	2,39E+01	-6,93E+01
WDP ⁽²⁾	m³	2,35E+01	1,51E+00	1,12E-01	7,05E-02	4,51E+02	3,17E-01	-9,25E-01

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

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Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	3,18E-06	2,41E-07	9,59E-02	2,25E-07	2,42E-02	7,68E-02	-4,03E-01
IRP ⁽¹⁾	kBq U235 eq.	3,80E+00	3,05E-01	3,65E-02	1,43E-02	2,36E+02	3,96E-02	-1,06E+00
ETP-FW ⁽²⁾	CTUe	6,54E+02	4,64E+01	1,38E+01	1,11E+01	3,36E+03	4,82E+01	-9,48E+01
HTP-NC ⁽²⁾	CTUh	3,33E-06	4,56E-08	1,31E+00	1,43E+00	2,40E-02	5,70E+00	-1,44E+00
HTP-C ⁽²⁾	CTUh	1,09E-07	8,20E-06	9,01E-10	2,02E-09	4,40E-07	1,89E-09	-2,13E-08
SQP ⁽²⁾	Pt	2,69E+02	2,83E+02	1,61E+01	3,34E+00	4,33E+03	1,00E+01	-2,50E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

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Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	1,06E+02	5,16E+00	4,25E-01	2,14E-01	5,38E+03	5,27E-01	-2,60E+01
PERM	MJ	1,21E+00	4,97E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,07E+02	5,49E+01	4,25E-01	2,14E-01	5,38E+03	5,27E-01	-2,60E+01
PENRE	MJ	5,90E+02	-1,27E+00	2,80E+01	2,07E+01	1,73E+04	2,39E+01	-6,93E+01
PENRM	MJ	2,16E+01	4,98E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	6,12E+02	3,71E+00	2,80E+01	2,07E+01	1,73E+04	2,39E+01	-6,93E+01
SM	kg	3,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	7,72E-01	4,52E-02	3,92E-03	2,39E-03	2,01E+01	1,01E-02	-1,78E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	4,33E-02	1,74E-04	1,77E-04	1,37E-04	5,70E-02	1,48E-04	3,81E-03
NHWD	kg	7,51E+00	8,04E-01	1,31E+00	1,43E+00	8,44E+01	5,70E+00	0,00E+00
RWD	kg	9,68E-04	7,75E-05	8,84E-06	3,38E-06	5,95E-02	9,72E-06	-2,80E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	6,40E-01	0,00E+00	2,24E+00	0,00E+00	4,92E+00	1,57E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,24E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

ECO RAYS TS RESULTS

The following tables summarize the total environmental impacts calculated through AEC Illuminazione proprietary LCA-Tool for the ECO RAYS TS street luminaire.

Size: **ECO RAYS TS XXX YYY-Y WWZZ.040-1M**

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	3,42E+01	2,30E+00	1,47E+00	1,49E+00	1,32E+02	2,03E+00	-3,67E+00
GWP-Biogenic	kg CO2 eq.	6,47E-01	-1,80E+00	1,25E-03	3,76E-01	7,39E+00	7,42E-02	-9,11E-03
GWP-Land use	kg CO2 eq.	6,92E-02	2,60E-02	7,39E-04	2,67E-04	1,98E-01	4,75E-04	-6,37E-02
GWP Total	kg CO2 eq.	3,49E+01	5,25E-01	1,47E+00	1,87E+00	1,40E+02	2,11E+00	-3,74E+00
ODP	kg CFC 11 eq.	8,54E-07	5,76E-08	3,16E-08	2,35E-08	2,66E-06	2,80E-08	-9,85E-08
AP	mol H+ eq.	3,21E-01	1,03E-02	7,98E-03	7,15E-03	6,84E-01	8,35E-03	-6,19E-02
EP-Freshwater	kg P eq.	2,00E-02	1,00E-03	1,01E-04	6,31E-05	6,18E-02	1,28E-04	-4,84E-03
EP-Marine	kg N eq.	3,84E-02	5,04E-03	2,75E-03	3,16E-03	1,03E-01	3,68E-03	-5,34E-03
EP-Terrestrial	mol N eq.	4,27E-01	3,17E-02	2,96E-02	3,30E-02	1,07E+00	3,66E-02	-6,15E-02
POCP	kg NMVOC eq.	1,46E-01	1,22E-02	1,01E-02	1,09E-02	4,01E-01	1,20E-02	-2,08E-02
ADPE ⁽²⁾	kg Sb eq.	3,27E-03	1,12E-05	4,58E-06	1,23E-06	1,52E-03	2,72E-06	-4,71E-04
ADPF ⁽²⁾	MJ	4,31E+02	3,15E+01	2,08E+01	1,96E+01	2,17E+03	2,23E+01	-5,15E+01
WDP ⁽²⁾	m³	1,56E+01	1,02E+00	8,31E-02	6,07E-02	5,67E+01	2,01E-01	-5,48E-01

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

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Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	2,24E-06	1,64E-07	7,12E-02	1,87E-07	2,07E-02	6,49E-02	-2,77E-01
IRP ⁽¹⁾	kBq U235 eq.	2,76E+00	2,02E-01	2,71E-02	1,31E-02	2,96E+01	3,25E-02	-7,39E-01
ETP-FW ⁽²⁾	CTUe	4,68E+02	3,33E+01	1,03E+01	1,01E+01	4,25E+02	3,57E+01	-5,46E+01
HTP-NC ⁽²⁾	CTUh	1,95E-06	3,24E-08	9,74E-01	9,55E-01	1,23E-02	4,59E+00	-1,02E+00
HTP-C ⁽²⁾	CTUh	8,64E-08	6,42E-06	6,69E-10	1,81E-09	5,54E-08	1,74E-09	-1,18E-08
SQP ⁽²⁾	Pt	1,90E+02	1,91E+02	1,19E+01	2,61E+00	5,45E+02	8,22E+00	-1,52E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

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Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	7,39E+01	4,34E+00	3,15E-01	1,95E-01	6,76E+02	4,31E-01	-1,82E+01
PERM	MJ	9,44E-01	3,27E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	7,49E+01	3,70E+01	3,15E-01	1,95E-01	6,76E+02	4,31E-01	-1,82E+01
PENRE	MJ	4,23E+02	-5,61E-01	2,08E+01	1,96E+01	2,17E+03	2,23E+01	-5,15E+01
PENRM	MJ	8,30E+00	3,46E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	4,31E+02	2,90E+00	2,08E+01	1,96E+01	2,17E+03	2,23E+01	-5,15E+01
SM	kg	3,32E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	5,13E-01	3,02E-02	2,91E-03	2,11E-03	2,53E+00	6,50E-03	-1,24E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	3,15E-02	1,19E-04	1,31E-04	1,30E-04	7,16E-03	1,40E-04	2,68E-03
NHWD	kg	5,89E+00	5,32E-01	9,74E-01	9,55E-01	1,06E+01	4,59E+00	0,00E+00
RWD	kg	7,01E-04	5,14E-05	6,56E-06	3,09E-06	7,47E-03	7,95E-06	-1,96E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	5,02E-01	0,00E+00	1,47E+00	0,00E+00	4,21E+00	1,44E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,07E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	3,81E+01	2,36E+00	1,58E+00	1,49E+00	1,18E+03	2,76E+00	-4,15E+00
GWP-Biogenic	kg CO2 eq.	6,56E-01	-1,80E+00	1,35E-03	3,77E-01	6,57E+01	7,49E-02	-8,98E-03
GWP-Land use	kg CO2 eq.	7,88E-02	2,60E-02	7,97E-04	2,67E-04	1,76E+00	5,21E-04	-6,75E-02
GWP Total	kg CO2 eq.	3,88E+01	5,81E-01	1,59E+00	1,87E+00	1,24E+03	2,83E+00	-4,23E+00
ODP	kg CFC 11 eq.	3,43E-06	5,80E-08	3,41E-08	2,35E-08	2,37E-05	3,00E-08	-1,06E-07
AP	mol H+ eq.	4,25E-01	1,04E-02	8,61E-03	7,15E-03	6,07E+00	8,67E-03	-9,53E-02
EP-Freshwater	kg P eq.	2,67E-02	1,01E-03	1,09E-04	6,31E-05	5,48E-01	1,39E-04	-7,68E-03
EP-Marine	kg N eq.	4,57E-02	5,06E-03	2,97E-03	3,16E-03	9,16E-01	4,35E-03	-7,06E-03
EP-Terrestrial	mol N eq.	5,17E-01	3,19E-02	3,19E-02	3,30E-02	9,52E+00	3,78E-02	-8,54E-02
POCP	kg NMVOC eq.	1,74E-01	1,25E-02	1,09E-02	1,09E-02	3,56E+00	1,23E-02	-2,76E-02
ADPE ⁽²⁾	kg Sb eq.	4,51E-03	1,16E-05	4,94E-06	1,23E-06	1,30E-02	2,85E-06	-8,91E-04
ADPF ⁽²⁾	MJ	4,91E+02	3,18E+01	2,24E+01	1,96E+01	1,93E+04	2,29E+01	-5,75E+01
WDP ⁽²⁾	m ³	1,86E+01	1,02E+00	8,97E-02	6,07E-02	5,04E+02	2,94E-01	-9,96E-01

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	2,60E-06	1,67E-07	7,68E-02	1,87E-07	2,42E-02	6,98E-02	-3,60E-01
IRP ⁽¹⁾	kBq U235 eq.	3,05E+00	2,03E-01	2,92E-02	1,31E-02	2,63E+02	3,52E-02	-8,00E-01
ETP-FW ⁽²⁾	CTUe	5,60E+02	3,54E+01	1,11E+01	1,01E+01	3,75E+03	3,95E+01	-9,45E+01
HTP-NC ⁽²⁾	CTUh	3,08E-06	3,39E-08	1,05E+00	9,55E-01	2,40E-02	4,99E+00	-1,23E+00
HTP-C ⁽²⁾	CTUh	1,02E-07	7,13E-06	7,22E-10	1,81E-09	4,91E-07	1,81E-09	-1,69E-08
SQP ⁽²⁾	Pt	2,26E+02	1,91E+02	1,29E+01	2,61E+00	4,84E+03	8,67E+00	-2,53E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	8,24E+01	4,35E+00	3,40E-01	1,95E-01	6,01E+03	4,66E-01	-2,03E+01
PERM	MJ	1,05E+00	3,27E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	8,34E+01	3,70E+01	3,40E-01	1,95E-01	6,01E+03	4,66E-01	-2,03E+01
PENRE	MJ	4,74E+02	-3,49E-01	2,24E+01	1,96E+01	1,93E+04	2,29E+01	-5,76E+01
PENRM	MJ	1,71E+01	3,57E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	4,91E+02	3,22E+00	2,24E+01	1,96E+01	1,93E+04	2,29E+01	-5,76E+01
SM	kg	3,32E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	5,99E-01	3,02E-02	3,14E-03	2,11E-03	2,25E+01	9,39E-03	-1,40E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	3,35E-02	1,20E-04	1,41E-04	1,30E-04	6,37E-02	1,43E-04	2,80E-03
NHWD	kg	6,71E+00	5,36E-01	1,05E+00	9,55E-01	9,43E+01	4,99E+00	0,00E+00
RWD	kg	7,76E-04	5,16E-05	7,08E-06	3,09E-06	6,64E-02	8,61E-06	-2,12E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	5,57E-01	0,00E+00	1,47E+00	0,00E+00	4,32E+00	1,56E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,59E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

ECO RAYS S RESULTS

The following tables summarize the total environmental impacts calculated through AEC Illuminazione proprietary LCA-Tool for the ECO RAYS S street luminaire.

Size: **ECO RAYS S XXX YYY-Y WWZZ.040-1M**

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	3,44E+01	2,01E+00	1,39E+00	1,46E+00	1,32E+02	2,04E+00	-3,65E+00
GWP-Biogenic	kg CO2 eq.	7,02E-01	-1,42E+00	1,19E-03	3,21E-01	7,39E+00	7,64E-02	-8,83E-03
GWP-Land use	kg CO2 eq.	6,67E-02	2,23E-02	7,01E-04	2,48E-04	1,98E-01	4,72E-04	-6,24E-02
GWP Total	kg CO2 eq.	3,52E+01	6,08E-01	1,40E+00	1,78E+00	1,40E+02	2,11E+00	-3,72E+00
ODP	kg CFC 11 eq.	8,58E-07	4,96E-08	3,00E-08	2,31E-08	2,66E-06	2,80E-08	-9,76E-08
AP	mol H+ eq.	3,20E-01	8,80E-03	7,57E-03	7,01E-03	6,84E-01	8,34E-03	-6,17E-02
EP-Freshwater	kg P eq.	2,01E-02	8,65E-04	9,56E-05	5,98E-05	6,18E-02	1,27E-04	-4,83E-03
EP-Marine	kg N eq.	3,85E-02	4,31E-03	2,61E-03	3,09E-03	1,03E-01	3,69E-03	-5,32E-03
EP-Terrestrial	mol N eq.	4,28E-01	2,69E-02	2,81E-02	3,24E-02	1,07E+00	3,65E-02	-6,14E-02
POCP	kg NMVOC eq.	1,47E-01	1,06E-02	9,58E-03	1,07E-02	4,01E-01	1,20E-02	-2,08E-02
ADPE ⁽²⁾	kg Sb eq.	3,27E-03	9,99E-06	4,35E-06	1,12E-06	1,52E-03	2,72E-06	-4,72E-04
ADPF ⁽²⁾	MJ	4,35E+02	2,66E+01	1,97E+01	1,91E+01	2,17E+03	2,23E+01	-5,10E+01
WDP ⁽²⁾	m ³	1,54E+01	8,70E-01	7,89E-02	5,70E-02	5,67E+01	2,01E-01	-5,53E-01

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

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Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	2,24E-06	1,43E-07	6,76E-02	1,74E-07	2,07E-02	6,47E-02	-2,75E-01
IRP ⁽¹⁾	kBq U235 eq.	2,85E+00	1,72E-01	2,57E-02	1,26E-02	2,96E+01	3,23E-02	-7,23E-01
ETP-FW ⁽²⁾	CTUe	4,65E+02	3,11E+01	9,74E+00	9,80E+00	4,25E+02	3,50E+01	-5,46E+01
HTP-NC ⁽²⁾	CTUh	1,94E-06	2,95E-08	9,25E-01	7,53E-01	1,23E-02	4,61E+00	-1,01E+00
HTP-C ⁽²⁾	CTUh	8,99E-08	6,43E-06	6,35E-10	1,74E-09	5,54E-08	1,74E-09	-1,13E-08
SQP ⁽²⁾	Pt	1,93E+02	1,53E+02	1,13E+01	2,33E+00	5,45E+02	8,22E+00	-1,53E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

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Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	7,41E+01	3,15E+00	2,99E-01	1,88E-01	6,76E+02	4,28E-01	-1,79E+01
PERM	MJ	9,46E-01	2,68E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	7,50E+01	2,99E+01	2,99E-01	1,88E-01	6,76E+02	4,28E-01	-1,79E+01
PENRE	MJ	4,27E+02	6,22E-02	1,97E+01	1,91E+01	2,17E+03	2,23E+01	-5,10E+01
PENRM	MJ	8,52E+00	2,85E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	4,35E+02	2,91E+00	1,97E+01	1,91E+01	2,17E+03	2,23E+01	-5,10E+01
SM	kg	3,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	5,07E-01	2,58E-02	2,76E-03	2,00E-03	2,53E+00	6,49E-03	-1,21E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	3,06E-02	1,04E-04	1,24E-04	1,27E-04	7,16E-03	1,40E-04	2,62E-03
NHWD	kg	5,93E+00	4,53E-01	9,25E-01	7,53E-01	1,06E+01	4,61E+00	0,00E+00
RWD	kg	7,25E-04	4,38E-05	6,23E-06	2,99E-06	7,47E-03	7,92E-06	-1,92E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	5,03E-01	0,00E+00	1,23E+00	0,00E+00	4,23E+00	1,46E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,09E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	3,84E+01	2,06E+00	1,51E+00	1,46E+00	1,18E+03	2,76E+00	-4,14E+00
GWP-Biogenic	kg CO2 eq.	7,17E-01	-1,42E+00	1,29E-03	3,21E-01	6,57E+01	7,71E-02	-8,70E-03
GWP-Land use	kg CO2 eq.	7,74E-02	2,23E-02	7,59E-04	2,48E-04	1,76E+00	5,18E-04	-6,62E-02
GWP Total	kg CO2 eq.	3,92E+01	6,64E-01	1,51E+00	1,78E+00	1,24E+03	2,84E+00	-4,21E+00
ODP	kg CFC 11 eq.	3,44E-06	5,00E-08	3,25E-08	2,31E-08	2,37E-05	3,00E-08	-1,05E-07
AP	mol H+ eq.	4,24E-01	8,90E-03	8,20E-03	7,01E-03	6,07E+00	8,66E-03	-9,51E-02
EP-Freshwater	kg P eq.	2,69E-02	8,70E-04	1,04E-04	5,98E-05	5,48E-01	1,38E-04	-7,67E-03
EP-Marine	kg N eq.	4,59E-02	4,33E-03	2,83E-03	3,09E-03	9,16E-01	4,36E-03	-7,05E-03
EP-Terrestrial	mol N eq.	5,17E-01	2,71E-02	3,04E-02	3,24E-02	9,52E+00	3,78E-02	-8,53E-02
POCP	kg NMVOC eq.	1,75E-01	1,09E-02	1,04E-02	1,07E-02	3,56E+00	1,23E-02	-2,76E-02
ADPE ⁽²⁾	kg Sb eq.	4,50E-03	1,04E-05	4,71E-06	1,12E-06	1,30E-02	2,85E-06	-8,92E-04
ADPF ⁽²⁾	MJ	4,97E+02	2,69E+01	2,14E+01	1,91E+01	1,93E+04	2,29E+01	-5,71E+01
WDP ⁽²⁾	m ³	1,84E+01	8,73E-01	8,55E-02	5,70E-02	5,04E+02	2,94E-01	-1,00E+00

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	2,60E-06	1,46E-07	7,32E-02	1,74E-07	2,42E-02	6,96E-02	-3,59E-01
IRP ⁽¹⁾	kBq U235 eq.	3,13E+00	1,73E-01	2,78E-02	1,26E-02	2,63E+02	3,50E-02	-7,84E-01
ETP-FW ⁽²⁾	CTUe	5,58E+02	3,32E+01	1,06E+01	9,80E+00	3,75E+03	3,88E+01	-9,45E+01
HTP-NC ⁽²⁾	CTUh	3,08E-06	3,10E-08	1,00E+00	7,53E-01	2,40E-02	5,01E+00	-1,23E+00
HTP-C ⁽²⁾	CTUh	1,06E-07	7,14E-06	6,88E-10	1,74E-09	4,91E-07	1,81E-09	-1,64E-08
SQP ⁽²⁾	Pt	2,30E+02	1,53E+02	1,22E+01	2,33E+00	4,84E+03	8,66E+00	-2,54E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	8,27E+01	3,16E+00	3,24E-01	1,88E-01	6,01E+03	4,64E-01	-2,00E+01
PERM	MJ	1,05E+00	2,68E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	8,38E+01	2,99E+01	3,24E-01	1,88E-01	6,01E+03	4,64E-01	-2,00E+01
PENRE	MJ	4,80E+02	2,74E-01	2,14E+01	1,91E+01	1,93E+04	2,29E+01	-5,71E+01
PENRM	MJ	1,73E+01	2,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	4,97E+02	3,23E+00	2,14E+01	1,91E+01	1,93E+04	2,29E+01	-5,71E+01
SM	kg	3,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	5,93E-01	2,59E-02	2,99E-03	2,00E-03	2,25E+01	9,38E-03	-1,38E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	3,26E-02	1,05E-04	1,35E-04	1,27E-04	6,37E-02	1,43E-04	2,74E-03
NHWD	kg	6,90E+00	4,58E-01	1,00E+00	7,53E-01	9,43E+01	5,01E+00	0,00E+00
RWD	kg	7,97E-04	4,40E-05	6,75E-06	2,99E-06	6,64E-02	8,58E-06	-2,08E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	5,58E-01	0,00E+00	1,23E+00	0,00E+00	4,34E+00	1,57E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,61E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

ECO RAYS BR RESULTS

The following tables summarize the total environmental impacts calculated through AEC Illuminazione proprietary LCA-Tool for the ECO RAYS BR street luminaire.

Size: **ECO RAYS BR XXX YYY-Y WWZZ.040-1M**

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	3,76E+01	1,67E+00	1,32E+00	1,43E+00	1,32E+02	2,11E+00	-3,92E+00
GWP-Biogenic	kg CO2 eq.	7,28E-01	-1,15E+00	1,13E-03	2,46E-01	7,39E+00	6,49E-02	-1,20E-02
GWP-Land use	kg CO2 eq.	7,26E-02	1,70E-02	6,67E-04	2,30E-04	1,98E-01	4,90E-04	-7,01E-02
GWP Total	kg CO2 eq.	3,84E+01	5,37E-01	1,33E+00	1,68E+00	1,40E+02	2,17E+00	-4,00E+00
ODP	kg CFC 11 eq.	9,07E-07	3,92E-08	2,86E-08	2,26E-08	2,66E-06	2,82E-08	-1,03E-07
AP	mol H+ eq.	3,93E-01	7,03E-03	7,20E-03	6,87E-03	6,84E-01	8,43E-03	-8,53E-02
EP-Freshwater	kg P eq.	2,48E-02	6,84E-04	9,09E-05	5,67E-05	6,18E-02	1,31E-04	-6,68E-03
EP-Marine	kg N eq.	4,37E-02	3,35E-03	2,48E-03	3,03E-03	1,03E-01	3,75E-03	-6,49E-03
EP-Terrestrial	mol N eq.	4,93E-01	2,13E-02	2,67E-02	3,19E-02	1,07E+00	3,68E-02	-7,70E-02
POCP	kg NMVOC eq.	1,66E-01	8,89E-03	9,11E-03	1,05E-02	4,01E-01	1,21E-02	-2,48E-02
ADPE ⁽²⁾	kg Sb eq.	4,12E-03	8,64E-06	4,13E-06	9,99E-07	1,52E-03	2,72E-06	-7,80E-04
ADPF ⁽²⁾	MJ	4,70E+02	2,13E+01	1,88E+01	1,87E+01	2,17E+03	2,24E+01	-5,63E+01
WDP ⁽²⁾	m³	1,82E+01	6,93E-01	7,50E-02	5,37E-02	5,67E+01	2,07E-01	-8,31E-01

ACRONYMES

GWP-Fossil = One Hundred Year Global Warming Potential - Fossil. **GWP-Biogenic** = One Hundred Year Global Warming Potential - Biogenic. **GWP-Land use** = One Hundred Year global warming potential - Land use and land-use change. **ODP** = Ozone Depletion Potential in the stratosphere. **AP** = Acidification Potential of Soil and Water. **EP-Freshwater** = Eutrophication potential, for freshwater. **EP-Marine** = Eutrophication potential, for salt water. **EP-Terrestrial** = Terrestrial eutrophication potential. **POCP** = Photochemical Ozone Formation. **ADPE** = Abiotic Non-Fossil Resource Depletion Potential. **ADP-Fossil** = Depletion potential of abiotic fossil resources. **WDP** = Water Deprivation Potential (user), deprivation-weighted water consumption.

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Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	2,52E-06	1,19E-07	6,43E-02	1,61E-07	2,07E-02	6,62E-02	-3,41E-01
IRP ⁽¹⁾	kBq U235 eq.	2,91E+00	1,36E-01	2,44E-02	1,22E-02	2,96E+01	3,32E-02	-8,51E-01
ETP-FW ⁽²⁾	CTUe	5,72E+02	2,84E+01	9,26E+00	9,45E+00	4,25E+02	3,91E+01	-8,64E+01
HTP-NC ⁽²⁾	CTUh	2,71E-06	2,62E-08	8,79E-01	6,00E-01	1,23E-02	4,54E+00	-1,13E+00
HTP-C ⁽²⁾	CTUh	8,39E-08	6,48E-06	6,04E-10	1,67E-09	5,54E-08	1,75E-09	-1,84E-08
SQP ⁽²⁾	Pt	2,19E+02	1,23E+02	1,08E+01	2,09E+00	5,45E+02	8,32E+00	-2,19E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

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Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	8,21E+01	3,15E+00	2,84E-01	1,81E-01	6,76E+02	4,44E-01	-2,05E+01
PERM	MJ	9,52E-01	2,09E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	8,30E+01	2,40E+01	2,84E-01	1,81E-01	6,76E+02	4,44E-01	-2,05E+01
PENRE	MJ	4,60E+02	4,47E-01	1,88E+01	1,87E+01	2,17E+03	2,24E+01	-5,63E+01
PENRM	MJ	9,99E+00	2,48E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	4,70E+02	2,93E+00	1,88E+01	1,87E+01	2,17E+03	2,24E+01	-5,63E+01
SM	kg	3,84E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	5,82E-01	2,05E-02	2,62E-03	1,91E-03	2,53E+00	6,67E-03	-1,41E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	3,61E-02	8,48E-05	1,18E-04	1,25E-04	7,16E-03	1,41E-04	3,23E-03
NHWD	kg	5,91E+00	3,60E-01	8,79E-01	6,00E-01	1,06E+01	4,54E+00	0,00E+00
RWD	kg	7,39E-04	3,46E-05	5,92E-06	2,89E-06	7,47E-03	8,13E-06	-2,25E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	5,06E-01	0,00E+00	9,52E-01	0,00E+00	4,14E+00	1,35E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,33E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

Main Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
GWP-Fossil	kg CO2 eq.	4,15E+01	1,72E+00	1,44E+00	1,43E+00	1,18E+03	2,83E+00	-4,40E+00
GWP-Biogenic	kg CO2 eq.	7,38E-01	-1,14E+00	1,23E-03	2,46E-01	6,57E+01	6,56E-02	-1,19E-02
GWP-Land use	kg CO2 eq.	8,33E-02	1,70E-02	7,25E-04	2,30E-04	1,76E+00	5,35E-04	-7,39E-02
GWP Total	kg CO2 eq.	4,23E+01	5,93E-01	1,44E+00	1,68E+00	1,24E+03	2,90E+00	-4,49E+00
ODP	kg CFC 11 eq.	3,49E-06	3,96E-08	3,11E-08	2,26E-08	2,37E-05	3,01E-08	-1,11E-07
AP	mol H+ eq.	4,98E-01	7,12E-03	7,83E-03	6,87E-03	6,07E+00	8,76E-03	-1,19E-01
EP-Freshwater	kg P eq.	3,15E-02	6,90E-04	9,88E-05	5,67E-05	5,48E-01	1,42E-04	-9,52E-03
EP-Marine	kg N eq.	5,11E-02	3,37E-03	2,70E-03	3,03E-03	9,16E-01	4,42E-03	-8,21E-03
EP-Terrestrial	mol N eq.	5,83E-01	2,15E-02	2,90E-02	3,19E-02	9,52E+00	3,81E-02	-1,01E-01
POCP	kg NMVOC eq.	1,94E-01	9,20E-03	9,91E-03	1,05E-02	3,56E+00	1,24E-02	-3,16E-02
ADPE ⁽²⁾	kg Sb eq.	5,36E-03	9,07E-06	4,49E-06	9,99E-07	1,30E-02	2,85E-06	-1,20E-03
ADPF ⁽²⁾	MJ	5,31E+02	2,16E+01	2,04E+01	1,87E+01	1,93E+04	2,31E+01	-6,24E+01
WDP ⁽²⁾	m ³	2,12E+01	6,96E-01	8,16E-02	5,37E-02	5,04E+02	3,00E-01	-1,28E+00

ACRONYMES

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Additional Environmental Impact Indicators – Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PM	disease inc.	2,88E-06	1,22E-07	6,99E-02	1,61E-07	2,42E-02	7,11E-02	-4,24E-01
IRP ⁽¹⁾	kBq U235 eq.	3,21E+00	1,37E-01	2,66E-02	1,22E-02	2,63E+02	3,59E-02	-9,12E-01
ETP-FW ⁽²⁾	CTUe	6,64E+02	3,04E+01	1,01E+01	9,45E+00	3,75E+03	4,28E+01	-1,26E+02
HTP-NC ⁽²⁾	CTUh	3,84E-06	2,77E-08	9,56E-01	6,00E-01	2,40E-02	4,95E+00	-1,35E+00
HTP-C ⁽²⁾	CTUh	1,00E-07	7,19E-06	6,57E-10	1,67E-09	4,91E-07	1,83E-09	-2,35E-08
SQP ⁽²⁾	Pt	2,56E+02	1,23E+02	1,17E+01	2,09E+00	4,84E+03	8,76E+00	-3,19E+01

ACRONYMES

PM = Particulate Matter Emissions - Potential incidence of disease due to PM emissions. **IRP** = Ionising radiation, human health - Potential efficiency of human exposure to U235. **ETP-FW** = Ecotoxicity (freshwater) - Potential comparative toxicity unit for ecosystems. **HTP-NC** = Human toxicity, non-carcinogenic effects - Potential comparative toxicity unit for humans. **HTP-C** = Human toxicity, cancer - Potential comparative toxicity unit for CTUh. **SQP** = Land use related impacts / Soil quality - Potential soil quality index.

Disclaimer (1) = This impact category mainly concerns the possible impact of low-dose ionising radiation on humans from the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or underground radioactive waste disposal facilities. **Disclaimer (2)** = The results of this environmental impact indicator should be used with caution, as uncertainties about the results are high or experience with the indicator is limited.

Resource use - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
PERE	MJ	9,08E+01	3,17E+00	3,09E-01	1,81E-01	6,01E+03	4,79E-01	-2,26E+01
PERM	MJ	1,06E+00	2,09E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	9,18E+01	2,40E+01	3,09E-01	1,81E-01	6,01E+03	4,79E-01	-2,26E+01
PENRE	MJ	5,12E+02	6,59E-01	2,04E+01	1,87E+01	1,93E+04	2,31E+01	-6,24E+01
PENRM	MJ	1,88E+01	2,59E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	5,31E+02	3,25E+00	2,04E+01	1,87E+01	1,93E+04	2,31E+01	-6,24E+01
SM	kg	3,84E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	6,70E-01	2,06E-02	2,85E-03	1,91E-03	2,25E+01	9,57E-03	-1,57E-01

ACRONYMES

PERE = Use of renewable primary energy resources excluding primary renewable energy resources used as feedstocks.
PERM = Use of renewable primary energy resources used as feedstocks. **PERT** = Use of renewable primary energy resources.
PENRE = Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as feedstocks.
PENRM = Use of non-renewable primary energy resources as feedstocks. **PENRT** = Use of non-renewable primary energy resources.
SM = Use of secondary materials. **RSF** = Use of renewable secondary fuels. **NRSF** = Use of non-renewable secondary fuels. **FW** = Net use of fresh water.

Waste generated - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
HWD	kg	3,80E-02	8,57E-05	1,29E-04	1,25E-04	6,37E-02	1,44E-04	3,35E-03
NHWD	kg	6,75E+00	3,65E-01	9,56E-01	6,00E-01	9,43E+01	4,95E+00	0,00E+00
RWD	kg	8,16E-04	3,48E-05	6,44E-06	2,89E-06	6,64E-02	8,79E-06	-2,41E-04

ACRONYMES

HWD = Hazardous Waste Disposed. **NHWD** = Non-Hazardous Waste Disposed. **RWD** = Radioactive Waste Disposed.

Outflows - Results per declared unit

Indicator	Unit of measure	Manufacturing Stage		Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
		A1-A2	A3	A4	A5	B1-B7	C1-C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	5,62E-01	0,00E+00	9,52E-01	0,00E+00	4,25E+00	1,47E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,85E-01	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ACRONYMES

CRU = Components for Reuse. **MFR** = Materials for Recycling. **MER** = Materials for Energy Recovery. **EEE** = Exported Electrical Energy. **EET** = Exported Thermal Energy.

SUMMARY TABLES

Total CO₂ equivalent production of the luminaire

Model	Size	GWP Total A1-A3 [kgCO ₂ eq]	GWP Total A1-C4 [kgCO ₂ eq]
ECO RAYS TP	ECO RAYS TP XXX YYY-Y WWZZ.040-1M	4,56E+01	1,92E+02*
	ECO RAYS TP XXX YYY-Y WWZZ.180-2M	4,97E+01	1,17E+03*
ECO RAYS TS	ECO RAYS TS XXX YYY-Y WWZZ.040-1M	3,55E+01	1,81E+02*
	ECO RAYS TS XXX YYY-Y WWZZ.200-2M	3,94E+01	1,29E+03*
ECO RAYS S	ECO RAYS S XXX YYY-Y WWZZ.040-1M	3,58E+01	1,81E+02*
	ECO RAYS S XXX YYY-Y WWZZ.200-2M	3,99E+01	1,29E+03*
ECO RAYS BR	ECO RAYS BR XXX YYY-Y WWZZ.040-1M	3,89E+01	1,84E+02*
	ECO RAYS BR XXX YYY-Y WWZZ.200-2M	4,29E+01	1,29E+03*

* Results for the GWP Total indicator refer to the functional units analysed and may be subject to change if configurations other than those indicated are considered.

BYBLIOGRAPHY & REFERENCES

- [1] **UNI ISO 14040: 2021**, Environmental Management - Life Cycle Assessment - Principles and Framework.
- [2] **UNI ISO 14044: 2021**, Environmental Management - Life Cycle Assessment - Requirements and Guidelines.
- [3] **UNI EN ISO 14025:2010**, Environmental labels and declarations - Type III environmental declarations - Principles and procedures (ISO 14025:2006).
- [4] **UNI EN ISO 14021:2021**, Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling).
- [5] **UNI EN 15804:2012 + A2:2019**, Sustainability of construction - Environmental Product Declarations - Key development rules per product category.
- [6] **EN 50693:2019** Product category rules for life cycle assessments of electronic and electrical products and systems.
- [7] **EPDIItaly Regulation** rev. 6.0 published on 30/10/2023.
- [8] **Core PCR 007** - Electronic and electrical products and systems – Rev. 3.1 – 12/11/2024.
- [9] **Sub-category PCR 020** “Electronic and electrical products and systems – Home appliances – REV2 – 2024/10/03.
- [10] **AEC Illuminazione** website (www.aecilluminazione.it).
- [11] **M-LCA-004 LCA-Tool – Report LCA_AEC Illuminazione.**