



TECHNOLOGIES FOR SUSTAINABLE LIGHTING



SUSTAINABLE LIGHT

- *High visual comfort*
- *Colour temperatures that adapt to the area of application*
- *Reduction of harmful frequencies*
- *Reducing Levels*



SUSTAINABLE PROCESS

- *Use of recyclable materials*
- *Use of green energy for production*
- *Reuse or refurbishment of devices*

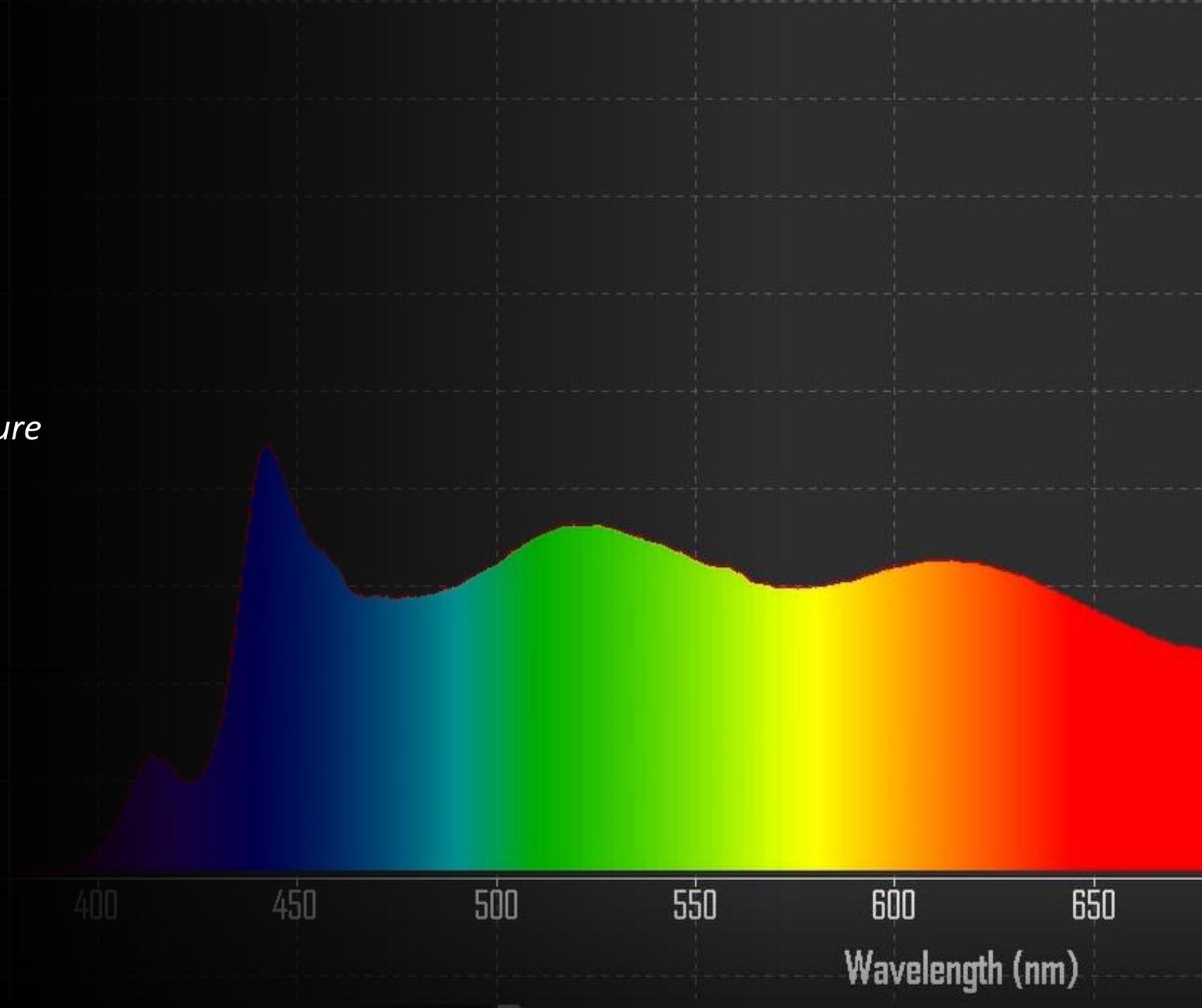




SUSTAINABLE LIGHT

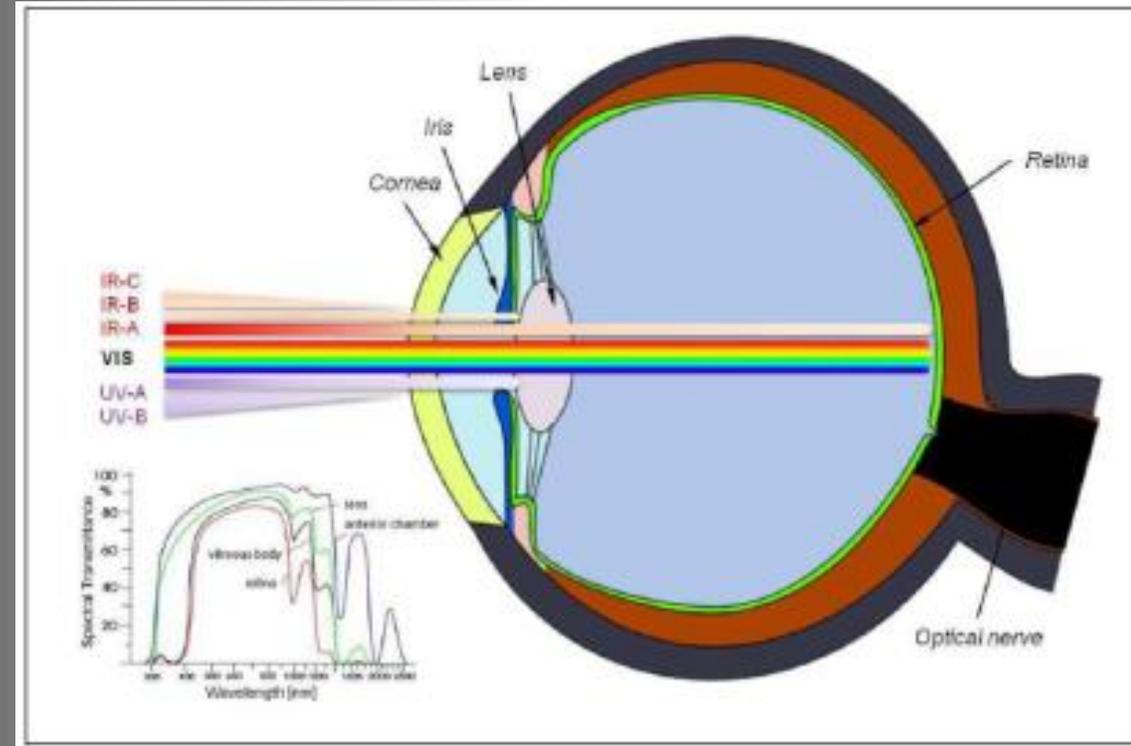
SUSTAINABLE LIGHTING

*The importance of color temperature
&
Blue Light Emission Limitation*

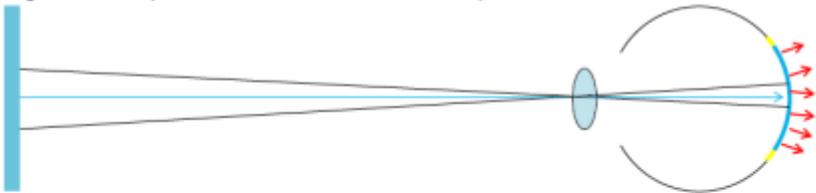


Key standards: IEC/EN 62471, IEC TR 62778

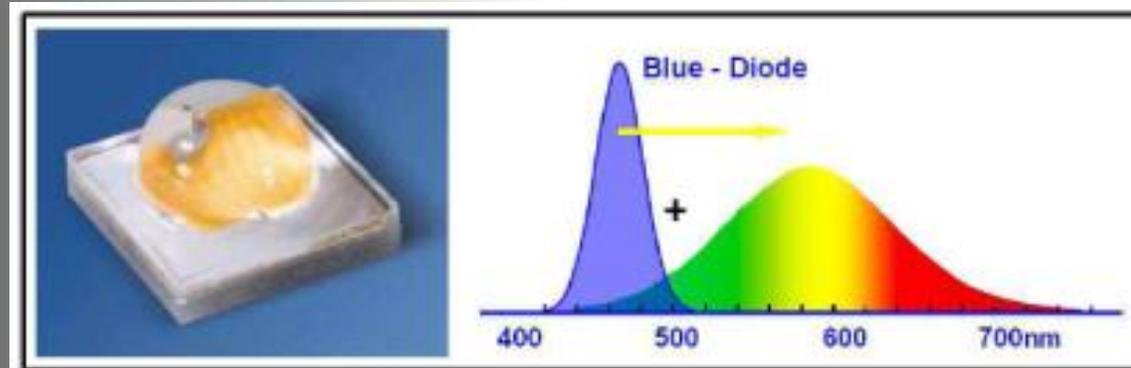
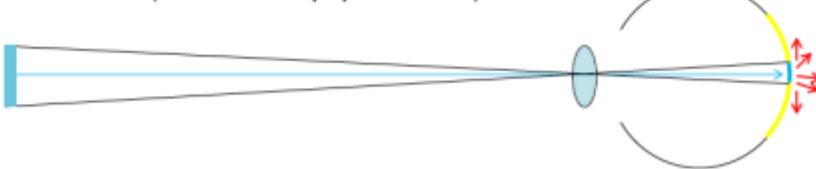
- Eye sensitivity
- Width of source
- Exposure time
- Intensity
- Distance



• large source (radiance of source relevant)



• small source (irradiance at pupil relevant)



Light influences natural cycles and behaviours

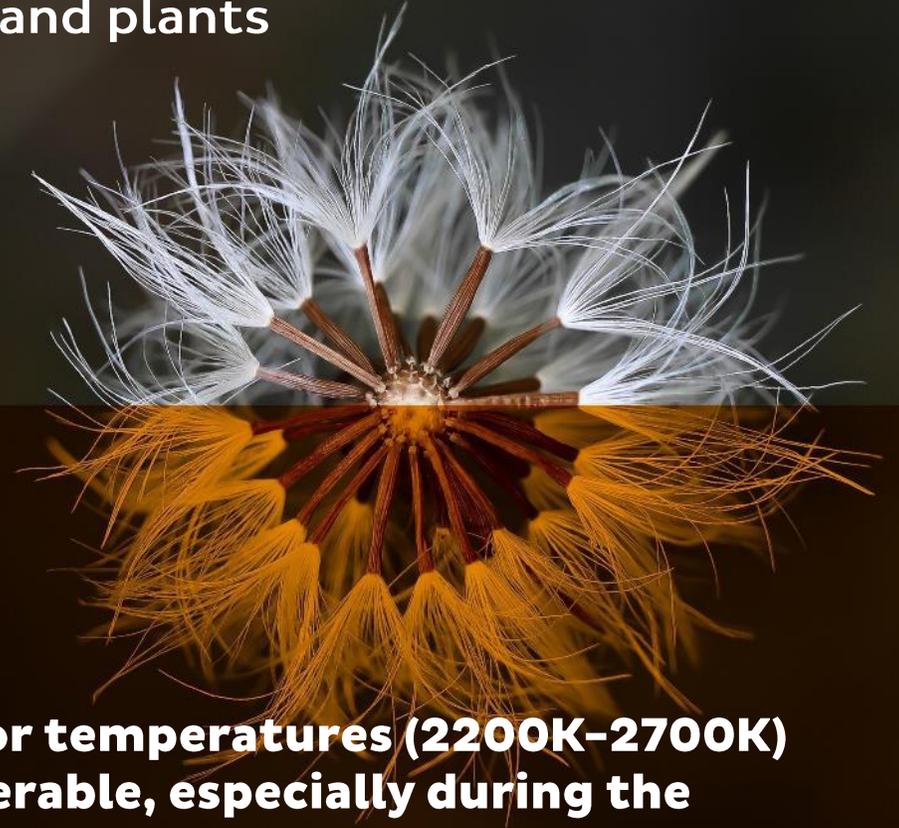
- *Light is one of the fundamental parameters that regulate the life of insects, land and aquatic animals and plants*
- *Intensity and color influence the waking cycle, food, reproduction and growth, orientation abilities, predator-prey relationship, and photosynthesis itself in plants*
- *Natural processes such as pollination are therefore modified so that they can potentially also influence biodiversity*



Light influences natural cycles and behaviours



- Recent studies allow us to highlight the light spectra that impact the behavior of animals and plants



- **Low color temperatures (2200K–2700K) are preferable, especially during the busier months (spring to fall)**



Morning

3500-4500K

Noon

5500-6500K

Afternoon

3500-4500K

The effect of dynamic lighting on your everyday life

TUNABLE WHITE

- **When switched on, the luminaire emits its maximum flux at a temperature of 2700°C**
- **During the evening and night hours, the colour temperature and luminous flux can be gradually reduced up to 2200K.**





SUSTAINABLE MANUFACTURING PROCESS

An aerial photograph of a dense forest, likely a coniferous forest, with a road running horizontally through the center. The trees are mostly green, but there are several dead, grey trees scattered throughout. The text is overlaid on the road.

It is not enough to make a nice presentation with a few trees, to be able to declare yourself a Sustainable Company!

What the European Community is asking to us

In accordance with the **GREEN DEAL** signed in 2019, EU member states committed to achieving **carbon neutrality by 2050**



Limit the Thermal rising at
MAX 1.5°C

The European Community requires reporting on the sustainability of a Company, through a dedicated report drawn up according to standardized guidelines



Objectives:

- **Involving more businesses**
- **Standardize reporting methodologies at European level and align with other regulations**
- **Disseminate comparable and reliable information**

2024 Report (2025
Annual Report)

2025 Report (2026
Annual Report)

Large public interest
companies (> 500
employees)
already subject to the
Non-Financial Reporting
Directive (NFRD).

Companies listed on the stock
exchange.

Banks and
insurance.

Large companies that meet more
than 2 criteria
+250 employees 50
million euros net turnover 25
million euros
balance.

For AEC, this obligation starts from 2026, but we are drafting it voluntarily as early as 2022!

**What does the market ask
to companies like AEC?**

It asks to report information related to the sustainability of its products.



LCA



I-TRON

EPD

*Envoiremental
Product
Declaration*

Alimentatore

Dispositivo elettronico RAEE

Copertura

Alluminio pressofuso

SPD

Dispositivo elettronico RAEE

Telaio

Alluminio pressofuso

PCB

Alluminio - Ceramica - Rame

Gancio di chiusura

Alluminio

Riflettore ottico

Alluminio

Testa palo

Alluminio pressofuso

Schermo ottico

Vetro temperato

Accessori di fissaggio

Acciaio zincato



LCA

Life Cycle Assessment

A. PRODUCTION STAGE

Module A1: Raw material extraction
Module A2: Transport
Module A3: Production

B. CONSTRUCTION STAGE

Module A4: Transport
Module A5: Installation

C. USE STAGE

Module B1: Use
Module B2: Maintenance
Module B3: Repair
Module B4: Replacement
Module B5: Restructuring

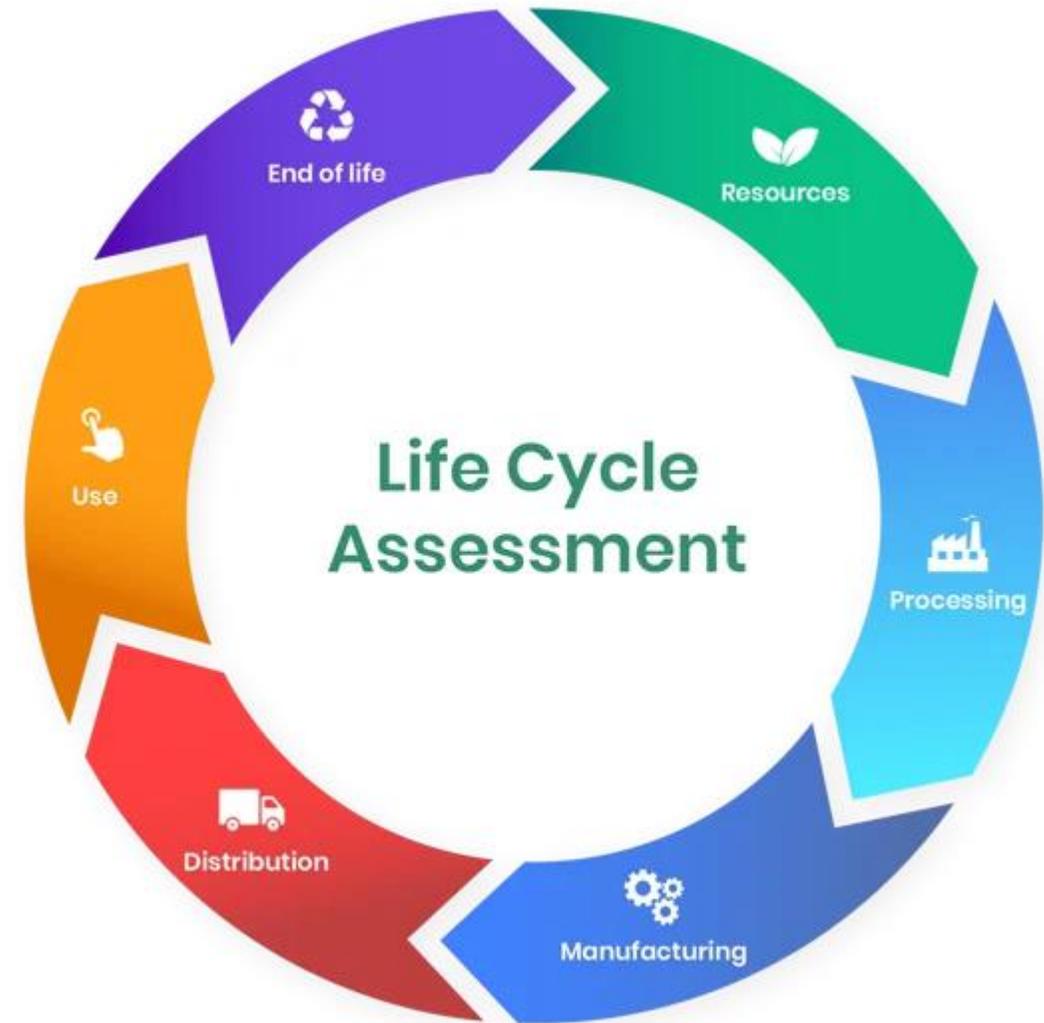
Module B6: Energy use
Module B7: Water use

D. END-OF-LIFE STAGE

Module C1: Demolition
Module C2: Transport
Module C3: Waste processing
Module C4: Disposal

E. BENEFITS AND LOADS BEYOND THE BOUNDARIES OF THE SYSTEM

Module D: Reuse-recovery-recycling potential



LCA Results

All the information from each stage of a product's life is translated into a series of indicators that make it possible to identify what the impact of a product or service on the environment is.

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.	2,63E+01	1,14E+00	8,46E-01	1,39E+00	1,18E+03	2,53E+00	-1,55E+00
GWP-Biogenic	kg CO2 eq.	5,03E-01	-5,38E-01	7,22E-04	3,61E-01	6,57E+01	3,99E-02	-5,43E-03
GWP-Land use	kg CO2 eq.	4,61E-02	1,29E-02	4,25E-04	2,03E-04	1,76E+00	3,56E-04	-3,56E-02
GWP Total	kg CO2 eq.	2,69E+01	6,11E-01	8,47E-01	1,75E+00	1,24E+03	2,57E+00	-1,60E+00
ODP	kg CFC 11 eq.	3,18E-06	2,85E-08	1,82E-08	2,20E-08	2,37E-05	2,57E-08	-4,65E-08
AP	mol H+ eq.	2,38E-01	4,87E-03	4,59E-03	6,71E-03	6,07E+00	7,81E-03	-1,35E-02
EP-Freshwater	kg P eq.	1,36E-02	5,08E-04	5,80E-05	5,20E-05	5,48E-01	9,76E-05	-1,08E-03
EP-Marine	kg N eq.	2,94E-02	2,45E-03	1,59E-03	2,99E-03	9,16E-01	4,13E-03	-1,63E-03
EP-Terrestrial	mol N eq.	3,22E-01	1,48E-02	1,70E-02	3,13E-02	9,52E+00	3,51E-02	-1,61E-02
POCP	kg NMVOC eq.	1,11E-01	5,87E-03	5,81E-03	1,03E-02	3,56E+00	1,14E-02	-6,40E-03
ADPE ⁽²⁾	kg Sb eq.	2,72E-03	5,76E-06	2,64E-06	8,31E-07	1,30E-02	1,97E-06	-2,18E-05
ADPF ⁽²⁾	MJ	3,38E+02	1,41E+01	1,20E+01	1,81E+01	1,93E+04	2,06E+01	-2,35E+01
WDP ⁽²⁾	m ³	1,34E+01	5,08E-01	4,79E-02	4,81E-02	5,04E+02	1,39E-01	1,35E-02

[GWP]

Global warming potential

[ODP]

Ozone Depletion potential in the stratosphere

[AP]

Acidification potential of soil and water

[EP]

Eutrophication potential of fresh and salt water

[POCP]

Photochemical formation of ozone

[ADPE]

Depletion potential of non-fossil abiotic resources

[ADPF]

Depletion potential of fossil abiotic resources

[WDP] Water use

LCA Results

All the information from each stage of a product's life is translated into a series of indicators that make it possible to identify what the impact of a product or service on the environment is.

This phase depends on the company's production processes and its raw material supply chain.

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ADPE ⁽²⁾	kg Sb eq.	2,72E-03	5,76E-06	2,64E-06	8,31E-07	1,30E-02	1,97E-06	-2,18E-05
ADPF ⁽²⁾	MJ	3,38E+02	1,41E+01	1,20E+01	1,81E+01	1,93E+04	2,06E+01	-2,35E+01
WDP ⁽²⁾	m ³	1,34E+01	5,08E-01	4,79E-02	4,81E-02	5,04E+02	1,39E-01	1,35E-02

LCA Results

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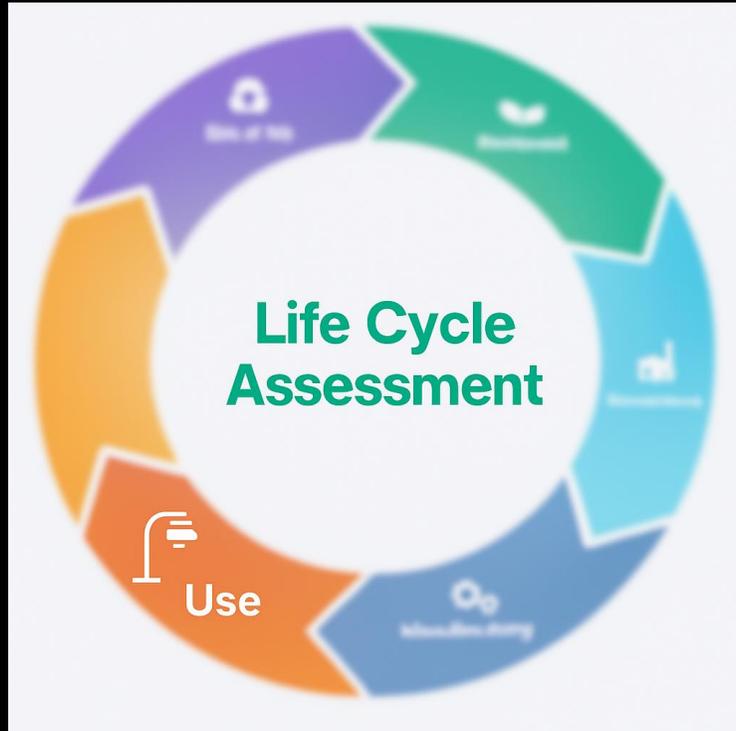
These phases depend on many external factors, such as the country of installation, its energy mix and waste disposal regulations.

Indicator	Unit of measure	Manufacturing Stage	
		A1-A2	A3
GWP-Fossil	kg CO2 eq.	2,63E+01	1,14E+00
GWP-Biogenic	kg CO2 eq.	5,03E-01	-5,38E-01
GWP-Land use	kg CO2 eq.	4,61E-02	1,29E-02
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WDP ⁽²⁾	m ³	1,34E+01	5,08E-01

Distribution Stage	Installation Stage	Use Stage	End-of-life Stage	Resource recovery stage
A4	A5	B1-B7	C1-C4	D
8,46E-01	1,39E+00	1,18E+03	2,53E+00	-1,55E+00
7,22E-04	3,61E-01	6,57E+01	3,99E-02	-5,43E-03
4,25E-04	2,03E-04	1,76E+00	3,56E-04	-3,56E-02
8,47E-01	1,75E+00	1,24E+03	2,57E+00	-1,60E+00
1,82E-08	2,20E-08	2,37E-05	2,57E-08	-4,65E-08
4,59E-03	6,71E-03	6,07E+00	7,81E-03	-1,35E-02
5,80E-05	5,20E-05	5,48E-01	9,76E-05	-1,08E-03
1,59E-03	2,99E-03	9,16E-01	4,13E-03	-1,63E-03
1,70E-02	3,13E-02	9,52E+00	3,51E-02	-1,61E-02
5,81E-03	1,03E-02	3,56E+00	1,14E-02	-6,40E-03
2,64E-06	8,31E-07	1,30E-02	1,97E-06	-2,18E-05
1,20E+01	1,81E+01	1,93E+04	2,06E+01	-2,35E+01
4,79E-02	4,81E-02	5,04E+02	1,39E-01	1,35E-02

How are the values of the environmental impact indicators calculated?

CO₂/kWh conversion factors from the globally recognized Ecoinvent database. These values may appear higher than online figures due to differences in calculation methods, scope, and data purpose



- Extraction and processing of fuels
- Power plant construction
- Energy transport
- Infrastructure maintenance
- Decommissioning of power plants

In contrast, many values found online refer only to the use phase (e.g. only emissions from combustion)

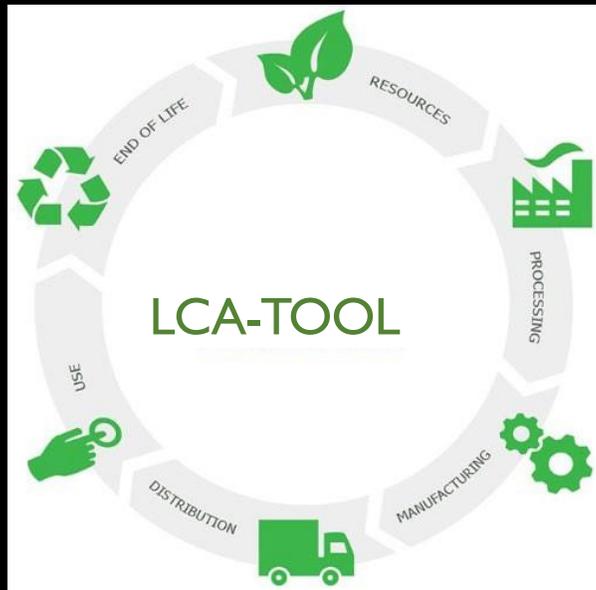
Ecoinvent also expresses the impact as **CO₂ equivalent** (CO₂eq)

How are the values of the environmental impact indicators calculated?

For the processing of data and results, it is possible to use specific software, specially designed for the simulation of environmental impacts. AEC Illuminazione, in order to be able to carry out LCA studies of its luminaires independently, has developed a tool: **LCA TOOL** an algorithm capable of calculating the environmental impacts of different products at each stage of their life.

The development and planning of the tool was carried out in accordance with relevant national and international (ISO) standards.

Benefits of an LCA TOOL



1. Verified and certified instrument

The LCA tool is also a third-party certified tool, which guarantees the accuracy and truthfulness of the results obtained.

2. Reduce working time

Completing an LCA report can be time-consuming, due to the lengthy time required to obtain the data collection needed to develop the study and calculate the environmental impact indicators.

Having a tool built on its own representative collection of products not only allows for more immediate results, but also the possibility of analyzing the impacts of products in the development phase and experimenting with the substitution of raw materials/components within a product to reduce the environmental impacts generated.

3. Specific impact assessments

Using the tool, it is possible to carry out LCA studies specifically for the place where they will be installed, thus determining the real environmental impacts of the product.

Key Standards for EPDs

ISO 14025

- Defines principles and procedures for Type III environmental declarations (EPDs).
- Requires LCA-based studies reviewed by an independent third party.
- Introduces **Product Category Rules (PCRs)** to ensure product comparability.

ISO 14040

- Sets the general **Life Cycle Assessment (LCA)** framework:
 - 1.Goal & scope definition
 - 2.Inventory analysis
 - 3.Impact assessment
 - 4.Interpretation

ISO 14044

- Technical guidelines to perform an LCA, including data collection, system modelling, and result verification.

EN 15804

- European standard for EPDs in the **construction industry**, defining transparent and comparable rules.

EN 50693

- Standard for **non-building electrical and electronic products** (e.g., luminaires, electronics).
- Includes end-of-life scenarios and environmental indicators.

Product Category Rules (PCRs)

- Define specific rules for each product category (e.g., system boundaries, impact categories).
- May include **sub-PCRs** for more detailed product family variations.

Equivalence between EPDs

Understanding the Environmental Product Declaration

- **EPD and ISO Standards:**

- The Environmental Product Declaration (EPD) complies with ISO 14025 and EN 15804 standards for construction products. For electronic product, EN 50693 must also be followed.
- It also follows the ISO 14040/44 standards, which define the life cycle assessment (LCA) methodologies used for environmental impact assessment.

- **Conversions and Recognitions:**

- The various European certification bodies that operate in compliance with the ISO 14040/44 standard recognise each other and issue the same type of certification.



ITALY



JAPAN



NORWAY



NETHERLANDS



NETHERLANDS



DENMARK



GERMANY



SPAIN



AUSTRALIA



IRELAND



CHINA



FINLAND



IRELAND



UK



AUSTRIA

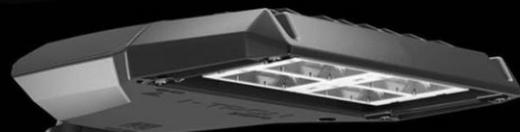


SLOVENIA



SPAIN

Documents et certifications



I-TRON
ZERO

REPORT LCA (LIFE CYCLE ASSESSMENT)

according to: UNI ISO 14040:2021, UNI ISO 14044:2021

Product name:	I-TRON ZERO 5P5
Product family:	I-TRON
Model:	I-TRON ZERO 5P5 80XX.180-3M
Document code:	LCA_ST_25_0248_I-TRON ZERO_EN
Release date:	04_2025



I-TRON

ENVIRONMENTAL PRODUCT DECLARATION

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

Program Operator:	EPDItaly
Publisher:	EPDItaly
Declaration number:	EPD_AEC_001
EPDItaly – Registration number:	EPDITALY0752
Publication date:	18.12.2024
Valid until:	18.12.2029

Product name:
I-TRON MICRO, I-TRON ZERO
I-TRON 1, I-TRON 2

Product family:
I-TRON

Model:
I-TRON MICRO XXX YYY-Y WWZZ.040-1M
I-TRON MICRO XXX YYY-Y WWZZ.200-2M
I-TRON ZERO XXX YYY-Y WWZZ.040-1M
I-TRON ZERO XXX YYY-Y WWZZ.200-4M
I-TRON 1 XXX YYY-Y WWZZ.060-5M
I-TRON 1 XXX YYY-Y WWZZ.180-6M
I-TRON 2 XXX YYY-Y WWZZ.060-7M
I-TRON 2 XXX YYY-Y WWZZ.180-12M

Manufacturing plant:
AEC Illuminazione SRL
Via A. Righi, n.4 Subbiano (AR) 52010
Via E. Fermi, n.83 Subbiano (AR) 52010

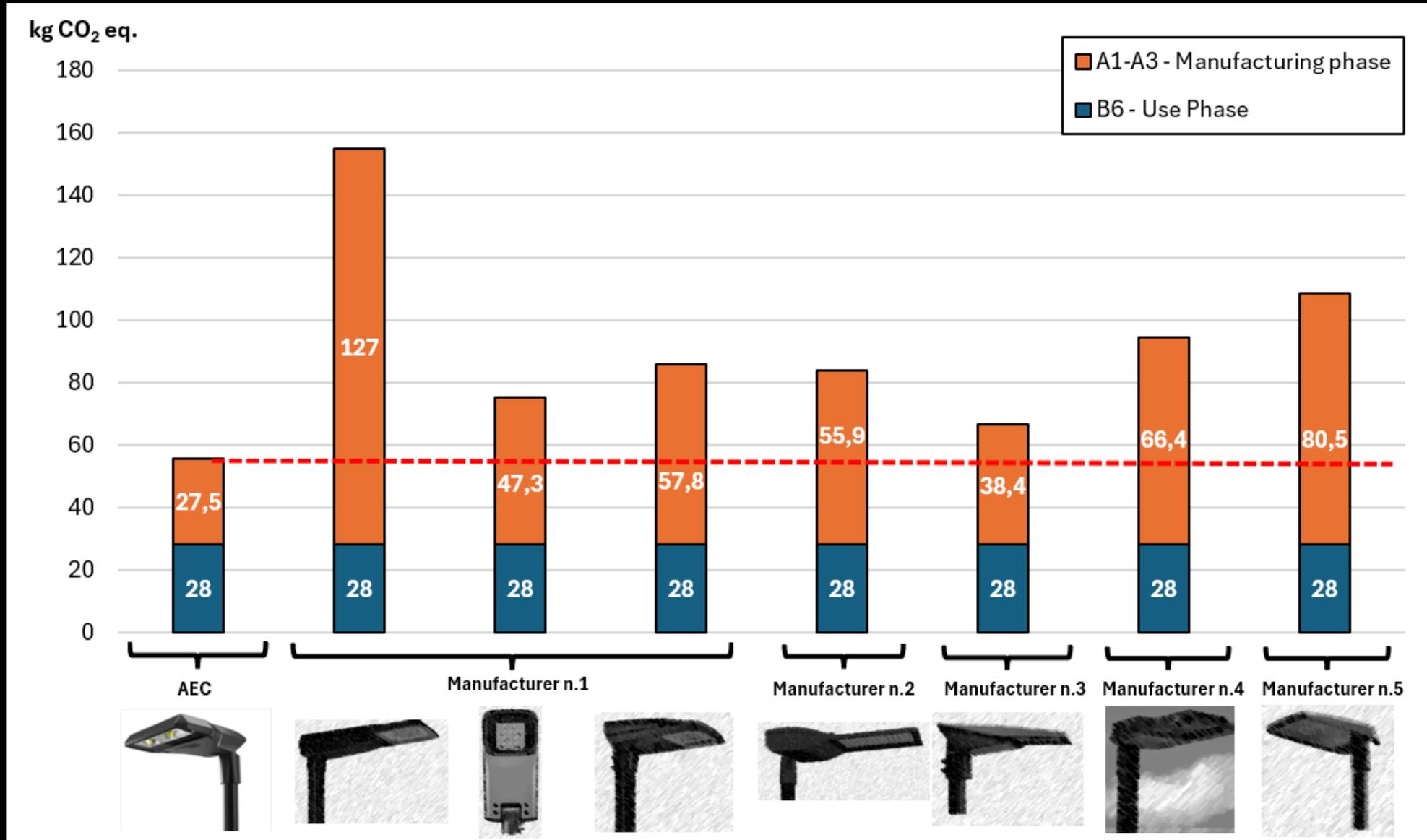
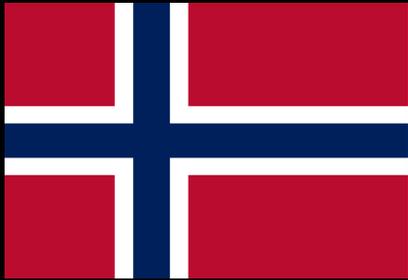


Comparison of products environmental impact

Product power: 20 W

Reference life: 40.000h

Energetic mix: Norway

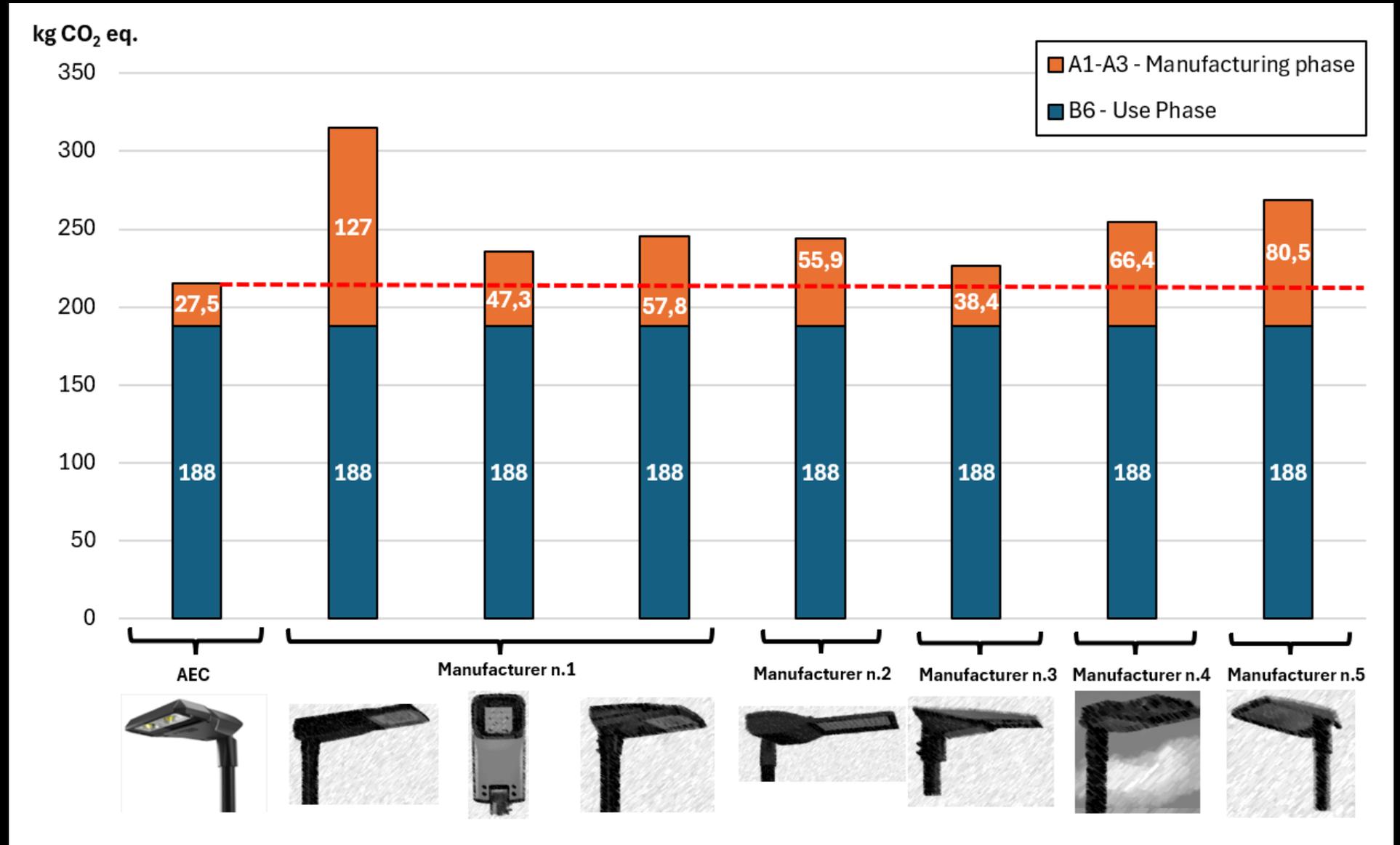


Comparison of products environmental impact

Product power: 20 W

Reference life: 40.000h

Energetic mix: Finland

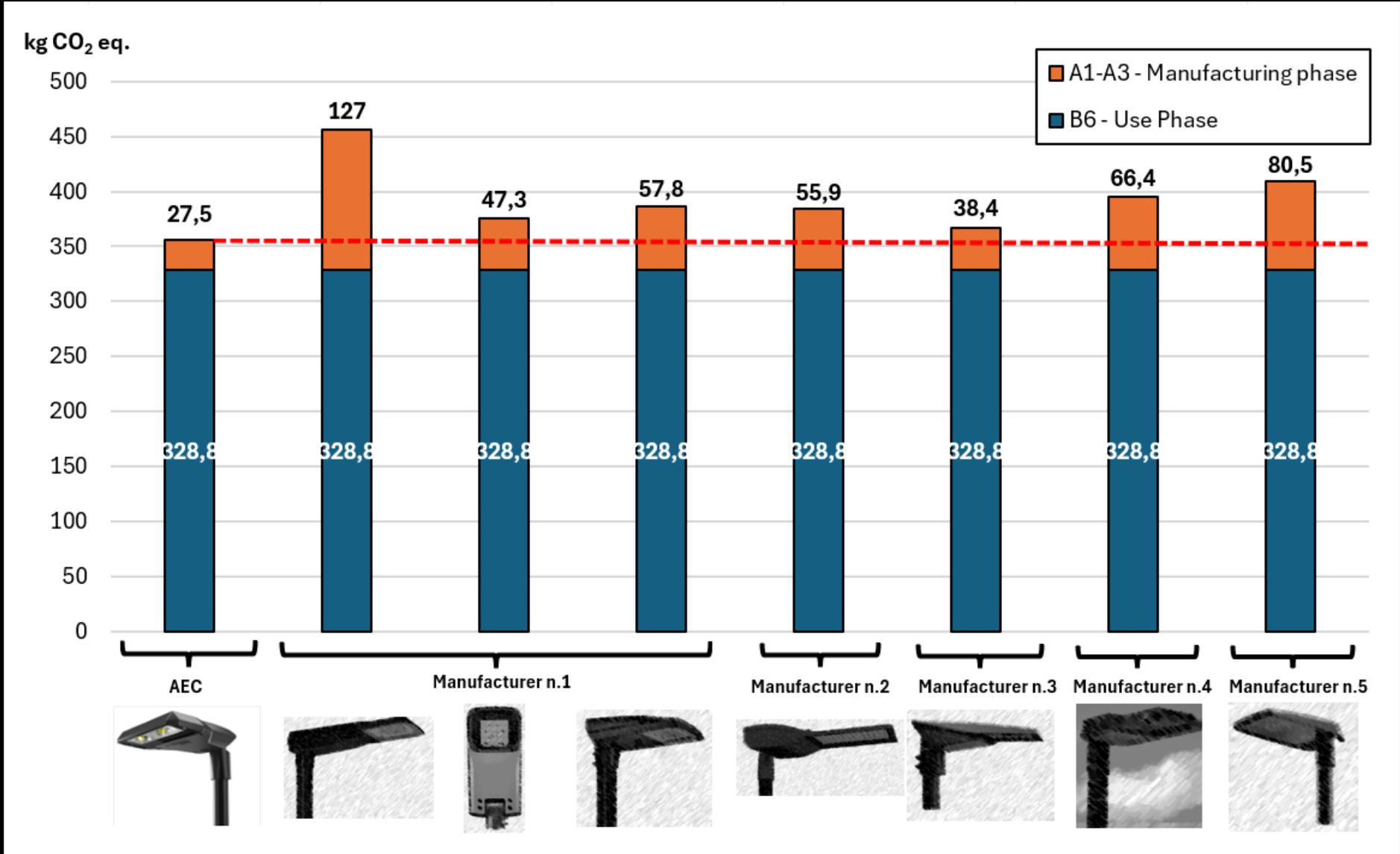


Comparison of products environmental impact

Product power: 20 W

Reference life: 40.000h

Energetic mix: Italy

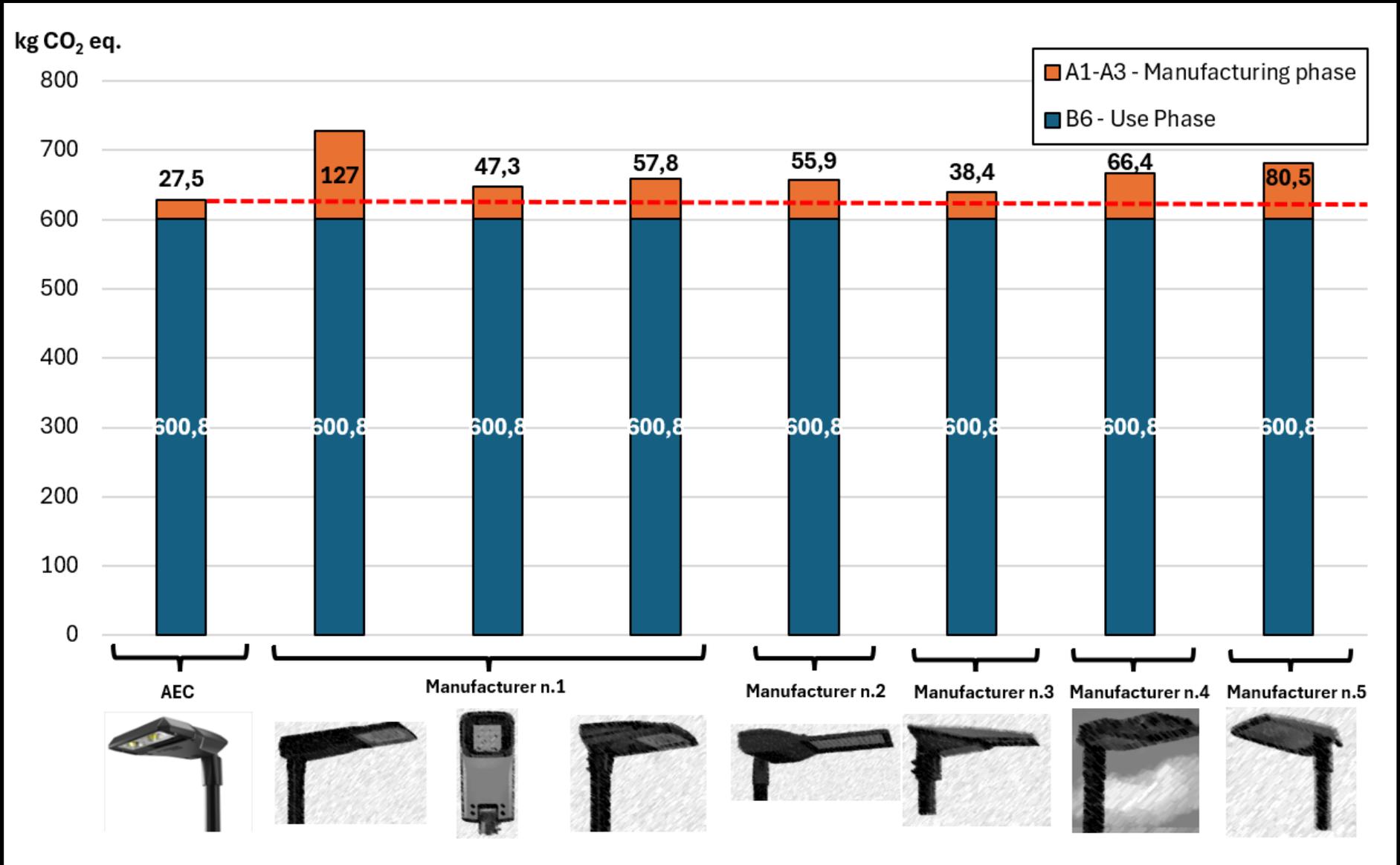


Comparison of products environmental impact

Product power: 20 W

Reference life: 40.000h

Energetic mix: Israel



AEC manufacturing with reduced environmental impact



AEC manufacturing with reduced environmental impact

1. Sustainable Design

Implement eco-design to create products using recyclable and sustainable materials, minimizing the use of resources.



2. Qualified Suppliers

Collaborate with qualified European suppliers respecting sustainable practices, guaranteeing an ecological and responsible supply chain.



3. Use of green Energy

Adopt renewable energy sources to power production processes

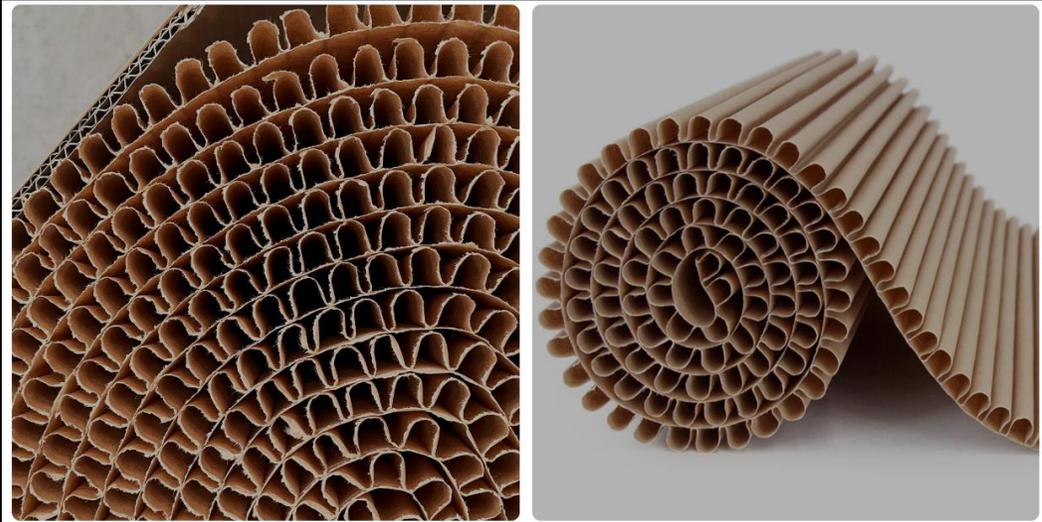


4. Efficiency of production processes

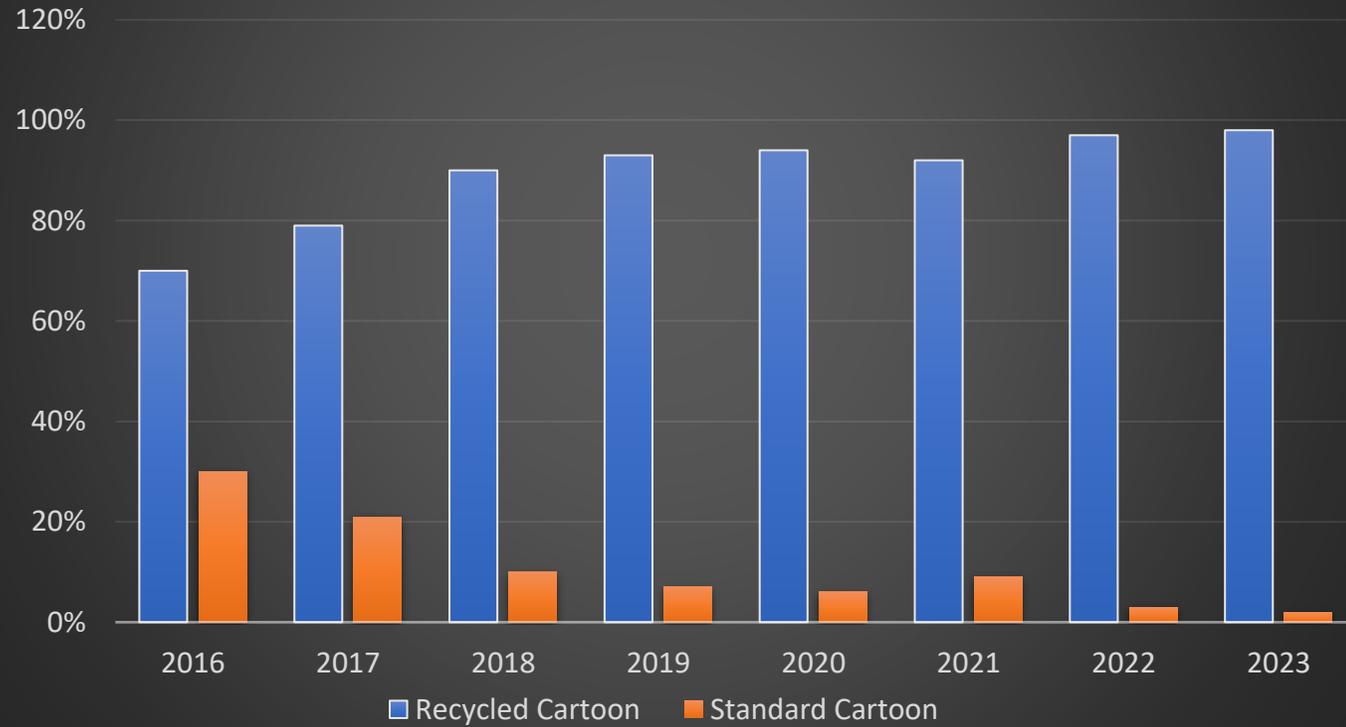
Improve energy efficiency and minimize waste through sustainable manufacturing practices.



AEC manufacturing with reduced environmental impact



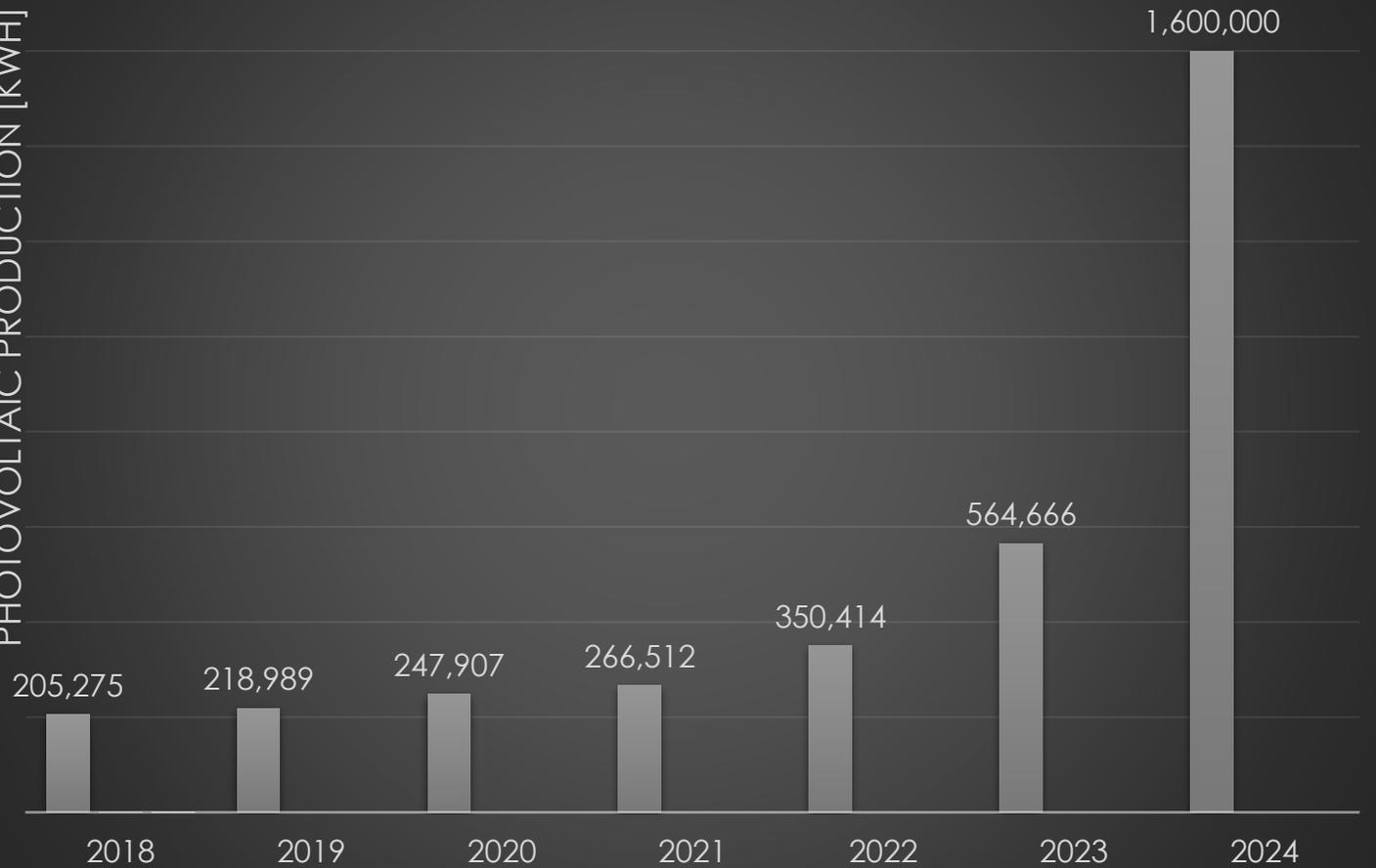
Use of Recyclable Packaging



2024

**80% of the
energy
produced by
solar energy**

PHOTOVOLTAIC PRODUCTION [KWH]





AEC is a N-ZEB Company
Nearly Zero Emitting Building

Merci de votre attention !

