

# Environmental Product Declaration

of multiple products based on the average result of the product group.

In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 for

## LP/L10 Cleverfit Emergency Exit by Clevertronics



<b>Programme</b>	The International EPD <sup>®</sup> System, <a href="http://www.environdec.com">www.environdec.com</a>
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An EPD should provide current information and maybe updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)

This EPD covers multiple products, with product-specific impact results. The list of products can be found on page 5.

## Key facts

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This EPD provides data for 1 installed emergency exit light, manufactured in China and sold to Australia, New Zealand and the United Kingdom.

## This EPD

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Published in line with EN 15804 and ISO 14025, providing specific information by walling products and detailed by product mass.

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## General information

An Environmental Product Declaration (EPD) is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a Product Category Rules (PCR). This is a specific EPD. The EPD owner has the sole ownership, liability, and responsibility for this EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or

versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/declared units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

## Program Information

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**CEN standard EN 15804+A2:2019/AC2021 serves as the Core Product Category Rules (PCR)**


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Product category rules (PCR):	PCR 2019:14; Construction products (EN 15804+A2) (1.3.4)
PCR review was conducted by:	The Technical Committee of the International EPD <sup>®</sup> System. A full list of members available on <a href="http://www.environdec.com">www.environdec.com</a> for a list of members. The review panel may be contacted via <a href="mailto:info@environdec.com">info@environdec.com</a> . Review chair: Claudia A. Peña, University of Concepción, Chile.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	<input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Procedure for follow-up of data during EPD validity involves third party verifier:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

*EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.*

## Company information

Clevertronics is an Australian emergency lighting specialist that operates across Australia, New Zealand and the United Kingdom, and has built a global reputation for our innovation and leadership in emergency lighting over the past twenty years. Its mission is to make emergency lighting easy by designing world-class products that are supported with unrivalled expertise and customer service.

**Table 1 | Company Information**

Company Data	
Owner of the EPD	Clevertronics Pty Ltd
Headquarters	1 Caribbean Drive Scoresby VIC 3179
Contact Person	Matthew Beattie
Contact information	vicsales@clevertronics.com.au
Manufacturer Site	Shanghai, China

## Product description

### LP Cleverfit Emergency Exit:

It could be used in various environment settings, including office buildings, factories, car parks, schools, retail space, and theatres. Product could be mounted on wall or ceiling.

### L10 Cleverfit Emergency Exit:

It could be used in various environment settings, including office buildings, factories, car parks, schools, retail space, and theatres. Product could be mounted on wall or ceiling.

The UN CPC code for products included in this EPD is 4653 (Lighting equipment), according to version 2.1, 2015.

The ANZSIC code is 2432 (Electric Lighting Equipment Manufacturing) according to version 2, 2013.

## Product information

**Table 2 Product Applications**

Product line	Product Names
LP Cleverfit Emergency Exit	CCFLED – AU, CCFLED – UK, AU - CCFLED-DALI, UK - CCFLED-DALI, AU - CCFLED-HV, AU - CCFLED-HVG, UK - CCFLED-HVG
L10 Cleverfit Emergency Exit	LCFLED – AU, LCFLED – UK, AU - LCFLED-DALI, UK - LCFLED-DALI, AU - LCFLED-HV, AU - LCFLED-HVG, UK - LCFLED-HVG

**Table 3 | Products Included**

Product name	Thickness (mm)	Width (mm)	Length (m)	Marketed product weight per item (kg)
CCFLED - AU	215	80	355	1.6
CCFLED - UK	215	80	355	1.8
AU - CCFLED-DALI	215	80	355	1.6
UK - CCFLED-DALI	215	80	355	1.7
AU - CCFLED-HV	215	80	355	1.6
AU - CCFLED-HVG	215	80	355	1.5
UK - CCFLED-HVG	215	80	355	1.5
LCFLED - AU	215	80	355	1.5
LCFLED - UK	215	80	355	1.5
AU - LCFLED-DALI	215	80	355	1.5
UK - LCFLED-DALI	215	80	355	1.5
AU - LCFLED-HV	215	80	355	1.5
AU - LCFLED-HVG	215	80	355	1.5
UK - LCFLED-HVG	215	80	355	1.5

## LCA information

**Table 4 | LCA Information**

Product Characteristics	
Declared Unit	1 installed product over its technical life time
Modules Included	Cradle to gate with options options, modules C1–C4, and module D with additional modules (A1-A3 + C + D and additional modules). The additional modules are A4, A5 and B1-B7.
Technical life time	LP Cleverfit Emergency Exit: 10 years L10 Cleverfit Emergency Exit: 15 years
Geographical Coverage	Australia, New Zealand, United Kingdom

Time Period	Foreground data was provided first-hand by Clevertronics for CY22 (2022-01-01 to 2022-12-31)
Software	SimaPro (v9.5.0.0)

## Declared unit

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This EPD provides data for one installed product, manufactured in China, sold and disposed in Australia, New Zealand and the United Kingdom.

## Life Cycle Assessment (LCA) methodology

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This EPD has been produced in conformance with the requirements of PCR2019:14, General Program Instructions (GPI) 5.0 and four information modules according to EN 15804.

### Take care when comparing EPDs

There are a few things to look out for when comparing LCAs within Environmental Product Declarations (EPDs):

- They must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs.
- The two EPDs have equivalent content declarations (e.g., identical declared/functional units) and are valid at the time of comparison.
- The two EPDs have equivalent system boundaries (e.g., cradle-to-gate, cradle-to-grave or other) and descriptions of data.
- Products have identical functions, technical performance and use.
- The LCA behind the EPDs applies equivalent data quality requirements, methods of data collection, and allocation methods.
- The LCA behind the EPDs applies identical cut-off rules and impact assessment methods (including the same version of characterization factors).
- **When evaluating a product's climate impact (i.e., emissions), use the total Global Warming Potential (GWP-total) measure.**

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For further information about comparability, see EN 15804 and ISO 14025.

The best way to compare products and materiality of differences is to place them into the context of a structure across the whole life cycle.

### Background data modelling

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The inventory data for the process are entered into the SimaPro (v9.5.0.0) LCA software program and linked to the pre-existing data for the upstream feedstocks and services selected in order of preference from:

- ecoinvent v3.9.1. At the time of this report, this ecoinvent database version is less than 1 year old.
- For Australia, the Australian Life Cycle Inventory (AusLCI) v1.42 compiled by the Australian Life Cycle Assessment Society. The AusLCI database at the time of this report was less than 1 year old.

## System Boundary

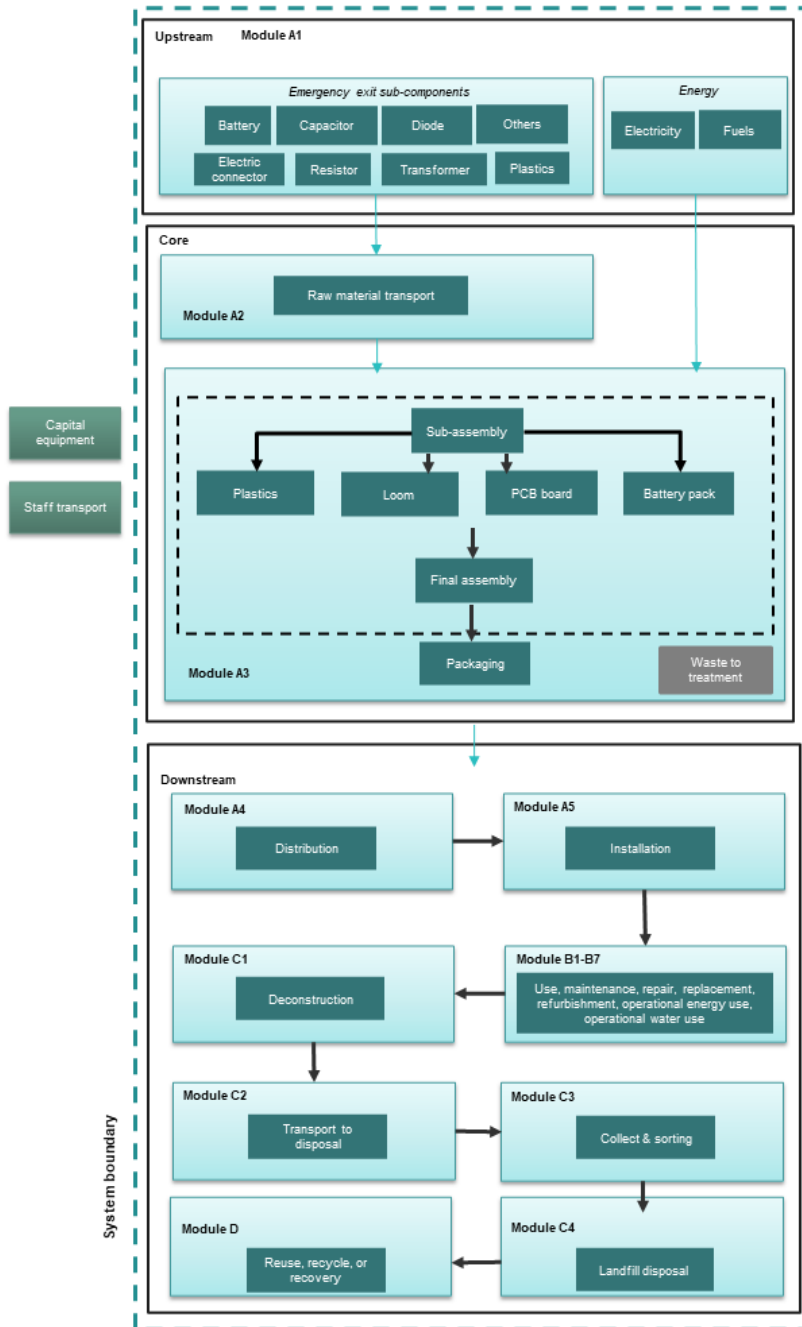


Figure 1: System Boundary

## Life Cycle content information

### Product stage (Module A1-A3)

The product is mainly composed of various electronic parts (e.g., capacitors, resistors), plastics, PCB board, batteries, PCA, metals, and are packaged with labels and manuals. There is no post-consumer recycled content in these components.

Clevertronics purchased different components from various suppliers (mainly from China) and have these components ship to one central assembly plant located in Shanghai, China for assembly. The assembly process doesn't require energy input, as the tool (pneumatic air screwdriver) is powered by compressed air.

### Upstream processes (A1)

The upstream processes include those involved in Module A1 – Raw material supply. This module includes:

- Extraction, transport, and manufacturing of raw materials
- Generation of electricity from primary and secondary energy resources, also including their extraction, refining and transport for Modules A1 and A3

### Transport of Raw materials (A2)

This module includes:

- External transportation of materials to the core processes and internal transport.
- External transportation including road transport and shipping (from oversea suppliers to Shanghai, China).

### Manufacturing process (A3)

This module includes:

- Manufacturing of product, which is the assembly process. The electricity mix of East China Grid, whose GWP-GHG is 0.87 kg CO<sub>2</sub> eq./kWh was considered.
- Packaging material (pallet, cardboard, shipping strap, plastic wrap, and shipping angled cardboard protectors) for sold product. Packaging material cradle to gate impact has been captured in A1-A3 modules, including raw material, manufacturing, transport to Clevertronics.
- Treatment of waste generated from the manufacturing processes.

**Table 5 | Material Content**

Product components	Weight % in one product	Biogenic carbon (kg C) per product
Battery	2.2-14.9%	0
Capacitor	0.6-1.0%	0
Labels	0.1-2.4%	0
Manuals	2.6-6.4%	0
Metals	0.1-39.0%	0
Electronic parts	2.3-7.1%	0
Plastics	41-84%	0
PCA	0.9-9.2%	0
Printed circuit board	3.3-6.1%	0
Resistor	0.2-0.5%	0

Manufacturing of product, which is the assembly process. The electricity mix of East China Grid, whose GWP-GHG is 0.87 kg CO<sub>2</sub> eq./kWh was considered.

- Packaging material (pallet, cardboard, shipping strap, plastic wrap, and shipping angled cardboard protectors) for sold product. Packaging material cradle to gate impact has been captured in A1-A3 modules, including raw material, manufacturing, transport to Clevertronics.
- Treatment of waste generated from the manufacturing processes.

Table 5 lists the main materials used to produce the L10/LP Cleverfit Emergency Exit lights. None of the products contain one or more substances that are listed in the “Candidate List of Substances of Very High Concern for authorisation”. According to the PCR 2019:14, if one or more substances of the “Candidate List of Substances of Very High Concern (SVHC) for authorisation” are present in a product and their total content exceeds 0.1% of the weight of the product, they need to be reported.

The cellulose pulp is assumed to have 12.2 MJ/kg as renewable energy resource used as raw material, based on the energy density quoted for biomass municipal and industrial materials in the National Greenhouse Accounts Factors (Department of the Environment, 2021). The cardboard boxes and the angled board protectors are assumed to have 14.39 MJ/kg as renewable energy resource used as raw material, based on searching result at <https://phyllis.nl/>: “cardboard (#2217)” with moisture level to be 7%.

**Table 6 | Packaging per declared unit**

Packaging	Weight (kg) per product	Biogenic carbon (kg C) per product
Product cardboard box	0.00189	0.0004
Shipping pallet	0.32	0.69
Shipping strap	0.0001	0
Shipping plastic wrap	0.00036	0
Angled board cardboard	0.0001	0.00002

It is discouraged to use the results of modules A1-A3 without considering the results of module C.

#### Transport (Module A4)

This module includes distribution from the manufacturing gate in Shanghai, China to different warehouse in Australia, New Zealand or the United Kingdom. All products are first transported to either Port of Shanghai or Shanghai Pudong Airport from the assembly plant. From there they are transported to different airports or shipping ports in different states in Australia, New Zealand or the United Kingdom. Then the products are transported to the regional warehouse. The distances were estimated using Google Map. Table 7 summarizes the distribution distances from manufacturing plant in Shanghai to different warehouses. Details of transportation are provided in Table 8 -

Table 10.

For products sold to Australia, the weighted average of the transport distances has been incorporated based on the amount of sales to different states in the country in the year 2022.

**Table 7 | Downstream distribution distances**

Transport mode	Unit	NSW	QLD	SA	VIC	WA	New Zealand	United Kingdom
Air transport from China to Australia, New Zealand and United Kingdom								
Truck	km	115.4	117.8	84.8	135	96.1	94.4	89.7
Air	km	7837	7281	7522	7986	7009	9346	9262
Sea transport from China to Australia and New Zealand								
Truck	km	205	92.7	68.3	79.9	83.7	64.9	NA
Sea	km	8469	7836	9875	9617	7477	9523	NA

**Table 8 | Transport to the building site – Truck transport**

Scenario information	Unit (expressed per functional unit or per declared unit)	Values
Vehicle type	-	Lorry
Vehicle size class	-	16-32 metric tonnes
Fuel type	-	Diesel
Emission standard	-	EURO5
Distance	km	As shown in <b>Error! Reference source not found.- Error! Reference source not found.</b>
Capacity utilisation (including empty returns)	%	26%
Bulk density of transported products	kg/m <sup>3</sup>	295
Volume capacity utilisation factor	-	1

**Table 9 | Transport to the building site – Sea transport**

Scenario information	Unit (expressed per functional unit or per declared unit)	Values
Vehicle type	-	Container ship
Load capacity	tonnes	43,000

Fuel type	-	Heavy fuel oil
Distance	km	As shown in <b>Error! Reference source not found.</b> - <b>Error! Reference source not found.</b>
Capacity utilisation (including empty returns)	%	70%
Bulk density of transported products	kg/m <sup>3</sup>	295
Volume capacity utilisation factor	-	1

**Table 10 | Transport to the building site – Air transport**

Scenario information	Unit (expressed per functional unit or per declared unit)	Values
Vehicle type	-	Freight aircraft, long haul
Fuel Type	-	Kerosene
Distance	km	As shown in <b>Error! Reference source not found.</b> - <b>Error! Reference source not found.</b>
Capacity utilisation (including empty returns)	%	80%
Bulk density of transported products	kg/m <sup>3</sup>	295
Volume capacity utilisation factor	-	1

### Installation (Module A5)

The installation process doesn't require any energy input but is associated with disposal of the product packaging. The amount of packaging disposed is disclosed in **Table 6**. Cardboard, angled board protectors and the pallet are recycled, and the other product packaging is sent to landfill.

### Use phase (module B1-B7)

There is no input for module B1, B2, B3, B4, B5, and B7. Operational energy use (B6) includes the annual electricity consumption for each product. The power and energy consumption for each product is summarized in **Table 11**. The daily use time for each product is around 24 hours and is used for 365 days per year.

**Table 11 | Power and energy consumption of one product**

Product name	Power consumption standby	Electricity consumption/year
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CCFLED - AU	2.5W	21.900 kWh
CCFLED - UK	3.6W	31.536 kWh
AU - CCFLED-DALI	2.8W	24.528 kWh
UK - CCFLED-DALI	3.9W	34.164 kWh
AU - CCFLED-HV	2.8W	24.528 kWh
AU - CCFLED-HVG	2.8W	24.528 kWh
UK - CCFLED-HVG	3.9W	34.164 kWh
LCFLED - AU	2.5W	21.900 kWh
LCFLED - UK	3.6W	31.536 kWh
AU - LCFLED-DALI	2.8W	24.528 kWh
UK - LCFLED-DALI	3.9W	34.164 kWh
AU - LCFLED-HV	2.8W	24.528 kWh
AU - LCFLED-HVG	2.8W	24.528 kWh
UK - LCFLED-HVG	3.9W	34.164 kWh

#### Deconstruction and end of life (Module C1-C4)

At end-of-life, products are removed, transported to waste processing, and landfilled. All products could be manually uninstalled, and no energy is required. It's assumed that battery in the product is recycled. Depending on the country where the product is sold, different recycling rates are applied. The rest of the product is landfilled.

#### Recyclability potentials (Module D)

The information in module D may contain technical information as well as LCA results from post-consumer recycling, i.e., environmental benefits or loads resulting from reusable products, recyclable materials and/or useful energy carriers leaving a product system e.g., as secondary materials or fuels. Avoided impacts from co-products from module A to C shall not be included in Module D.

For this analysis, only battery recycling benefit and/or load is included due to limited information about recycling emergency exit sign. It's assumed that only aluminum and copper are recovered during the battery recycling process.

## Scope of Declaration

The scope of this declaration is according to the General Program Instructions (GPI) and four information modules according to EN 15804 as given in Table 12. Modules B1, B2, B3, B4, B5 and B7 are not relevant and therefore, these modules are not reported in the result table.

Table 12 | Declared life cycle stages

	Upstream		Core	Downstream													Other environmental information	
	Raw material supply	Transport	Manufacturing	Transport	Construction installation process	Material emissions from usage	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction and demolition	Transport	Waste processing	Disposal	Reuse, recycle or recovery	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Modules declared	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Geography	China	Global	China	Global	Australia, New Zealand, United Kingdom													
Specific data used	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Cut-off rules

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It is common practice in LCA/LCI protocols to propose exclusion limits for inputs and outputs that fall below a threshold % of the total, but with the exception that where the input/output has a “significant” impact it should be included. According to the PCR 2019:14, Life cycle inventory data shall according to EN 15804+A2 include a minimum of 95% of total inflows (mass and energy) per module. Inflows not included in the LCA shall be documented in the EPD. Data gaps in included stages in the downstream modules shall be reported in the EPD, including an evaluation of their significance. In accordance with the PCR 2019:14, the following system boundaries are applied to manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI. Capital equipment and buildings typically account for less than a few percent of nearly all LCIs and this is usually smaller than the error in the inventory data itself. For this project, it is assumed that capital equipment makes a negligible contribution to the impacts as per Frischknecht et al. (Frischknecht, 2007) with no further investigation.
- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. For this project, the impacts of employees are excluded.

## Allocation

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According to EN 15804+A2, in a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes.

In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.

The following stepwise allocation principles shall be applied for multi-input/output allocations:

- The initial allocation step includes dividing up the system sub-processes and collecting the input and output data related to these sub-processes.
- The first (preferably) allocation procedure step for each sub-process is to partition the inputs and outputs of the system into their different products in a way that reflects the underlying physical relationships between them.
- The second (worst case) allocation procedure step is needed when physical relationship alone cannot be established or used as the basis for allocation. In this case, the remaining environmental inputs and outputs from a sub-process must be allocated between the products in a way that reflects other relationships between them, such as the economic value of the products.

Waste values were provided in each manufacturing location in annual amount and were allocated to each product according to the percentage of total product produced by unit count in one year.

## Data Quality and Validation

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The primary data used for the study is based on direct utility bills or feedstock quantities from Clevertronics’s procurement records. Edge considers the data to be of good quality for primary data used in this study.

Overall, for all background data, the quality was considered good when processes chosen were geographically, temporal, and technologically relevant as shown in Table 13. For data that was based on assumptions, quality was considered fair, unless based on official reports.

Table 13 | Data quality assessment scheme

Quality	Geographical representativeness	Technical representativeness	Time representativeness
Very good	Data from area under study	Data from processes and products under study. Same of technology applied as defined in goal and scope (i.e., identical technology)	Less than 3 years difference between the reference years according to the documentation and the time period for which data are representative.
Good	Average data from larger area in which the area under study is included	Data from processes and products under study with similar technology. Evidence of variations in state of technology, e.g., different by-product.	Less than 6 years difference between the reference year according to the documentation and the time period for which data are representative.
Fair	Data from area with similar production conditions	Data from processes and products under study but from different technology. This score is applied when no technology is specified.	Less than 10 years difference between the reference year according to the documentation and the time period for which data are representative.
Poor	Data from area with slightly similar production conditions	Data on related processes or products.	Less than 15 years difference between the reference year according to the documentation and the time period for which data are representative.
Very poor	Data from unknown or distinctly different area (North America instead of Middle East, OECD-Europe instead of Russia)	Data on related processes or products but with a different scale or from different technology.	Age of data unknown or more than 15 years difference between the reference year according to the documentation and the time period for which data are representative.

## Assumptions, Choices, and Limitations

Table 14 | Assumptions or limitations data assessment scheme

Assumption or limitation	Impact on LCA results	Discussion
Raw material emission factors	Major	As there is no component specific LCA available, the emission factors assigned to all raw materials are from ecoinvent 3.9.1, with the closest proxy possible. For this LCA study, raw material (A1) contributes the most to the product's whole life cycle. Thus, if more specific LCA is available in the future, they should be used to help improve the accuracy of the product LCA result.
Raw materials without supplier's information	Minor	In this LCA study, it's assumed that the distance from suppliers to the assembly plant is 50km, for products without suppliers' information.
Raw material transport distance	Minor	The distances for raw material transport (both truck transport and sea transport) were estimated based on Google Map and <a href="https://sea-distances.org/">https://sea-distances.org/</a> . Though the difference between actual

		and estimated distances could be minimal, using the actual distance will help improve the accuracy of the LCA result.
Product packaging – angled board cardboard weight	Minor	The weight of the angled board cardboard is an assumption (0.0001kg) per product.
The % market sold in Australia for product AU-LCFLED-DALI	Medium	Because no AU-LCFLED-DALI was sold to Australia in calendar year 2022, it's assumed that the % of market is evenly distributed to different regions – 20% in each region.
Distance from installation site to disposal site	Minor	As there is no primary data available, it's assumed that the disposal site is 25km away from the installation/use location.
Exclusion of employees, capital good and infrastructure	Minor	Allowed/required as per EPD rules.

## Compliance with Standards

The methodology and report format has been modified to comply with:

- ISO 14040:2006 and ISO14044:2006+A1:2018 which describe the principles, framework, requirements and provides guidelines for life cycle assessment (LCA).
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations -- Principles and procedures, which establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations.
- EN 15804:2012+A2:2019: Sustainability of construction works – Environmental product declarations - Core rules for the product category of construction products – hereafter referred to as EN 15804+A2.
- Product Category Rules (PCR) 2019:14, v1.3.4 – Construction products – Hereafter referred to as PCR 2019:14.
- General Programme Instructions (GPI) for the International EPD System v.5.0 – containing instructions regarding methodology and the content that must be included in EPDs registered under the International EPD System.
- Instructions of EPD Australasia V4.2 – a regional annex to the general programme instructions of the International EPD System.

This EPD follows additional requirements for construction products considered as Electronic or Electric Equipment.

## Environmental Impact Indicators

The potential environmental impacts, use of resources and waste categories included in this EPD were calculated using the SimaPro v9.5.0.0 tool and are listed in Table 15. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

**Table 15 | Life Cycle Impact, Resource and Waste Assessment Categories, Measurements and Methods accordance with EN15804+A2**

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Potential environmental impacts			
Global warming potential (fossil)	GWP - Fossil	kg CO <sub>2</sub> equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Global warming potential (biogenic)	GWP - Biogenic	kg CO <sub>2</sub> equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Global warming potential (land use/ land transformation)	GWP - Luluc	kg CO <sub>2</sub> equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Total global warming potential	GWP - Total	kg CO <sub>2</sub> equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Acidification potential	AP	mol H <sup>+</sup> eq.	Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008
Eutrophication – aquatic freshwater	EP - freshwater	kg P equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – aquatic marine	EP - marine	kg N equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication – terrestrial	EP – terrestrial	mol N equivalent	Accumulated Exceedance, Seppälä et al. 2006, Posch et al.
Photochemical ozone creation potential	POCP	kg NMVOC equivalents	LOTOS-EUROS, Van Zelm et al., 2008, as applied in ReCiPe
Abiotic depletion potential (elements)*	ADPE	kg Sb equivalents	CML (v4.8)
Abiotic depletion potential (fossil fuels)*	ADPF	MJ net calorific value	CML (v4.8)
Ozone depletion potential	ODP	kg CFC 11 equivalents	Steady-state ODPs, WMO 2014
Water Depletion Potential*	WDP	m <sup>3</sup> equivalent deprived	Available Water Remaining (AWARE) Boulay et al., 2016 (includes Australia flows calculated using 36 Australian catchments)
Resource use			
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value	Manual for direct inputs <sup>1</sup>
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value	Manual for direct inputs <sup>2</sup>
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value	ecoinvent version 3.8 and expanded by PRé Consultants <sup>3</sup>
Use of non-renewable primary energy excluding non-renewable	PENRE	MJ, net calorific value	Manual for direct inputs <sup>4</sup>

primary energy resources used as raw materials			
Use of non- renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value	Manual for direct inputs <sup>5</sup>
Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value	ecoinvent version 3.8 and expanded by PRé Consultants <sup>6</sup>
Use of secondary material	SM	kg	Manual for direct inputs
Use of renewable secondary fuels	RSF	MJ, net calorific value	Manual for direct inputs
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value	Manual for direct inputs
Use of net fresh water	FW	m <sup>3</sup>	ReCiPe 2016
<b>Waste categories</b>			
Hazardous waste disposed	HWD	kg	EDIP 2003 (v1.05)
Non-hazardous waste disposed	NHWD	kg	EDIP 2003 (v1.05) <sup>7</sup>
Radioactive waste disposed/stored	RWD	kg	EDIP 2003 (v1.05)
<b>Output flow categories</b>			
Components for re-use	CRU	kg	Manual for direct inputs
Material for recycling	MFR	kg	Manual for direct inputs
Materials for energy recovery	MERE	kg	Manual for direct inputs
Exported energy - electricity	EE - e	MJ per energy carrier	Manual for direct inputs
Exported energy – thermal	EE – t	MJ per energy carrier	Manual for direct inputs
<b>Additional environmental impact indicators</b>			
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO <sub>2</sub> equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021 <sup>8</sup>
Particulate matter	Potential incidence of disease due to PM emissions (PM)	Disease incidence	SETAC-UNEP, Fantke et al. 2016
Ionising radiation - human health**	Potential Human exposure efficiency relative to U235 (IRP)	kBq U-235 eq	Human Health Effect model
Eco-toxicity (freshwater)*	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	CTUe	USEtox
Human toxicity potential - cancer effects*	Potential Comparative	CTUh	USEtox

	Toxic Unit for humans (HTP-c)		
Human toxicity potential - non cancer effects*	Potential Comparative Toxic Unit for humans (HTP-nc)	CTUh	USEtox
Soil quality*	Potential soil quality index (SQP)	dimensionless	Soil quality index (LANCA <sup>®</sup> )

\*Disclaimer – The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

\*\*Disclaimer – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

<sup>1</sup> PERE = PERT - PERM

<sup>2</sup> Calculated based on the lower heating value of renewable raw materials. LHV is taken from <https://phyllis.nl/>, as recommended by SimaPro in compliance with EN15804+A2: <https://support.simapro.com/s/article/How-to-calculate-EN-15804-A2-indicators-in-desktop-SimaPro>

<sup>3</sup> Calculated as sum of renewables, biomass; renewable, wind, solar and geothermal, and renewable, water.

<sup>4</sup> PENRE = PENRT - PENRM

<sup>5</sup> Calculated based on the lower heating value (LHV) of non-renewable raw materials. LHV is taken from <https://phyllis.nl/>, as recommended by SimaPro in compliance with EN15804+A2: <https://support.simapro.com/s/article/How-to-calculate-EN-15804-A2-indicators-in-desktop-SimaPro>

<sup>6</sup> Calculated as sum of non-renewables, fossil and non-renewable, nuclear

<sup>7</sup> Calculated as sum of Bulk waste and Slags/ash

<sup>8</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.

## Environmental Performance

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The following tables provide the environmental information produced using LCA for all products covered in this EPD. This EPD uses LCFLLED – UK as the representative product. Conversion factors are provided for all other products based on the proportion of the product's impact results to that of the representative product, for each indicator.

The results generated by module A1-A3 should not be used in isolation. It is strongly advised that the outcomes produced by modules A1-A3 are considered alongside the results derived from module C to ensure comprehensiveness and accurate analysis.

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

Table 16 | LCFLED – UK sold to the United Kingdom

Potential environmental impacts

Indicator	ABR	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	kg CO <sub>2</sub> eq.	1.03E+01	8.18E+00	1.27E-02	1.34E+02	0.00E+00	4.18E-03	1.05E-03	6.07E-03	-8.45E-04
Global warming potential - biogenic	GWP - biogenic	kg CO <sub>2</sub> eq.	-2.46E+00	5.48E-04	2.52E+00	1.78E-01	0.00E+00	3.03E-07	3.43E-06	3.69E-05	-1.97E-06
Global warming potential - land use/ land transformation	GWP – luluc	kg CO <sub>2</sub> eq.	1.74E-02	2.52E-04	4.07E-05	1.53E-01	0.00E+00	1.41E-07	2.79E-10	2.35E-06	-1.59E-06
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>kg CO<sub>2</sub> eq.</b>	<b>1.04E+01</b>	<b>8.18E+00</b>	<b>1.28E-02</b>	<b>1.34E+02</b>	<b>0.00E+00</b>	<b>4.18E-03</b>	<b>1.05E-03</b>	<b>6.11E-03</b>	<b>-8.49E-04</b>
Ozone depletion potential	ODP	kg CFC 11 eq.	4.09E-07	1.24E-07	1.60E-10	6.48E-06	0.00E+00	5.59E-11	7.82E-12	7.94E-11	-5.89E-12
Acidification potential	AP	mol H <sup>+</sup> eq.	7.16E-02	3.54E-02	6.48E-05	3.01E-01	0.00E+00	1.20E-05	3.70E-06	5.03E-05	-4.94E-05
Eutrophication – freshwater	EP - freshwater	kg P eq.	5.74E-03	4.43E-05	2.26E-06	1.01E-02	0.00E+00	8.08E-08	2.16E-09	2.26E-06	-3.86E-06
Eutrophication – marine	EP – marine	kg N eq.	1.10E-02	1.46E-02	2.35E-05	8.88E-02	0.00E+00	4.41E-06	6.39E-07	2.19E-05	-2.56E-06
Eutrophication – terrestrial	EP – terrestrial	mol N eq.	1.43E-01	1.56E-01	2.46E-04	1.01E+00	0.00E+00	4.67E-05	6.87E-06	2.36E-04	-3.50E-05
Photochemical ozone creation potential	POCP	kg NMVOC eq.	3.88E-02	4.83E-02	7.39E-05	2.88E-01	0.00E+00	1.68E-05	1.85E-06	7.03E-05	-9.93E-06
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	kg Sb eq.	8.13E-04	2.76E-07	7.24E-10	6.19E-06	0.00E+00	2.43E-10	7.38E-13	2.25E-10	-6.24E-07
Abiotic depletion potential - fossil fuels	ADP – fossil	MJ	1.49E+02	1.06E+02	1.67E-01	3.51E+03	0.00E+00	5.47E-02	1.07E-02	7.61E-02	-5.56E-03
Water Depletion Potential	WDP	m <sup>3</sup>	3.22E+00	1.31E-01	3.93E-04	3.78E+00	0.00E+00	7.78E-05	1.05E-04	2.62E-04	-7.87E-04

Resource Use

Indicator		Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ	3.55E+01	1.67E-01	3.94E+00	9.30E+02	0.00E+00	8.01E-05	9.29E-04	1.46E+00	-2.15E-03
Use of renewable primary energy resources used as raw materials	PERM	MJ	5.39E+00	0.00E+00	-3.93E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.46E+00	0.00E+00
<b>Primary renewable energy - total</b>	<b>PERT</b>	<b>MJ</b>	<b>4.08E+01</b>	<b>1.67E-01</b>	<b>8.23E-03</b>	<b>9.30E+02</b>	<b>0.00E+00</b>	<b>8.01E-05</b>	<b>9.29E-04</b>	<b>1.86E-03</b>	<b>-2.15E-03</b>

Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ	1.19E+02	1.06E+02	1.70E-01	3.51E+03	0.00E+00	5.47E-02	1.07E-02	2.95E+01	-5.56E-03
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ	2.95E+01	0.00E+00	-3.22E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.95E+01	0.00E+00
<b>Primary non renewable energy - total</b>	<b>PENRT</b>	<b>MJ</b>	<b>1.49E+02</b>	<b>1.06E+02</b>	<b>1.67E-01</b>	<b>3.51E+03</b>	<b>0.00E+00</b>	<b>5.47E-02</b>	<b>1.07E-02</b>	<b>7.61E-02</b>	<b>-5.56E-03</b>
Use of secondary material	SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	FW	m <sup>3</sup>	9.66E-02	4.98E-03	3.75E-05	5.94E-01	0.00E+00	2.80E-06	1.98E-06	1.05E-05	-1.93E-05

### Waste production

Indicator	ABR	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Hazardous waste disposed	HWD	kg	6.73E-04	7.12E-04	8.10E-07	7.56E-03	0.00E+00	3.66E-07	9.54E-09	4.27E-07	-1.62E-07
Non-hazardous waste disposed	NHWD	kg	7.81E-01	5.99E-03	3.23E-04	1.81E+00	0.00E+00	1.44E-05	1.04E-03	1.06E+00	-8.24E-04
Radioactive waste disposed/stored	RWD	kg	1.92E-04	4.38E-06	2.10E-07	2.68E-02	0.00E+00	1.96E-09	2.74E-12	4.27E-08	-1.68E-08

### Output flows

Indicator	ABR	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Components for reuse	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	MFR	kg	3.00E-01	0.00E+00	3.22E-01	0.00E+00	0.00E+00	0.00E+00	1.07E-03	0.00E+00	0.00E+00
Materials for energy recovery	MFRE	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - electricity	EE - e	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - thermal	EE - t	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

### Additional environmental impact indicators



Indicator	ABR	Unit	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO <sub>2</sub> eq	1.04E+01	8.18E+00	1.28E-02	1.34E+02	0.00E+00	4.18E-03	1.05E-03	6.11E-03	-8.49E-04
Particulate matter	PM	disease incidence	6.40E-07	6.15E-08	1.01E-09	1.69E-06	0.00E+00	2.74E-10	3.11E-11	1.31E-09	-1.25E-10
Ionizing radiation - human health	IRP	kBq U-235 eq	7.82E-01	2.15E-02	8.41E-04	1.23E+02	0.00E+00	9.84E-06	9.42E-08	1.76E-04	-6.44E-05
Ecotoxicity - freshwater	ETP - fw	CTUe	6.35E+01	4.29E+01	7.86E-02	1.10E+02	0.00E+00	2.44E-02	5.46E-04	2.61E-02	-2.88E-02
Human toxicity potential - cancer effects	HTP - c	CTUh	4.17E-09	5.28E-11	1.31E-12	5.58E-09	0.00E+00	1.60E-13	6.31E-14	3.15E-13	-3.78E-12
Human toxicity potential - non cancer effects	HTP - nc	CTUh	1.04E-07	1.18E-08	4.35E-11	1.51E-07	0.00E+00	1.32E-11	1.96E-12	3.71E-11	-1.53E-10
Soil quality	SQP	Pt	2.28E+02	1.44E-01	7.29E-03	1.47E+03	0.00E+00	2.11E-04	2.51E-03	1.85E-01	-1.33E-02

## Additional Environmental Information

This EPD is declared as one installed product. As per section 5.4.6.1 of PCR 1.3.4, the following conversion factors are applied for obtaining the results for different products with the same declared unit.

Table 17 | Conversion factors for environmental impact per installed CCFLED – AU sold to Australia

### Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.20	0.04	1.00	1.29	1.00	1.56	1.26	1.04	1.26
Global warming potential - biogenic	GWP - biogenic	1.00	0.04	1.00	4.16	1.00	1.56	1.26	0.11	1.26
Global warming potential - land use/ land transformation	GWP – luluc	0.87	0.04	1.00	0.00	1.00	1.56	1.26	0.00	1.26
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.20</b>	<b>0.04</b>	<b>1.00</b>	<b>1.29</b>	<b>1.00</b>	<b>1.56</b>	<b>1.26</b>	<b>1.03</b>	<b>1.26</b>
Ozone depletion potential	ODP	1.22	0.04	1.00	0.07	1.00	1.56	1.26	10.85	1.26
Acidification potential	AP	1.16	0.14	1.00	3.27	1.00	1.56	1.26	0.33	1.26
Eutrophication – freshwater	EP - freshwater	1.08	0.05	1.00	0.02	1.00	1.56	1.26	0.00	1.26
Eutrophication – marine	EP – marine	1.10	0.09	1.00	1.76	1.00	1.56	1.26	0.13	1.26
Eutrophication – terrestrial	EP – terrestrial	0.99	0.09	1.00	1.66	1.00	1.56	1.26	0.14	1.26
Photochemical ozone creation potential	POCP	1.25	0.08	1.00	1.52	1.00	1.56	1.26	0.12	1.26
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.10	0.03	1.00	0.00	1.00	1.56	1.26	0.03	1.26
Abiotic depletion potential - fossil fuels	ADP – fossil	1.36	0.04	1.00	0.38	1.00	1.56	1.26	1.14	1.26
Water Depletion Potential	WDP	1.52	0.03	1.00	8.13	1.00	1.56	1.26	2.27	1.26

### Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	0.96	0.04	1.00	0.21	1.00	1.56	1.26	0.49	1.26
Use of renewable primary energy resources used as raw materials	PERM	0.86	1.00	1.00	1.00	1.00	1.00	1.00	0.49	1.00
<b>Primary renewable energy - total</b>	<b>PERT</b>	<b>0.95</b>	<b>0.04</b>	<b>1.00</b>	<b>0.21</b>	<b>1.00</b>	<b>1.56</b>	<b>1.26</b>	<b>0.61</b>	<b>1.26</b>
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	1.19	0.04	1.00	0.38	1.00	1.56	1.26	2.07	1.26
Use of non-renewable primary energy resources used as raw materials	PENRM	2.07	1.00	1.00	1.00	1.00	1.00	1.00	2.07	1.00
<b>Primary non renewable energy - total</b>	<b>PENRT</b>	<b>1.36</b>	<b>0.04</b>	<b>1.00</b>	<b>0.38</b>	<b>1.00</b>	<b>1.56</b>	<b>1.26</b>	<b>1.14</b>	<b>1.26</b>
Use of secondary material	SM	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Use of renewable secondary fuels	RSF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Use of non-renewable secondary fuels	NRSF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Use of net fresh water	FW	1.29	0.03	1.00	0.88	1.00	1.56	1.26	1.25	1.26

### Waste production

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Hazardous waste disposed	HWD	0.86	0.03	1.00	0.00	1.00	1.56	1.26	0.04	1.26
Non-hazardous waste disposed	NHWD	1.02	0.05	0.68	4.02	1.00	1.56	1.26	0.00	1.26
Radioactive waste disposed/stored	RWD	0.93	0.04	1.00	0.00	1.00	1.56	1.26	0.00	1.26

### Output flows

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
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Components for reuse	CRU	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	MFR	1.00	1.00	1.00	1.00	1.00	1.00	1.26	1.00	1.00
Materials for energy recovery	MFRE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	EE - e	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.20	0.04	1.00	1.29	1.00	1.56	1.26	1.03	1.26
Particulate matter	PM	1.09	0.10	1.00	4.93	1.00	1.56	1.26	0.08	1.26
Ionizing radiation - human health	IRP	0.92	0.04	1.00	0.00	1.00	1.56	1.26	0.00	1.26
Ecotoxicity - freshwater	ETP - fw	2.94	0.04	1.00	1.37	1.00	1.56	1.26	0.84	1.26
Human toxicity potential - cancer effects	HTP - c	1.82	0.08	1.00	2.44	1.00	1.56	1.26	0.85	1.26
Human toxicity potential - non cancer effects	HTP - nc	3.49	0.05	1.00	3.45	1.00	1.56	1.26	0.58	1.26
Soil quality	SQP	0.97	0.04	1.00	0.32	1.00	1.56	1.26	0.02	1.26

Table 18 | Conversion factors for environmental impact per installed CCFLED – AU sold to New Zealand

Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.20	0.10	1.00	0.21	1.00	1.61	0.00	1.04	0.00
Global warming potential - biogenic	GWP - biogenic	1.00	0.10	1.00	0.68	1.00	1.61	0.00	0.12	0.00
Global warming potential - land use/ land transformation	GWP – luluc	0.87	0.10	1.00	0.00	1.00	1.61	0.00	0.00	0.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.20</b>	<b>0.10</b>	<b>1.00</b>	<b>0.21</b>	<b>1.00</b>	<b>1.61</b>	<b>0.00</b>	<b>1.04</b>	<b>0.00</b>
Ozone depletion potential	ODP	1.22	0.10	1.00	0.06	1.00	1.61	0.00	10.90	0.00
Acidification potential	AP	1.16	0.21	1.00	0.30	1.00	1.61	0.00	0.33	0.00
Eutrophication – freshwater	EP - freshwater	1.08	0.10	1.00	2.40	1.00	1.61	0.00	0.00	0.00
Eutrophication – marine	EP – marine	1.10	0.16	1.00	0.19	1.00	1.61	0.00	0.14	0.00
Eutrophication – terrestrial	EP – terrestrial	0.99	0.16	1.00	0.13	1.00	1.61	0.00	0.14	0.00
Photochemical ozone creation potential	POCP	1.25	0.15	1.00	0.20	1.00	1.61	0.00	0.12	0.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.10	0.09	1.00	0.11	1.00	1.61	0.00	0.03	0.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.36	0.10	1.00	0.10	1.00	1.61	0.00	1.14	0.00
Water Depletion Potential	WDP	1.52	0.09	1.00	0.32	1.00	1.61	0.00	2.28	0.00

Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	0.96	0.10	1.00	0.96	1.00	1.61	0.00	0.49	0.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.20	0.10	1.00	0.21	1.00	1.61	0.00	1.04	0.00
Particulate matter	PM	1.09	0.15	1.00	0.19	1.00	1.61	0.00	0.08	0.00
Ionizing radiation - human health	IRP	0.92	0.10	1.00	0.00	1.00	1.61	0.00	0.00	0.00
Ecotoxicity - freshwater	ETP - fw	2.94	0.10	1.00	0.03	1.00	1.61	0.00	0.85	0.00
Human toxicity potential - cancer effects	HTP - c	1.82	0.14	1.00	0.03	1.00	1.61	0.00	0.85	0.00
Human toxicity potential - non cancer effects	HTP - nc	3.49	0.11	1.00	0.09	1.00	1.61	0.00	0.58	0.00
Soil quality	SQP	0.97	0.10	1.00	0.00	1.00	1.61	0.00	0.02	0.00

Table 19 | Conversion factors for environmental impact per installed AU - CCFLED-DALI sold to Australia

#### Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.42	0.05	1.00	1.63	1.00	1.61	1.26	1.07	1.26
Global warming potential - biogenic	GWP - biogenic	1.00	0.05	1.00	5.62	1.00	1.61	1.26	0.12	1.26
Global warming potential - land use/ land transformation	GWP – luluc	1.11	0.05	1.00	0.00	1.00	1.61	1.26	0.00	1.26
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.42</b>	<b>0.05</b>	<b>1.00</b>	<b>1.63</b>	<b>1.00</b>	<b>1.61</b>	<b>1.26</b>	<b>1.07</b>	<b>1.26</b>
Ozone depletion potential	ODP	1.48	0.05	1.00	0.01	1.00	1.61	1.26	11.20	1.26
Acidification potential	AP	1.52	0.16	1.00	3.85	1.00	1.61	1.26	0.34	1.26
Eutrophication – freshwater	EP - freshwater	1.59	0.06	1.00	0.02	1.00	1.61	1.26	0.00	1.26
Eutrophication – marine	EP – marine	1.38	0.11	1.00	1.32	1.00	1.61	1.26	0.14	1.26
Eutrophication – terrestrial	EP – terrestrial	1.22	0.11	1.00	1.24	1.00	1.61	1.26	0.14	1.26
Photochemical ozone creation potential	POCP	1.51	0.10	1.00	1.22	1.00	1.61	1.26	0.13	1.26
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.74	0.04	1.00	0.00	1.00	1.61	1.26	0.03	1.26
Abiotic depletion potential - fossil fuels	ADP – fossil	1.55	0.04	1.00	0.55	1.00	1.61	1.26	1.17	1.26
Water Depletion Potential	WDP	1.70	0.04	1.00	5.11	1.00	1.61	1.26	2.35	1.26

#### Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.06	0.05	1.00	0.16	1.00	1.61	1.26	0.49	1.26





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.42	0.05	1.00	1.63	1.00	1.61	1.26	1.07	1.26
Particulate matter	PM	1.30	0.11	1.00	7.28	1.00	1.61	1.26	0.08	1.26
Ionizing radiation - human health	IRP	1.27	0.05	1.00	0.00	1.00	1.61	1.26	0.00	1.26
Ecotoxicity - freshwater	ETP - fw	3.36	0.04	1.00	1.16	1.00	1.61	1.26	0.87	1.26
Human toxicity potential - cancer effects	HTP - c	2.05	0.09	1.00	1.56	1.00	1.61	1.26	0.87	1.26
Human toxicity potential - non cancer effects	HTP - nc	4.00	0.06	1.00	3.90	1.00	1.61	1.26	0.59	1.26
Soil quality	SQP	1.01	0.05	1.00	0.35	1.00	1.61	1.26	0.02	1.26

**Table 20 | Conversion factors for environmental impact per installed AU - CCFLED-DALI sold to New Zealand**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.42	0.34	1.00	0.24	1.00	1.61	0.00	1.08	0.00
Global warming potential - biogenic	GWP - biogenic	1.00	0.34	1.00	0.76	1.00	1.61	0.00	0.12	0.00
Global warming potential - land use/ land transformation	GWP – luluc	1.11	0.34	1.00	0.00	1.00	1.61	0.00	0.00	0.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.42</b>	<b>0.34</b>	<b>1.00</b>	<b>0.24</b>	<b>1.00</b>	<b>1.61</b>	<b>0.00</b>	<b>1.07</b>	<b>0.00</b>
Ozone depletion potential	ODP	1.48	0.34	1.00	0.07	1.00	1.61	0.00	11.25	0.00
Acidification potential	AP	1.52	0.43	1.00	0.34	1.00	1.61	0.00	0.34	0.00
Eutrophication – freshwater	EP - freshwater	1.59	0.34	1.00	2.69	1.00	1.61	0.00	0.00	0.00
Eutrophication – marine	EP – marine	1.38	0.39	1.00	0.21	1.00	1.61	0.00	0.14	0.00
Eutrophication – terrestrial	EP – terrestrial	1.22	0.39	1.00	0.14	1.00	1.61	0.00	0.14	0.00
Photochemical ozone creation potential	POCP	1.51	0.38	1.00	0.22	1.00	1.61	0.00	0.13	0.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.74	0.33	1.00	0.13	1.00	1.61	0.00	0.03	0.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.55	0.34	1.00	0.11	1.00	1.61	0.00	1.18	0.00
Water Depletion Potential	WDP	1.70	0.33	1.00	0.35	1.00	1.61	0.00	2.36	0.00

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.06	0.34	1.00	1.08	1.00	1.61	0.00	0.49	0.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.42	0.34	1.00	0.24	1.00	1.61	0.00	1.07	0.00
Particulate matter	PM	1.30	0.38	1.00	0.22	1.00	1.61	0.00	0.08	0.00
Ionizing radiation - human health	IRP	1.27	0.34	1.00	0.00	1.00	1.61	0.00	0.00	0.00
Ecotoxicity - freshwater	ETP - fw	3.36	0.34	1.00	0.04	1.00	1.61	0.00	0.87	0.00
Human toxicity potential - cancer effects	HTP - c	2.05	0.37	1.00	0.03	1.00	1.61	0.00	0.88	0.00
Human toxicity potential - non cancer effects	HTP - nc	4.00	0.35	1.00	0.10	1.00	1.61	0.00	0.60	0.00
Soil quality	SQP	1.01	0.34	1.00	0.00	1.00	1.61	0.00	0.02	0.00

Table 21 | Conversion factors for environmental impact per installed AU - CCFLD-HV sold to Australia

Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.41	0.05	1.00	1.69	1.00	1.58	1.26	1.05	1.26
Global warming potential - biogenic	GWP - biogenic	1.00	0.05	1.00	5.66	1.00	1.58	1.26	0.12	1.26
Global warming potential - land use/ land transformation	GWP – luluc	1.10	0.05	1.00	0.00	1.00	1.58	1.26	0.00	1.26
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.41</b>	<b>0.05</b>	<b>1.00</b>	<b>1.69</b>	<b>1.00</b>	<b>1.58</b>	<b>1.26</b>	<b>1.05</b>	<b>1.26</b>
Ozone depletion potential	ODP	1.59	0.05	1.00	0.01	1.00	1.58	1.26	10.99	1.26
Acidification potential	AP	1.34	0.16	1.00	3.85	1.00	1.58	1.26	0.33	1.26
Eutrophication – freshwater	EP - freshwater	1.43	0.06	1.00	0.02	1.00	1.58	1.26	0.00	1.26
Eutrophication – marine	EP – marine	1.33	0.11	1.00	1.14	1.00	1.58	1.26	0.14	1.26
Eutrophication – terrestrial	EP – terrestrial	1.16	0.11	1.00	1.06	1.00	1.58	1.26	0.14	1.26
Photochemical ozone creation potential	POCP	1.45	0.10	1.00	1.09	1.00	1.58	1.26	0.12	1.26
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.52	0.04	1.00	0.00	1.00	1.58	1.26	0.03	1.26
Abiotic depletion potential - fossil fuels	ADP – fossil	1.54	0.05	1.00	0.55	1.00	1.58	1.26	1.15	1.26
Water Depletion Potential	WDP	1.62	0.04	1.00	4.84	1.00	1.58	1.26	2.30	1.26

Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.04	0.05	1.00	0.14	1.00	1.58	1.26	0.56	1.26





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.41	0.05	1.00	1.69	1.00	1.58	1.26	1.05	1.26
Particulate matter	PM	1.25	0.11	1.00	8.05	1.00	1.58	1.26	0.08	1.26
Ionizing radiation - human health	IRP	1.26	0.05	1.00	0.00	1.00	1.58	1.26	0.00	1.26
Ecotoxicity - freshwater	ETP - fw	3.21	0.05	1.00	0.87	1.00	1.58	1.26	0.85	1.26
Human toxicity potential - cancer effects	HTP - c	1.94	0.09	1.00	1.39	1.00	1.58	1.26	0.86	1.26
Human toxicity potential - non cancer effects	HTP - nc	3.61	0.06	1.00	3.96	1.00	1.58	1.26	0.58	1.26
Soil quality	SQP	0.99	0.05	1.00	0.35	1.00	1.58	1.26	0.02	1.26

**Table 22 | Conversion factors for environmental impact per installed AU - CCFLED-HV sold to New Zealand**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.41	0.18	1.00	0.24	1.00	1.58	0.00	1.06	0.00
Global warming potential - biogenic	GWP - biogenic	1.00	0.18	1.00	0.76	1.00	1.58	0.00	0.12	0.00
Global warming potential - land use/ land transformation	GWP – luluc	1.10	0.18	1.00	0.00	1.00	1.58	0.00	0.00	0.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.41</b>	<b>0.18</b>	<b>1.00</b>	<b>0.24</b>	<b>1.00</b>	<b>1.58</b>	<b>0.00</b>	<b>1.05</b>	<b>0.00</b>
Ozone depletion potential	ODP	1.59	0.18	1.00	0.07	1.00	1.58	0.00	11.04	0.00
Acidification potential	AP	1.34	0.28	1.00	0.34	1.00	1.58	0.00	0.33	0.00
Eutrophication – freshwater	EP - freshwater	1.43	0.18	1.00	2.69	1.00	1.58	0.00	0.00	0.00
Eutrophication – marine	EP – marine	1.33	0.23	1.00	0.21	1.00	1.58	0.00	0.14	0.00
Eutrophication – terrestrial	EP – terrestrial	1.16	0.23	1.00	0.14	1.00	1.58	0.00	0.14	0.00
Photochemical ozone creation potential	POCP	1.45	0.22	1.00	0.22	1.00	1.58	0.00	0.12	0.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.52	0.17	1.00	0.13	1.00	1.58	0.00	0.03	0.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.54	0.18	1.00	0.11	1.00	1.58	0.00	1.16	0.00
Water Depletion Potential	WDP	1.62	0.17	1.00	0.35	1.00	1.58	0.00	2.31	0.00

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.04	0.18	1.00	1.08	1.00	1.58	0.00	0.56	0.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.41	0.18	1.00	0.24	1.00	1.58	0.00	1.05	0.00
Particulate matter	PM	1.25	0.23	1.00	0.22	1.00	1.58	0.00	0.08	0.00
Ionizing radiation - human health	IRP	1.26	0.18	1.00	0.00	1.00	1.58	0.00	0.00	0.00
Ecotoxicity - freshwater	ETP - fw	3.21	0.18	1.00	0.04	1.00	1.58	0.00	0.86	0.00
Human toxicity potential - cancer effects	HTP - c	1.94	0.21	1.00	0.03	1.00	1.58	0.00	0.86	0.00
Human toxicity potential - non cancer effects	HTP - nc	3.61	0.19	1.00	0.10	1.00	1.58	0.00	0.59	0.00
Soil quality	SQP	0.99	0.18	1.00	0.00	1.00	1.58	0.00	0.02	0.00

**Table 23 | Conversion factors for environmental impact per installed AU - CCFLED-HVG sold to Australia**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.39	0.05	1.00	1.70	1.00	1.57	1.26	1.05	1.26
Global warming potential - biogenic	GWP - biogenic	1.00	0.05	1.00	5.66	1.00	1.57	1.26	0.12	1.26
Global warming potential - land use/ land transformation	GWP – luluc	1.08	0.05	1.00	0.00	1.00	1.57	1.26	0.00	1.26
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.39</b>	<b>0.05</b>	<b>1.00</b>	<b>1.70</b>	<b>1.00</b>	<b>1.57</b>	<b>1.26</b>	<b>1.04</b>	<b>1.26</b>
Ozone depletion potential	ODP	1.56	0.05	1.00	0.00	1.00	1.57	1.26	10.94	1.26
Acidification potential	AP	1.46	0.16	1.00	3.84	1.00	1.57	1.26	0.33	1.26
Eutrophication – freshwater	EP - freshwater	1.40	0.06	1.00	0.02	1.00	1.57	1.26	0.00	1.26
Eutrophication – marine	EP – marine	1.33	0.11	1.00	1.10	1.00	1.57	1.26	0.14	1.26
Eutrophication – terrestrial	EP – terrestrial	1.18	0.11	1.00	1.03	1.00	1.57	1.26	0.14	1.26
Photochemical ozone creation potential	POCP	1.48	0.10	1.00	1.06	1.00	1.57	1.26	0.12	1.26
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.57	0.04	1.00	0.00	1.00	1.57	1.26	0.03	1.26
Abiotic depletion potential - fossil fuels	ADP – fossil	1.53	0.05	1.00	0.55	1.00	1.57	1.26	1.15	1.26
Water Depletion Potential	WDP	1.62	0.04	1.00	4.80	1.00	1.57	1.26	2.29	1.26

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.04	0.05	1.00	0.14	1.00	1.57	1.26	0.56	1.26





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.39	0.05	1.00	1.70	1.00	1.57	1.26	1.04	1.26
Particulate matter	PM	1.26	0.11	1.00	8.18	1.00	1.57	1.26	0.08	1.26
Ionizing radiation - human health	IRP	1.23	0.05	1.00	0.00	1.00	1.57	1.26	0.00	1.26
Ecotoxicity - freshwater	ETP - fw	3.21	0.05	1.00	0.81	1.00	1.57	1.26	0.85	1.26
Human toxicity potential - cancer effects	HTP - c	1.87	0.09	1.00	1.36	1.00	1.57	1.26	0.85	1.26
Human toxicity potential - non cancer effects	HTP - nc	3.57	0.06	1.00	3.96	1.00	1.57	1.26	0.58	1.26
Soil quality	SQP	0.99	0.05	1.00	0.35	1.00	1.57	1.26	0.02	1.26

**Table 24 | Conversion factors for environmental impact per installed AU - CCFLED-HVG sold to New Zealand**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.39	0.18	1.00	0.24	1.00	1.57	0.00	1.05	0.00
Global warming potential - biogenic	GWP - biogenic	1.00	0.18	1.00	0.76	1.00	1.57	0.00	0.12	0.00
Global warming potential - land use/ land transformation	GWP – luluc	1.08	0.18	1.00	0.00	1.00	1.57	0.00	0.00	0.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.39</b>	<b>0.18</b>	<b>1.00</b>	<b>0.24</b>	<b>1.00</b>	<b>1.57</b>	<b>0.00</b>	<b>1.05</b>	<b>0.00</b>
Ozone depletion potential	ODP	1.56	0.17	1.00	0.07	1.00	1.57	0.00	10.99	0.00
Acidification potential	AP	1.46	0.28	1.00	0.34	1.00	1.57	0.00	0.33	0.00
Eutrophication – freshwater	EP - freshwater	1.40	0.18	1.00	2.69	1.00	1.57	0.00	0.00	0.00
Eutrophication – marine	EP – marine	1.33	0.23	1.00	0.21	1.00	1.57	0.00	0.14	0.00
Eutrophication – terrestrial	EP – terrestrial	1.18	0.23	1.00	0.14	1.00	1.57	0.00	0.14	0.00
Photochemical ozone creation potential	POCP	1.48	0.22	1.00	0.22	1.00	1.57	0.00	0.12	0.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.57	0.17	1.00	0.13	1.00	1.57	0.00	0.03	0.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.53	0.17	1.00	0.11	1.00	1.57	0.00	1.15	0.00
Water Depletion Potential	WDP	1.62	0.17	1.00	0.35	1.00	1.57	0.00	2.30	0.00

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.04	0.18	1.00	1.08	1.00	1.57	0.00	0.56	0.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.39	0.18	1.00	0.24	1.00	1.57	0.00	1.05	0.00
Particulate matter	PM	1.26	0.23	1.00	0.22	1.00	1.57	0.00	0.08	0.00
Ionizing radiation - human health	IRP	1.23	0.17	1.00	0.00	1.00	1.57	0.00	0.00	0.00
Ecotoxicity - freshwater	ETP - fw	3.21	0.17	1.00	0.04	1.00	1.57	0.00	0.85	0.00
Human toxicity potential - cancer effects	HTP - c	1.87	0.21	1.00	0.03	1.00	1.57	0.00	0.86	0.00
Human toxicity potential - non cancer effects	HTP - nc	3.57	0.18	1.00	0.10	1.00	1.57	0.00	0.58	0.00
Soil quality	SQP	0.99	0.18	1.00	0.00	1.00	1.57	0.00	0.02	0.00

Table 25 | Conversion factors for environmental impact per installed AU - LCFLED-AU sold to Australia

Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.39	0.04	1.00	2.00	1.00	1.60	2.59	1.07	2.59
Global warming potential - biogenic	GWP - biogenic	1.00	0.04	1.00	6.48	1.00	1.60	2.59	0.12	2.59
Global warming potential - land use/ land transformation	GWP – luluc	1.09	0.04	1.00	0.00	1.00	1.60	2.59	0.00	2.59
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.39</b>	<b>0.04</b>	<b>1.00</b>	<b>2.01</b>	<b>1.00</b>	<b>1.60</b>	<b>2.59</b>	<b>1.06</b>	<b>2.59</b>
Ozone depletion potential	ODP	1.60	0.04	1.00	0.07	1.00	1.60	2.59	11.14	2.59
Acidification potential	AP	1.41	0.15	1.00	4.65	1.00	1.60	2.59	0.34	2.59
Eutrophication – freshwater	EP - freshwater	1.33	0.05	1.00	0.03	1.00	1.60	2.59	0.00	2.59
Eutrophication – marine	EP – marine	1.31	0.10	1.00	2.11	1.00	1.60	2.59	0.14	2.59
Eutrophication – terrestrial	EP – terrestrial	1.26	0.10	1.00	1.98	1.00	1.60	2.59	0.14	2.59
Photochemical ozone creation potential	POCP	1.41	0.09	1.00	1.87	1.00	1.60	2.59	0.13	2.59
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.23	0.03	1.00	0.00	1.00	1.60	2.59	0.03	2.59
Abiotic depletion potential - fossil fuels	ADP – fossil	1.53	0.04	1.00	0.65	1.00	1.60	2.59	1.17	2.59
Water Depletion Potential	WDP	1.63	0.04	1.00	9.58	1.00	1.60	2.59	2.33	2.59

Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.04	0.04	1.00	0.29	1.00	1.60	2.59	0.55	2.59





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.39	0.04	1.00	2.01	1.00	1.60	2.59	1.06	2.59
Particulate matter	PM	1.30	0.10	1.00	8.14	1.00	1.60	2.59	0.08	2.59
Ionizing radiation - human health	IRP	1.22	0.04	1.00	0.00	1.00	1.60	2.59	0.00	2.59
Ecotoxicity - freshwater	ETP - fw	3.08	0.04	1.00	1.59	1.00	1.60	2.59	0.87	2.59
Human toxicity potential - cancer effects	HTP - c	1.93	0.09	1.00	2.81	1.00	1.60	2.59	0.87	2.59
Human toxicity potential - non cancer effects	HTP - nc	3.72	0.05	1.00	4.91	1.00	1.60	2.59	0.59	2.59
Soil quality	SQP	0.99	0.05	1.00	0.47	1.00	1.60	2.59	0.02	2.59

Table 26 | Conversion factors for environmental impact per installed AU - LCFLED-AU sold to New Zealand

Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.39	0.08	1.00	0.32	1.00	1.60	0.00	1.08	0.00
Global warming potential - biogenic	GWP - biogenic	1.00	0.08	1.00	1.02	1.00	1.60	0.00	0.12	0.00
Global warming potential - land use/ land transformation	GWP – luluc	1.09	0.08	1.00	0.00	1.00	1.60	0.00	0.00	0.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.39</b>	<b>0.08</b>	<b>1.00</b>	<b>0.32</b>	<b>1.00</b>	<b>1.60</b>	<b>0.00</b>	<b>1.07</b>	<b>0.00</b>
Ozone depletion potential	ODP	1.60	0.08	1.00	0.09	1.00	1.60	0.00	11.23	0.00
Acidification potential	AP	1.41	0.08	1.00	0.46	1.00	1.60	0.00	0.34	0.00
Eutrophication – freshwater	EP - freshwater	1.33	0.09	1.00	3.60	1.00	1.60	0.00	0.00	0.00
Eutrophication – marine	EP – marine	1.31	0.08	1.00	0.28	1.00	1.60	0.00	0.14	0.00
Eutrophication – terrestrial	EP – terrestrial	1.26	0.08	1.00	0.19	1.00	1.60	0.00	0.14	0.00
Photochemical ozone creation potential	POCP	1.41	0.08	1.00	0.30	1.00	1.60	0.00	0.13	0.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.23	0.08	1.00	0.17	1.00	1.60	0.00	0.03	0.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.53	0.08	1.00	0.15	1.00	1.60	0.00	1.18	0.00
Water Depletion Potential	WDP	1.63	0.08	1.00	0.47	1.00	1.60	0.00	2.35	0.00

Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.04	0.08	1.00	1.45	1.00	1.60	0.00	0.55	0.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.39	0.08	1.00	0.32	1.00	1.60	0.00	1.07	0.00
Particulate matter	PM	1.30	0.10	1.00	0.29	1.00	1.60	0.00	0.08	0.00
Ionizing radiation - human health	IRP	1.22	0.08	1.00	0.00	1.00	1.60	0.00	0.00	0.00
Ecotoxicity - freshwater	ETP - fw	3.08	0.08	1.00	0.05	1.00	1.60	0.00	0.87	0.00
Human toxicity potential - cancer effects	HTP - c	1.93	0.09	1.00	0.04	1.00	1.60	0.00	0.88	0.00
Human toxicity potential - non cancer effects	HTP - nc	3.72	0.08	1.00	0.14	1.00	1.60	0.00	0.60	0.00
Soil quality	SQP	0.99	0.09	1.00	0.00	1.00	1.60	0.00	0.02	0.00

Table 27 | Conversion factors for environmental impact per installed AU - LCFLED-DALI sold to Australia

Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.61	0.04	1.00	1.94	1.00	1.63	2.59	1.09	2.59
Global warming potential - biogenic	GWP - biogenic	0.99	0.04	1.00	6.41	1.00	1.63	2.59	0.12	2.59
Global warming potential - land use/ land transformation	GWP – luluc	1.32	0.04	1.00	0.00	1.00	1.63	2.59	0.00	2.59
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.61</b>	<b>0.04</b>	<b>1.00</b>	<b>1.95</b>	<b>1.00</b>	<b>1.63</b>	<b>2.59</b>	<b>1.08</b>	<b>2.59</b>
Ozone depletion potential	ODP	1.88	0.04	1.00	0.09	1.00	1.63	2.59	11.34	2.59
Acidification potential	AP	1.66	0.14	1.00	4.30	1.00	1.63	2.59	0.34	2.59
Eutrophication – freshwater	EP - freshwater	1.73	0.05	1.00	0.03	1.00	1.63	2.59	0.00	2.59
Eutrophication – marine	EP – marine	1.56	0.09	1.00	2.37	1.00	1.63	2.59	0.14	2.59
Eutrophication – terrestrial	EP – terrestrial	1.47	0.10	1.00	2.24	1.00	1.63	2.59	0.14	2.59
Photochemical ozone creation potential	POCP	1.63	0.09	1.00	2.05	1.00	1.63	2.59	0.13	2.59
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.75	0.03	1.00	0.00	1.00	1.63	2.59	0.03	2.59
Abiotic depletion potential - fossil fuels	ADP – fossil	1.71	0.04	1.00	0.69	1.00	1.63	2.59	1.19	2.59
Water Depletion Potential	WDP	1.77	0.03	1.00	10.76	1.00	1.63	2.59	2.38	2.59

Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.13	0.04	1.00	0.46	1.00	1.63	2.59	0.55	2.59





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.61	0.04	1.00	1.95	1.00	1.63	2.59	1.08	2.59
Particulate matter	PM	1.48	0.10	1.00	6.65	1.00	1.63	2.59	0.08	2.59
Ionizing radiation - human health	IRP	1.56	0.04	1.00	0.00	1.00	1.63	2.59	0.00	2.59
Ecotoxicity - freshwater	ETP - fw	3.41	0.04	1.00	1.85	1.00	1.63	2.59	0.88	2.59
Human toxicity potential - cancer effects	HTP - c	2.08	0.08	1.00	3.13	1.00	1.63	2.59	0.88	2.59
Human toxicity potential - non cancer effects	HTP - nc	3.97	0.05	1.00	4.57	1.00	1.63	2.59	0.60	2.59
Soil quality	SQP	1.02	0.04	1.00	0.53	1.00	1.63	2.59	0.02	2.59

**Table 28 | Conversion factors for environmental impact per installed AU - LCFLED-DALI sold to New Zealand**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.61	0.34	1.00	0.36	1.00	1.63	0.00	1.10	0.00
Global warming potential - biogenic	GWP - biogenic	0.99	0.34	1.00	1.15	1.00	1.63	0.00	0.12	0.00
Global warming potential - land use/ land transformation	GWP – luluc	1.32	0.34	1.00	0.00	1.00	1.63	0.00	0.00	0.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.61</b>	<b>0.34</b>	<b>1.00</b>	<b>0.36</b>	<b>1.00</b>	<b>1.63</b>	<b>0.00</b>	<b>1.09</b>	<b>0.00</b>
Ozone depletion potential	ODP	1.88	0.34	1.00	0.11	1.00	1.63	0.00	11.44	0.00
Acidification potential	AP	1.66	0.43	1.00	0.51	1.00	1.63	0.00	0.35	0.00
Eutrophication – freshwater	EP - freshwater	1.73	0.34	1.00	4.03	1.00	1.63	0.00	0.00	0.00
Eutrophication – marine	EP – marine	1.56	0.39	1.00	0.31	1.00	1.63	0.00	0.14	0.00
Eutrophication – terrestrial	EP – terrestrial	1.47	0.39	1.00	0.22	1.00	1.63	0.00	0.14	0.00
Photochemical ozone creation potential	POCP	1.63	0.38	1.00	0.33	1.00	1.63	0.00	0.13	0.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.75	0.33	1.00	0.19	1.00	1.63	0.00	0.03	0.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.71	0.34	1.00	0.17	1.00	1.63	0.00	1.20	0.00
Water Depletion Potential	WDP	1.77	0.33	1.00	0.53	1.00	1.63	0.00	2.40	0.00

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.17	0.34	1.00	1.62	1.00	1.63	0.00	0.55	0.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.61	0.34	1.00	0.36	1.00	1.63	0.00	1.09	0.00
Particulate matter	PM	1.48	0.38	1.00	0.32	1.00	1.63	0.00	0.08	0.00
Ionizing radiation - human health	IRP	1.56	0.34	1.00	0.00	1.00	1.63	0.00	0.00	0.00
Ecotoxicity - freshwater	ETP - fw	3.41	0.34	1.00	0.06	1.00	1.63	0.00	0.89	0.00
Human toxicity potential - cancer effects	HTP - c	2.08	0.37	1.00	0.05	1.00	1.63	0.00	0.89	0.00
Human toxicity potential - non cancer effects	HTP - nc	3.97	0.35	1.00	0.15	1.00	1.63	0.00	0.61	0.00
Soil quality	SQP	1.02	0.34	1.00	0.00	1.00	1.63	0.00	0.02	0.00

Table 29 | Conversion factors for environmental impact per installed Product AU - LCFLED-HV sold to Australia

Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.60	0.05	1.00	2.54	1.00	1.63	2.59	1.08	2.59
Global warming potential - biogenic	GWP - biogenic	0.99	0.05	1.00	8.49	1.00	1.63	2.59	0.12	2.59
Global warming potential - land use/ land transformation	GWP – luluc	1.30	0.05	1.00	0.00	1.00	1.63	2.59	0.00	2.59
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.59</b>	<b>0.05</b>	<b>1.00</b>	<b>2.54</b>	<b>1.00</b>	<b>1.63</b>	<b>2.59</b>	<b>1.08</b>	<b>2.59</b>
Ozone depletion potential	ODP	1.95	0.05	1.00	0.01	1.00	1.63	2.59	11.30	2.59
Acidification potential	AP	1.59	0.17	1.00	5.76	1.00	1.63	2.59	0.34	2.59
Eutrophication – freshwater	EP - freshwater	1.66	0.06	1.00	0.03	1.00	1.63	2.59	0.00	2.59
Eutrophication – marine	EP – marine	1.53	0.11	1.00	1.67	1.00	1.63	2.59	0.14	2.59
Eutrophication – terrestrial	EP – terrestrial	1.43	0.12	1.00	1.56	1.00	1.63	2.59	0.14	2.59
Photochemical ozone creation potential	POCP	1.59	0.10	1.00	1.60	1.00	1.63	2.59	0.13	2.59
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.64	0.04	1.00	0.00	1.00	1.63	2.59	0.03	2.59
Abiotic depletion potential - fossil fuels	ADP – fossil	1.69	0.05	1.00	0.83	1.00	1.63	2.59	1.18	2.59
Water Depletion Potential	WDP	1.73	0.04	1.00	7.22	1.00	1.63	2.59	2.37	2.59

Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.12	0.05	1.00	0.21	1.00	1.63	2.59	0.55	2.59





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.59	0.05	1.00	2.54	1.00	1.63	2.59	1.08	2.59
Particulate matter	PM	1.45	0.11	1.00	12.22	1.00	1.63	2.59	0.08	2.59
Ionizing radiation - human health	IRP	1.54	0.05	1.00	0.00	1.00	1.63	2.59	0.00	2.59
Ecotoxicity - freshwater	ETP - fw	3.34	0.05	1.00	1.24	1.00	1.63	2.59	0.88	2.59
Human toxicity potential - cancer effects	HTP - c	2.05	0.09	1.00	2.05	1.00	1.63	2.59	0.88	2.59
Human toxicity potential - non cancer effects	HTP - nc	3.84	0.06	1.00	5.94	1.00	1.63	2.59	0.60	2.59
Soil quality	SQP	1.01	0.05	1.00	0.52	1.00	1.63	2.59	0.02	2.59

Table 30 | Conversion factors for environmental impact per installed AU - LCFLED-HV sold to New Zealand

Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.60	0.18	1.00	0.36	1.00	1.63	0.00	1.09	0.00
Global warming potential - biogenic	GWP - biogenic	0.99	0.18	1.00	1.15	1.00	1.63	0.00	0.12	0.00
Global warming potential - land use/ land transformation	GWP – luluc	1.30	0.18	1.00	0.00	1.00	1.63	0.00	0.00	0.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.59</b>	<b>0.18</b>	<b>1.00</b>	<b>0.36</b>	<b>1.00</b>	<b>1.63</b>	<b>0.00</b>	<b>1.09</b>	<b>0.00</b>
Ozone depletion potential	ODP	1.95	0.18	1.00	0.11	1.00	1.63	0.00	11.40	0.00
Acidification potential	AP	1.59	0.29	1.00	0.51	1.00	1.63	0.00	0.34	0.00
Eutrophication – freshwater	EP - freshwater	1.66	0.19	1.00	4.03	1.00	1.63	0.00	0.00	0.00
Eutrophication – marine	EP – marine	1.53	0.24	1.00	0.31	1.00	1.63	0.00	0.14	0.00
Eutrophication – terrestrial	EP – terrestrial	1.43	0.24	1.00	0.22	1.00	1.63	0.00	0.14	0.00
Photochemical ozone creation potential	POCP	1.59	0.23	1.00	0.33	1.00	1.63	0.00	0.13	0.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.64	0.17	1.00	0.19	1.00	1.63	0.00	0.03	0.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.69	0.18	1.00	0.17	1.00	1.63	0.00	1.19	0.00
Water Depletion Potential	WDP	1.73	0.18	1.00	0.53	1.00	1.63	0.00	2.39	0.00

Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.12	0.18	1.00	1.62	1.00	1.63	0.00	0.55	0.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.59	0.18	1.00	0.36	1.00	1.63	0.00	1.09	0.00
Particulate matter	PM	1.45	0.23	1.00	0.32	1.00	1.63	0.00	0.08	0.00
Ionizing radiation - human health	IRP	1.54	0.18	1.00	0.00	1.00	1.63	0.00	0.00	0.00
Ecotoxicity - freshwater	ETP - fw	3.34	0.18	1.00	0.06	1.00	1.63	0.00	0.89	0.00
Human toxicity potential - cancer effects	HTP - c	2.05	0.22	1.00	0.05	1.00	1.63	0.00	0.89	0.00
Human toxicity potential - non cancer effects	HTP - nc	3.84	0.19	1.00	0.15	1.00	1.63	0.00	0.60	0.00
Soil quality	SQP	1.01	0.19	1.00	0.00	1.00	1.63	0.00	0.02	0.00

**Table 31 | Conversion factors for environmental impact per installed Product AU - LCFLED-HVG sold to Australia**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.59	0.04	1.00	2.39	1.00	1.61	2.59	1.07	2.59
Global warming potential - biogenic	GWP - biogenic	0.99	0.04	1.00	7.85	1.00	1.61	2.59	0.12	2.59
Global warming potential - land use/ land transformation	GWP – luluc	1.30	0.04	1.00	0.00	1.00	1.61	2.59	0.00	2.59
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.59</b>	<b>0.04</b>	<b>1.00</b>	<b>2.39</b>	<b>1.00</b>	<b>1.61</b>	<b>2.59</b>	<b>1.07</b>	<b>2.59</b>
Ozone depletion potential	ODP	1.99	0.04	1.00	0.11	1.00	1.61	2.59	11.21	2.59
Acidification potential	AP	1.57	0.15	1.00	6.33	1.00	1.61	2.59	0.34	2.59
Eutrophication – freshwater	EP - freshwater	1.63	0.05	1.00	0.04	1.00	1.61	2.59	0.00	2.59
Eutrophication – marine	EP – marine	1.52	0.10	1.00	3.06	1.00	1.61	2.59	0.14	2.59
Eutrophication – terrestrial	EP – terrestrial	1.42	0.10	1.00	2.89	1.00	1.61	2.59	0.14	2.59
Photochemical ozone creation potential	POCP	1.58	0.09	1.00	2.69	1.00	1.61	2.59	0.13	2.59
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.60	0.03	1.00	0.00	1.00	1.61	2.59	0.03	2.59
Abiotic depletion potential - fossil fuels	ADP – fossil	1.69	0.04	1.00	0.69	1.00	1.61	2.59	1.17	2.59
Water Depletion Potential	WDP	1.71	0.04	1.00	13.29	1.00	1.61	2.59	2.35	2.59

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.11	0.04	1.00	0.25	1.00	1.61	2.59	0.62	2.59





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.59	0.04	1.00	2.39	1.00	1.61	2.59	1.07	2.59
Particulate matter	PM	1.45	0.11	1.00	9.75	1.00	1.61	2.59	0.08	2.59
Ionizing radiation - human health	IRP	1.54	0.04	1.00	0.00	1.00	1.61	2.59	0.00	2.59
Ecotoxicity - freshwater	ETP - fw	3.29	0.04	1.00	2.56	1.00	1.61	2.59	0.87	2.59
Human toxicity potential - cancer effects	HTP - c	1.97	0.09	1.00	4.13	1.00	1.61	2.59	0.87	2.59
Human toxicity potential - non cancer effects	HTP - nc	3.78	0.05	1.00	6.53	1.00	1.61	2.59	0.59	2.59
Soil quality	SQP	1.01	0.05	1.00	0.53	1.00	1.61	2.59	0.02	2.59

**Table 32 | Conversion factors for environmental impact per installed AU - LCFLED-HVG sold to New Zealand**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.59	0.18	1.00	0.36	1.00	1.61	0.00	1.08	0.00
Global warming potential - biogenic	GWP - biogenic	0.99	0.18	1.00	1.15	1.00	1.61	0.00	0.12	0.00
Global warming potential - land use/ land transformation	GWP – luluc	1.30	0.18	1.00	0.00	1.00	1.61	0.00	0.00	0.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.59</b>	<b>0.18</b>	<b>1.00</b>	<b>0.36</b>	<b>1.00</b>	<b>1.61</b>	<b>0.00</b>	<b>1.08</b>	<b>0.00</b>
Ozone depletion potential	ODP	1.99	0.18	1.00	0.11	1.00	1.61	0.00	11.30	0.00
Acidification potential	AP	1.57	0.29	1.00	0.51	1.00	1.61	0.00	0.34	0.00
Eutrophication – freshwater	EP - freshwater	1.63	0.19	1.00	4.03	1.00	1.61	0.00	0.00	0.00
Eutrophication – marine	EP – marine	1.52	0.24	1.00	0.31	1.00	1.61	0.00	0.14	0.00
Eutrophication – terrestrial	EP – terrestrial	1.42	0.24	1.00	0.22	1.00	1.61	0.00	0.14	0.00
Photochemical ozone creation potential	POCP	1.58	0.23	1.00	0.33	1.00	1.61	0.00	0.13	0.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.60	0.17	1.00	0.19	1.00	1.61	0.00	0.03	0.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.69	0.18	1.00	0.17	1.00	1.61	0.00	1.18	0.00
Water Depletion Potential	WDP	1.71	0.18	1.00	0.53	1.00	1.61	0.00	2.37	0.00

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.11	0.18	1.00	1.62	1.00	1.61	0.00	0.62	0.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.59	0.18	1.00	0.36	1.00	1.61	0.00	1.08	0.00
Particulate matter	PM	1.45	0.23	1.00	0.32	1.00	1.61	0.00	0.08	0.00
Ionizing radiation - human health	IRP	1.54	0.18	1.00	0.00	1.00	1.61	0.00	0.00	0.00
Ecotoxicity - freshwater	ETP - fw	3.29	0.18	1.00	0.06	1.00	1.61	0.00	0.88	0.00
Human toxicity potential - cancer effects	HTP - c	1.97	0.22	1.00	0.05	1.00	1.61	0.00	0.88	0.00
Human toxicity potential - non cancer effects	HTP - nc	3.78	0.19	1.00	0.15	1.00	1.61	0.00	0.60	0.00
Soil quality	SQP	1.01	0.18	1.00	0.00	1.00	1.61	0.00	0.02	0.00

**Table 33 | Conversion factors for environmental impact per installed CCFLED – UK sold to the United Kingdom**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	2.76	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Global warming potential - biogenic	GWP - biogenic	0.98	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Global warming potential - land use/ land transformation	GWP – luluc	2.83	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>2.75</b>	<b>1.48</b>	<b>1.00</b>	<b>0.67</b>	<b>1.00</b>	<b>1.48</b>	<b>1.00</b>	<b>1.49</b>	<b>1.00</b>
Ozone depletion potential	ODP	4.56	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Acidification potential	AP	2.22	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Eutrophication – freshwater	EP - freshwater	2.99	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Eutrophication – marine	EP – marine	2.66	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Eutrophication – terrestrial	EP – terrestrial	2.24	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Photochemical ozone creation potential	POCP	2.42	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	2.30	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Abiotic depletion potential - fossil fuels	ADP – fossil	2.49	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Water Depletion Potential	WDP	1.66	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.68	1.48	1.00	0.67	1.00	1.48	1.00	1.02	1.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	2.75	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Particulate matter	PM	2.35	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Ionizing radiation - human health	IRP	3.73	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Ecotoxicity - freshwater	ETP - fw	1.95	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Human toxicity potential - cancer effects	HTP - c	2.27	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Human toxicity potential - non cancer effects	HTP - nc	1.51	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00
Soil quality	SQP	1.12	1.48	1.00	0.67	1.00	1.48	1.00	1.49	1.00

Table 34 | Conversion factors for environmental impact per installed UK - CCFLED-DALI sold to the United Kingdom

Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	2.98	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Global warming potential - biogenic	GWP - biogenic	0.98	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Global warming potential - land use/ land transformation	GWP – luluc	3.08	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>2.98</b>	<b>1.53</b>	<b>1.00</b>	<b>0.72</b>	<b>1.00</b>	<b>1.53</b>	<b>1.00</b>	<b>1.54</b>	<b>1.00</b>
Ozone depletion potential	ODP	4.83	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Acidification potential	AP	2.58	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Eutrophication – freshwater	EP - freshwater	3.50	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Eutrophication – marine	EP – marine	2.94	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Eutrophication – terrestrial	EP – terrestrial	2.47	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Photochemical ozone creation potential	POCP	2.68	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	2.94	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Abiotic depletion potential - fossil fuels	ADP – fossil	2.68	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Water Depletion Potential	WDP	1.85	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00

Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.78	1.53	1.00	0.72	1.00	1.53	1.00	1.03	1.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	2.98	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Particulate matter	PM	2.55	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Ionizing radiation - human health	IRP	4.09	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Ecotoxicity - freshwater	ETP - fw	2.37	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Human toxicity potential - cancer effects	HTP - c	2.50	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Human toxicity potential - non cancer effects	HTP - nc	2.03	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00
Soil quality	SQP	1.16	1.53	1.00	0.72	1.00	1.53	1.00	1.54	1.00

**Table 35 | Conversion factors for environmental impact per installed UK – CCFLED-HVG sold to the United Kingdom**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	3.00	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Global warming potential - biogenic	GWP - biogenic	0.98	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Global warming potential - land use/ land transformation	GWP – luluc	3.09	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>2.99</b>	<b>1.51</b>	<b>1.00</b>	<b>0.72</b>	<b>1.00</b>	<b>1.51</b>	<b>1.00</b>	<b>1.51</b>	<b>1.00</b>
Ozone depletion potential	ODP	4.97	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Acidification potential	AP	2.42	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Eutrophication – freshwater	EP - freshwater	3.35	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Eutrophication – marine	EP – marine	2.90	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Eutrophication – terrestrial	EP – terrestrial	2.42	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Photochemical ozone creation potential	POCP	2.63	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	2.72	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Abiotic depletion potential - fossil fuels	ADP – fossil	2.68	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Water Depletion Potential	WDP	1.78	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.77	1.51	1.00	0.72	1.00	1.51	1.00	1.03	1.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	2.99	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Particulate matter	PM	2.52	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Ionizing radiation - human health	IRP	4.11	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Ecotoxicity - freshwater	ETP - fw	2.23	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Human toxicity potential - cancer effects	HTP - c	2.40	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Human toxicity potential - non cancer effects	HTP - nc	1.65	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00
Soil quality	SQP	1.14	1.51	1.00	0.72	1.00	1.51	1.00	1.51	1.00

**Table 36 | Conversion factors for environmental impact per installed UK - LCFLED-DALI sold to the United Kingdom**

**Potential environmental impacts**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.23	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Global warming potential - biogenic	GWP - biogenic	1.00	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Global warming potential - land use/ land transformation	GWP – luluc	1.25	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.23</b>	<b>1.05</b>	<b>1.00</b>	<b>0.72</b>	<b>1.00</b>	<b>1.05</b>	<b>1.00</b>	<b>1.05</b>	<b>1.00</b>
Ozone depletion potential	ODP	1.27	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Acidification potential	AP	1.36	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Eutrophication – freshwater	EP - freshwater	1.51	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Eutrophication – marine	EP – marine	1.29	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Eutrophication – terrestrial	EP – terrestrial	1.24	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Photochemical ozone creation potential	POCP	1.27	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.65	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.19	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Water Depletion Potential	WDP	1.18	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00

**Resource Use**

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.10	1.05	1.00	0.72	1.00	1.05	1.00	1.02	1.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.23	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Particulate matter	PM	1.21	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Ionizing radiation - human health	IRP	1.36	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Ecotoxicity - freshwater	ETP - fw	1.42	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Human toxicity potential - cancer effects	HTP - c	1.23	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Human toxicity potential - non cancer effects	HTP - nc	1.52	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00
Soil quality	SQP	1.03	1.05	1.00	0.72	1.00	1.05	1.00	1.05	1.00

**Table 37 | Conversion factors for environmental impact per installed UK - LCFLED-HVG sold to the United Kingdom**

### Potential environmental impacts

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential - fossil	GWP - fossil	1.23	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Global warming potential - biogenic	GWP - biogenic	1.00	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Global warming potential - land use/ land transformation	GWP – luluc	1.25	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
<b>Global warming potential - total</b>	<b>GWP – total</b>	<b>1.23</b>	<b>1.02</b>	<b>1.00</b>	<b>1.08</b>	<b>1.00</b>	<b>1.02</b>	<b>1.00</b>	<b>1.02</b>	<b>1.00</b>
Ozone depletion potential	ODP	1.40	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Acidification potential	AP	1.20	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Eutrophication – freshwater	EP - freshwater	1.36	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Eutrophication – marine	EP – marine	1.24	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Eutrophication – terrestrial	EP – terrestrial	1.18	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Photochemical ozone creation potential	POCP	1.20	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Abiotic depletion potential - minerals and metals	ADP – mineral & metals	1.41	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Abiotic depletion potential - fossil fuels	ADP – fossil	1.18	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Water Depletion Potential	WDP	1.11	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00

### Resource Use

Indicator		A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	1.09	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00





Exported energy - thermal	EE - t	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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**Additional environmental impact indicators**

Indicator	ABR	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	1.23	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Particulate matter	PM	1.17	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Ionizing radiation - human health	IRP	1.36	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Ecotoxicity - freshwater	ETP - fw	1.27	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Human toxicity potential - cancer effects	HTP - c	1.13	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Human toxicity potential - non cancer effects	HTP - nc	1.13	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00
Soil quality	SQP	1.02	1.02	1.00	1.08	1.00	1.02	1.00	1.02	1.00

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