

## Statement of Verification

BREG EN EPD No.: 000750

Issue 01

This is to verify that the

### Environmental Product Declaration

provided by:

**Vaillant Group UK Ltd**



is in accordance with the requirements of:

**EN 15804:2012+A2:2019**

and

**BRE Global Scheme Document SD207**

This declaration is for:

1 boiler to produce either 20, 25 or 30 kW of heating and domestic hot water production, according to the reference usage scenario defined in the EN 15502-1 standard and during the 17 year reference lifetime of the product.

### Company Address

Vaillant Group UK Ltd.  
Nottingham Road  
DE56 1JT Belper  
UNITED KINGDOM



Signed for BRE Global Ltd

Hayley Thomson

Operator

12 January 2026

Date of this Issue

12 January 2026

Date of First Issue

11 January 2031

Expiry Date



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## Environmental Product Declaration

EPD Number: **000750**

### General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3. 1 (11/2023)  PEP ecopassport®. (2023, 19 octobre). PSR-0012-ed2.0-EN-2023-10-19 – Product Specific Rules for gas, fuel oil or biomass boilers for heating only or heating and domestic hot water production
Commissioner of LCA study	LCA consultant/Tool
Vaillant Group	Frédéric Assouad/Simapro
Declared/Functional Unit	Applicability/Coverage
1 boiler to produce either 20, 25 or 30 kW of heating and domestic hot water production, according to the reference usage scenario defined in the EN 15502-1 standard and during the 17-year reference lifetime of the product.	Product specific.
EPD Type	Background database
Cradle to Gate with Module C and D	ecoinvent
Demonstration of Verification	
CEN standard EN 15804 serves as the core PCR V3.1 (11/2023)	
Independent verification of the declaration and data according to EN ISO 14025:2010 <input checked="" type="checkbox"/> Internal <input type="checkbox"/> External	
(Where appropriate <sup>b</sup> ) Third party verifier: Flavie Lowres	
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)	
Comparability	
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance	

## Information modules covered

Product			Construction		Use stage							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	Related to the building fabric					Related to the building		C1	C2	C3	C4	D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Note: Ticks indicate the Information Modules declared.

## Manufacturing site(s)

The products are manufacturing in Belper:

Vaillant Group UK Ltd.  
 Nottingham Road  
 DE56 1JT Belper  
 UNITED KINGDOM

## Construction Product:

### Product Description

The data has been calculated for each product. The system studied is a condensing gas boiler (fixed on wall) for space heating and producing hot water for individual domestic use.

### Technical Information

Property	ecoTEC plus 826 - 20kW	ecoTEC plus 832 - 25kW	ecoTEC plus 836 - 30kW	ecoTEC plus 840 - 30 kW
Pn (nominal power)	20	25	30	30
Pa (power output at the arithmetic average of the max and min power output according to EN 15502-1/A1 for a gas boilers by kW)	11,2	14,2	17,2	17,2
Etas (%)	93,0	94,0	94,0	94,0
Product Weight without packaging (kg)	35,3	38,7	38,3	37,5



### Main Product Contents

Material/Chemical Input	%
Steel	59-70
Brass and Copper	14-22
Aluminium	6-7
Electronic	2
PP	1-2
PUR	1
Others	4-6

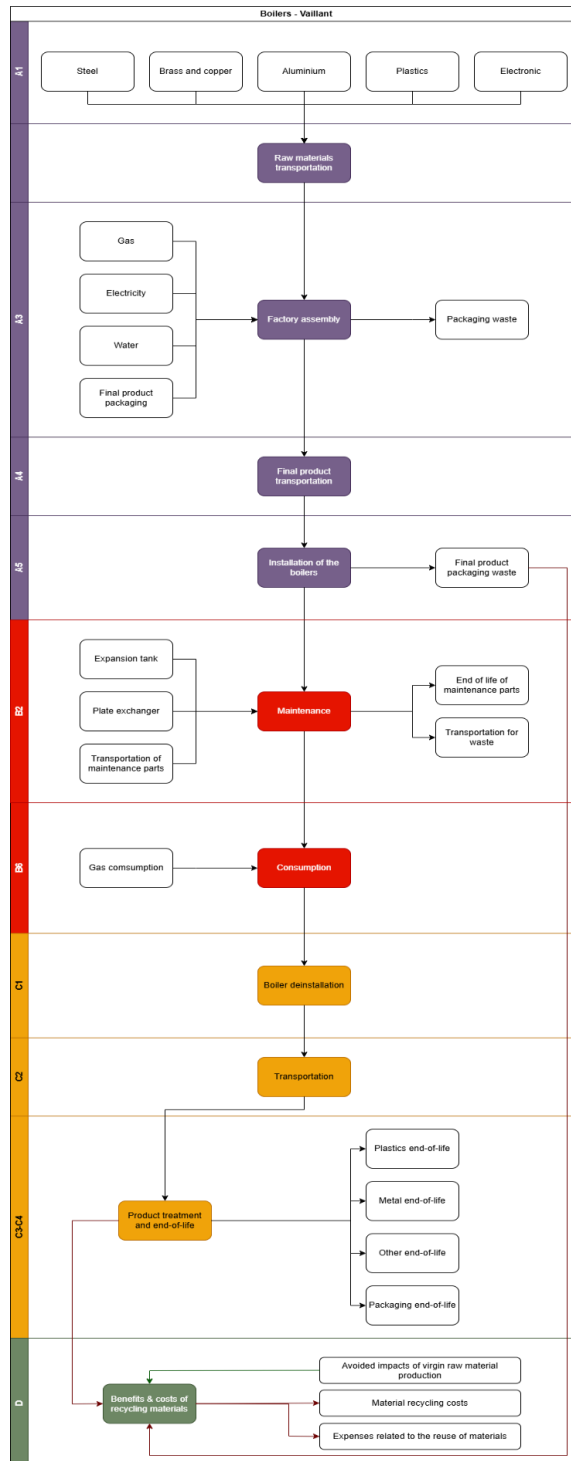
### Manufacturing Process

A boiler is made up of components manufactured and supplied directly by the manufacturer or components ready to be assembled on site. Boilers are assembled in Belper, England, and distributed, installed, and used in the UK.

During stage A1, a default loss quantity is considered in order to take into account the waste produced during the processing of raw materials by the various raw material suppliers. The percentages considered are as follow:

- 5% for plastic injection and elastomer
- 30% for any other processes

Process flow diagram



## Construction Installation

Products are manufactured in Belper and distributed in the UK. The longest distance the unit can travel in the UK (1000 km) by lorry has been considered for this scenario.

The installation of the boilers requires no additional components.

The packaging of the units are disposed of during the installation of the combined units. Packaging includes :

- corrugated cardboard: 71% recycled
- plain wood: 44.1% recycled

## Use Information

B1 : It was assumed the following liquid discharges :

Substance	Quantity released into water	Unit
Sulphite	0,05	mg/MJin
Sulphate	0,05	mg/MJin
Nitrate	0,13	mg/MJin
Nitrite	0,003	mg/MJin

B2: An average return trip distance of 100 km covered by an operator is considered every year for visual inspection. The heat exchanger and the vessel expansion are changed 3 times and 1 time respectively during the reference lifetime.

B3: If the boiler is installed and maintained yearly in accordance with the manufacturer's requirements, the boiler should not require repair throughout its reference lifetime.

B4: the boiler has a reference lifetime of 17 years and therefore no replacement is required providing the boiler has been installed and maintained in accordance with the manufacturer's requirement.

B5: the boiler has a reference lifetime of 17 years and therefore no refurbishment is required providing the boiler has been installed and maintained in accordance with the manufacturer's requirement.

B6: the energy required to operate the boiler was considered over 17 years study period

B7: the boiler is sealed. the water runs through the system to be heated and then fed back into the system. there is therefore no water input into the boiler.

## End of Life

C3: It was assumed the following: 70% of metal and 50% of the plastics are recycled.

C4: No information was provided, so a conservative estimate was made. All other non-recycled materials are sent to landfill at 100%.

## Life Cycle Assessment Calculation Rules

### Declared unit description

1 boiler to produce either 20, 25 or 30 kW of heating and domestic hot water, according to the reference usage scenario defined in the EN 15502-1 and during the 17-years reference lifetime of the product.

### System boundary

The system boundary considered in the LCA study is cradle to grave which covers all production stages (A1-A3), transportation to site (A4), installation (A5), use stages (B1-B7), and end-of-life stages (C1-C4) and D in accordance with EN 15804:2012+A2:2019. Additionally, this EPD complies with EN 50693:2019 PCR for the evaluation of electronic and electrical products and systems.

The study period of this LCA is 17 years which is same as the reference service life of the product for the entire system boundary from A1-C4.

Impacts and losses/wastage in production, transport, use stage and end of life stage are accounted in their respective modules

### Data sources, quality, and allocation

Specific primary data derived from the manufacturing of the boilers tank process in Belper, UK factory have been modelled using Simapro v9.5 LCA software and data collected during the period of 2023. In accordance with the requirements of EN15804, the most current available data has been used. The manufacturer-specific data for one unit of each. Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production) from the ecoinvent 3.10 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804. The quantities of materials have been calculated based on the components used in the unit. The amount of water, energy and waste was allocated to each product based on the total number of boilers manufactured per year.

Specific UK datasets have been selected from the ecoinvent LCI for this LCA. The quality level of geographical and technical representativeness is therefore good. The quality level of time representativeness is good as the background LCI datasets are based on ecoinvent v3.10 (released in 2024).

The English electricity mix (2023) used has an impact on the climate change indicator of 0.252 kgCO<sub>2</sub>eq/kWh, the gas (2023) used for the boilers has an impact of 0.283 kgCO<sub>2</sub>eq/m<sup>3</sup>.

### Cut-off criteria

The cut-off rule used in this study is that defined in PCR edition 4 as follows:

- The mass of intermediate flows not considered must be less than or equal to 5% of the mass of the elements in the reference product corresponding to the Functional unit.
- Energy flows not considered must be less than or equal to 5% of the total primary energy used during the life cycle of the reference product corresponding to the Functional unit,
- The environmental impacts not considered must be less than or equal to 5% of the total environmental impacts generated throughout the life cycle of the reference product corresponding to the Functional unit.

No raw materials are excluded in this study.

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## LCA Results : ecoTEC Plus VUW 20/26CS/1-5 (N-GB)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CFC11 eq	mol H <sup>+</sup> eq	kg (PO <sub>4</sub> ) <sup>3-</sup> eq
Product stage	Raw material supply	A1	1,80E+02	1,81E+02	-	6,43E-01	4,63E-06	4,48E+00	2,61E-02
	Transport	A2	2,33E+01	2,33E+01	7,50E-03	1,16E-02	5,06E-07	5,09E-02	1,89E-04
	Manufacturing	A3	1,06E+01	1,65E+01	-	2,41E-02	1,99E-06	6,19E-02	6,57E-04
	Total (Consumption grid)	A1-3	2,13E+02	2,21E+02	-	6,79E-01	7,13E-06	4,59E+00	2,70E-02
Construction process stage	Transport	A4	8,10E+00	8,09E+00	2,61E-03	4,03E-03	1,76E-07	1,77E-02	6,57E-05
	Construction	A5	1,45E+01	1,18E+00	1,33E+01	2,50E-04	8,16E-09	2,26E-03	5,70E-06
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	5,92E+02	5,91E+02	6,06E-01	2,99E-01	1,48E-05	2,51E+00	1,02E-02
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	6,78E+04	6,78E+04	1,27E+01	9,39E+00	2,99E-03	5,29E+01	2,42E-01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	6,65E-01	6,65E-01	2,14E-04	3,31E-04	1,45E-08	1,45E-03	5,40E-06
	Waste processing	C3	1,81E+01	1,80E+01	8,92E-02	2,71E-02	8,55E-07	6,02E-01	2,22E-03
	Disposal	C4	4,44E-01	4,43E-01	3,43E-04	1,86E-04	1,12E-08	1,43E-03	3,55E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-	-	-	-	-	-	-
			8,75E+01	8,69E+01	-2,19E-01	-3,56E-01	-1,79E-06	-2,18E+00	-2,12E-02

GWP-total = Global warming potential, total;  
 GWP-fossil = Global warming potential, fossil;  
 GWP-biogenic = Global warming potential, biogenic;  
 GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;  
 AP = Acidification potential, accumulated exceedance; and  
 EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			EP-marine	EP-terrestrial	POCP	ADP-mineral & metal	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m <sup>3</sup> world eq deprived	disease incidence
Product stage	Raw material supply	A1	3,17E-01	4,07E+00	1,31E+00	6,07E-02	2,34E+03	9,03E+01	1,71E-05
	Transport	A2	1,25E-02	1,30E-01	7,90E-02	7,80E-05	3,30E+02	1,38E+00	1,73E-06
	Manufacturing	A3	1,74E-02	1,70E-01	8,17E-02	5,04E-05	7,03E+02	6,11E+00	6,73E-07
	Total (Consumption grid)	A1-3	3,47E-01	4,37E+00	1,47E+00	6,08E-02	3,37E+03	9,78E+01	1,95E-05
Construction process stage	Transport	A4	4,35E-03	4,53E-02	2,75E-02	2,71E-05	1,15E+02	4,80E-01	6,01E-07
	Construction	A5	3,75E-03	8,11E-03	3,88E-03	1,05E-06	5,27E+00	1,48E-01	8,02E-08
Use stage	Use	B1	9,11E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	7,41E-01	8,07E+00	3,05E+00	6,56E-03	7,98E+03	5,72E+01	2,89E-05
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	1,60E+01	1,77E+02	1,16E+02	6,64E-02	9,68E+05	1,46E+03	3,05E-04
End of life	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	3,58E-04	3,73E-03	2,26E-03	2,23E-06	9,44E+00	3,95E-02	4,94E-08
	Waste processing	C3	3,26E-02	4,29E-01	1,33E-01	7,32E-03	2,75E+02	1,35E+01	2,34E-06
Potential benefits and loads beyond the system boundaries	Disposal	C4	5,76E-04	5,12E-03	2,13E-03	1,16E-06	6,28E+00	1,01E-01	3,74E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2,16E-01	-3,40E+00	-8,08E-01	-2,56E-02	-1,07E+03	-4,20E+01	-1,10E-05

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;  
 EP-terrestrial = Eutrophication potential, accumulated exceedance;  
 POCP = Formation potential of tropospheric ozone;  
 ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;

ADP-fossil = Depletion potential of the stratospheric ozone layer;  
 WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and  
 PM = Particulate matter.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U <sup>235</sup> eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	7,13E+00	6,31E+03	1,03E-06	5,28E-05	1,95E+03
	Transport	A2	1,67E-01	1,63E+02	1,06E-08	2,35E-07	2,00E+02
	Manufacturing	A3	1,29E+00	7,47E+01	1,29E-08	1,29E-07	1,05E+03
	Total (Consumption grid)	A1-3	8,59E+00	6,55E+03	1,05E-06	5,32E-05	3,20E+03
Construction process stage	Transport	A4	5,82E-02	5,68E+01	3,69E-09	8,15E-08	6,95E+01
	Construction	A5	8,64E-03	1,53E+01	1,24E-09	2,03E-08	4,55E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	6,87E+00	4,86E+03	7,41E-07	9,56E-06	3,06E+03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	2,61E+02	4,96E+04	1,23E-05	1,33E-04	2,18E+04
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	4,78E-03	4,67E+00	3,03E-10	6,70E-09	5,71E+00
	Waste processing	C3	1,44E+00	5,08E+02	2,37E-07	1,34E-05	2,56E+02
	Disposal	C4	6,77E-03	2,85E+01	2,36E-10	3,86E-09	8,02E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3,06E+00	-5,24E+03	-5,39E-07	-2,15E-05	-8,72E+02

IRP = Potential human exposure efficiency relative to U235;  
 ETP-fw = Potential comparative toxic unit for ecosystems;  
 HTP-c = Potential comparative toxic unit for humans;

HTP-nc = Potential comparative toxic unit for humans; and  
 SQP = Potential soil quality index.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, primary energy			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	4,15E+02	3,10E+01	4,46E+02	2,26E+03	7,97E+01	2,34E+03
	Transport	A2	5,19E+00	0,00E+00	5,19E+00	3,30E+02	0,00E+00	3,30E+02
	Manufacturing	A3	1,52E+02	5,17E+01	2,03E+02	6,50E+02	5,62E+01	7,07E+02
	Total (Consumption grid)	A1-3	5,72E+02	8,27E+01	6,54E+02	3,24E+03	1,36E+02	3,38E+03
Construction process stage	Transport	A4	1,81E+00	0,00E+00	1,81E+00	1,15E+02	0,00E+00	1,15E+02
	Construction	A5	9,01E+01	-8,99E+01	1,82E-01	5,27E+00	0,00E+00	5,27E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	2,63E+02	0,00E+00	2,63E+02	7,98E+03	0,00E+00	7,98E+03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	7,81E+03	0,00E+00	7,81E+03	9,68E+05	0,00E+00	9,68E+05
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	1,48E-01	0,00E+00	1,48E-01	9,44E+00	0,00E+00	9,44E+00
	Waste processing	C3	4,63E+01	0,00E+00	4,63E+01	2,75E+02	0,00E+00	2,75E+02
	Disposal	C4	2,62E-01	0,00E+00	2,62E-01	6,28E+00	0,00E+00	6,28E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2,42E+02	0,00E+00	-2,42E+02	-1,04E+03	-3,57E+01	-1,07E+03

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;  
 PERM = Use of renewable primary energy resources used as raw materials;  
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;  
 PENRM = Use of non-renewable primary energy resources used as raw materials;  
 PENRT = Total use of non-renewable primary energy resource

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m <sup>3</sup>
Product stage	Raw material supply	A1	9,10E-01	0,00E+00	0,00E+00	3,01E+00
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	4,75E-02
	Manufacturing	A3	2,26E-01	0,00E+00	0,00E+00	1,51E-01
	Total (Consumption grid)	A1-3	1,14E+00	0,00E+00	0,00E+00	3,20E+00
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	1,65E-02
	Construction	A5	0,00E+00	0,00E+00	0,00E+00	4,81E-03
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	0,00E+00	0,00E+00	0,00E+00	1,90E+00
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	0,00E+00	0,00E+00	0,00E+00	5,51E+01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	1,36E-03
	Waste processing	C3	0,00E+00	0,00E+00	0,00E+00	3,99E-01
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	3,85E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	-1,54E+00

SM = Use of secondary material;  
RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;  
FW = Net use of fresh water

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	4,07E+01	1,38E+03	4,90E-03
	Transport	A2	3,19E-01	1,91E+01	1,09E-04
	Manufacturing	A3	5,76E-01	6,91E+00	7,28E-04
	Total (Consumption grid)	A1-3	4,16E+01	1,41E+03	5,73E-03
Construction process stage	Transport	A4	1,11E-01	6,64E+00	3,78E-05
	Construction	A5	7,79E-02	4,55E+00	8,20E-06
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	3,59E+01	3,78E+02	4,64E-03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	4,22E+02	4,07E+03	1,97E-01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	9,11E-03	5,45E-01	3,10E-06
	Waste processing	C3	3,78E+00	1,82E+02	1,17E-03
	Disposal	C4	1,64E-01	1,33E+01	4,75E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2,38E+01	-7,27E+02	-2,12E-03

HWD = Hazardous waste disposed;  
 NHWD = Non-hazardous waste disposed;  
 RWD = Radioactive waste disposed

### LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,71E-01	8,03E-01
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Manufacturing	A3	0,00E+00	1,20E+00	0,00E+00	0,00E+00	0,00E+00	2,64E+00
	Total (Consumption grid)	A1-3	0,00E+00	1,20E+00	0,00E+00	0,00E+00	2,71E-01	3,44E+00
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Construction	A5	0,00E+00	4,32E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	0,00E+00	4,85E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Waste processing	C3	0,00E+00	2,30E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU = Components for reuse;  
MFR = Materials for recycling

MER = Materials for energy recovery;  
EE = Exported Energy

## LCA Results : ecoTEC Plus VUW 25/32CS/1-5 (N-GB)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CFC11 eq	mol H <sup>+</sup> eq	kg (PO <sub>4</sub> ) <sup>3-</sup> eq
Product stage	Raw material supply	A1	1,98E+02	1,99E+02	-	6,56E-01	4,66E-06	3,38E+00	2,14E-02
	Transport	A2	2,54E+01	2,54E+01	8,18E-03	1,26E-02	5,52E-07	5,55E-02	2,06E-04
	Manufacturing	A3	1,09E+01	1,65E+01	-	2,41E-02	1,99E-06	6,19E-02	6,57E-04
	Total (Consumption grid)	A1-3	2,34E+02	2,40E+02	-	6,93E-01	7,21E-06	3,50E+00	2,22E-02
Construction process stage	Transport	A4	8,70E+00	8,69E+00	2,80E-03	4,33E-03	1,89E-07	1,90E-02	7,06E-05
	Construction	A5	1,45E+01	1,18E+00	1,33E+01	2,50E-04	8,16E-09	2,26E-03	5,70E-06
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	5,92E+02	5,91E+02	6,06E-01	2,99E-01	1,48E-05	2,51E+00	1,02E-02
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	8,07E+04	8,07E+04	1,51E+01	1,12E+01	3,55E-03	6,29E+01	2,87E-01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	7,26E-01	7,25E-01	2,34E-04	3,61E-04	1,58E-08	1,59E-03	5,89E-06
	Waste processing	C3	1,64E+01	1,63E+01	8,74E-02	2,41E-02	1,01E-06	4,12E-01	1,72E-03
	Disposal	C4	4,66E-01	4,65E-01	3,04E-04	1,95E-04	1,18E-08	1,46E-03	3,64E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-	-	-	-	-	-	-
			9,97E+01	9,91E+01	-2,17E-01	-3,66E-01	-2,98E-06	-1,56E+00	-1,67E-02

GWP-total = Global warming potential, total;  
 GWP-fossil = Global warming potential, fossil;  
 GWP-biogenic = Global warming potential, biogenic;  
 GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;  
 AP = Acidification potential, accumulated exceedance; and  
 EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			EP-marine	EP-terrestrial	POCP	ADP-mineral & metal	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m <sup>3</sup> world eq deprived	disease incidence
Product stage	Raw material supply	A1	2,84E-01	3,49E+00	1,17E+00	4,27E-02	2,55E+03	7,92E+01	1,72E-05
	Transport	A2	1,37E-02	1,42E-01	8,61E-02	8,50E-05	3,60E+02	1,51E+00	1,89E-06
	Manufacturing	A3	1,75E-02	1,70E-01	8,17E-02	5,04E-05	7,04E+02	6,11E+00	6,74E-07
	Total (Consumption grid)	A1-3	3,16E-01	3,80E+00	1,33E+00	4,28E-02	3,61E+03	8,69E+01	1,98E-05
Construction process stage	Transport	A4	4,68E-03	4,87E-02	2,95E-02	2,91E-05	1,23E+02	5,16E-01	6,46E-07
	Construction	A5	3,75E-03	8,11E-03	3,88E-03	1,05E-06	5,27E+00	1,48E-01	8,02E-08
Use stage	Use	B1	9,11E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	7,41E-01	8,07E+00	3,05E+00	6,56E-03	7,98E+03	5,72E+01	2,89E-05
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	1,90E+01	2,10E+02	1,38E+02	7,91E-02	1,15E+06	1,74E+03	3,63E-04
End of life	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	3,90E-04	4,06E-03	2,46E-03	2,43E-06	1,03E+01	4,31E-02	5,39E-08
	Waste processing	C3	2,62E-02	3,37E-01	1,04E-01	4,81E-03	2,60E+02	1,16E+01	2,19E-06
	Disposal	C4	5,91E-04	5,13E-03	2,16E-03	1,17E-06	6,47E+00	1,11E-01	3,83E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1,89E-01	-2,69E+00	-7,12E-01	-1,64E-02	-1,19E+03	-3,26E+01	-1,08E-05

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;  
 EP-terrestrial = Eutrophication potential, accumulated exceedance;  
 POCP = Formation potential of tropospheric ozone;  
 ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;

ADP-fossil = Depletion potential of the stratospheric ozone layer;  
 WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and  
 PM = Particulate matter.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U <sup>235</sup> eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	7,28E+00	4,58E+03	1,08E-06	3,65E-05	1,80E+03
	Transport	A2	1,83E-01	1,78E+02	1,16E-08	2,56E-07	2,18E+02
	Manufacturing	A3	1,29E+00	7,50E+01	1,29E-08	1,30E-07	1,05E+03
	Total (Consumption grid)	A1-3	8,76E+00	4,83E+03	1,10E-06	3,69E-05	3,07E+03
Construction process stage	Transport	A4	6,26E-02	6,10E+01	3,96E-09	8,76E-08	7,47E+01
	Construction	A5	8,64E-03	1,53E+01	1,24E-09	2,03E-08	4,55E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	6,87E+00	4,86E+03	7,41E-07	9,56E-06	3,06E+03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	3,11E+02	5,91E+04	1,47E-05	1,58E-04	2,59E+04
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	5,22E-03	5,09E+00	3,31E-10	7,31E-09	6,23E+00
	Waste processing	C3	1,39E+00	3,69E+02	2,40E-07	1,15E-05	1,98E+02
	Disposal	C4	6,09E-03	2,19E+01	2,24E-10	3,87E-09	8,09E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3,15E+00	-3,77E+03	-8,74E-07	-1,31E-05	-7,47E+02

IRP = Potential human exposure efficiency relative to U235;  
 ETP-fw = Potential comparative toxic unit for ecosystems;  
 HTP-c = Potential comparative toxic unit for humans;

HTP-nc = Potential comparative toxic unit for humans; and  
 SQP = Potential soil quality index.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, primary energy			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	4,69E+02	3,10E+01	5,00E+02	2,46E+03	8,68E+01	2,55E+03
	Transport	A2	5,67E+00	0,00E+00	5,67E+00	3,60E+02	0,00E+00	3,60E+02
	Manufacturing	A3	1,54E+02	4,97E+01	2,03E+02	6,51E+02	5,62E+01	7,07E+02
	Total (Consumption grid)	A1-3	6,29E+02	8,06E+01	7,09E+02	3,47E+03	1,43E+02	3,61E+03
Construction process stage	Transport	A4	1,94E+00	0,00E+00	1,94E+00	1,23E+02	0,00E+00	1,23E+02
	Construction	A5	9,01E+01	-8,99E+01	1,82E-01	5,27E+00	0,00E+00	5,27E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	2,63E+02	0,00E+00	2,63E+02	7,98E+03	0,00E+00	7,98E+03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	9,29E+03	0,00E+00	9,29E+03	1,15E+06	0,00E+00	1,15E+06
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	1,62E-01	0,00E+00	1,62E-01	1,03E+01	0,00E+00	1,03E+01
	Waste processing	C3	3,92E+01	0,00E+00	3,92E+01	2,60E+02	0,00E+00	2,60E+02
	Disposal	C4	2,20E-01	0,00E+00	2,20E-01	6,47E+00	0,00E+00	6,47E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2,77E+02	0,00E+00	-2,77E+02	-1,16E+03	-3,90E+01	-1,19E+03

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;  
 PERM = Use of renewable primary energy resources used as raw materials;  
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;  
 PENRM = Use of non-renewable primary energy resources used as raw materials;  
 PENRT = Total use of non-renewable primary energy resource

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m <sup>3</sup>
Product stage	Raw material supply	A1	8,58E-01	0,00E+00	0,00E+00	2,81E+00
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	5,18E-02
	Manufacturing	A3	2,26E-01	0,00E+00	0,00E+00	1,51E-01
	Total (Consumption grid)	A1-3	1,08E+00	0,00E+00	0,00E+00	3,02E+00
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	1,77E-02
	Construction	A5	0,00E+00	0,00E+00	0,00E+00	4,81E-03
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	0,00E+00	0,00E+00	0,00E+00	1,90E+00
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	0,00E+00	0,00E+00	0,00E+00	6,55E+01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	1,48E-03
	Waste processing	C3	0,00E+00	0,00E+00	0,00E+00	3,53E-01
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	3,77E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	-1,36E+00

SM = Use of secondary material;  
RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;  
FW = Net use of fresh water

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	7,66E+01	9,85E+02	5,10E-03
	Transport	A2	3,48E-01	2,08E+01	1,19E-04
	Manufacturing	A3	5,77E-01	7,01E+00	7,28E-04
	Total (Consumption grid)	A1-3	7,75E+01	1,01E+03	5,95E-03
Construction process stage	Transport	A4	1,19E-01	7,13E+00	4,06E-05
	Construction	A5	7,79E-02	4,55E+00	8,20E-06
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	3,59E+01	3,78E+02	4,64E-03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	5,02E+02	4,84E+03	2,35E-01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	9,94E-03	5,95E-01	3,39E-06
	Waste processing	C3	3,61E+00	1,19E+02	1,17E-03
	Disposal	C4	1,22E-01	1,41E+01	4,50E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4,71E+01	-4,93E+02	-2,42E-03

HWD = Hazardous waste disposed;  
 NHWD = Non-hazardous waste disposed;  
 RWD = Radioactive waste disposed

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

			Other environmental information describing output flows – at end of life					
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,14E-01	8,63E-01
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Manufacturing	A3	0,00E+00	1,29E+00	0,00E+00	0,00E+00	0,00E+00	2,64E+00
	Total (Consumption grid)	A1-3	0,00E+00	1,29E+00	0,00E+00	0,00E+00	2,14E-01	3,50E+00
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Construction	A5	0,00E+00	4,32E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	0,00E+00	4,85E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Waste processing	C3	0,00E+00	2,54E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU = Components for reuse;  
MFR = Materials for recycling

MER = Materials for energy recovery;  
EE = Exported Energy

## LCA Results : ecoTEC Plus VUW 30/36CS/1-5 (N-GB)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CFC11 eq	mol H <sup>+</sup> eq	kg (PO <sub>4</sub> ) <sup>3-</sup> eq
Product stage	Raw material supply	A1	1,96E+02	1,97E+02	-	6,54E-01	4,53E-06	3,37E+00	2,13E-02
	Transport	A2	2,51E+01	2,51E+01	8,09E-03	1,25E-02	5,46E-07	5,48E-02	2,04E-04
	Manufacturing	A3	1,08E+01	1,65E+01	5,65E+00	2,41E-02	1,99E-06	6,19E-02	6,57E-04
	Total (Consumption grid)	A1-3	2,32E+02	2,39E+02	-	6,91E-01	7,07E-06	3,49E+00	2,22E-02
Construction process stage	Transport	A4	8,62E+00	8,61E+00	2,78E-03	4,28E-03	1,87E-07	1,88E-02	6,99E-05
	Construction	A5	1,45E+01	1,18E+00	1,33E+01	2,50E-04	8,16E-09	2,26E-03	5,70E-06
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	5,92E+02	5,91E+02	6,06E-01	2,99E-01	1,48E-05	2,51E+00	1,02E-02
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	9,14E+04	9,14E+04	1,71E+01	1,27E+01	4,02E-03	7,12E+01	3,25E-01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	7,17E-01	7,17E-01	2,31E-04	3,57E-04	1,56E-08	1,57E-03	5,82E-06
	Waste processing	C3	1,63E+01	1,62E+01	8,31E-02	2,40E-02	1,02E-06	4,12E-01	1,72E-03
	Disposal	C4	4,39E-01	4,39E-01	2,92E-04	1,88E-04	1,11E-08	1,41E-03	3,49E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-	-	-	-	-	-	-
			9,91E+01	9,86E+01	-2,14E-01	-3,66E-01	-2,93E-06	-1,56E+00	-1,67E-02

GWP-total = Global warming potential, total;  
 GWP-fossil = Global warming potential, fossil;  
 GWP-biogenic = Global warming potential, biogenic;  
 GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;  
 AP = Acidification potential, accumulated exceedance; and  
 EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			EP-marine	EP-terrestrial	POCP	ADP-mineral & metal	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m <sup>3</sup> world eq deprived	disease incidence
Product stage	Raw material supply	A1	2,82E-01	3,48E+00	1,16E+00	4,27E-02	2,51E+03	7,78E+01	1,71E-05
	Transport	A2	1,35E-02	1,41E-01	8,51E-02	8,41E-05	3,56E+02	1,49E+00	1,86E-06
	Manufacturing	A3	1,74E-02	1,70E-01	8,17E-02	5,04E-05	7,03E+02	6,11E+00	6,74E-07
	Total (Consumption grid)	A1-3	3,13E-01	3,79E+00	1,33E+00	4,28E-02	3,57E+03	8,54E+01	1,97E-05
Construction process stage	Transport	A4	4,63E-03	4,82E-02	2,92E-02	2,89E-05	1,22E+02	5,11E-01	6,40E-07
	Construction	A5	3,75E-03	8,11E-03	3,88E-03	1,05E-06	5,27E+00	1,48E-01	8,02E-08
Use stage	Use	B1	9,11E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	7,41E-01	8,07E+00	3,05E+00	6,56E-03	7,98E+03	5,72E+01	2,89E-05
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	2,16E+01	2,38E+02	1,56E+02	8,95E-02	1,30E+06	1,97E+03	4,11E-04
End of life	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	3,86E-04	4,02E-03	2,43E-03	2,40E-06	1,02E+01	4,26E-02	5,33E-08
	Waste processing	C3	2,61E-02	3,37E-01	1,04E-01	4,81E-03	2,59E+02	1,16E+01	2,19E-06
Potential benefits and loads beyond the system boundaries	Disposal	C4	5,55E-04	4,95E-03	2,08E-03	1,13E-06	6,26E+00	1,06E-01	3,70E-08
	Reuse, recovery, recycling potential	D	-1,88E-01	-2,68E+00	-7,10E-01	-1,64E-02	-1,18E+03	-3,22E+01	-1,08E-05

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;  
 EP-terrestrial = Eutrophication potential, accumulated exceedance;  
 POCP = Formation potential of tropospheric ozone;  
 ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;

ADP-fossil = Depletion potential of the stratospheric ozone layer;  
 WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and  
 PM = Particulate matter.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U <sup>235</sup> eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	7,20E+00	4,52E+03	1,07E-06	3,65E-05	1,79E+03
	Transport	A2	1,81E-01	1,76E+02	1,14E-08	2,53E-07	2,15E+02
	Manufacturing	A3	1,29E+00	7,50E+01	1,29E-08	1,30E-07	1,05E+03
	Total (Consumption grid)	A1-3	8,67E+00	4,77E+03	1,09E-06	3,68E-05	3,06E+03
Construction process stage	Transport	A4	6,20E-02	6,05E+01	3,93E-09	8,68E-08	7,39E+01
	Construction	A5	8,64E-03	1,53E+01	1,24E-09	2,03E-08	4,55E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	6,87E+00	4,86E+03	7,41E-07	9,56E-06	3,06E+03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	3,52E+02	6,69E+04	1,66E-05	1,79E-04	2,93E+04
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	5,16E-03	5,03E+00	3,27E-10	7,23E-09	6,16E+00
	Waste processing	C3	1,39E+00	3,69E+02	2,41E-07	1,15E-05	1,97E+02
	Disposal	C4	5,84E-03	2,18E+01	2,18E-10	3,74E-09	7,79E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3,14E+00	-3,74E+03	-8,69E-07	-1,31E-05	-7,46E+02

IRP = Potential human exposure efficiency relative to U235;  
 ETP-fw = Potential comparative toxic unit for ecosystems;  
 HTP-c = Potential comparative toxic unit for humans;

HTP-nc = Potential comparative toxic unit for humans; and  
 SQP = Potential soil quality index.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, primary energy			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	4,67E+02	3,07E+01	4,98E+02	2,43E+03	7,83E+01	2,51E+03
	Transport	A2	5,60E+00	0,00E+00	5,60E+00	3,56E+02	0,00E+00	3,56E+02
	Manufacturing	A3	1,53E+02	4,99E+01	2,03E+02	6,51E+02	5,62E+01	7,07E+02
	Total (Consumption grid)	A1-3	6,26E+02	8,06E+01	7,06E+02	3,44E+03	1,34E+02	3,58E+03
Construction process stage	Transport	A4	1,92E+00	0,00E+00	1,92E+00	1,22E+02	0,00E+00	1,22E+02
	Construction	A5	9,01E+01	-8,99E+01	1,82E-01	5,27E+00	0,00E+00	5,27E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	2,63E+02	0,00E+00	2,63E+02	7,98E+03	0,00E+00	7,98E+03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	1,05E+04	0,00E+00	1,05E+04	1,30E+06	0,00E+00	1,30E+06
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	1,60E-01	0,00E+00	1,60E-01	1,02E+01	0,00E+00	1,02E+01
	Waste processing	C3	3,91E+01	0,00E+00	3,91E+01	2,59E+02	0,00E+00	2,59E+02
	Disposal	C4	2,16E-01	0,00E+00	2,16E-01	6,26E+00	0,00E+00	6,26E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2,77E+02	0,00E+00	-2,77E+02	-1,15E+03	-3,48E+01	-1,18E+03

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;  
 PERM = Use of renewable primary energy resources used as raw materials;  
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;  
 PENRM = Use of non-renewable primary energy resources used as raw materials;  
 PENRT = Total use of non-renewable primary energy resource

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m <sup>3</sup>
Product stage	Raw material supply	A1	8,51E-01	0,00E+00	0,00E+00	2,78E+00
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	5,12E-02
	Manufacturing	A3	2,26E-01	0,00E+00	0,00E+00	1,51E-01
	Total (Consumption grid)	A1-3	1,08E+00	0,00E+00	0,00E+00	2,98E+00
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	1,76E-02
	Construction	A5	0,00E+00	0,00E+00	0,00E+00	4,81E-03
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	0,00E+00	0,00E+00	0,00E+00	1,90E+00
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	0,00E+00	0,00E+00	0,00E+00	7,42E+01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	1,46E-03
	Waste processing	C3	0,00E+00	0,00E+00	0,00E+00	3,53E-01
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	3,64E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	-1,35E+00

SM = Use of secondary material;  
RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;  
FW = Net use of fresh water

### LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	7,67E+01	9,85E+02	5,03E-03
	Transport	A2	3,44E-01	2,06E+01	1,17E-04
	Manufacturing	A3	5,77E-01	6,99E+00	7,28E-04
	Total (Consumption grid)	A1-3	7,76E+01	1,01E+03	5,88E-03
Construction process stage	Transport	A4	1,18E-01	7,06E+00	4,02E-05
	Construction	A5	7,79E-02	4,55E+00	8,20E-06
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	3,59E+01	3,78E+02	4,64E-03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	5,69E+02	5,49E+03	2,66E-01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	9,82E-03	5,88E-01	3,35E-06
	Waste processing	C3	3,61E+00	1,19E+02	1,17E-03
	Disposal	C4	1,22E-01	1,37E+01	4,19E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4,72E+01	-4,93E+02	-2,41E-03

HWD = Hazardous waste disposed;  
 NHWD = Non-hazardous waste disposed;  
 RWD = Radioactive waste disposed

### LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing output flows – at end of life			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,10E-01	8,55E-01
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Manufacturing	A3	0,00E+00	1,28E+00	0,00E+00	0,00E+00	0,00E+00	2,64E+00
	Total (Consumption grid)	A1-3	0,00E+00	1,28E+00	0,00E+00	0,00E+00	2,10E-01	3,49E+00
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Construction	A5	0,00E+00	4,32E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	0,00E+00	4,85E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Waste processing	C3	0,00E+00	2,53E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU = Components for reuse;  
MFR = Materials for recycling

MER = Materials for energy recovery;  
EE = Exported Energy

## LCA Results : ecoTEC Plus VUW 30/40CS/1-5 (N-GB)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CO <sub>2</sub> eq	kg CFC11 eq	mol H <sup>+</sup> eq	kg (PO <sub>4</sub> ) <sup>3-</sup> eq
Product stage	Raw material supply	A1	1,88E+02	1,89E+02	-	7,22E-01	4,75E-06	4,29E+00	2,56E-02
	Transport	A2	2,47E+01	2,46E+01	7,94E-03	1,23E-02	5,36E-07	5,39E-02	2,00E-04
	Manufacturing	A3	1,08E+01	1,65E+01	5,73E+00	2,41E-02	1,99E-06	6,20E-02	6,59E-04
	Total (Consumption grid)	A1-3	2,24E+02	2,30E+02	-	7,58E-01	7,28E-06	4,41E+00	2,64E-02
Construction process stage	Transport	A4	8,49E+00	8,48E+00	2,73E-03	4,22E-03	1,85E-07	1,85E-02	6,89E-05
	Construction	A5	1,45E+01	1,18E+00	1,33E+01	2,51E-04	8,18E-09	2,27E-03	5,71E-06
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	5,92E+02	5,91E+02	6,06E-01	2,99E-01	1,48E-05	2,51E+00	1,02E-02
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	9,04E+04	9,04E+04	1,69E+01	1,25E+01	3,98E-03	7,05E+01	3,22E-01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	7,05E-01	7,04E-01	2,27E-04	3,50E-04	1,53E-08	1,54E-03	5,72E-06
	Waste processing	C3	1,84E+01	1,83E+01	9,02E-02	2,75E-02	9,18E-07	5,80E-01	2,18E-03
	Disposal	C4	4,60E-01	4,59E-01	3,58E-04	1,97E-04	1,15E-08	1,51E-03	3,73E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-	-	-	-	-	-	-
			9,16E+01	9,10E+01	-2,29E-01	-4,10E-01	-1,87E-06	-2,21E+00	-1,94E-02

GWP-total = Global warming potential, total;  
 GWP-fossil = Global warming potential, fossil;  
 GWP-biogenic = Global warming potential, biogenic;  
 GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;  
 AP = Acidification potential, accumulated exceedance; and  
 EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			EP-marine	EP-terrestrial	POCP	ADP-mineral & metal	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m <sup>3</sup> world eq deprived	disease incidence
Product stage	Raw material supply	A1	3,16E-01	4,01E+00	1,31E+00	5,76E-02	2,45E+03	8,91E+01	1,74E-05
	Transport	A2	1,33E-02	1,38E-01	8,36E-02	8,26E-05	3,50E+02	1,46E+00	1,83E-06
	Manufacturing	A3	1,74E-02	1,70E-01	8,18E-02	5,04E-05	7,04E+02	6,11E+00	6,75E-07
	Total (Consumption grid)	A1-3	3,47E-01	4,32E+00	1,48E+00	5,77E-02	3,51E+03	9,66E+01	1,99E-05
Construction process stage	Transport	A4	4,57E-03	4,75E-02	2,88E-02	2,84E-05	1,21E+02	5,04E-01	6,31E-07
	Construction	A5	3,76E-03	8,13E-03	3,89E-03	1,05E-06	5,28E+00	1,48E-01	8,04E-08
Use stage	Use	B1	9,11E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	7,41E-01	8,07E+00	3,05E+00	6,56E-03	7,98E+03	5,72E+01	2,89E-05
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	2,14E+01	2,36E+02	1,55E+02	8,86E-02	1,29E+06	1,95E+03	4,07E-04
End of life	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	3,79E-04	3,94E-03	2,39E-03	2,36E-06	1,00E+01	4,18E-02	5,23E-08
	Waste processing	C3	3,23E-02	4,24E-01	1,32E-01	7,02E-03	2,81E+02	1,37E+01	2,39E-06
	Disposal	C4	5,94E-04	5,38E-03	2,24E-03	1,22E-06	6,62E+00	1,08E-01	3,95E-08
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2,06E-01	-3,32E+00	-7,88E-01	-2,53E-02	-1,13E+03	-4,30E+01	-1,12E-05

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;  
 EP-terrestrial = Eutrophication potential, accumulated exceedance;  
 POCP = Formation potential of tropospheric ozone;  
 ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;

ADP-fossil = Depletion potential of the stratospheric ozone layer;  
 WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and  
 PM = Particulate matter.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U <sup>235</sup> eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	7,40E+00	6,09E+03	1,03E-06	4,98E-05	1,92E+03
	Transport	A2	1,77E-01	1,73E+02	1,12E-08	2,48E-07	2,12E+02
	Manufacturing	A3	1,29E+00	7,50E+01	1,29E-08	1,30E-07	1,05E+03
	Total (Consumption grid)	A1-3	8,87E+00	6,34E+03	1,06E-06	5,02E-05	3,19E+03
Construction process stage	Transport	A4	6,11E-02	5,96E+01	3,87E-09	8,55E-08	7,29E+01
	Construction	A5	8,65E-03	1,54E+01	1,24E-09	2,03E-08	4,56E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	6,87E+00	4,86E+03	7,41E-07	9,56E-06	3,06E+03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	3,49E+02	6,62E+04	1,64E-05	1,78E-04	2,90E+04
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	5,07E-03	4,94E+00	3,21E-10	7,10E-09	6,05E+00
	Waste processing	C3	1,47E+00	5,00E+02	2,45E-07	1,34E-05	2,53E+02
	Disposal	C4	6,90E-03	2,88E+01	2,46E-10	4,03E-09	8,44E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3,26E+00	-4,77E+03	-5,67E-07	-2,19E-05	-8,50E+02

IRP = Potential human exposure efficiency relative to U235;  
 ETP-fw = Potential comparative toxic unit for ecosystems;  
 HTP-c = Potential comparative toxic unit for humans;

HTP-nc = Potential comparative toxic unit for humans; and  
 SQP = Potential soil quality index.

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, primary energy			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	4,32E+02	3,16E+01	4,64E+02	2,37E+03	8,10E+01	2,45E+03
	Transport	A2	5,50E+00	0,00E+00	5,50E+00	3,50E+02	0,00E+00	3,50E+02
	Manufacturing	A3	1,53E+02	5,05E+01	2,04E+02	6,51E+02	5,62E+01	7,07E+02
	Total (Consumption grid)	A1-3	5,91E+02	8,21E+01	6,73E+02	3,37E+03	1,37E+02	3,51E+03
Construction process stage	Transport	A4	1,89E+00	0,00E+00	1,89E+00	1,21E+02	0,00E+00	1,21E+02
	Construction	A5	9,02E+01	-9,00E+01	1,82E-01	5,28E+00	0,00E+00	5,28E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	2,63E+02	0,00E+00	2,63E+02	7,98E+03	0,00E+00	7,98E+03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	1,04E+04	0,00E+00	1,04E+04	1,29E+06	0,00E+00	1,29E+06
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	1,57E-01	0,00E+00	1,57E-01	1,00E+01	0,00E+00	1,00E+01
	Waste processing	C3	4,63E+01	0,00E+00	4,63E+01	2,81E+02	0,00E+00	2,81E+02
	Disposal	C4	2,68E-01	0,00E+00	2,68E-01	6,62E+00	0,00E+00	6,62E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2,50E+02	0,00E+00	-2,50E+02	-1,10E+03	-3,60E+01	-1,13E+03

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;  
 PERM = Use of renewable primary energy resources used as raw materials;  
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;  
 PENRM = Use of non-renewable primary energy resources used as raw materials;  
 PENRT = Total use of non-renewable primary energy resource

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m <sup>3</sup>
Product stage	Raw material supply	A1	9,07E-01	0,00E+00	0,00E+00	3,12E+00
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	5,03E-02
	Manufacturing	A3	2,26E-01	0,00E+00	0,00E+00	1,52E-01
	Total (Consumption grid)	A1-3	1,13E+00	0,00E+00	0,00E+00	3,32E+00
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	1,73E-02
	Construction	A5	0,00E+00	0,00E+00	0,00E+00	4,81E-03
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	0,00E+00	0,00E+00	0,00E+00	1,90E+00
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	0,00E+00	0,00E+00	0,00E+00	7,35E+01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	1,44E-03
	Waste processing	C3	0,00E+00	0,00E+00	0,00E+00	4,07E-01
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	4,04E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	-1,66E+00

SM = Use of secondary material;  
RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;  
FW = Net use of fresh water

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	4,26E+01	1,31E+03	5,13E-03
	Transport	A2	3,38E-01	2,02E+01	1,15E-04
	Manufacturing	A3	5,78E-01	6,98E+00	7,28E-04
	Total (Consumption grid)	A1-3	4,35E+01	1,34E+03	5,97E-03
Construction process stage	Transport	A4	1,16E-01	6,96E+00	3,96E-05
	Construction	A5	7,80E-02	4,56E+00	8,21E-06
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	3,59E+01	3,78E+02	4,64E-03
	Repair	B3	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	5,63E+02	5,43E+03	2,63E-01
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	9,65E-03	5,77E-01	3,29E-06
	Waste processing	C3	3,89E+00	1,74E+02	1,21E-03
	Disposal	C4	1,65E-01	1,40E+01	4,77E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2,52E+01	-7,08E+02	-2,29E-03

HWD = Hazardous waste disposed;  
 NHWD = Non-hazardous waste disposed;  
 RWD = Radioactive waste disposed

## LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,48E-01	8,43E-01
	Transport	A2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Manufacturing	A3	0,00E+00	1,26E+00	0,00E+00	0,00E+00	0,00E+00	2,64E+00
	Total (Consumption grid)	A1-3	0,00E+00	1,26E+00	0,00E+00	0,00E+00	2,48E-01	3,49E+00
Construction process stage	Transport	A4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Construction	A5	0,00E+00	4,32E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use stage	Use	B1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Maintenance	B2	0,00E+00	4,85E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Repair	B3	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Replacement	B4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Refurbishment	B5	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational energy use	B6	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Operational water use	B7	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
End of life	Deconstruction, demolition	C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Transport	C2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Waste processing	C3	0,00E+00	2,43E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Disposal	C4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU = Components for reuse;  
MFR = Materials for recycling

MER = Materials for energy recovery;  
EE = Exported Energy

## Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	Products are manufactured in Livingston and distributed in the UK. The longest distance the unit can travel in the UK (1000 km) by lorry has been considered for this scenario.		
	Fuel type / Vehicle type	Litre of fuel type per distance or vehicle type	16-32 metric ton, EURO6
	Distance:	km	1000
	Capacity utilisation (incl. empty returns)	%	36,2
	Average load	t	5,8
	Weight of vehicle + load	t	15,8
	Maximum payload	t	16,0
A5 – Installation in the building	For this study, it was assumed that no unit were damaged on installation.		
	The installation of the boilers requires no additional component.		
	The packaging of the unit is disposed of during installation. Packaging includes:		
	Corrugated cardboard and paper	Recycled	82%
	Plastic	Recycled	41%
B2 – Maintenance	The boiler is maintained once a year repair throughout its reference lifetime. This maintenance requires a check of electrical circuits and the removal of any obstructions. No parts are removed or replaced during this maintenance - providing the boiler has been installed and maintained in accordance with the manufacturer's guidance.		
	The expansion vessel is changed once per reference lifetime. The heat plate exchanger is changed 3 times per reference lifetime.		
B3 – Repair	The boiler should not require repair throughout its reference lifetime - providing the boiler has been installed and maintained in accordance with the manufacturer's guidance.		
B4 – Replacement	The boiler has a reference lifetime of 17 years. No replacements are required - providing the boiler has been installed and maintained in accordance with the manufacturer's guidance.		
B5 – Refurbishment	The boiler has a reference lifetime of 17 years. No refurbishment is required - providing the boiler has been installed and maintained in accordance with the manufacturer's guidance.		
B6 – Operational energy use	Total energy consumption of the boiler per functional unit c		
	ecoTEC Plus VUW 20/26CS/1-5 (N-GB)	kWh	2,43E+05
	ecoTEC Plus VUW 25/32CS/1-5 (N-GB)	kWh	2,89E+05
	ecoTEC Plus VUW 30/36CS/1-5 (N-GB)	kWh	3,27E+05
	ecoTEC Plus VUW 30/40CS/1-5 (N-GB)	kWh	3,24E+05
B7 – Use of water	The boiler is sealed. Water runs through the system to be heated and is then fed back into the system. There is therefore no water consumed by the unit throughout its reference lifetime.		

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
C1 to C4 End of life,	Conservative figures were used for the disposal of the various components		
	Recycled metal	%	60-80
	Recycled plastic	%	0-20
	Landfill of other components	%	100
Module D	According to the PCR PN 514 Rev 3.1		
All specifications from website	<a href="https://professional.vaillant.co.uk/for-installers/products/ecotec-plus-826-832-836-840-940-154176.html#specification">https://professional.vaillant.co.uk/for-installers/products/ecotec-plus-826-832-836-840-940-154176.html#specification</a>		

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