

# Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

## Aggregates

from

### UAB Pagirių Nesta



Programme operator:	Rakennustieto Oy
Type of EPD:	EPD of multiple products from a company
EPD registration number:	RTS_444_25
Version date:	2025-12-04
Validity date:	2030-12-04



## GENERAL INFORMATION



Jukka Seppänen  
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## MANUFACTURER INFORMATION

Manufacturer	UAB PAGIRIŲ NESTA
Address	89 Kalno St., Melekonys, LT-14119 Vilnius District, Lithuania
Contact details	karjeras@pagiriunesta.lt, +370 6557 4150
Website	<a href="http://www.pagiriunesta.lt/pagiriu_nesta">http://www.pagiriunesta.lt/pagiriu_nesta</a>

## PRODUCT IDENTIFICATION

Product name	1 group – Natural aggregates (0–32 mm) 2 group – Washed aggregates (0–20/40 mm) 3 group – Crushed aggregates (0–32 mm)
Place of production	Pagiriai Gravel Quarry at Kalno St. 89, Melekonys, LT-14119 Vilnius District, Lithuania
CPC code	15310, 15320

## EPD INFORMATION

Program operator	Rakennustieto Oy
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
EPD type	EPD of multiple products from a company
Period for data	2024
PCR	RTS PCR (Version 121124)
EPD author	Urtė Valdavičė, UAB "Vesta Consulting"
EPD verification	Independent verification of this EPD and data, according to ISO 14025: o Internal verification <input type="checkbox"/> External verification <input checked="" type="checkbox"/>
EPD verifier	Mari Kirss, Meetripuu OÜ

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes 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.

# PRODUCT AND MANUFACTURER

## ABOUT THE MANUFACTURER

Pagiriai Gravel Quarry has been operating since 1974, when the deposit was first explored, and production began in 1976. Until 1998, the company was part of AB Nesta under the division Pagiriai Plant where the production of concrete aggregates started in 1981.

The company has implemented an internal production control system, and all products are certified and comply with the requirements of LST EN standards.

## PRODUCT DESCRIPTION

The products consist of natural sand and gravel mixtures, washed aggregates, and crushed aggregates. The materials are extracted from post-glacial deposits and further processed through screening, washing, and crushing, depending on the product group. Products are classified into three groups according to their applications and manufacturing processes (see Table below).

	<b>1 GROUP – Natural aggregates</b>	<b>2 GROUP – Washed Aggregates</b>	<b>3 GROUP – Crushed Stone Aggregates</b>
<b>Description</b>	The sand and gravel mix consists of various fractions of sand and pebbles.	Fine aggregate (washed sand) and coarse aggregate (washed gravel)	Crushed and washed stone aggregates produced from solid rock.
<b>Manufacturing steps</b>	Excavation, screening	Excavation, screening and washing	Excavation, screening, washing and crushing
<b>Typical fractions</b>	0/4, 0/5, 0/8, 0/16, 0/32 mm.	0/4, 4/16, 2/8, 8/16, 20/40 mm.	0/4, 4/16, 16/32, 0/32, 0/45, 2/8, 2/16 mm.
<b>Applications</b>	Road construction, foundations, base layers, drainage systems.	Production of structural and non-structural concrete reinforced concrete elements, and prefabricated products.	Road and foundation layers, drainage systems, concrete mixtures, and decorative surfacing.

Product images are presented below. Further information regarding the products and their description can be found at [http://www.pagiriunesta.lt/pagiriu\\_nesta](http://www.pagiriunesta.lt/pagiriu_nesta)



**SAND**



**GRAVEL**



**COARSE GRAVEL**



**CRUSHED STONE**

## PRODUCT STANDARDS

Product name	EU standards
Gravel fr. 4/16	LST EN 12620:2003+A1:2008 - valid from 2006
Gravel fr. 16/32 ;0/45	LST EN 13043+AC:2004;
Gravel fr. 2/8;0/32	LST EN 13043+AC:2004; LST EN 12620:2003+A1:2008; LST EN 13242+A1:2008
Gravel fr. 5/8	LST EN 13043+AC:2004; LST EN 12620:2003+A1:2008; LST EN 13242+A1:2008
Gravel fr. 8/11	LST EN 13043+AC:2004; LST EN 12620:2003+A1:2008; LST EN 13242+A1:2008
Gravel fr. 11/16	LST EN 13043+AC:2004; LST EN 12620:2003+A1:2008; LST EN 13242+A1:2008
Gravel fr. 4/16	LST EN 12620:2003+A1:2008
Gravel fr.0/4	LST EN 13043+AC:2004; LST EN 12620:2003+A1:2008; LST EN 13242+A1:2008
Sand fr. 0/4	LST EN 12620:2003+A1:2008; LST EN 13043+AC:2004; LST EN 13242+A1: 2008
Sand fr. 0/1 (sieve)	LST EN 12620:2003+A1:2008; LST EN 13139+AC:2004
Sand fr. 0/2 (sieve)	LST EN 12620:2003+A1:2008; LST EN 13139+AC:2004; LST EN 13043+AC :2004
Sand - gravel mix fr.0/5	LST EN 13285:2018
Sand - gravel mix fr.0/8	LST EN 13242+A1: 2008; 13285:2018
Sand - gravel mix 0/11	LST EN 13242+A1:2008
Sand - gravel mix 0/16	LST EN 13285:2018
Gravel mix fr.0/32	LST EN 13285:2018
Gravel mix 0/45 (SPS)	LST EN 13285:2018

## PRODUCT COMPOSITION

Product Material	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-%	Biogenic material, kg C/DU
Gravel and sand	1000	0	0	0
Total	1000	0	0	0

## PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0	-
Minerals	100	LT
Fossil materials	0	-
Bio-based materials	0	-

## SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0.1 % (1000 ppm).

## PRODUCT LIFE-CYCLE

### MANUFACTURING (A1-A3)

**A1:** This module considers the extraction of raw materials.

**A2:** The raw materials are extracted on the site, therefore, no transportation is required. Empty returns are not considered.

**A3:** This module includes the manufacture of products. It has considered all the energy consumption in the production plant.

### MANUFACTURING PROCESS

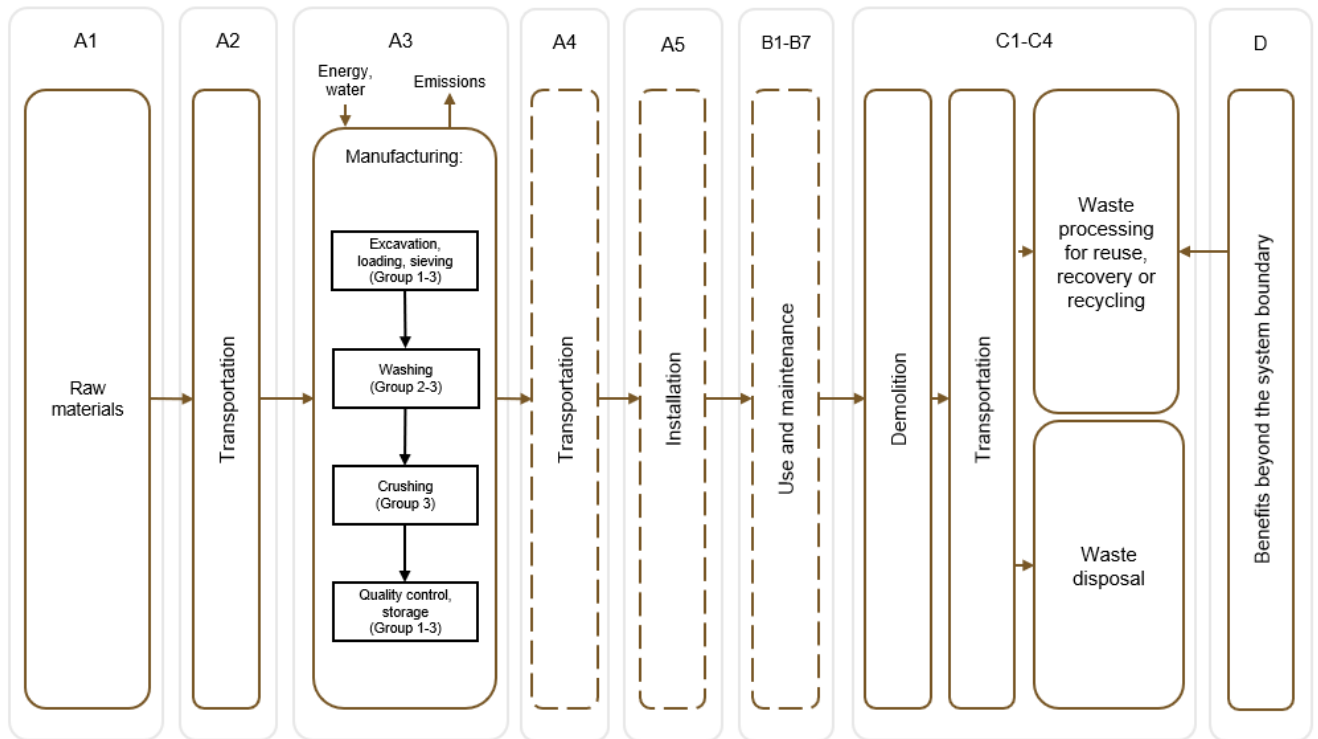
The production of mineral aggregates includes three main process groups: (1) excavation, screening, and sieving, (2) excavation, screening, and washing, and (3) excavation, screening, crushing, and washing.

In the **first group**, sand and sand–gravel mixtures are excavated and transported to hoppers, from which the material is conveyed onto vibrating screens. Depending on the mesh size, particles are separated into different fractions and stored as finished products.

In the **second group**, the excavated sand–gravel mix is fed into hoppers and washed on vibrating screens using water from a closed technological circuit. Coarse gravel fractions and fine sand are separated, dewatered in a dehydrator, and stored in product piles.

In the **third group**, coarse material (>16 mm) is fed into jaw and cone crushers to produce crushed stone. The crushed material is screened, washed, and dewatered before being conveyed to the final storage area. Process water containing fine particles is directed to sedimentation ponds, where solids settle and clarified water is reused in the washing process.

The manufacturing process diagram is presented below.



Note. The dashed lines indicated that construction and use stage (A4–A5, B1–B7 modules) were not assessed, as their inclusion is not mandatory for this type of EPD.

## TRANSPORT AND INSTALLATION (A4-A5)

**A4:** This EPD does not cover the Transport module.

**A5:** This EPD does not cover the Installation module.

## PRODUCT USE AND MAINTENANCE (B1-B7)

**B1-B7:** This EPD does not cover the Use stage.

## PRODUCT END OF LIFE (C1-C4, D)

This EPD includes modules C1–C4 and D, as the aggregates are used in a variety of applications. While a portion of the material is incorporated into composite products such as concrete or asphalt, a significant share is also used as a standalone construction material (e.g., in base layers, fillings, or landscaping).

End-of-life scenarios for aggregates used in bound applications are not covered in this LCA and are instead included in the respective product EPDs (e.g., concrete or asphalt). This EPD therefore describes the unbound use scenario, where aggregates are not chemically or physically bound within other materials.

**C1:** Deconstruction, dismantling, demolition

For unbound use, no demolition process is required. However, a small amount of diesel consumption (1.1 kWh/tonne) is included to represent handling and loading of aggregates at the end of life using mobile machinery.

**C2:** Transport of the discarded product to the processing site

It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. Transportation distance to the closest treatment facilities. is estimated as 80 km and the transportation method is assumed as lorry which is the most common option.

**C3:** Waste processing for reuse, recovery, and/or recycling

At end of life, the product undergoes simple mechanical treatment, such as screening or sorting to remove fines or debris before re-use; no crushing or washing is assumed, as the material retains its properties and can be directly reused (assumed, 90% of the product).

**C4:** Discharge (disposal)

Module C4 includes the landfilling of the minor share of material that cannot be recovered, mainly fines and debris separated during mechanical treatment. It is assumed that 10% of product is treated as inert mineral waste and disposed of at a licensed landfill facility.

**D:** Benefits and loads beyond the system boundary

For the recovered share, benefits are modelled as substitution of primary aggregate of comparable grade delivered at plant (sand/gravel for Groups 1–2; crushed aggregate for Group 3).

## LIFE-CYCLE ASSESSMENT

### DECLARED UNIT

Declared unit	1 ton
Mass per declared unit	1000 kg

### SYSTEM BOUNDARY

The scope of the EPD is cradle to gate with modules C1-C4 and module D. The covered life-cycle modules listed in the following table. Geographical scope is Europe.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	ND	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = ND

## **DATA QUALITY**

The EPD covers products extracted and processed at the Pagiriai Gravel Quarry in Vilnius (Lithuania), which provided data for the period January - December 2024. The data collection has been done internally and thoroughly. The data is based on yearly production amounts and extrapolations of measurements on specific machines and plants. The EPD covers raw material supply, product production and end-of-life in Europe geographical scale. Aggregate production involves excavating, washing (group 1-2), and crushing (group 3) the sand and gravel. The site is powered by residual mix energy, additionally diesel for mobile machinery use. Background data was sourced from the ecoinvent 3.11, and One Click LCA databases. No poor or very poor data was found during the assessment of relevant data using PEF method (EN 15804:2012+A2:2019, Annex E, only E.2). The data quality assessment is done in accordance with EN 15941:2024 and is assessed in terms of precision, completeness, representativeness, consistency, and sources of data. Overall, the data quality can be described as good. The EN 15804 reference package used is based on EF 3.1.

## **CUT-OFF CRITERIA**

The study does not exclude any modules or processes that are mandatory according to the Standards and PCR. No hazardous materials or substances are excluded. All major raw materials and energy inputs, as well as emissions and outputs from the unit processes for which data is available, are fully included in the calculation. In line with the PCR, the total excluded input and output flows do not exceed 5% of energy use or mass across the life cycle.

## **ALLOCATION, ESTIMATES AND ASSUMPTIONS**

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per EN 15804, allocation is conducted in the following order: 1) Allocation should be avoided; 2) Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small; 3) Allocation should be based on economic values.

The allocations in the Ecoinvent 3.11 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, 15804:2012+A2:2019. The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP). Scenarios included in the LCA are based on realistic scenarios which are currently in use and are representative for one of the most likely scenario alternatives. The environmental impacts of capital goods (e.g., production equipment, recycling machinery) and infrastructure (e.g., recycling facilities, transportation systems) have not been included in this assessment.

## **BIOGENIC CARBON CONTENT**

There is no biogenic carbon content in the products.

## **CALCULATION RULES FOR AVERAGING DATA**

Product averages were calculated as mass-weighted means of activity data for each aggregate group. Since all products within a group are produced using the same process steps and equipment, the variation of results between different fractions is minimal (< 10 %). Minor differences may occur due to particle size or natural moisture variation, but these are within normal operational fluctuations and do not justify separate modelling. The averaged dataset is therefore representative for the whole product group.

## ENVIRONMENTAL PERFORMANCE

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. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

A comma (“,”) is used as the decimal separator throughout this report. ND = Module Not declared.

### 1 Group: Natural aggregates (0–32 mm)

#### CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
GWP – total <sup>1)</sup>	kg CO <sub>2</sub> eq.	2,10E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,26E-01	6,26E-01	-3,42E+00
GWP – fossil	kg CO <sub>2</sub> eq.	2,10E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,24E-01	6,26E-01	-3,41E+00
GWP – biogenic	kg CO <sub>2</sub> eq.	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CFC 11 eq.	2,19E-04	ND	ND	ND	ND	ND	ND	ND	ND	4,08E-05	3,85E-03	2,14E-03	3,58E-04	-4,01E-03
Ozone depletion pot.	mol H <sup>+</sup> eq.	3,16E-08	ND	ND	ND	ND	ND	ND	ND	ND	5,92E-09	1,27E-07	1,34E-08	1,74E-08	-3,25E-08
Acidification potential	kg P eq.	1,84E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,56E-03	2,94E-02	4,17E-03	4,38E-03	-2,33E-02
EP-freshwater <sup>2)</sup>	kg N eq.	8,83E-05	ND	ND	ND	ND	ND	ND	ND	ND	1,28E-05	6,70E-04	6,95E-04	5,48E-05	-1,06E-03
EP-marine	mol N eq.	8,52E-03	ND	ND	ND	ND	ND	ND	ND	ND	1,66E-03	9,65E-03	6,64E-04	1,68E-03	-7,19E-03
EP-terrestrial	kg NMVOC eq.	9,32E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,82E-02	1,05E-01	5,88E-03	1,84E-02	-8,09E-02
POCP (“smog”) <sup>3)</sup>	kg Sb eq.	2,79E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,43E-03	4,33E-02	1,88E-03	6,63E-03	-2,41E-02
ADP-minerals & metals <sup>4)</sup>	MJ	1,17E-06	ND	ND	ND	ND	ND	ND	ND	ND	1,43E-07	2,40E-05	9,83E-06	9,32E-07	-1,79E-05
ADP-fossil resources	m <sup>3</sup>	2,75E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-4,28E+01
Water use <sup>5)</sup>	kg CO <sub>2</sub> eq.	7,59E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,34E-02	6,17E-01	4,67E-01	6,73E-01	-4,90E+01

Note. 1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

## ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Particulate matter	Incidence	5,21E-07	ND	ND	ND	ND	ND	ND	ND	ND	1,02E-07	8,62E-07	1,48E-08	1,01E-07	-4,68E-07
Ionizing radiation <sup>6)</sup>	kBq U235e	1,84E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,21E-03	1,09E-01	4,67E-01	9,17E-03	-2,33E-01
Ecotoxicity (freshwater)	CTUe	1,67E+01	ND	ND	ND	ND	ND	ND	ND	ND	2,96E+00	1,77E+01	2,31E+01	1,02E+01	-8,68E+01
Human toxicity, cancer	CTUh	2,19E-10	ND	ND	ND	ND	ND	ND	ND	ND	4,06E-11	1,42E-09	2,16E-10	1,13E-10	-8,76E-10
Human tox. non-cancer	CTUh	3,81E-09	ND	ND	ND	ND	ND	ND	ND	ND	6,38E-10	8,09E-08	1,18E-08	2,55E-09	-2,66E-08
SQP <sup>7)</sup>	-	1,86E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,43E-01	1,26E+02	3,26E+00	3,01E+01	-5,30E+01

Note. 6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

## USE OF NATURAL RESOURCES

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Renew. PER as energy <sup>8)</sup>	MJ	2,07E-01	ND	ND	ND	ND	ND	ND	ND	ND	3,26E-02	1,71E+00	4,51E+00	1,43E-01	-3,42E+00
Renew. PER as material	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	2,07E-01	ND	ND	ND	ND	ND	ND	ND	ND	3,26E-02	1,71E+00	4,51E+00	1,43E-01	-3,42E+00
Non-re. PER as energy	MJ	2,75E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-4,28E+01
Non-re. PER as material	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	2,75E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-4,28E+01
Secondary materials	kg	1,13E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,15E-03	5,32E-02	2,68E-03	3,81E-03	8,10E+02
Renew. secondary fuels	MJ	2,97E-05	ND	ND	ND	ND	ND	ND	ND	ND	5,63E-06	6,76E-04	2,31E-05	7,96E-05	-2,41E-04
Non-ren. secondary fuels	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m <sup>3</sup>	1,87E-03	ND	ND	ND	ND	ND	ND	ND	ND	3,32E-04	1,85E-02	1,09E-02	1,58E-02	-1,14E+00

Note. 8) PER = Primary energy resources

## END OF LIFE – WASTE

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Hazardous waste	kg	3,41E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,82E-03	2,12E-01	4,05E-02	1,74E-02	-2,74E-01
Non-hazardous waste	kg	5,48E-01	ND	ND	ND	ND	ND	ND	ND	ND	8,48E-02	3,92E+00	3,41E+00	1,00E+02	-5,84E+00
Radioactive waste	kg	4,53E-06	ND	ND	ND	ND	ND	ND	ND	ND	5,42E-07	2,66E-05	1,20E-04	2,24E-06	-5,70E-05

## END OF LIFE – OUTPUT FLOWS

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	9,00E+02	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

## ADDITIONAL INDICATOR – GWP-GHG

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
GWP-GHG	kg CO <sub>2</sub> e	2,10E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,26E-01	6,26E-01	-3,42E+00

Note. 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 CO<sub>2</sub> is set to zero.

## 2 Group: Washed aggregates (0–20/40 mm)

### CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
GWP – total <sup>1)</sup>	kg CO <sub>2</sub> eq.	2,52E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,26E-01	6,26E-01	-3,42E+00
GWP – fossil	kg CO <sub>2</sub> eq.	2,52E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,24E-01	6,26E-01	-3,41E+00
GWP – biogenic	kg CO <sub>2</sub> eq.	2,50E-04	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CFC 11 eq.	3,03E-04	ND	ND	ND	ND	ND	ND	ND	ND	4,08E-05	3,85E-03	2,14E-03	3,58E-04	-4,01E-03
Ozone depletion pot.	mol H <sup>+</sup> eq.	3,99E-08	ND	ND	ND	ND	ND	ND	ND	ND	5,92E-09	1,27E-07	1,34E-08	1,74E-08	-3,25E-08
Acidification potential	kg P eq.	1,97E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,56E-03	2,94E-02	4,17E-03	4,38E-03	-2,33E-02
EP-freshwater <sup>2)</sup>	kg N eq.	2,37E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,28E-05	6,70E-04	6,95E-04	5,48E-05	-1,06E-03
EP-marine	mol N eq.	8,80E-03	ND	ND	ND	ND	ND	ND	ND	ND	1,66E-03	9,65E-03	6,64E-04	1,68E-03	-7,19E-03
EP-terrestrial	kg NMVOC eq.	9,61E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,82E-02	1,05E-01	5,88E-03	1,84E-02	-8,09E-02
POCP (“smog”) <sup>3)</sup>	kg Sb eq.	2,90E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,43E-03	4,33E-02	1,88E-03	6,63E-03	-2,41E-02
ADP-minerals & metals <sup>4)</sup>	MJ	3,91E-06	ND	ND	ND	ND	ND	ND	ND	ND	1,43E-07	2,40E-05	9,83E-06	9,32E-07	-1,79E-05
ADP-fossil resources	m <sup>3</sup>	3,37E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-4,28E+01
Water use <sup>5)</sup>	kg CO <sub>2</sub> eq.	1,28E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,34E-02	6,17E-01	4,67E-01	6,73E-01	-4,90E+01

Note. 1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

## ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Particulate matter	Incidence	5,27E-07	ND	ND	ND	ND	ND	ND	ND	ND	1,02E-07	8,62E-07	1,48E-08	1,01E-07	-4,68E-07
Ionizing radiation <sup>6)</sup>	kBq U235e	6,74E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,21E-03	1,09E-01	4,67E-01	9,17E-03	-2,33E-01
Ecotoxicity (freshwater)	CTUe	2,67E+01	ND	ND	ND	ND	ND	ND	ND	ND	2,96E+00	1,77E+01	2,31E+01	1,02E+01	-8,68E+01
Human toxicity, cancer	CTUh	2,96E-10	ND	ND	ND	ND	ND	ND	ND	ND	4,06E-11	1,42E-09	2,16E-10	1,13E-10	-8,76E-10
Human tox. non-cancer	CTUh	7,32E-09	ND	ND	ND	ND	ND	ND	ND	ND	6,38E-10	8,09E-08	1,18E-08	2,55E-09	-2,66E-08
SQP <sup>7)</sup>	-	2,58E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,43E-01	1,26E+02	3,26E+00	3,01E+01	-5,30E+01

Note. 6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

## USE OF NATURAL RESOURCES

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Renew. PER as energy <sup>8)</sup>	MJ	5,00E-01	ND	ND	ND	ND	ND	ND	ND	ND	3,26E-02	1,71E+00	4,51E+00	1,43E-01	-3,42E+00
Renew. PER as material	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	5,00E-01	ND	ND	ND	ND	ND	ND	ND	ND	3,26E-02	1,71E+00	4,51E+00	1,43E-01	-3,42E+00
Non-re. PER as energy	MJ	3,37E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-4,28E+01
Non-re. PER as material	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	3,37E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-4,28E+01
Secondary materials	kg	1,34E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,15E-03	5,32E-02	2,68E-03	3,81E-03	8,10E+02
Renew. secondary fuels	MJ	3,60E-05	ND	ND	ND	ND	ND	ND	ND	ND	5,63E-06	6,76E-04	2,31E-05	7,96E-05	-2,41E-04
Non-ren. secondary fuels	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m <sup>3</sup>	5,84E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,32E-04	1,85E-02	1,09E-02	1,58E-02	-1,14E+00

Note. 8) PER = Primary energy resources

## END OF LIFE – WASTE

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Hazardous waste	kg	6,17E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,82E-03	2,12E-01	4,05E-02	1,74E-02	-2,74E-01
Non-hazardous waste	kg	1,30E+00	ND	ND	ND	ND	ND	ND	ND	ND	8,48E-02	3,92E+00	3,41E+00	1,00E+02	-5,84E+00
Radioactive waste	kg	1,68E-05	ND	ND	ND	ND	ND	ND	ND	ND	5,42E-07	2,66E-05	1,20E-04	2,24E-06	-5,70E-05

## END OF LIFE – OUTPUT FLOWS

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	9,00E+02	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

## ADDITIONAL INDICATOR – GWP-GHG

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
GWP-GHG	kg CO <sub>2</sub> e	2,52E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,26E-01	6,26E-01	-3,42E+00

Note. 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 CO<sub>2</sub> is set to zero.

### 3 Group: Crushed aggregates (0–32 mm)

#### CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
GWP – total <sup>1)</sup>	kg CO <sub>2</sub> eq.	4,97E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,26E-01	6,26E-01	-8,31E+00
GWP – fossil	kg CO <sub>2</sub> eq.	4,97E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,24E-01	6,26E-01	-8,31E+00
GWP – biogenic	kg CO <sub>2</sub> eq.	2,50E-04	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CFC 11 eq.	6,76E-04	ND	ND	ND	ND	ND	ND	ND	ND	4,08E-05	3,85E-03	2,14E-03	3,58E-04	-7,92E-03
Ozone depletion pot.	mol H <sup>+</sup> eq.	8,90E-08	ND	ND	ND	ND	ND	ND	ND	ND	5,92E-09	1,27E-07	1,34E-08	1,74E-08	-6,65E-08
Acidification potential	kg P eq.	2,75E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,56E-03	2,94E-02	4,17E-03	4,38E-03	-5,05E-02
EP-freshwater <sup>2)</sup>	kg N eq.	1,08E-03	ND	ND	ND	ND	ND	ND	ND	ND	1,28E-05	6,70E-04	6,95E-04	5,48E-05	-2,64E-03
EP-marine	mol N eq.	1,05E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,66E-03	9,65E-03	6,64E-04	1,68E-03	-1,19E-02
EP-terrestrial	kg NMVOC eq.	1,13E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,82E-02	1,05E-01	5,88E-03	1,84E-02	-1,44E-01
POCP (“smog”) <sup>3)</sup>	kg Sb eq.	3,50E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,43E-03	4,33E-02	1,88E-03	6,63E-03	-3,98E-02
ADP-minerals & metals <sup>4)</sup>	MJ	2,00E-05	ND	ND	ND	ND	ND	ND	ND	ND	1,43E-07	2,40E-05	9,83E-06	9,32E-07	-4,39E-05
ADP-fossil resources	m <sup>3</sup>	6,95E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-1,02E+02
Water use <sup>5)</sup>	kg CO <sub>2</sub> eq.	4,11E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,34E-02	6,17E-01	4,67E-01	6,73E-01	-1,23E+01

Note. 1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

## ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Particulate matter	Incidence	5,65E-07	ND	ND	ND	ND	ND	ND	ND	ND	1,02E-07	8,62E-07	1,48E-08	1,01E-07	-7,57E-07
Ionizing radiation <sup>6)</sup>	kBq U235e	3,30E-01	ND	ND	ND	ND	ND	ND	ND	ND	2,21E-03	1,09E-01	4,67E-01	9,17E-03	-8,08E-01
Ecotoxicity (freshwater)	CTUe	8,51E+01	ND	ND	ND	ND	ND	ND	ND	ND	2,96E+00	1,77E+01	2,31E+01	1,02E+01	-2,37E+01
Human toxicity, cancer	CTUh	7,38E-10	ND	ND	ND	ND	ND	ND	ND	ND	4,06E-11	1,42E-09	2,16E-10	1,13E-10	-2,24E-09
Human tox. non-cancer	CTUh	2,78E-08	ND	ND	ND	ND	ND	ND	ND	ND	6,38E-10	8,09E-08	1,18E-08	2,55E-09	-6,67E-08
SQP <sup>7)</sup>	-	6,66E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,43E-01	1,26E+02	3,26E+00	3,01E+01	-9,19E+01

Note. 6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

## USE OF NATURAL RESOURCES

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Renew. PER as energy <sup>8)</sup>	MJ	2,02E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,26E-02	1,71E+00	4,51E+00	1,43E-01	-9,90E+00
Renew. PER as material	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	2,02E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,26E-02	1,71E+00	4,51E+00	1,43E-01	-9,90E+00
Non-re. PER as energy	MJ	6,95E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-1,02E+02
Non-re. PER as material	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	6,95E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,19E+00	1,25E+02	1,67E+01	1,53E+01	-1,02E+02
Secondary materials	kg	2,55E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,15E-03	5,32E-02	2,68E-03	3,81E-03	8,10E+02
Renew. secondary fuels	MJ	7,24E-05	ND	ND	ND	ND	ND	ND	ND	ND	5,63E-06	6,76E-04	2,31E-05	7,96E-05	-7,52E-04
Non-ren. secondary fuels	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m <sup>3</sup>	6,50E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,32E-04	1,85E-02	1,09E-02	1,58E-02	-2,92E-01

Note. 8) PER = Primary energy resources

## END OF LIFE – WASTE

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Hazardous waste	kg	2,23E-01	ND	ND	ND	ND	ND	ND	ND	ND	5,82E-03	2,12E-01	4,05E-02	1,74E-02	-7,72E-01
Non-hazardous waste	kg	5,56E+00	ND	ND	ND	ND	ND	ND	ND	ND	8,48E-02	3,92E+00	3,41E+00	1,00E+02	-1,44E+01
Radioactive waste	kg	8,22E-05	ND	ND	ND	ND	ND	ND	ND	ND	5,42E-07	2,66E-05	1,20E-04	2,24E-06	-1,97E-04

## END OF LIFE – OUTPUT FLOWS

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	9,00E+02	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

## ADDITIONAL INDICATOR – GWP-GHG

Results per declared unit															
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D
GWP-GHG	kg CO <sub>2</sub> e	4,97E+00	ND	ND	ND	ND	ND	ND	ND	ND	3,99E-01	8,61E+00	7,26E-01	6,26E-01	-8,31E+00

Note. 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 CO<sub>2</sub> is set to zero.

# SCENARIO DOCUMENTATION

## MANUFACTURING ENERGY SCENARIO DOCUMENTATION

Scenario parameter	Value kg CO <sub>2</sub> e / kWh	Source
Electricity, high voltage, residual mix (Reference product: electricity, high voltage)	0,74	Data sources: ecoinvent 3.11 Country: Lithuania
Diesel, burned in building machine	0,36	Data sources: ecoinvent 3.11 Country: world

## END OF LIFE SCENARIO DOCUMENTATION

Scenario parameter	Value
Collection process – kg collected separately	1000
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	900
Recovery process – kg for recycling	0
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	100
Scenario assumptions e.g. transportation	Transported 80 km with an average lorry.

Note. Yield factor = 0,9 (assuming 10% of material is lost in the recovery process)

**Note on Module D:** The potential benefits shown in Module D are greater than the manufacturing impacts because the recovered material is assumed to replace a generic European primary aggregate with higher embodied impacts, while the Pagiriai quarry operates with lower-than-average energy use and a low-carbon electricity mix. The difference therefore reflects the contrast between site-specific data (A1–A3) and generic substitution data rather than an error in calculation.

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