Environmental Product Declaration

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

Steel reinforcement products

from

BaltMetExport SIA

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-11960
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This EPD covers multiple products and is considered as a FAMILY EPD based on an average recipe.
An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *Construction Products, PCR 2019:14 Version 1.3.2 and NPCR 013:2019 Part B for Steel and Aluminium construction products Version 4.0 061021*
PCR review was conducted by: *The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members.* *The review panel may be contacted via the Secretariat info@environdec.com* *NPCR 013:2019 Part B review conducted by The Norwegian EPD Foundation secretariat*
Life Cycle Assessment (LCA)
LCA accountability: *Bureau Veritas Latvia SIA, riga@bureauveritas.com*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Elisabet Amat Guasch, GREENIZE* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

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

Company information

Owner of the EPD: BaltMetExport SIA
Contact: Staņislavs Šešins, Board Member, stanislavs@bmexport.lv, +371 26469977
Description of the organisation: BaltMetExport is one of the leading steel reinforcement product suppliers in the Baltics and Scandinavia. Our export to Scandinavian countries reaches up to 80% of our total production. Customers appreciate our knowledge and expertise in steel reinforcement production and deliveries. That is one of the reasons why we are chosen by biggest Scandinavias' construction companies for regular reinforcement deliveries to their construction sites.
Product-related or management system-related certifications:
Cutting, Bending and Re-bundling: EN 10080:2005, SS212540:2014, NS 3576-1:2005 + NS 3576-2 + 3:2012, LVS 191-1:2012+AC:2015, SFS 1267:2013
Units for concrete reinforcement: TR 392:2018, SFS 1267:2008
Name and location of production site(s): Rūpniecības 39, Jelgava, Latvia

Product information

Product name:
Reinforcement steel products

Product identification:
Reinforcement steel products made out of Hot-rolled ribbed steel

Product illustrations:


Cut & Bent products


Structures


Straight bars


Welded mesh


Spinmaster

Product description:
Many different types of structures and components of structures can be built using reinforced concrete including slabs, walls, beams, columns, foundations, frames and more. Rebar, also known as reinforcement steel and reinforcing steel, is a steel bar or mesh of steel wires used in reinforced concrete and masonry structures to strengthen and hold the concrete in tension. To improve the quality of the bond with the concrete, the surface of rebar is often patterned. Rebar is necessary to compensate for the fact that whilst concrete is strong in compression, it is relatively weak in tension. By casting rebar into concrete, it is able to carry tensile loads and so increase overall strength.

The technical parameters of the **Reinforcement steel products** considered as a declared unit are:

Name	Value	Unit
Yield strength	500	MPa
Thermal conductivity	40-50	W/m·K
Density	7850	kg/m^3

UN CPC code: 412 - Rolled, drawn and folded products of iron and steel.

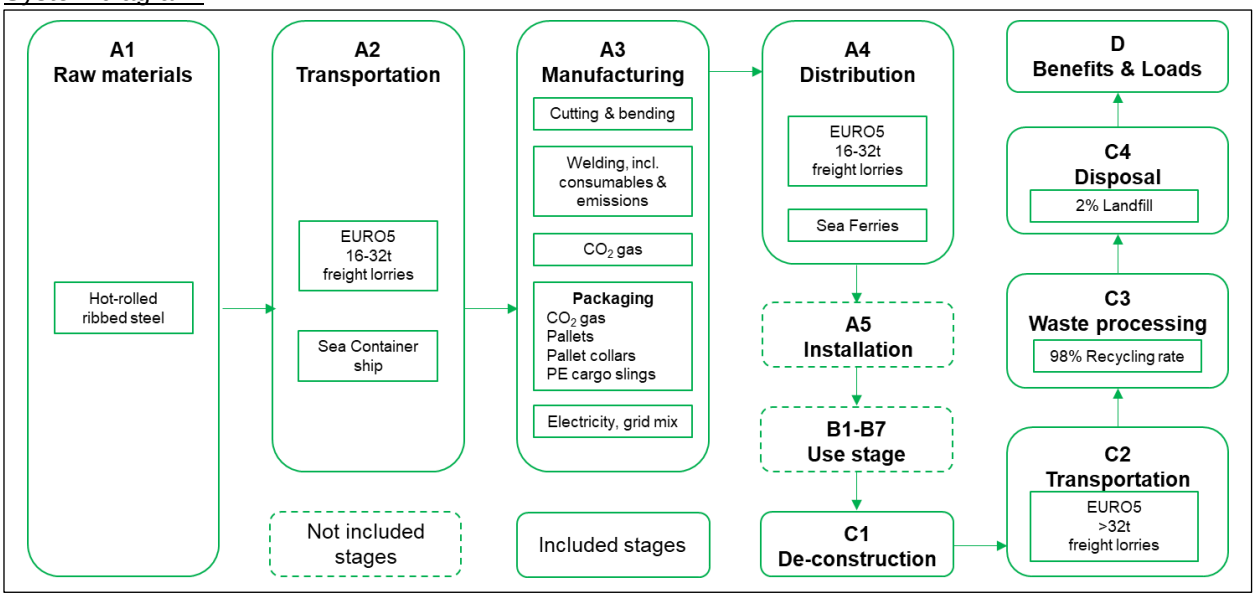
Geographical scope: This EPD has a European Scope. Nonetheless, it must be clarified that transport distances to Construction sites (module A4) in the model under study correspond to several construction sites in different parts of Europe – Scandinavian and Baltic countries.

LCA information

Functional unit / declared unit: 1 kg of Reinforcement steel products
Reference service life: Since products of that kind are not normally replaced during the service life of a building, it has been assumed that reference service life is equal to estimated Service Life of building or the structure of intended use.
Time representativeness: Data represents the manufacturing of the products in the time period from September 2022 to September 2023. The database used for proxy data is Ecoinvent v3.8. This database data is compiled in November 2021, i.e., no data is older than ten years.
Database(s) and LCA software used: Ecoinvent v3.8 has been used to conduct the quantitative evaluation in this study. This database provided the background system's life cycle inventory data for raw and processed materials. The LCA software used to obtain results of impact assessment - SimaPro 9.5.
Description of system boundaries: LCA study has been performed in the “Cradle-to-gate with options, modules C1 – C4 and module D, and with optional module A4” form. All major materials, production energy use, and waste are included for phases A1-A3, A4, C1-C4 and D. Use stage (B1-B7) has not been considered for this study as it is not mandatory.

The processes related to infrastructure, construction, and production of equipment, as well as tools that are not directly consumed in the production process, have been excluded. Personnel-related activities, such as transportation to and from work, have been excluded.

System diagram:



Data quality: The foreground data has been collected internally, considering the latest available average production amounts and measurements during the time period from September 2022 to September 2023. Data regarding waste processing has been taken from waste scenarios for closest locations in Ecoinvent v3.8. The quality level in this study is qualified as Very good according to the UN Environment Global Guidance criteria on LCA database development. Data is geographically representative as it comes from the area of study. It is technically representative as it comes from processes and products under study using the same state of technology defined in goal and scope. According to the provided data, it is also time representative. Data quality rating procedure has been performed using a rating system where "1" means Excellent quality, and "5" means Poor quality. An average for each criterion is presented as follows:

Technological Representativeness, TeR	Geographic representativeness, GeR	Time Representativeness, TiR	Precision, P	**Average DQR**
1,74	**2,17**	**1,98**	**2,17**	**2,02**

Stages and Production description

Product Stage

Module A1 includes Raw material supply, i.e., production of raw materials. In module A1, extraction and processing of raw materials and generation of electricity and heat from primary energy resources to produce these raw materials are included. The only raw material for BaltMetExport reinforcement steel products is Hot-rolled steel bars. Materials used for packaging, that has been considered in Manufacturing module A3, are polyester cargo slings, wooden pallets and pallet collars.

In **Module A2**, transport type and distances from the locations of raw material and packaging suppliers to the BaltMetExport manufacturing plant in Jelgava, Latvia are included according to the data provided by manufacturer. Materials, distances and means of transportation are listed in the Table below:

Material	Type of vehicle	kgkm	Distance, km	Fuel consumption, l/tkm	Value, l/t
Steel rebars	Lorry 16-32t, EURO5	2,43E+02	240	0,0441	10,58
Steel rebars	Container ship	4,60E+03	4544	0,0025	11,54
Welding wire	Lorry 16-32t, EURO5	1,00E-04	1	0,0441	0,04
Wooden pallets	Lorry 16-32t, EURO5	8,85E-02	59	0,0441	2,60
Pallet collars	Lorry 16-32t, EURO5	9,90E-03	33	0,0441	1,45
Polyester slings	Lorry 16-32t, EURO5	1,50E-02	50	0,0441	2,20
Gas	Lorry 16-32t, EURO5	2,80E-02	56	0,0441	2,47

The manufacturing process (**module A3**) of Reinforcement steel products includes several stages of metal processing such as cutting, bending, welding etc. Packaging required for the final product is wooden pallets, pallet collars (wood and metal) and polyester cargo slings.

Product is manufactured within the limits of the same manufacturing plant. National grid mix of Electricity is the only source of energy for all manufacturing purposes.

Not all materials are used to their full potential, therefore, some waste flows are produced during the manufacturing phase. In terms of total weight, the most significant waste flow is production cut-offs that have been considered as waste steel for recycling.

Greenhouse gas emissions from the use of Electricity in the manufacturing phase are represented by the National production mix that consists of import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3). No additional data has been provided on consumed electricity, therefore, emission factor acquired from Ecoinvent v3.8, of Latvian electricity mix is 0.555 kgCO_2 eq/kWh.

Construction process Stage

Table below describes the scenarios for **module A4** transportation of the final product and its packaging from BaltMetExport manufacturing plant in Latvia to Construction sites in Norway, Sweden, Finland, Estonia, Latvia and Lithuania. The distances to customers have been provided by manufacturer.

Country	Vehicle	kg*km	Distance, km	Fuel consumption, l/tkm	Value, l/t
Finland	Lorry 16-32t, EURO5	1,35E+02	364	0,0441	16,05
	Sea Ferry	3,08E+01	83	0,0298	2,47
	Lorry 16-32t, EURO5	7,42E+00	20	0,0441	0,88
Sweden #1	Lorry 16-32t, EURO5	4,32E+01	261	0,0441	11,51
	Sea Ferry	6,78E+01	410	0,0298	12,21
	Lorry 16-32t, EURO5	4,80E+01	290	0,0441	12,78
Sweden #2	Lorry 16-32t, EURO5	2,93E+01	177	0,0441	7,80
	Sea Ferry	4,60E+01	278	0,0298	8,28
	Lorry 16-32t, EURO5	9,59E+00	58	0,0441	2,56
Estonia	Lorry 16-32t, EURO5	3,31E+01	300	0,0441	13,22
Latvia	Lorry 16-32t, EURO5	3,01E+00	50	0,0441	2,20
Lithuania	Lorry 16-32t, EURO5	1,38E+01	230	0,0441	10,14

Country	Vehicle	kg*km	Distance, km	Fuel consumption, l/tkm	Value, l/t
Norway #1	Lorry 16-32t, EURO5	7,32E+00	261	0,0441	11,51
	Sea Ferry	1,15E+01	410	0,0298	12,21
	Lorry 16-32t, EURO5	1,65E+01	587	0,0441	25,88
Norway #2	Lorry 16-32t, EURO5	4,97E+00	177	0,0441	7,80
	Sea Ferry	7,80E+00	278	0,0298	8,28
	Lorry 16-32t, EURO5	1,51E+01	538	0,0441	23,72
Norway #3	Lorry 16-32t, EURO5	5,11E+00	364	0,0441	16,05
	Sea Ferry	1,16E+00	83	0,0298	2,47
	Lorry 16-32t, EURO5	5,95E+00	424	0,0441	18,69
	Sea Ferry	1,37E+00	98	0,0298	2,92
	Lorry 16-32t, EURO5	2,81E-01	20	0,0441	0,88

Use Stage:

Modules B1-B7, that define use stage of the product, are not declared for this study – those are not mandatory for LCA “Cradle-to-gate with options” form.

End of Life Stage:

It has been assumed, that 0.239 MJ/kg of energy is consumed in **module C1** by construction machinery that is represented by Diesel burned in building machine. Specific demand of energy represents demolition/de-construction activities.

Module C2 considers an average transport distance of 50 km by >32 metric ton EURO5 freight lorry.

As a waste processing activity in **module C3**, recycling, i.e., sorting of Scrap steel, has been considered. Recycling represents 98% share of the product weight with the remaining 2% considered for final disposal (Landfill) in module C4.

Module C4 represents Landfilling activities for final disposal of 2% share of the product and also considers additional distance of 50km for transportation of waste flow.
As described above, this study also considers module D, representing Reuse, Recovery and Recycling potential,

Benefits and loads beyond the system boundaries:
This study has also considered **module D** (reuse, recovery, recycling, potential) where net benefit of avoided product (steel) has been modelled. Module also represents additional loads of secondary steel production.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	EU	EU	LV	EU	MND	MND	MND	MND	MND	MND	MND	MND	EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	NOT RELEVANT			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Hot-rolled steel	1,00	81% *	0% 0.0
TOTAL	**1,00**	0%	**0% 0.0**
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Wooden pallet	0,0015	0,150%	0,357
Pallet collars (wood share)	0,0002	0,023%	0,054
Pallet collars (metal share)	0,0001	0,008%	0,000
Polyester slings	0,0003	0,030%	0,000
TOTAL	**0,0021**	**0,210%**	**0,411**

*According to manufacturer provided data, product composition foresees 81-82% of post-consumer scrap steel and 18-19% of pre-consumer scrap steel.

No dangerous substances from the candidate list of SVHC for Authorization have been identified.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	4,1E-01	6,9E-02	2,1E-02	3,6E-03	5,5E-02	1,2E-04	3,5E-02
GWP-biogenic	kg CO_2 eq.	5,4E-04	-2,7E-05	-7,2E-06	-1,4E-06	-1,9E-05	-1,8E-07	-9,9E-05
GWP-luluc	kg CO_2 eq.	7,6E-04	7,0E-07	5,1E-07	2,9E-08	6,8E-06	2,3E-09	1,3E-05
GWP-total	kg CO_2 eq.	4,1E-01	6,9E-02	2,1E-02	3,6E-03	5,5E-02	1,2E-04	3,5E-02
ODP	kg CFC 11 eq.	3,3E-08	1,6E-08	4,6E-09	8,4E-10	1,2E-08	2,7E-11	1,7E-09
AP	mol H^+ eq.	2,5E-03	7,7E-04	2,2E-04	1,2E-05	5,8E-04	7,6E-07	1,4E-04
EP-freshwater	kg P eq.	5,4E-06	3,6E-08	1,4E-08	1,8E-09	1,7E-07	2,2E-10	1,7E-06
EP-marine	kg N eq.	6,3E-04	2,1E-04	9,9E-05	3,8E-06	2,6E-04	3,0E-07	3,1E-05
EP-terrestrial	mol N eq.	6,5E-03	2,3E-03	1,1E-03	4,2E-05	2,8E-03	3,3E-06	3,4E-04
POCP	kg NMVOC eq.	2,2E-03	5,9E-04	3,0E-04	1,1E-05	7,7E-04	9,2E-07	1,7E-04
ADP-minerals&metals*	kg Sb eq.	6,4E-08	2,5E-09	1,1E-09	1,5E-10	2,8E-09	5,5E-12	1,5E-07
ADP-fossil*	MJ	5,8E+00	9,6E-01	2,8E-01	5,0E-02	7,6E-01	1,7E-03	3,3E-01
WDP*	m^3	1,9E-01	-1,6E-04	7,3E-05	-8,4E-06	5,9E-04	1,0E-07	1,1E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; 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; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

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

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	4,06E-01	4,1E-01	6,9E-02	2,0E-02	3,6E-03	5,5E-02	1,2E-04
EP-freshwater	kg PO_4^{3-} eq.	1,6E-05	1,1E-07	4,4E-08	5,5E-09	5,2E-07	6,5E-10	5,2E-06
Additional voluntary indicators e.g., the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017								

Use of resources

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	7,7E-01	1,1E-03	3,4E-04	5,8E-05	4,7E-03	2,3E-06	3,3E-03
PERM	MJ	4,6E-02	3,6E-04	1,2E-04	1,9E-05	6,9E-04	2,0E-06	2,6E-03
PERT	MJ	8,1E-01	1,4E-03	4,6E-04	7,7E-05	5,4E-03	4,3E-06	5,9E-03
PENRE	MJ	7,2E+00	9,6E-01	2,8E-01	5,0E-02	7,6E-01	1,7E-03	3,1E-01
PENRM	MJ	5,2E-02	1,1E-06	1,6E-06	2,1E-08	5,4E-06	4,5E-09	-9,4E-04
PENRT	MJ	7,3E+00	9,6E-01	2,8E-01	5,0E-02	7,6E-01	1,7E-03	3,1E-01
SM	kg	1,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	-2,0E-02
RSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
NRSF	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
FW	m^3	4,2E-03	2,6E-06	4,6E-06	1,3E-07	2,6E-05	1,6E-08	3,0E-04
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

[1] 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_2 is set to zero.

Waste production and output flows

Waste production

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2,2E-05	2,1E-06	7,4E-07	1,3E-07	1,9E-06	4,3E-09	2,6E-06
Non-hazardous waste disposed	kg	3,5E-02	4,1E-05	1,7E-05	2,1E-06	1,6E-04	2,0E-02	9,1E-03
Radioactive waste disposed	kg	2,9E-05	6,9E-06	2,0E-06	3,6E-07	5,3E-06	1,2E-08	3,2E-07

Output flows

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Material for recycling	kg	1,4E-02	0,0E+00	0,0E+00	0,0E+00	9,8E-01	0,0E+00	0,0E+00
Materials for energy recovery	kg	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Exported energy, electricity	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Exported energy, thermal	MJ	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Other environmental performance indicators

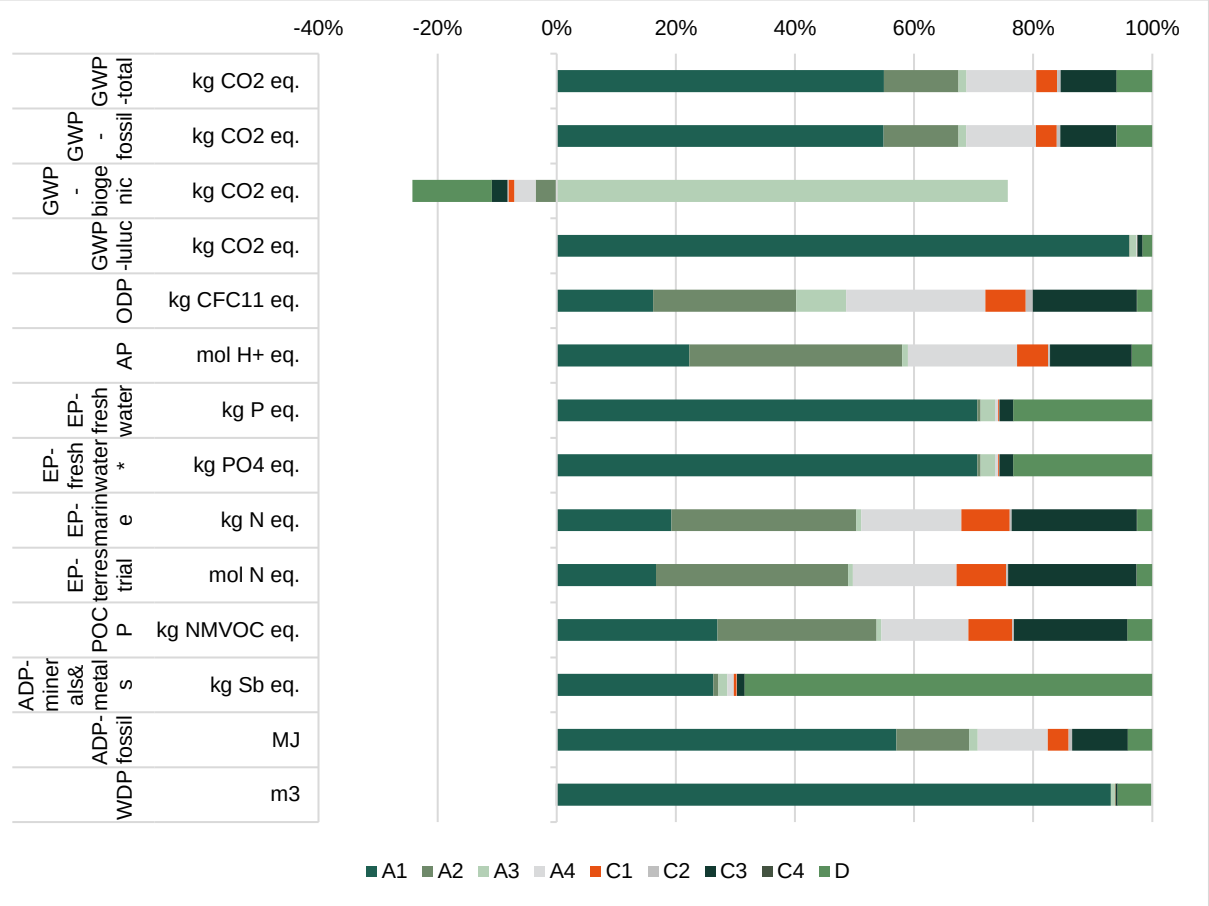
Biogenic carbon content

Results per functional or declared unit	
Biogenic carbon content	**Quantity**
Carbon content in product, kg C	0,00
Carbon content in accompanying packaging, kg C	8,63E-04

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg CO_2

LCA Interpretation

The estimated impact assessment results are only relative statements that do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins, or risks.
Contribution to environmental impact per each module for declared unit of **Reinforcement steel products** from BaltMetExport is displayed in following Figure:



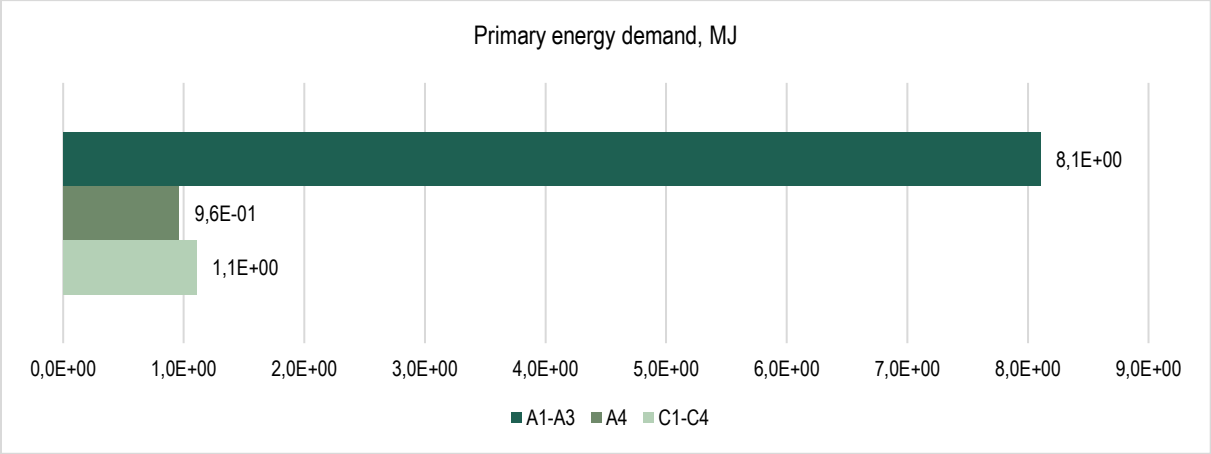
Contribution to environmental impact per each module for DU of Reinforcement steel products

With exclusion of some impact categories, Raw material module A1 is resulting in more than 50% of total impact, with supply of raw material and packaging (module A2) coming in as second biggest contributor to major share of core impact categories. Share of impact from manufacturing (module A3) itself is not a major contributor, generating significant impact only in GWP-biogenic and even less than 10% in Ozone depletion potential. Results of impact assessment are mainly based on energy dense raw material production processes that have numerous background processes that can also be tracked with help of the software. This also matches the life cycle inventory data, where the biggest input is the Hot-rolled steel used for manufacturing purposes of Reinforcement steel.

Considering total demand of primary energy per declared unit, that has been calculated using Cumulative Energy Demand (LHV) V1.00 impact assessment method, demand of primary energy (displayed in following Figure) is distributed as follows:

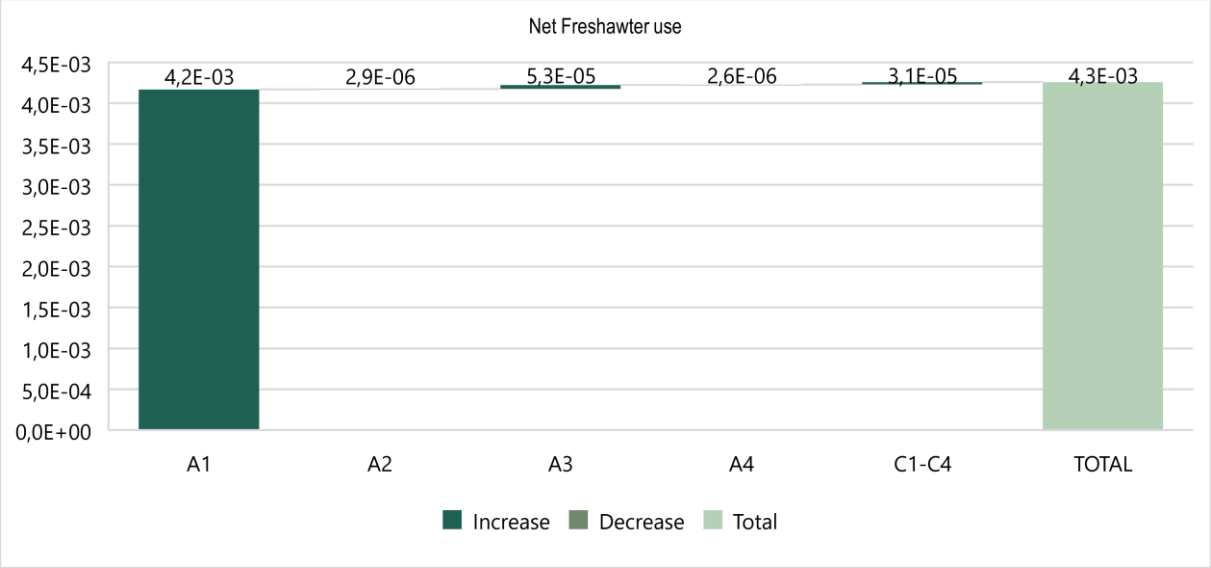
- 80% for Product stage (A1-A3)
- 9% for Distribution module (A4)

- 11% for End-of-life stage (C1-C4)



Primary energy demand per DU of Reinforcement steel products, aggregated

Other key effect factor is Freshwater consumption, that is displayed in following Figure as a Waterfall chart. A waterfall chart shows a running total as values are added or subtracted. It's useful for understanding how an initial value of net Freshwater use is affected by a series of positive and negative values. In case of Reinforcement steel products, no values have been subtracted as each module only adds up to total use. In terms of freshwater use levels, the Product stage (A1-A3) is responsible for most of its demand with more than 99% share, with the remaining share resulting mostly (0,73%) in End-of-Life stage.



Net freshwater use for Reinforcement steel products, aggregated

Additional environmental information

No additional information.

Information related to Sector EPD

This is an individual EPD.

Differences versus previous versions

- Editorial changes, i.e. version of the SimaPro software.
- Norway has been added as a destination for module A4. Therefore, shift of initial market shares and results of impact assessment have been updated along with DQR.

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