

This appendix refers to the EPD MD-23028-EN, developed according to EN15804+A2:2019. Results in the appendix communicates LCA results in the format described in EN15804+A1:2013, in order to accommodate a need in the transition period between the two standard revisions. The appendix cannot stand alone, as the reference EPD describes the basis of the assessment.

**ERS-0191 (130W) – Per 1 Wp over 25 years**

ENVIRONMENTAL IMPACTS PER 1 Wp												
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	[kg CO <sub>2</sub> -eq.]	9.36E-01	8.15E-03	3.57E-03	0.00E+00	2.24E-02	0.00E+00	1.79E-03	1.83E-02	3.49E-02	7.55E-04	-6.46E-02
ODP	[kg CFC11-eq.]	1.19E-07	1.47E-09	4.41E-10	0.00E+00	3.78E-09	0.00E+00	3.03E-10	3.38E-09	7.48E-10	1.54E-10	-3.20E-09
AP	[kg SO <sub>2</sub> -eq.]	5.22E-03	2.85E-05	1.13E-05	0.00E+00	8.53E-05	0.00E+00	6.82E-06	6.54E-05	1.10E-04	4.32E-06	-5.30E-04
EP	[kg PO <sub>4</sub> <sup>3-</sup> -eq.]	1.73E-03	5.87E-06	4.97E-06	0.00E+00	1.56E-05	0.00E+00	1.25E-06	1.29E-05	7.86E-05	1.96E-05	-2.80E-04
POCP	[kg ethene-eq.]	2.20E-04	1.08E-06	5.45E-07	0.00E+00	4.81E-06	0.00E+00	3.84E-07	2.38E-06	4.83E-06	1.61E-07	-2.90E-05
ADPE	[kg Sb-eq.]	5.18E-05	3.75E-08	4.29E-09	0.00E+00	1.15E-08	0.00E+00	9.21E-10	6.42E-08	1.87E-06	8.56E-10	-1.00E-05
ADPF	[MJ]	1.01E+01	1.20E-01	4.03E-02	0.00E+00	3.05E-01	0.00E+00	2.44E-02	2.73E-01	1.64E-01	1.27E-02	-6.96E-01
Caption	GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential of soil and water; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources											
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.											

RESOURCE USE PER 1 Wp												
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	[MJ]	1.89E+00	2.07E-03	1.37E-01	0.00E+00	1.77E-03	0.00E+00	1.38E-04	3.93E-03	2.70E-02	2.83E-04	-1.55E-01
PERM	[MJ]	1.35E-01	0.00E+00	-1.35E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.03E+00	2.07E-03	1.57E-03	0.00E+00	1.77E-03	0.00E+00	1.38E-04	3.93E-03	2.70E-02	2.83E-04	-1.55E-01
PENRE	[MJ]	1.07E+01	1.23E-01	4.32E-02	0.00E+00	3.07E-01	0.00E+00	2.45E-02	2.79E-01	5.31E-01	1.29E-02	-8.23E-01
PENRM	[MJ]	3.27E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.27E-01	0.00E+00	0.00E+00
PENRT	[MJ]	1.10E+01	1.23E-01	4.32E-02	0.00E+00	3.07E-01	0.00E+00	2.45E-02	2.79E-01	2.04E-01	1.29E-02	-8.23E-01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m <sup>3</sup> ]	2.42E-02	1.55E-05	1.02E-05	0.00E+00	4.62E-05	0.00E+00	1.40E-06	3.11E-05	1.71E-04	1.55E-05	-6.70E-04
Caption	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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Use of net fresh water											
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.											

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 Wp												
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
HWD	[kg]	7.08E-04	3.29E-07	1.07E-07	0.00E+00	8.40E-07	0.00E+00	6.72E-08	7.28E-07	1.92E-07	1.46E-08	-1.20E-06
NHWD	[kg]	1.50E-01	5.20E-03	6.35E-04	0.00E+00	4.11E-04	0.00E+00	3.28E-05	1.43E-02	2.51E-02	9.07E-02	-1.05E-02
RWD	[kg]	2.48E-05	8.22E-07	2.67E-07	0.00E+00	2.12E-06	0.00E+00	1.69E-07	1.89E-06	8.15E-07	8.63E-08	-2.60E-06
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	9.85E-04	0.00E+00	1.39E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-02	0.00E+00	0.00E+00
MER	[kg]	7.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	1.26E-03	0.00E+00	2.84E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.33E-02	0.00E+00	0.00E+00
EET	[MJ]	4.71E-03	0.00E+00	1.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E-01	0.00E+00	0.00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy											
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**ERS-0191 (130W) – Per 1 m<sup>2</sup> over 25 years**

ENVIRONMENTAL IMPACTS PER 1 m <sup>2</sup>												
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D

GWP	[kg CO <sub>2</sub> -eq.]	1.64E+02	1.43E+00	6.24E-01	0.00E+00	3.91E+00	0.00E+00	3.13E-01	3.20E+00	6.11E+00	1.32E-01	-1.13E+01
ODP	[kg CFC11-eq.]	2.09E-05	2.57E-07	7.72E-08	0.00E+00	6.62E-07	0.00E+00	5.30E-08	5.92E-07	1.31E-07	2.70E-08	-5.60E-07
AP	[kg SO <sub>2</sub> -eq.]	9.14E-01	4.99E-03	1.98E-03	0.00E+00	1.49E-02	0.00E+00	1.19E-03	1.14E-02	1.93E-02	7.56E-04	-9.28E-02
EP	[kg PO <sub>4</sub> <sup>3-</sup> -eq.]	3.02E-01	1.03E-03	8.70E-04	0.00E+00	2.73E-03	0.00E+00	2.19E-04	2.26E-03	1.38E-02	3.43E-03	-4.90E-02
POCP	[kg ethene-eq.]	3.86E-02	1.89E-04	9.54E-05	0.00E+00	8.42E-04	0.00E+00	6.72E-05	4.17E-04	8.45E-04	2.82E-05	-5.08E-03
ADPE	[kg Sb-eq.]	9.06E-03	6.56E-06	7.51E-07	0.00E+00	2.01E-06	0.00E+00	1.61E-07	1.12E-05	3.27E-04	1.50E-07	-1.75E-03
ADPF	[MJ]	1.77E+03	2.09E+01	7.06E+00	0.00E+00	5.33E+01	0.00E+00	4.27E+00	4.78E+01	2.87E+01	2.21E+00	-1.22E+02
Caption	GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential of soil and water; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources											
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RESOURCE USE PER 1 m <sup>2</sup>												
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	[MJ]	3.32E+02	3.63E-01	2.40E+01	0.00E+00	3.10E-01	0.00E+00	2.42E-02	6.88E-01	4.73E+00	4.95E-02	-2.70E+01
PERM	[MJ]	2.37E+01	0.00E+00	-2.37E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	3.55E+02	3.63E-01	2.75E-01	0.00E+00	3.10E-01	0.00E+00	2.42E-02	6.88E-01	4.73E+00	4.95E-02	-2.70E+01
PENRE	[MJ]	1.86E+03	2.15E+01	7.55E+00	0.00E+00	5.37E+01	0.00E+00	4.29E+00	4.88E+01	9.29E+01	2.25E+00	-1.44E+02
PENRM	[MJ]	5.73E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.73E+01	0.00E+00	0.00E+00
PENRT	[MJ]	1.92E+03	2.15E+01	7.55E+00	0.00E+00	5.37E+01	0.00E+00	4.29E+00	4.88E+01	3.57E+01	2.25E+00	-1.44E+02
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m <sup>3</sup> ]	4.23E+00	2.71E-03	1.79E-03	0.00E+00	8.09E-03	0.00E+00	2.45E-04	5.44E-03	2.99E-02	2.71E-03	-1.17E-01
Caption	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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Use of net fresh water											
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WASTE CATEGORIES AND OUTPUT FLOWS PER 1 m <sup>2</sup>												
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
HWD	[kg]	1.24E-01	5.76E-05	1.87E-05	0.00E+00	1.47E-04	0.00E+00	1.18E-05	1.27E-04	3.36E-05	2.56E-06	-2.10E-04
NHWD	[kg]	2.62E+01	9.10E-01	1.11E-01	0.00E+00	7.19E-02	0.00E+00	5.74E-03	2.51E+00	4.39E+00	1.59E+01	-1.83E+00
RWD	[kg]	4.34E-03	1.44E-04	4.67E-05	0.00E+00	3.71E-04	0.00E+00	2.96E-05	3.31E-04	1.43E-04	1.51E-05	-4.55E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	1.72E-01	0.00E+00	2.43E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.22E+00	0.00E+00	0.00E+00
MER	[kg]	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	2.20E-01	0.00E+00	4.98E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.63E+01	0.00E+00	0.00E+00
EET	[MJ]	8.25E-01	0.00E+00	1.87E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.05E+01	0.00E+00	0.00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy											
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Checked and approved by

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