soltec

FOOTPRINT OF CARBON OF PRODUCT SF 1

REFERENCE TO THE ISLAND PROJECT

RMC | INGENIERIA AMBIENTAL

INDEX

INDEX OF TABLES

INTRODUCTION

The Carbon Footprint is a tool that organizations and business activities have available to assess the total impact that our activities have on the climate, in reference to greenhouse gas emissions.

Knowing the emissions associated with our organization and our products is the first step to establishing redesign actions, replacing less polluting materials and planning activities aimed at reducing our Carbon Footprint.

Greenhouse gas emissions from products occur throughout their entire “cradle to grave” life cycle, from the extraction of raw materials, through manufacturing and distribution, to use by customers and final disposal or management as waste.

SOLTEC has been calculating emissions from activities arising from its organization since 2017 and has proposed actions that have resulted in a reduction of its emissions.

Knowing the Carbon Footprint of the SF1 Product opens up a window of possibilities in the design of our products, and allows us to align ourselves with European net zero emissions policies.

CARBON FOOTPRINT

OBJECTIVES OF THE PRODUCT

SF1

The objective of the study is to evaluate the Carbon Footprint of the life cycle of the Solar Tracker SF1 product, called Tracker SF1, for monitoring solar energy captured by solar installations, consisting of the Tracker SF1 (structural and mechanical components) and the Tracker Control Box (electrical components).

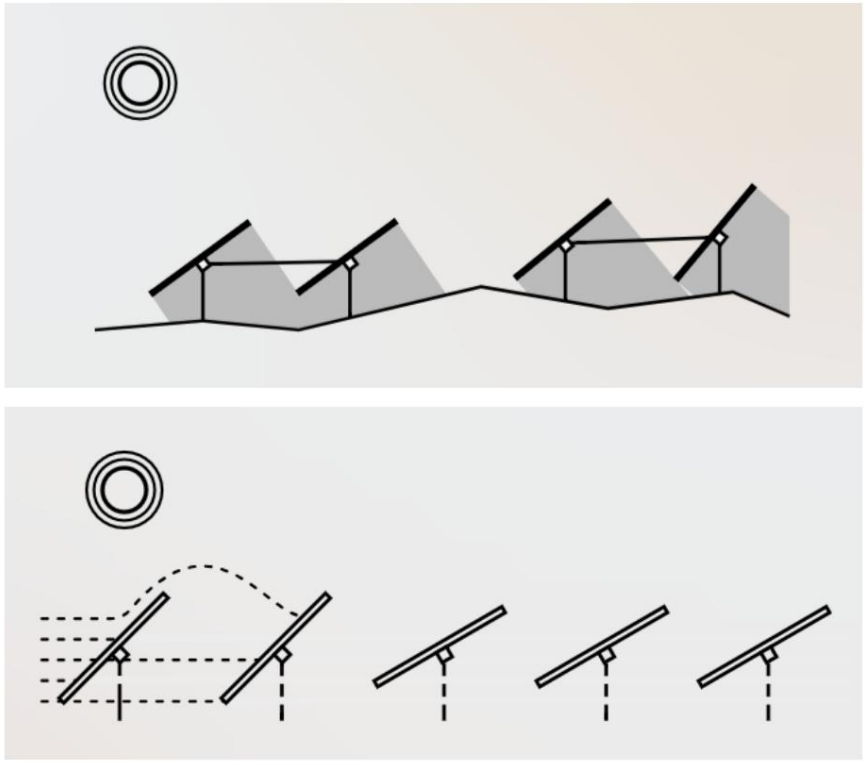
The objective of the study has been divided into the following objectives:

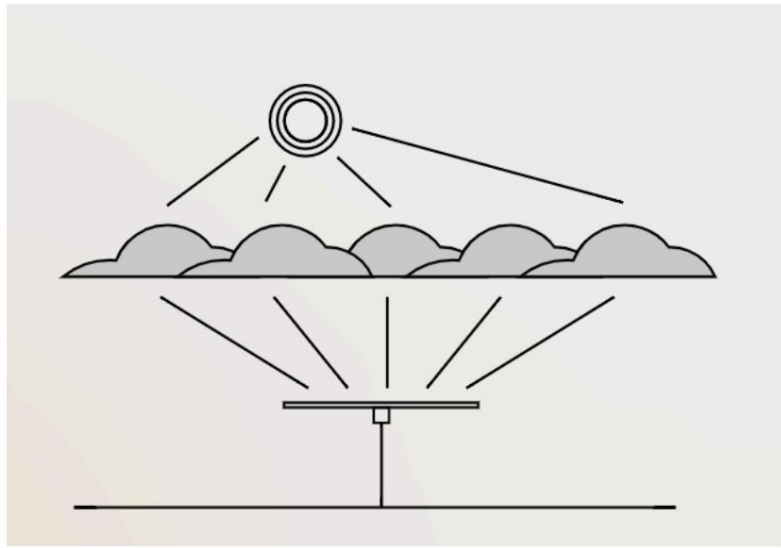
-Make a detailed inventory of the CF life cycle associated with the production, use and disposal of the Tracker SF1 product.

-Compare the results of this study with other similar life cycle studies and identify the main reasons for possible significant differences that may be found.

INTENDED USE OF THE PRODUCT

The product is called Solar Tracker SF1 or Tracker SF1 for use in industrial installations.
It is a mechanical device capable of orienting the solar panels so that they remain approximately perpendicular to the sun rays, following the sun from the east at sunrise to the west at sunset.
The intended result is the maximum performance of a photovoltaic installation.
It consists of a single axis and double row, designed for 72 and 78 cell modules. Thanks to its self-powered system and wireless communication, it is a more efficient solar tracker that is adaptable to the terrain.





SCOPE OF PCF

The objective of the study is an evaluation of the “cradle to gate” Carbon Footprint life cycle of the Tracker SF1 solar tracker product.

The unit processes included are the following:

-Production of raw materials.

-Energy consumption in the facilities.

-Manufacturing (assembly)

-Operation of facilities.

-Storage of products on the premises.

The subsequent process of transport to customer premises, assembly at customer premises and installation are outside the scope of this Carbon Footprint.

GHG emissions and removals associated with the production of capital goods (buildings, manufacturing machinery, transport trucks, etc.) employees in the product life cycle are excluded from the PCF assessment.

SYSTEM LIMITS

The system studied is based on a “cradle to gate” Life Cycle Analysis carried out in accordance with the recommendations and requirements of the International Standards ISO 4040:2006 and ISO 14044:2006 and the European Standard UNE - EN 15804:2012+A2:2020 and Product Category Rule 2019:2014, Version 1.2.5, Construction Products.

This Environmental Product Declaration (EPD) covers the stages of the life cycle of “Cradle to Gate with Options” , being the option chosen for the study f) Construction service EPD: Cradle to gate with modules A1-A5 and optional modules.

The life cycle stages included in the Carbon Footprint are the following:

Stage of product	A1	Supply of raw materials	**X**
	A2	Transport to factory	**X**
	A3	Manufacturing	**X**
Construction on	A4	Transport to project	**X**
	A5	Installation / Construction	**X**
Stage of use	B1	Use	MNE
	B2	Maintenance	MNE
	B3	Repair	MNE
	B4	Substitution	MNE
	B5	Rehabilitation	MNE
	B6	Energy use in service	MNE
	B7	Water use in service	MNE
End of Life	C1	Deconstruction / Demolition	MNE
	C2	Transport	MNE
	C3	Waste treatment	MNE
	C4	Elimination	MNE
	D1	Reuse potential, recovery and/or recycling	MNE

X= Module included in the HC; NR= Non-relevant module; MNE= Module not evaluated

Table 1. Stages of stroke included in the CF SF1 study.

METHODOLOGY

Different calculation procedures based on the units in which the activity data were avalable have been used to carry out this study.

The activities carried out by SOLTEC to develop its functions can be classified in various ways (litres of fuel consumed in machinery and vehicles, kWh of electricity consumed, euros spent on services received, etc.).

The methodological basis for calculating greenhouse gas emissions resulting from these activities is always the same, and consists of applying the following formula:

Carbon Footprint = Activity Data x Emission Factor

Being:

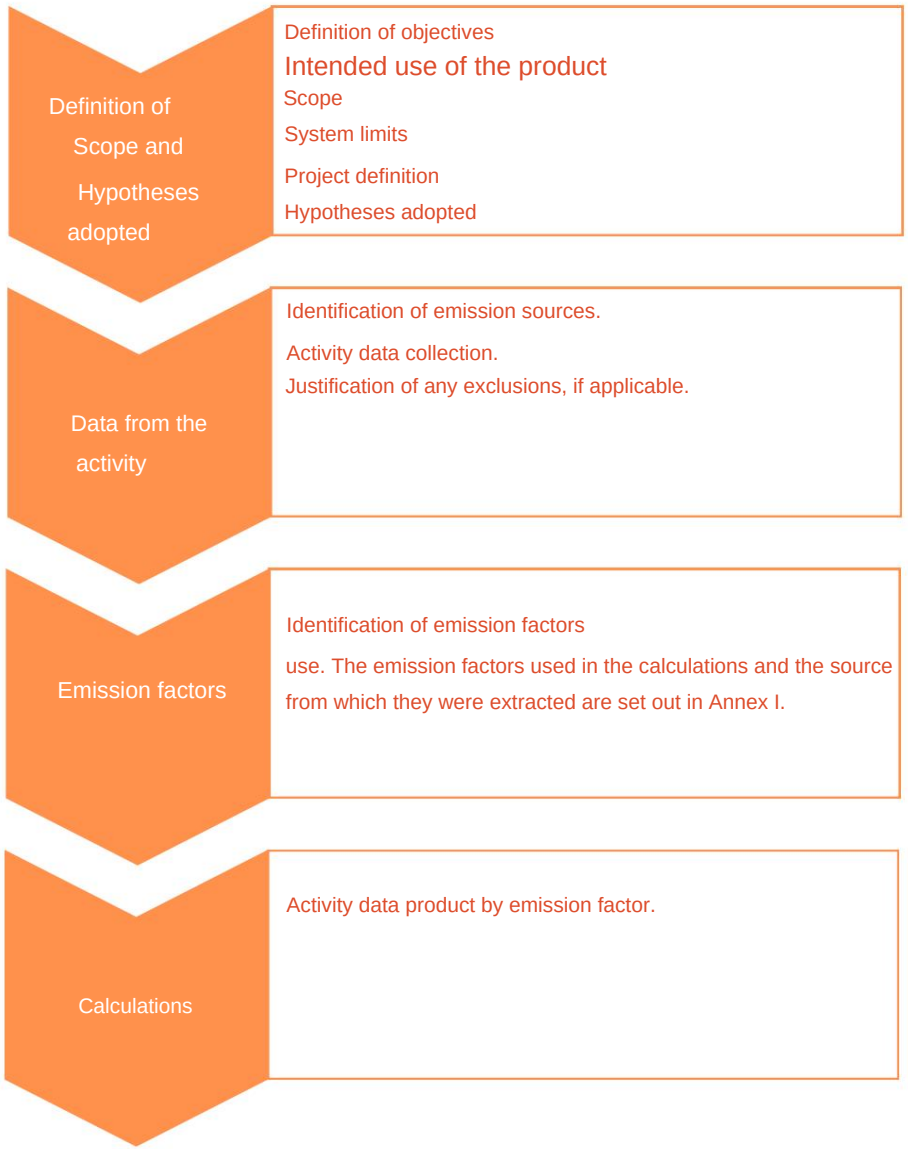
- ***Activity data:*** parameter that defines the degree of activity (e.g.: liters of diesel C)

- ***Normalized emission factor:*** assumes the amount of greenhouse gases emitted by each unit of the “activity data” parameter (e.g.: 2.868 kg CO2/l)

The unit used to present the results is t CO2eq (tons of CO2 equivalent), universal unit of measurement that indicates the global warming potential (GWP) of each of the greenhouse gases, expressed in terms of the GWP of a unit of carbon dioxide. It is used to measure the impact on climate change of the release of different greenhouse gases through the same unit.

The methodology used to perform the scope 1+2 and 3 calculations is based primarily on the procedures described in the ***Standard accounting and reporting corporate of the Greenhouse Gas Protocol,*** a system that constitutes the international methodology with greater implementation today and following IPCC guidelines.

Next is a diagram describing the steps that have been followed to calculate the carbon footprint:



SF1 DESCRIPTION

The SFOne solar tracker stands out as the comprehensive solution for projects solar energy that require not only unbeatable adaptability to difficult terrain, but also optimum efficiency and performance.

This tracker combines mechanical simplicity with extraordinary

Soltec's experience of more than 20 years.

Specially designed for larger 72 and 78 cell modules,

This single-axis, double-row solar tracker combines advanced engineering with cutting-edge technologies such as the Full Wireless System and the Open Grid.

Thread for wireless communication.

Its self-powering capacity thanks to its dedicated panel and its optimized structure for quick and easy installation significantly reduce operating and maintenance costs, while Its low visual impact design blends into any environment.

With SFOne, photovoltaic projects achieve unprecedented energy efficiency.

ELEMENTS THAT MAKE UP SF1

External tracker 1x45

External tracker-short 1x30.

1row 1x45 external tracker.

Edge 1x45 indoor tracker.

Indoor tracker 1x45.

Tracker Control Box Full Wireless MK IV.

The features are as follows:

Model	**SF Solar Tracker**
Mounting the PV module	No rating
Design load index	N/A
Grounding the PV module	Yeah
Maximum voltage of the PV system	1500 Vdc
Environmental index (electrical boxes/panels)	Type 3x

Table 2. General characteristics of the SF1 Tracker.

Setting up the input phase	DC
Nominal voltage (VDC)	24
Nominal current (A)	9
Power (W)	130
Power (HP)	0.174
0 R W R U torque (Nm)	300

Table 3. Engine characteristics.

External tracker 1x45

ELEMENT DESCRIPTION	UNITS	AMOUNT TOTAL (KG)
ABARCÓN	103	20.68
SAPWOOD	2	0.02
SHOCK ABSORBER	4	32
CLAMPING RING	20	15.6
WASHER	344	4.88
HINGE	8	4.56
DAMPER ARM	4	10.6
ISO 14 CARDAN	1	1.49
CARDAN NO KEY	1	0.51
BUSHING	2	1.44
ROTATION AXIS	12	875.94
SPLINED SHAFT	1	3.17
PILE	22	818.1
PIN	2	0.04
ASYMMETRIC PLATE	16	0.32
SLEWING DRIVE	1	33.9
DAMPER REINFORCEMENT	2	3.58
DAMPER REINFORCEMENT	2	3.58
BUSHING REINFORCEMENT	20	6.8
REGULATOR HINCA	20	48
SINGLE BEARING	40	18
MODULE SUPPORT	127	175.22
S L E W I N G D R I V E SUPPORT	4	11.24
TRACKER EXTREME COVER	7	0.42
HEXAGON SCREW	361	15.05
TUBE CARDAN	1	7,13
BRAKE NUT	438	6.06
TT UNION	16	47.6
MOTOR	1	44.4
TOTAL	**1582**	**2210.33**

Table 4 Components of the 1x45 Outdoor Tracker.

Short external tracker 1x30

ELEMENT DESCRIPTION	UNITS	AMOUNT TOTAL (KG)
ABARCÓN	73	14.68
SAPWOOD	2	0.02
SHOCK ABSORBER	4	32
CLAMPING RING	12	9.36
WASHER	248	3.92
HINGE	4	2.28
DAMPER HINGE	4	2.28
DAMPER ARM	4	10.6
ISO 14 CARDAN	1	1.49
CARDAN WITHOUT KEY	1	0.51
BROCHETED BUSHING	2	1.44
ROTATION AXIS	8	623.7
SPLINED SHAFT	1	3.17
HINCA	14	519.54
MEGA GRIP	32	
ENGINE	1	44.4
PIN	2	0.04
ASYMMETRIC PLATE	16	0.32
REDUCER	1	33.9
BUSHING REINFORCEMENT	12	4.08
DAMPER REINFORCEMENT	4	7.16
REGULATOR HINCA	12	28.8
SINGLE BEARING	24	10.8
MODULE SUPPORT	97	149.42
REDUCER SUPPORT	4	11.24
FOLLOWER END COVER	4	0.24
SCREW HEXAGONAL	259	12,11
CARDAN TUBE	1	7,13
BRAKE NUT	306	4.26
UNION TT	8	30.4
TOTAL	**1129**	**1569.29**

Table 5. Short external tracker 1x30.

1row 1x45 outdoor tracker

ELEMENT DESCRIPTION	UNITS	AMOUNT TOTAL (KG)
ABARCÓN	10.44	52
SHOCK ABSORBER	16	2
RING	7.8	10
WASHER	2.44	172
DAMPER HINGE	2.28	4
DAMPER ARM	5.3	2
ROTATION AXIS	437.97	6
HINCA	110.49	3
HINCA	298.56	8
ENGINE	44.4	1
ASYMMETRIC PLATE	0.16	8
REINFORCEMENT OF DRIVE BUSHING	3.4	10
DAMPER REINFORCEMENT	3.58	2
REGULATOR HINCA	24	10
SINGLE BEARING	9	20
MODULE SUPPORT	88.24	64
REDUCER SUPPORT	5.62	2
FOLLOWER END COVER	0.12	2
HEXAGON SCREW	7.54	182
BRAKE NUT	3.04	220
TT UNION	26.6	8
TOTAL	**1731.66**	**2101**

Table 6. 1row 1x45 exterior tracker.

Tracker Interior edge 1x45

ELEMENT DESCRIPTION	UNITS	AMOUNT TOTAL (KG)
ABARCÓN	19	95
SAPWOOD	0.02	2
CLAMPING RING	12.48	16
WASHER	3.2	272
BROCHETED BUSHING	1.44	2
ROTATION AXIS	891.84	12
SPLINED SHAFT	3.17	1
HINCA	668.74	18
PIN	0.04	2
ASYMMETRIC PLATE	0.32	16
REGULATOR HINCA	38.4	16
SINGLE BEARING	14.4	32
MODULE SUPPORT	105.78	103
REDUCER SUPPORT	11.24	4
FOLLOWER END COVER	0.24	4
HEXAGON SCREW	11.89	301
CARDAN TUBE	7,13	1
BRAKE NUT	5.06	362
TT UNION	46.6	16
ISO 14 CARDAN	1.49	1
CARDAN WITHOUT KEY	0.51	1
REDUCER	33.9	1
ENGINE	44.4	1
TOTAL	**1921,29**	**1279**

Table 7. Edge 1x45 interior tracker.

Indoor Tracker 1x45

ELEMENT DESCRIPTION	UNITS	AMOUNT TOTAL (KG)
ABARCÓN	19	95
SAPWOOD	0.02	2
CLAMPING RING	12.48	16
WASHER	3.2	272
BROCHETED BUSHING	1.44	2
ROTATION AXIS	875.94	12
SPLINED SHAFT	3.17	1
HINCA	370.18	10
FAN	298.56	8
PIN	0.04	2
ASYMMETRIC PLATE	0.32	16
REGULATOR HINCA	38.4	16
SINGLE BEARING	14.4	32
MODULE SUPPORT	82.5	95
REDUCER SUPPORT	11.24	4
FOLLOWER END COVER	0.24	4
HEXAGON SCREW	11.77	297
CARDAN TUBE	7,13	1
BRAKE NUT	5.02	358
TT UNION	40	16
ISO 14 CARDAN	1.49	1
CARDAN WITHOUT KEY	0.51	1
REDUCER	33.9	1
Engine	44.4	1
TOTAL	**1875.35**	**1263**

Table 8. Indoor tracker 1 x45.

Tracker Control Box Full Wireless MK IV

ELEMENT	MATERIAL	WEIGHT (KG)
Connector	Several	0.124
Electronic plate	Components electronic	0.141
Aluminum box	Aluminum	1,946
Plastic (Polycarbonate)	Polycarbonate	0.358
Screws	Steel	0.024
Lithium ion battery	Lithium ion battery	1.5
TOTAL		4,093

Table 9. Weights and components of the Tracker Control Box Full Wireless MKIV.

ADOPTED HYPOTHESES

The hypotheses adopted for the calculation of the Carbon Footprint of the Totana IV Project are as follows:

1. All products made from S280GD + ZM310, S355JR steel base, S350GD+Z275, S420GD+Z275, S350GD+ZM310 and S355 MC have been modeled as a hot rolled, low alloy steel product and the result is the global average of the processes that give place this product.
2. Alloy steel and steel parts have been modeled as steel, low-allowed.
3. Stainless steel parts have been modeled as steel, low-allowed, as there are no emission factors available for steel stainless.
4. LCI data includes, according to EN 15804, a minimum of 95% of the total inputs (mass and energy) per module.
5. For the transport of products manufactured in Spain, modeling transport as a market for transport, freight, lorry, unspecified, with a European geographic scope. 6. For the transport of products manufactured in China, a model has been created Transport on a container ship with a geographical scope world.
7. Flows from infrastructure, construction, production of equipment and tools that are not directly consumed in the project, have been excluded from the Life Cycle Inventory, since they do not have the potential to cause significant environmental impact.

IDENTIFICATION OF EMISSION SOURCES AND ACTIVITY DATA

Once the limits of the Carbon Footprint study system have been determined and the product has been described, the following sources of carbon are identified: issuance associated with the different operations, as well as the activity data of each of the Trackers defined above.

EXTERNAL TRACKER 1X45

TRACKER	CATEGORY	SUBCATEGORY	ACTIVITY DATA	UNIT
EXTERNAL TRACKER 1X45	Steel components	Steel alloy	35.18	kg
	HDG steel components	HDG steel	2025,15	kg
	Steel components inexorable	Stainless steel	0.06	kg
	Aluminum components	Aluminum	15.6	kg
	Shock absorber	Shock absorber	32	kg
	Reducer	Iron	39.52	kg
	Polyamide	Polyamide	18	kg
	Polypropylene	Polypropylene	0.42	kg
	Engine	Engine	44.4	kg
	Transport	Transport of raw materials in heavy goods truck	425.48	Tn.km
	Transport	Transport of raw materials in maritime containers	20410,158	Tn.km

Table 10. Identification of emission sources and activity data of the Tracker External 1x45.

SHORT EXTERNAL TRACKER 1X30

TRACKER	CATEGORY	SUBCATEGORY	ACTIVITY DATA	UNIT
EXTERNAL TRACKER 1X45	Steel components	Steel alloy	35.1	kg
	HDG steel components	HDG steel	1403.43	kg
	Steel components stainless	Stainless steel	0.06	kg
	Aluminum components	Aluminum	9.36	kg
	Shock absorber	Shock absorber	32	kg
	Polyamide	Polyamide	10.8	kg
	Polypropylene	Polypropylene	0.24	kg
	Engine	Engine	44.4	kg
	Reducer	Iron	33.9	kg
	Transport	Transport of raw materials in heavy goods truck	301,503	Tn.km
	Transport	Transport of raw materials in maritime containers	14519,199	Tn.km

Table 11. Identification of emission sources and activity data of the short External Tracker 1x30.

1ROW 1X45 OUTDOOR TRACKER

TRACKER	CATEGORY	SUBCATEGORY	ACTIVITY DATA	UNIT
EXTERNAL TRACKER 1X45	Steel components	Steel alloy	63.1	kg
	HDG steel components	HDG steel	1349.4	kg
	Aluminum components	Aluminum	6.24	kg
	Shock absorber	Shock absorber	128	kg
	Engine	Engine	177.6	kg
	Polyamide	Polyamide	7.2	kg
	Polypropylene	Polypropylene	0.12	kg
	Transport	Transport of raw materials in heavy goods truck	335,916	Tn.km
	Transport	Transport of raw materials in maritime containers	17039,256	Tn.km

Table 12. Identification of emission sources and activity data of the 1row 1x45 Outdoor Tracker.

TRACKER INDOOR EDGE 1X45

TRACKER	CATEGORY	SUBCATEGORY	ACTIVITY DATA	UNIT
EXTERNAL TRACKER 1X45	Steel components	Steel alloy	47.28	kg
	HDG steel components	HDG steel	1779.81	kg
	Steel components stainless	Stainless steel	0.06	kg
	Engine	Engine	44.4	kg
	Polyamide	Polyamide	14.4	kg
	Polypropylene	Polypropylene	0.24	kg
	Reducer	Iron	33.9	kg
	Transport	Transport of raw materials in heavy goods truck	364,078	Tn.km
	Transport	Transport of raw materials in maritime containers	18022,168	Tn.km

Table 13. Identification of emission sources and activity data of the edge 1x45 indoor Tracker.

INDOOR TRACKER 1X45

TRACKER	CATEGORY	SUBCATEGORY	ACTIVITY DATA	UNIT
EXTERNAL TRACKER 1X45	Steel components	Steel alloy	35.84	kg
	HDG steel components	HDG steel	1748.43	kg
	Steel components stainless	Stainless steel	0.06	kg
	Aluminum	Aluminum	12.48	kg
	Engine	Engine	44.4	kg
	Polypropylene	Polypropylene	0.24	kg
	Reducer	Iron	33.9	kg
	Transport	Transport of raw materials in heavy goods truck	352,523	Tn.km
	Transport	Transport of raw materials in maritime containers	17730,114	Tn.km

Table 14. Identification of emission sources and activity data of the 1x45 indoor Tracker.

TRACKER CONTROL BOX FULL WIRELESS MKIV

TRACKER	CATEGORY	SUBCATEGORY	ACTIVITY DATA	UNIT
TRACKER CONTROL BOX FULL WIRELESS MKIV	Connector	Connector	0.124	kg
	Electronic components	Electronic plate	0.141	kg
	Aluminum box	Aluminum	1,948	kg
	Plastic	Polycarbonate	0.358	kg
	Screws	Steel	0.024	kg
	Battery	Lithium ion battery	1.5	Kg

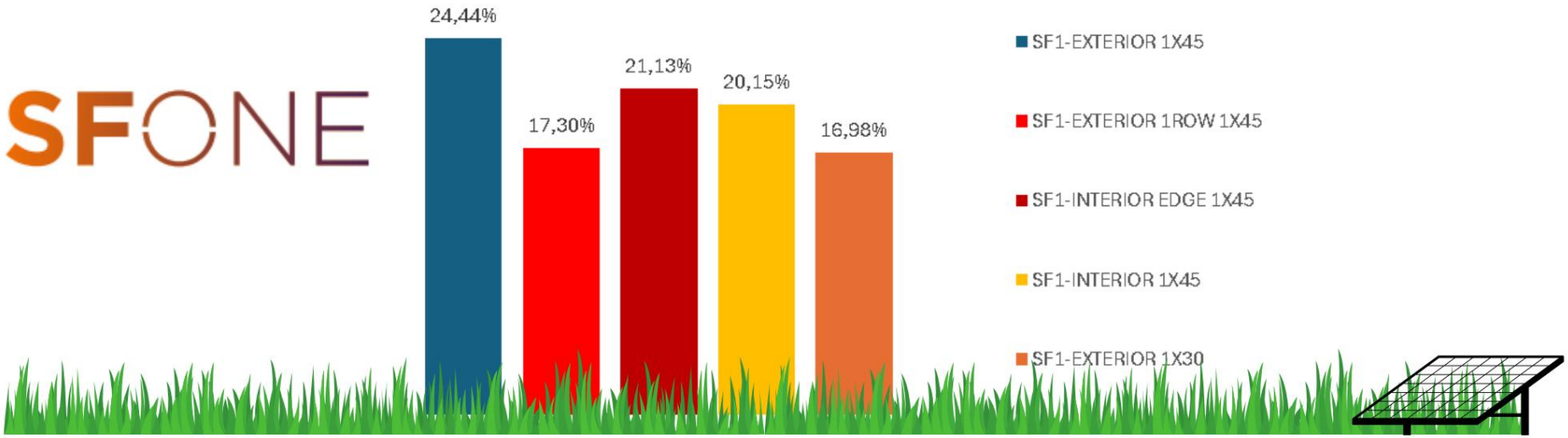
Table 15. Identification of emission sources and activity data of the Tracker Control Box Full Wireless MKIV.

SF1 CARBON FOOTPRINT CALCULATION

To calculate the Carbon Footprint of the SF1 product, the Ecoinvent_391_cuoff database and the openLCA 1.11.0 software have been used. The indicator
The environmental factor used is the Global Warming Potential 100 (IPCC). The results obtained for each of the trackers are as follows:

DENOMINATION	EMISSIONS (Kg CO2eq)	%
SF1-OUTDOOR 1X45	5030,74702	24.44%
SF1-OUTDOOR 1X30	3494,86652	16.98%
SF1-EXTERIOR 1ROW 1X45	3561,45149	17.30%
SF1-INTERIOR EDGE 1X45	4350,51018	21.13%
SF1-INTERIOR 1X45	4146,99347	20.15%
TOTAL	**20584,5687**	100

Table 16. Results in kg of CO2eq of all the Trackers that make up SF1.



The results obtained for each type of carbon that contributes to the total emissions of Greenhouse Gases of each of the tracker, are the following:

DENOMINATION	CLIMATE CHANGE, 100 (KG CO2 EQ)	FOSSIL 100 (KG CO2 EQ)	BIOGENIC, 100 (KG CO2 EQ)	LAND USE, 100 (KG CO2 EQ)
SF1-OUTDOOR 1X45	5030,74702	5023,083	4,237	3,4272
SF1-OUTDOOR 1X30	3494,86652	3489,529	2,947	2,3913
SF1-EXTERIOR 1ROW 1X45	3561,45149	3556,000	2,996	2,4554
SF1-INTERIOR EDGE 1X45	4350,51018	4343,869	3,667	2,9736
SF1-INTERIOR 1X45	4146,99347	4140,526	3,543	2,9239
TOTAL	**20584,5687**	**20553,008**	**17,389**	**14,1713**
%	**100%**	**99.85%**	**0.08%**	**0.07%**

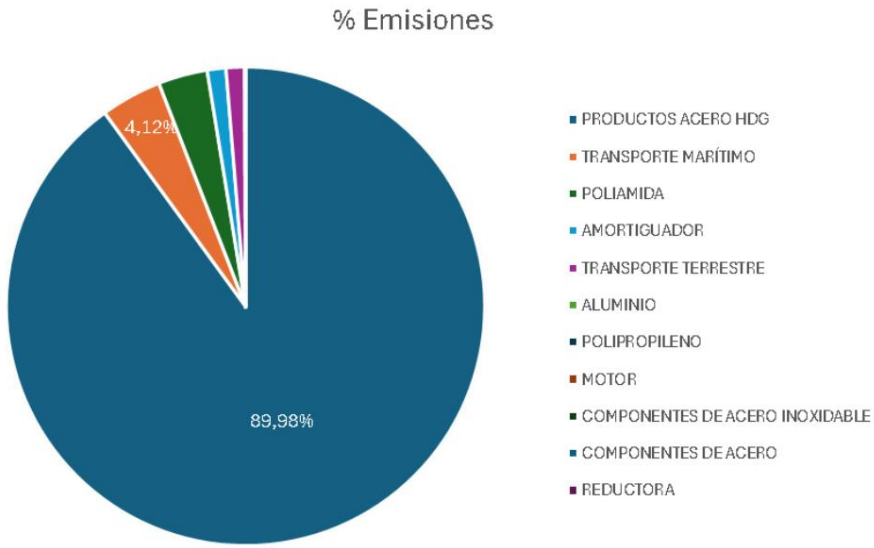
Table 17. Results in kg of CO2eq of all the Trackers that make up the SF1, for all carbon types.

The results obtained from the Global Warming Potential (IPCC), for each of the trackers that make up the SF1 product, as well as for each of the components, are the following:

EXTERNAL TRACKER 1X45

CONTRIBUTION (%)	CATEGORY	EMISSIONS (Kg CO2eq)
89.98%	HDG STEEL PRODUCTS	4,526,765
4.12%	MARITIME TRANSPORT	207,439
3.33%	POLYAMIDE	167,564
1.26%	SHOCK ABSORBER	63,318
1.26%	LAND TRANSPORT	63,274
0.02%	ALUMINUM	1,044
0.02%	POLYPROPYLENE	0.960
0.01%	ENGINE	0.258
0.00%	STEEL COMPONENTS STAINLESS	0.108
0.00%	STEEL COMPONENTS	0.010
0.00%	REDUCER	0.007
TOTAL		**5030,747**

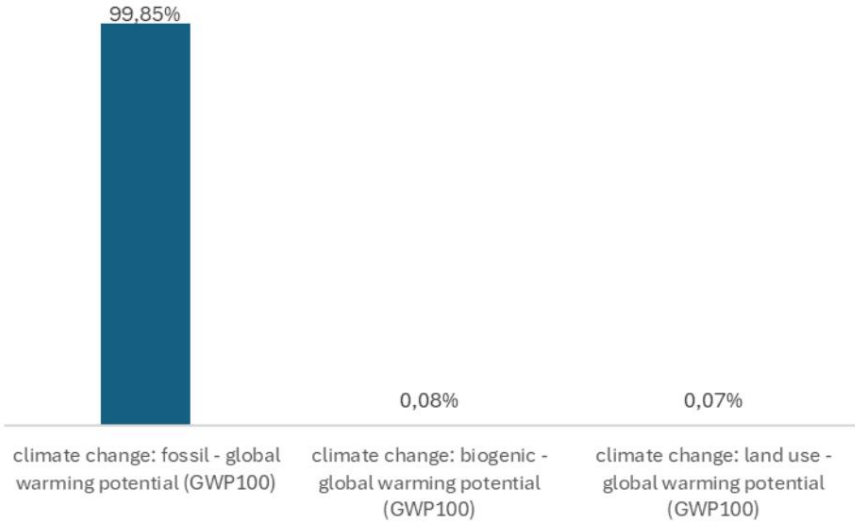
Table 18. Results in kg CO2eq from Tracker External 1x45. IPCC WGP 100.



Below are the results of the Global Warming Potential environmental indicator for the different types of carbon that make up the total emissions of Greenhouse Gases.
The first table shows the results of the GWP 100 without including the carbon from CFs,
and the second table shows the results of the GWP 100

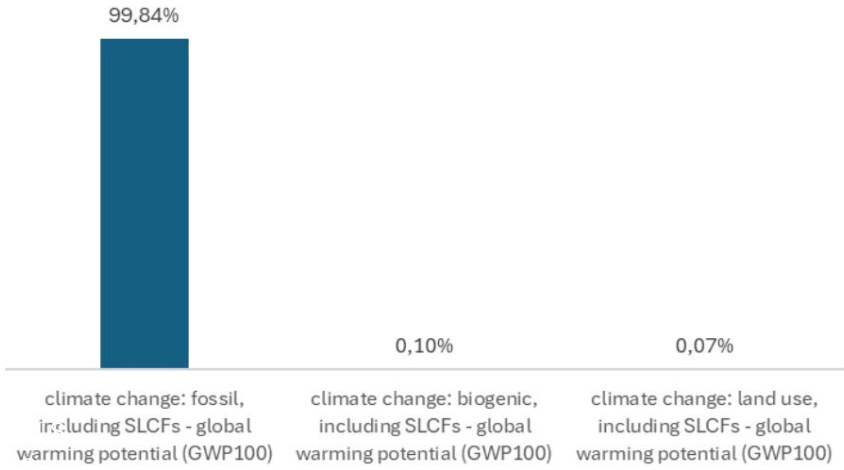
CONTRIBUTION (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.85%	climate change: fossil - global warming potential (GWP100)	5,023,083
0.08%	climate change: biogenic - global warming potential (GWP100)	4,237
0.07%	climate change: land use - global warming potential (GWP100)	3,427
	TOTAL	**5,030,747**

Table 19. Results in kg CO2eq of the Tracker External 1x45. IPCC WGP 100, for the different carbon typologies.



CONTRIBUTION (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.84%	climate change: fossil, including SLCFs - global warming potential (GWP100)	5,217,831
0.10%	climate change: biogenic, including SLCFs - global warming potential (GWP100) climate	4,997
0.07%	change: land use, including SLCFs - global warming potential (GWP100)	3,471
	TOTAL	**5,226,299**

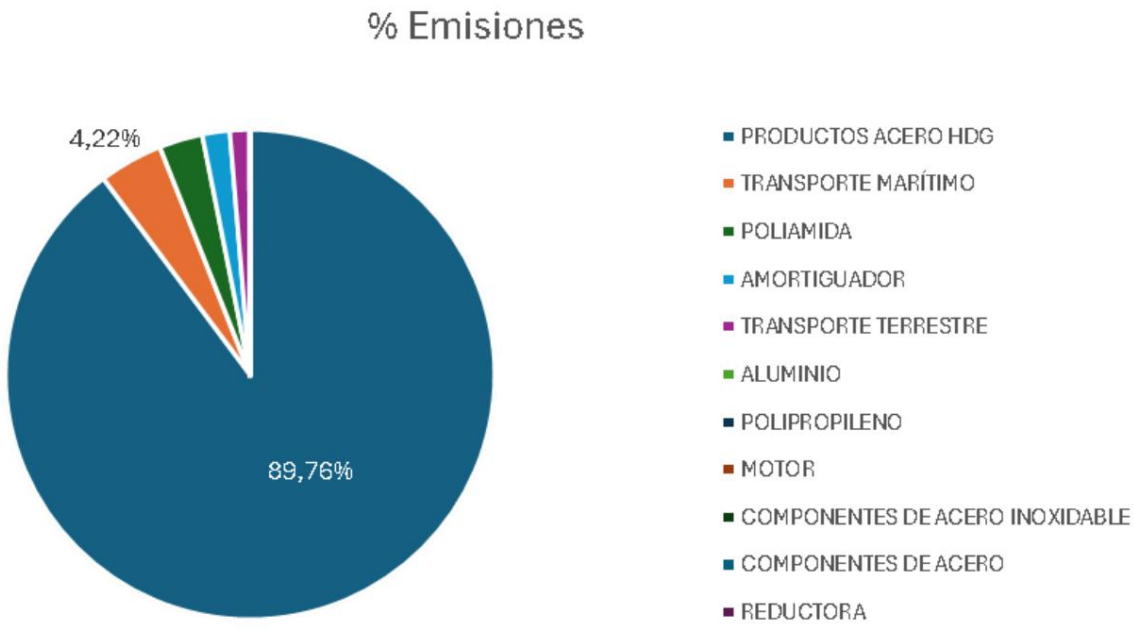
Table 20. Results in kg CO2eq from Tracker External 1x45. IPCC WGP 100, for the different carbon typologies, including carbon from CFs gases.



OUTDOOR TRACKER 1X30

CONTRIBUTION (%)	CATEGORY	EMISSIONS (Kg CO2eq)
89.76%	HDG STEEL PRODUCTS	3,137,051
4.22%	MARITIME TRANSPORT	147,566
2.88%	POLYAMIDE	100,538
1.81%	SHOCK ABSORBER	63,318
1.28%	LAND TRANSPORT	44,836
0.02%	ALUMINUM	0.626
0.02%	POLYPROPYLENE	0.549
0.01%	ENGINE	0.258
0%	STEEL COMPONENTS STAINLESS	0.108
0%	STEEL COMPONENTS	0.010
0%	REDUCER	0.006
TOTAL		**3494,867**

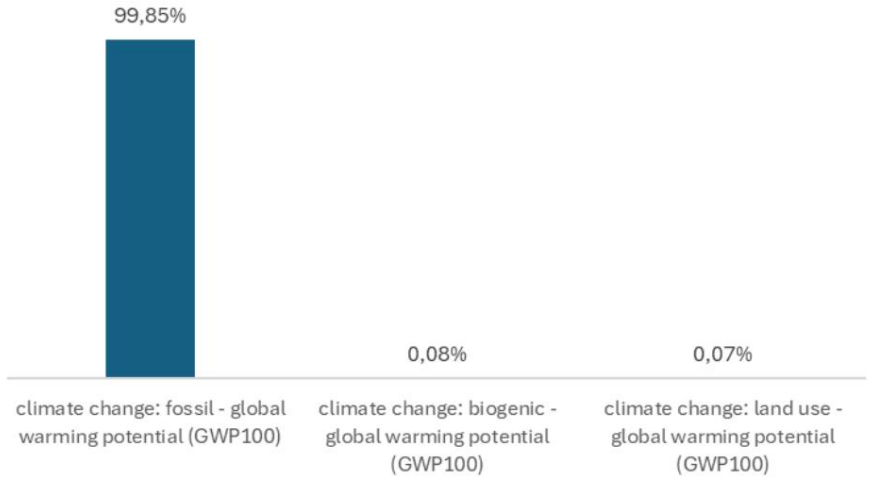
Table 21. Results in kg CO2eq of the Outdoor Tracker 1x30. IPCC WGP 100.



Below are the results of the Global Warming Potential environmental indicator for the different types of carbon that make up the total greenhouse gas emissions. The first table presents the results of GWP 100 excluding carbon from CFs, and the second table presents the results of GWP 100

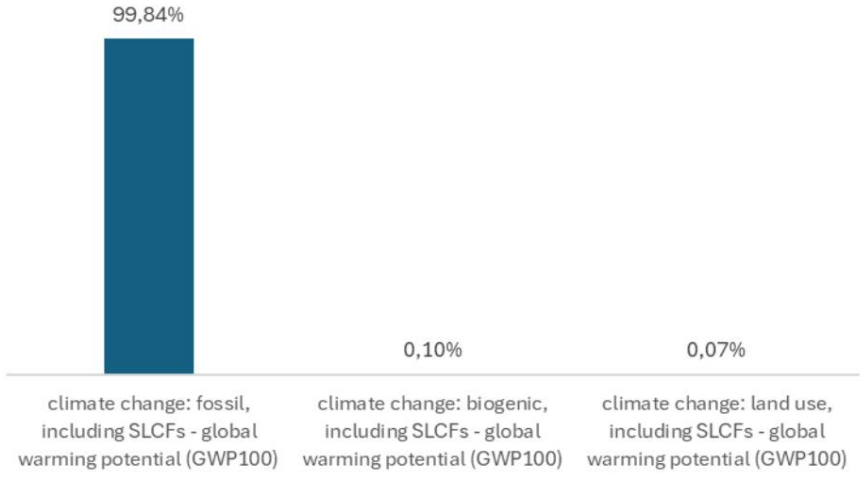
CONTRIBUTED N (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.85%	climate change: fossil - global warming potential (GWP100)	3,489,529
0.08%	climate change: biogenic - global warming potential (GWP100)	2,947
0.07%	climate change: land use - global warming potential (GWP100)	2,391
TOTAL		**3,494,867**

Table 22. Results in kg CO2eq of the Outdoor Tracker 1x30. IPCC WGP 100, for the different carbon typologies.



CONTRIBUTED N (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.85%	climate change: fossil - global warming potential (GWP100)	3,489,529
0.08%	climate change: biogenic - global warming potential (GWP100)	2,947
0.07%	climate change: land use - global warming potential (GWP100)	2,391
TOTAL		**3,494,867**

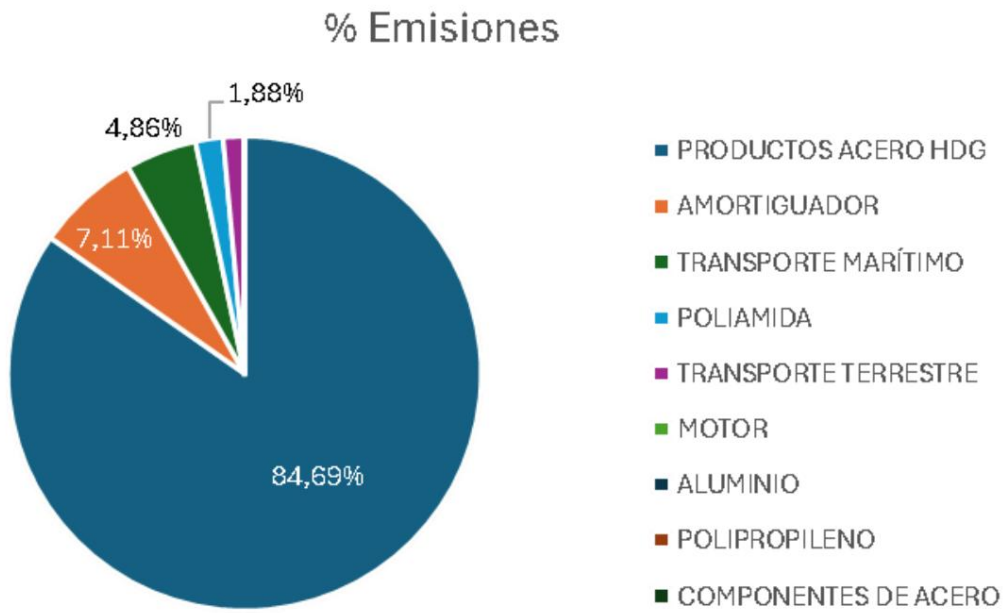
Table 23. Results in kg CO2eq of the Outdoor Tracker 1x30. IPCC WGP 100, for the different carbon typologies, including carbon from CF gases.



1ROW 1X45 OUTDOOR TRACKER

CONTRIBUTION ON (%)	CATEGORY	EMISSIONS (Kg CO2eq)
84.69%	HDG STEEL PRODUCTS	3,016,279
7.11%	SHOCK ABSORBER	253,272
4.86%	MARITIME TRANSPORT	173,179
1.88%	POLYAMIDE	67,026
1.40%	LAND TRANSPORT	49,954
0.03%	ENGINE	1,033
0.01%	ALUMINUM	0.418
0.01%	POLYPROPYLENE	0.274
0%	STEEL COMPONENTS	0.017
TOTAL		**3561,451**

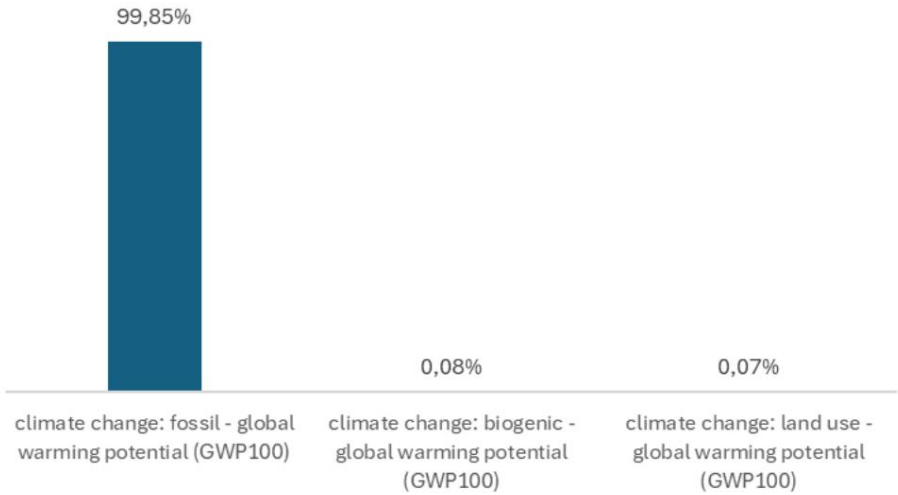
Table 24. Results in kg CO2eq of the Outdoor Tracker 1row 1x45. IPCC WGP 100.



Below are the results of the Global Warming Potential environmental indicator for the different types of carbon that make up the total greenhouse gas emissions. The first table presents the results of GWP 100 excluding carbon from CFs, and the second table presents the results of GWP 100

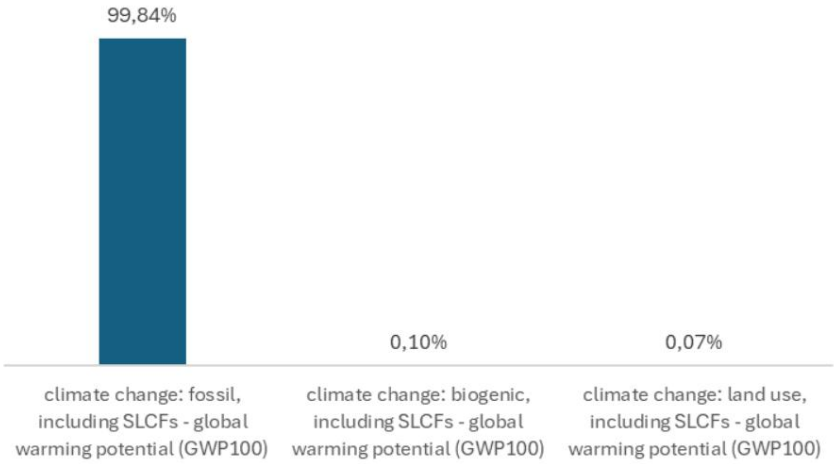
CONTRIBUTED N (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.85%	climate change: fossil - global warming potential (GWP100)	3,556,000
0.08%	climate change: biogenic - global warming potential (GWP100)	2,996
0.07%	climate change: land use - global warming potential (GWP100)	2,455
TOTAL		**3,561,451**

Table 25. Results in kg CO2eq of the Outdoor Tracker 1x30. IPCC WGP 100, for the different carbon typologies.



CONTRIBUTED N (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.84%	climate change: fossil, including SLCFs - global warming potential (GWP100)	3,695,184
0.10%	climate change: biogenic, including SLCFs - global warming potential (GWP100)	3,540
0.07%	climate change: land use, including SLCFs - global warming potential (GWP100)	2,487
TOTAL		**3,701,212**

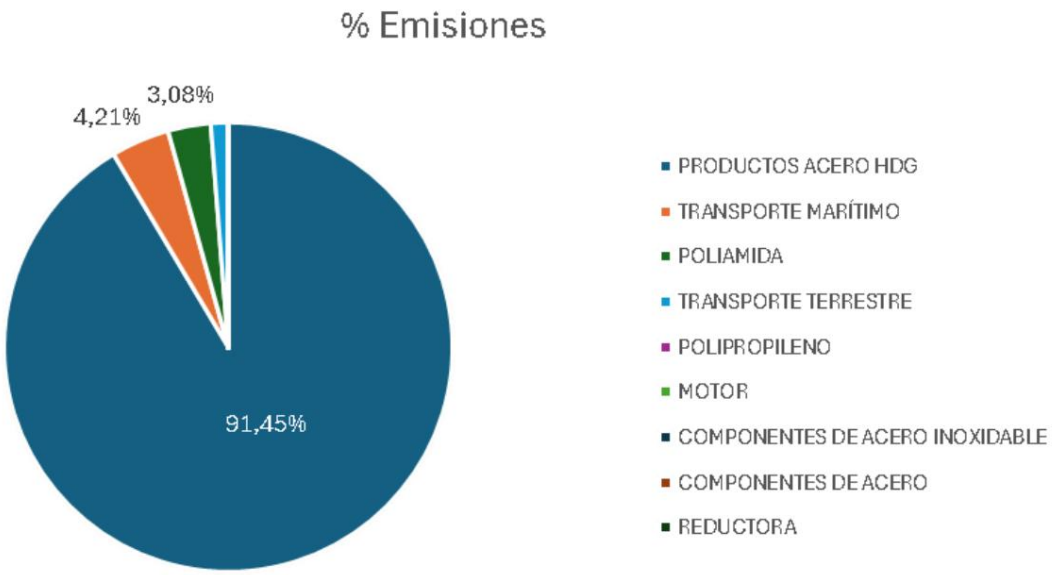
Table 26. Results in kg CO2eq of the Outdoor Tracker 1x30. IPCC WGP 100, for the different carbon typologies, including carbon from CF gases.



TRACKER INDOOR EDGE 1X45

CONTRIBUTION (%)	CATEGORY	EMISSIONS (Kg CO2eq)
91.45%	HDG STEEL PRODUCTS	3,978,363
4.21%	MARITIME TRANSPORT	183,169
3.08%	POLYAMIDE	134,051
1.24%	LAND TRANSPORT	54,074
0.01%	POLYPROPYLENE	0.549
0.01%	ENGINE	0.258
0%	STEEL COMPONENTS STAINLESS	0.108
0%	STEEL COMPONENTS	0.013
0%	REDUCER	0.006
TOTAL		**4,350,510**

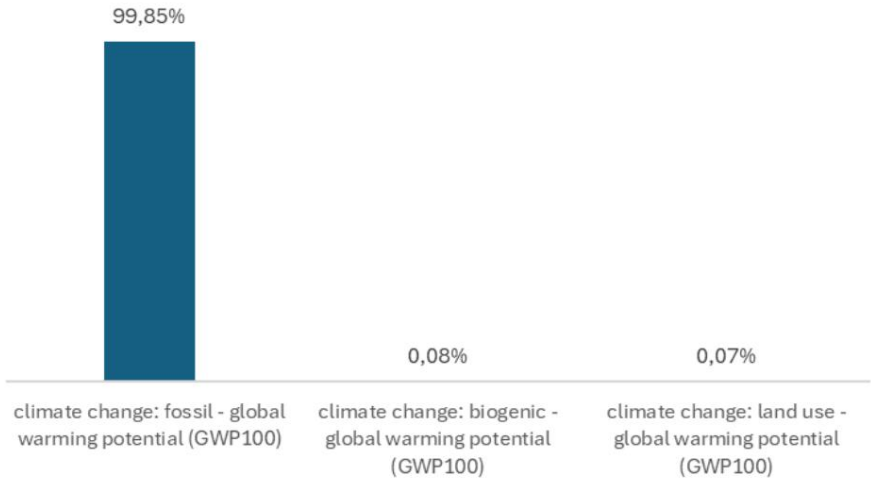
Table 27. Results in kg of CO2eq from the Tracker Interior edge 1x45. IPCC WGP 100.



Below are the results of the Global Warming Potential environmental indicator for the different types of carbon that make up the total greenhouse gas emissions. The first table presents the results of GWP 100 excluding carbon from CFs, and the second table presents the results of GWP 100

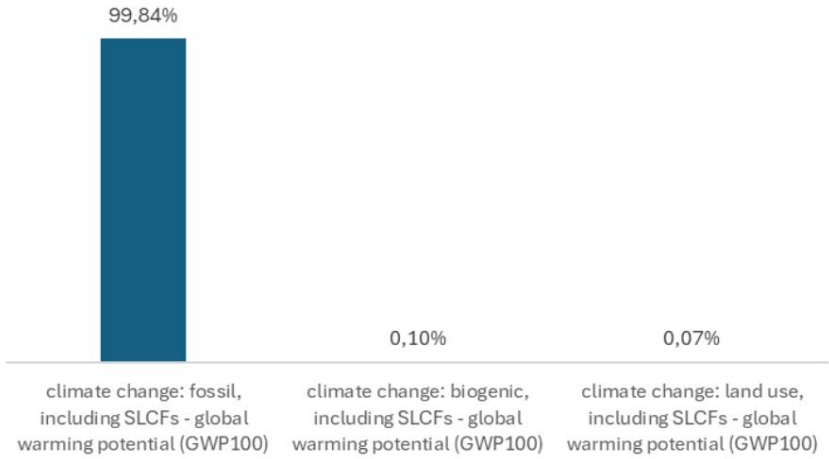
CONTRIBUTED N (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.85%	climate change: fossil - global warming potential (GWP100)	4,343,869
0.08%	climate change: biogenic - global warming potential (GWP100)	3,667
0.07%	climate change: land use - global warming potential (GWP100)	2,974
	TOTAL	**4,350,510**

Table 28. Results in kg CO2eq of the Tracker Interior Edge 1x45. IPCC WGP 100, for the different carbon typologies.



CONTRIBUTED N (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.84%	climate change: fossil, including SLCFs - global warming potential (GWP100)	4,512,472
0.10%	climate change: biogenic, including SLCFs - global warming potential (GWP100)	4,325
0.07%	climate change: land use, including SLCFs - global warming potential (GWP100)	3,012
	TOTAL	**4,519,809**

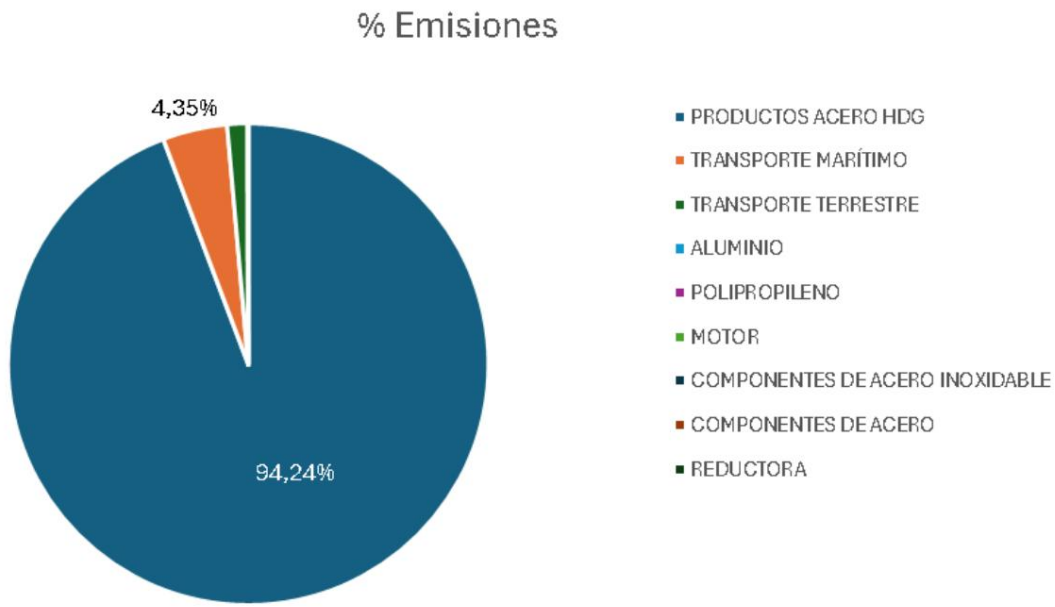
Table 29. Results in kg CO2eq from the Interior Edge Tracker 1x45. IPCC WGP 100, for the different carbon typologies, including carbon from CFs gases.



INDOOR TRACKER 1X45

CONTRIBUTION (%)	CATEGORY	EMISSIONS (Kg CO2eq)
94.24%	HDG STEEL PRODUCTS	4,146,993
4.35%	MARITIME TRANSPORT	3,908,220
1.37%	LAND TRANSPORT	180,200
0.02%	ALUMINUM	56,807
0.01%	POLYPROPYLENE	0.835
0.01%	ENGINE	0.549
0%	STEEL COMPONENTS STAINLESS	0.258
0%	STEEL COMPONENTS	0.108
0%	REDUCER	0.010
TOTAL		**4146,993**

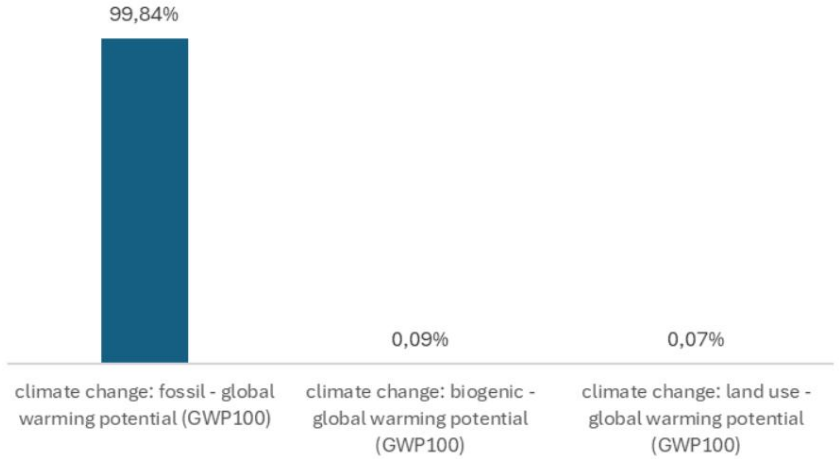
Table 30. Results in kg of CO2eq from Indoor Tracker 1x45. IPCC GWP 100.



Below are the results of the Global Warming Potential environmental indicator for the different types of carbon that make up the total greenhouse gas emissions. The first table presents the results of GWP 100 excluding carbon from CFs, and the second table presents the results of GWP 100

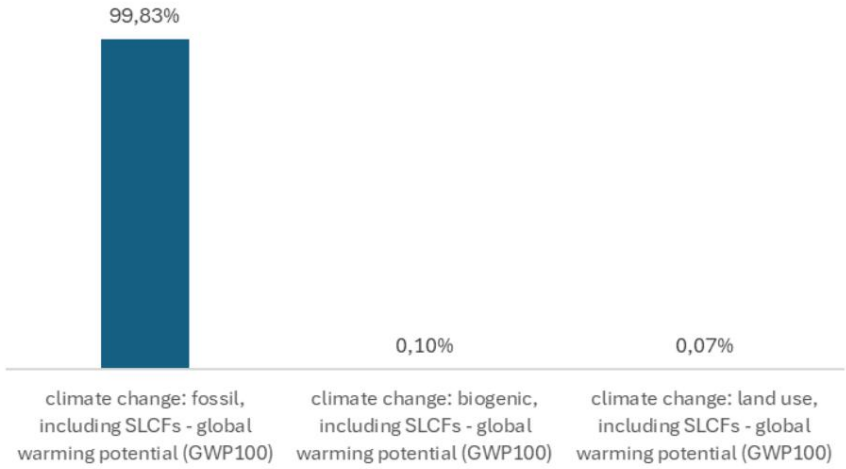
CONTRIBUTED N (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.84%	climate change: fossil - global warming potential (GWP100)	4.140,526
0.09%	climate change: biogenic - global warming potential (GWP100)	3,543
0.07%	climate change: land use - global warming potential (GWP100)	2,924
	TOTAL	**4,146,993**

Table 31. Results in kg CO2eq of the Indoor Tracker 1x45. IPCC WGP 100, for the different carbon typologies.



CONTRIBUTED N (%)	CATEGORY	EMISSIONS (Kg CO2eq)
99.83%	climate change: fossil, including SLCFs - global warming potential (GWP100)	4,305,638
0.10%	climate change: biogenic, including SLCFs - global warming potential (GWP100)	4,189
0.07%	climate change: land use, including SLCFs - global warming potential (GWP100)	2,961
	TOTAL	**4,312,788**

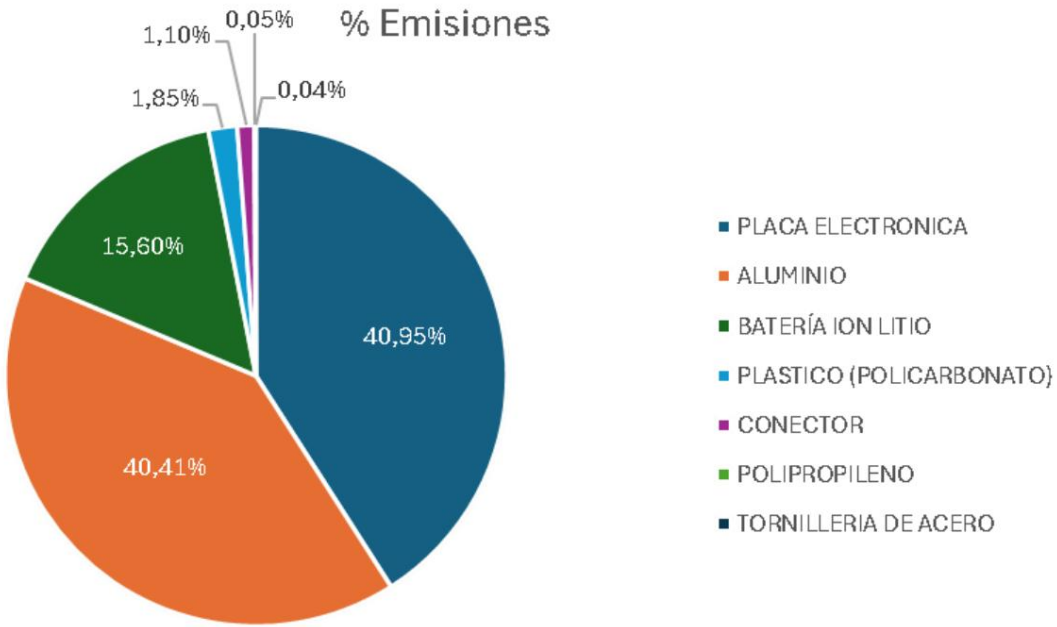
Table 32. Results in kg CO2eq of the Indoor Tracker 1x45. IPCC WGP 100, for the different carbon typologies, including carbon from CFs gases.



TRACKER CONTROL BOX FULL WIRELESS MKIV

CONTRIBUTION (%)	CATEGORY	EMISSIONS (Kg CO2eq)
40.95%	ELECTRONIC BOARD	40,342
40.41%	ALUMINUM	39,803
15.60%	LITHIUM ION BATTERY	15,369
1.85%	PLASTIC (POLYCARBONATE)	1,820
1.10%	CONNECTOR	1,080
0.05%	POLYPROPYLENE	0.047
0.04%	STEEL SCREWS	0.044
TOTAL		**98,505**

Table 33. Results in kg of CO2eq of the Tracker Control Box Full Wireless MKIV.



RESULTS BY COMPONENTS

DENOMINATION	EMISSIONS (Kg CO2eq)	%
HDG STEEL PRODUCTS	18566,67867	90.20%
MARITIME TRANSPORT	891,55246	4.33%
POLYAMIDE	469,17926	2.28%
SHOCK ABSORBER	379,90852	1.85%
LAND TRANSPORT	268,86421	1.31%
ALUMINUM	2,92347	0.01%
POLYPROPYLENE	2,87994	0.01%
ENGINE	2,06559	0.01%
STAINLESS STEEL COMPONENTS	0.43124	0.00%
STEEL COMPONENTS	0.05972	0.00%
REDUCER	0.02562	0.00%

Table 34. Results in kg of CO2eq of all components that make up SF1.

RESULTS BY PRODUCT WEIGHT

ITEMS	WEIGHT OF EACH TRACKER (KG)	TOTAL WEIGHT (KG)	EMISSIONS IN KG CO2 EQ	CO2 EMISSIONS IN KG PER KG OF PRODUCT
SF1-OUTDOOR 1X45	2210.33	9307.92	20584,57	2.21
SF1-OUTDOOR 1X30	1569.29			
SF1-EXTERIOR 1ROW 1X45	1731.66			
SF1-INTERIOR EDGE 1X45	1921,29			
SF1-INTERIOR 1X45	1875.35			

Table 35. Results in kg of CO2eq per kg of product.

2.21 kg of CO2 per kg of product

CARBON FOOTPRINT CALCULATION OF THE ISLAND PROJECT

TRACKER DESCRIPTION	NUMBER OF TRACKER	CLIMATE CHANGE (WGP 100, IPCC) (KG CO2 EQ)
SF1-OUTDOOR 1X45	18	90553,446
SF1-OUTDOOR 1X30	7	24464,066
SF1-EXTERIOR 1ROW 1X45	2	7122,903
SF1-INTERIOR EDGE 1X45	36	156618,366
SF1-INTERIOR 1X45	23	95380,850
TOTAL		**374139,631**

Table 36. Results in kg of CO2eq of the La Isla Project.

CONCLUSIONS

1. Emissions from the SF1 Solar Tracker product amount to 20,584 tons of CO2 equivalent.
2. The emissions of the Tracker Control Box Full Wireless MKIV amount to 0.985 Tn of CO2 equivalent.
3. The element or component that produces the most global emissions of Greenhouse Gases is the manufacturing of products HDG steel that makes up each of the trackers, with proportions ranging from 89.98% in the Exterior Tracker or External 1x45, up to 94.24% on the 1x45 Indoor Tracker.
4. Maritime transport is the second largest contributor to greenhouse gas emissions, as the 50% of the steel products, as well as the motor and the gearbox, come from China.
5. Fossil carbon is the type of carbon that contributes most to the Climate Change environmental indicator, being above 99% on all trackers.

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In Murcia, September 23, 2024

ANNEX I

CATEGORY	SOURCE EMISSION FACTOR
HDG STEEL PRODUCTS	**Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/ad88f8b1-f275-4d51-9ee5- 31ebd455ab88/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce**
MARITIME TRANSPORT	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/ec70772e-f23c-4b39-94b3- 94754f4ad9bb/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
POLYAMIDE	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/afd80ee7-0038-415d-b8d9- 736b3288c2a2/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
SHOCK ABSORBER	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/3b94d9bf-56fd-4e55-8648-d3347bd5b3b2/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
LAND TRANSPORT	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/84053d32-6ada-4e03-9831- 0a77ab6b88b8/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
ALUMINUM	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/b68b5fe5-511e-4a31-b4e2-a9908f086413/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
POLYPROPYLENE	https://v391.ecoquery.ecoinvent.org/Details/UPR/4652be7d-a144-4a7b-b35d-942ffa489c45/290c1f85-4cc4- 4fa1-b0c8-2cb7f4276dce
ENGINE	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/cdda0f1f-a321-4d15-a7fe-4057eeeb9664/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
STAINLESS STEEL COMPONENTS	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/56b1b7e3-81a1-40f4-8bc7- 1f98844bceec/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
STEEL COMPONENTS	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/3b94d9bf-56fd-4e55-8648-d3347bd5b3b2/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
REDUCER	Dataset documentation: https://v391.ecoquery.ecoinvent.org/Details/UPR/5f27c353-efa0-405f-b82b-6f60a1df95b5/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce

Table 37. Source of extraction of the emission factors.