STARBOARD
INNOVATION QUALITY

2021 CARBON FOOTPRINT REPORT

INCLUDING RAW MATERIALS, PRODUCTION, TRAVEL
& STARBOARD HQ EMISSIONS

SUMMARY

In this report, we disclose Starboard's carbon footprint for the fiscal year 2021 (June 2020 – May 2019). The purpose of this report is to highlight and be completely transparent about Starboard's CO2 emissions and role as a polluter. Measuring our environmental impact is the first step towards identifying areas for improvement and implementing positive change.

At Starboard, we began calculating our Carbon Footprint in the 2017 Fiscal year. Since then, we have continuously improved our calculation process to create the most accurate picture of our environmental impact.

This report includes Starboard's Carbon Emissions associated with production, travel and energy use at Starboard HQ. All calculations used and presented in the report have been verified as correct by Carbon Footprint TM.

For each tonne of carbon dioxide released by Starboard's activities, 10 mangroves are planted. Each absorbing, on average, 1 tonne of CO2 over the first 20 years of their life. Resulting in making Starboard not just climate neutral but 10 x climate positive.

Starboard's total carbon footprint for 2021 is **4831 Tonnes CO2e**, An 82% increase in emissions from 2020 which can be mostly attributed to 3 main factors:

- **Higher overall production quantities.**
- **Increases in calculation scope** to include emissions from over 20,000 IQFoil products made by our sister company Severne.
- **Improvements in calculation accuracy,** particularly in energy estimations and travel calculations.

We will also break down the causes of our emissions, identify key learnings from the year and elaborate on Starboard's efforts to lead the way to a climate positive future.

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INTRO

"Starboard's mission is not only to make the best boards in the world, but also the best boards for the world "

Starboard is a world-leading water sports company that specializes in designing and manufacturing equipment, accessories and apparel for Windsurfing, Stand Up Paddleboarding (SUP) and Foiling.

Starboard Blue is at the heart of our company and hopes to lead and inspire environmental change and to protect the big blue playground that we share.

VERIFICATION

Carbon Footprint TM has verified this report. To ensure it shows an accurate representation of Starboard's carbon footprint. The results shown assure a limited level of assurance (as defined by ISO 14064-3). The Starboard products examined in this report were reviewed across several product lines that comply with GHG Protocol Product Life Cycle Accounting and Reporting Standard.

Carbon Footprint TM have reviewed the following areas:

- Scope of calculation/boundary
- Input datasets and assumptions
- Emissions factors used
- Calculation methodology
- Carbon Emission Calculations
- Results

PURPOSE

The purpose of this report is to disclose Starboard's carbon footprint for the fiscal year 2021 (June 2020 – May 2021). This third-party verification has certified Starboard under the Carbon Footprint Standard. This report is public to be completely transparent about Starboard's emissions and role as an industry polluter.

SCOPE

Our carbon footprint calculations include emissions from all 3 scopes.

Within the field of carbon footprinting, greenhouse gas emissions are categorised into 3 scopes; scope 1 covers direct emissions (e.g. combustion engines or gas stoves). Scope 2 covers indirect emissions (e.g. from purchased electricity). Scope 3 includes all other indirect emissions that occur in a company's value chain.

Scope 1
Company Car emissions

Scope 2
Electricity use at Starboard HQ

Scope 3
Raw Materials, Production, Business Travel, Employee Commutes

Furthermore, we will examine the amount of Starboard's total emitted CO2 versus CO2 absorbed through our Carbon Offset Program. This will show Starboard's overall progression towards a climate positive future.

PRODUCTION

METHODOLOGY

Emissions of each product are analysed using a Cradle to Gate assessment. This method includes calculating the carbon emissions from the following:

1. Raw materials & packaging
2. Energy Use
3. Raw material transportation & product distribution

The methodology for this report does not include the product use and the final disposal of the product.

RAW MATERIALS

Calculating the footprint of a product's Raw Materials involves breaking it down into its material components and using the following equation to calculate the embodied emissions of individual components:

Embodied emissions of component (kg CO2) **=**

Emissions Factor (kg CO2 per kg material) **X** **Mass** (kg)

The embodied emissions from all components are then added together along with an additional percentage to account for wasted materials (10-20% depending on the product category), providing the final raw material footprint.

This same formula is used to calculate the carbon emissions of product packaging.

ENERGY USE

Carbon Footprint UK has recommended Starboard to, **"Select the most appropriate method by which to allocate emissions to product assembly."**

For this report, the manufacturing emissions relate to energy use within the production facilities. An estimation for energy use per board is calculated by dividing the average KWH used per month by the average quantity of boards produced.

Energy emissions per board (kg CO2) **=**

Avg. Monthly Energy use (kwh) **÷** **Avg. monthly board production**

We then multiply the kWh per board by the local emission factor for energy where the factory is based. In this case, Thailand.

For all other products, we assumed energy use was proportionate to the weight of the item compared to an average SUP board.

TRANSPORTATION

For this report, the emissions for raw material transportation (before production) and distribution (post-production) are both taken into account.

Emissions for both activities are calculated using the same formula:

Transport emissions (kg CO2) **=** **Mass** (kg) **X**

Emission Factor for transport mode (kg CO2 per km) **X** **Distance** (km)

For distribution, the mass of the material includes the packaging materials; distance is based on the average kilometres from the factory to global distributors, and the transportation mode is a cargo ship.

For raw material transportation, the calculations take into consideration the distance from the supplier of the raw material to the factory of manufacture. Transportation mode varies between materials and this is accounted for.

METHODOLOGY CHANGES

2020 - 2021

Starboard have been calculating their Carbon Footprint every year since 2017. Just as we focus on improving our products year on year, we also work to improve our carbon footprint calculations by aligning with the most up to date science and broadening our scope. Ensuring we create the most accurate representation of our environmental impact every year.

Here are some of the improvements and adjustments that we made between 2020 and 2021:

Broadened scope of our board production calculations to include the Raw Material Transportation Emissions.

The raw material transportation emissions refer to the CO2 released when the raw materials are shipped to our supplier factories before production. This increased the carbon footprint of our boards by around 2% compared to the 2020 numbers.

Streamlined our estimations for energy emissions across all products.

For the past 3 years, we have used a very basic energy estimation for all products other than composite SUP and Windsurf boards. This year, to make our calculations more consistent and more accurate, we have assumed that energy use was proportionate to the weight of the item compared to an average SUP board.

Altering this estimation has increased the footprints associated with some items, such as board bags, but has decreased the footprint of others such as apparel.

Accessory Inclusion

This year we have altered the calculations for some products by including the accessories they come within their footprint. For example, the inflatables calculations now include the emissions associated with the board bag, pump and bottle holder. SUP and windsurf boards include the emissions from their recommended fin.

SUP COMPOSITE

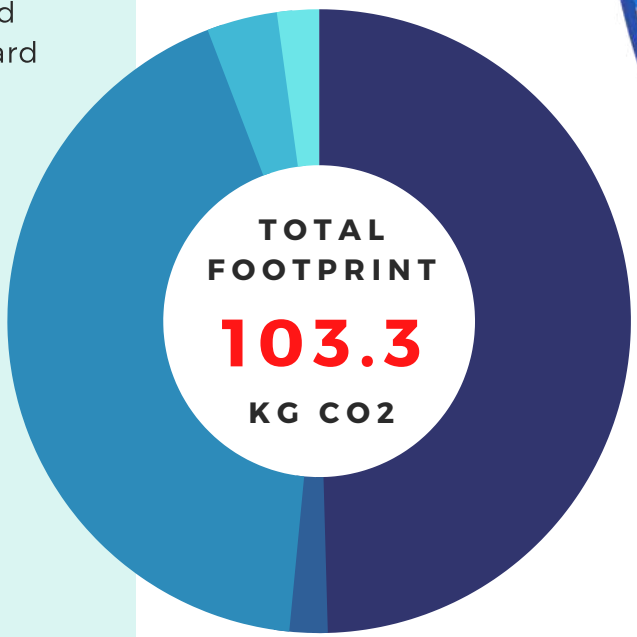
Board Model: Whopper
Technology: ASAP
Size: 10'0" x 34"

PRODUCTION

A composite SUP board generally refers to a Stand Up Paddleboard made with an EPS foam core that uses materials such as carbon fiber, expoxy resin and wood. You can view the SUP hardboard range here.

Overall the production of Composite SUP boards is responsible for between 94kg and 121kg of CO2 per board. This varies depending on the size, model and technology used in the board.

The following graph shows the carbon footprint breakdown for one of Starboard's most popular board models, the Whopper.



106.7 KG CO2

Is the average amount released by a Starboard Composite SUP board. From the extraction of the raw materials to the boards arrival with our distributors all over the world.

749 TONNES CO2

Is the total amount released by the production of all Starboard Composite SUP boards'.

WINDSURF

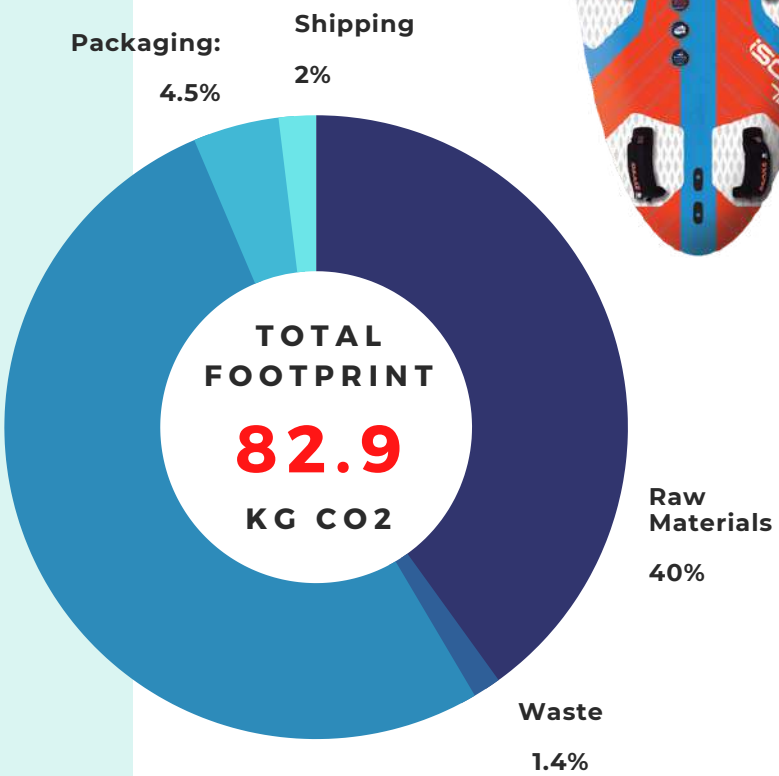
Board Model: iSonic
Technology: Carbon Reflex Sandwich
Size: 72

PRODUCTION

The Windsurf board category encompasses boards across all disciplines, from smaller wave boards to larger race and foil boards. The WindSUP range is included within the inflatables calculations.

Mainly, due to their smaller average size, windsurf boards have less associated emissions than SUP boards, averaging between 81kg and 108kg per board.

The following graph shows the carbon footprint breakdown for one of Starboard's more popular board models, the iSonic.



93.3 KG CO2

Is the average amount released by a Starboard Windsurf board. From the extraction of the raw materials to the boards' arrival with our distributors all over the world.

729 TONNES CO2

Is the total amount released by the production of all Starboard Composite Windsurf boards'.

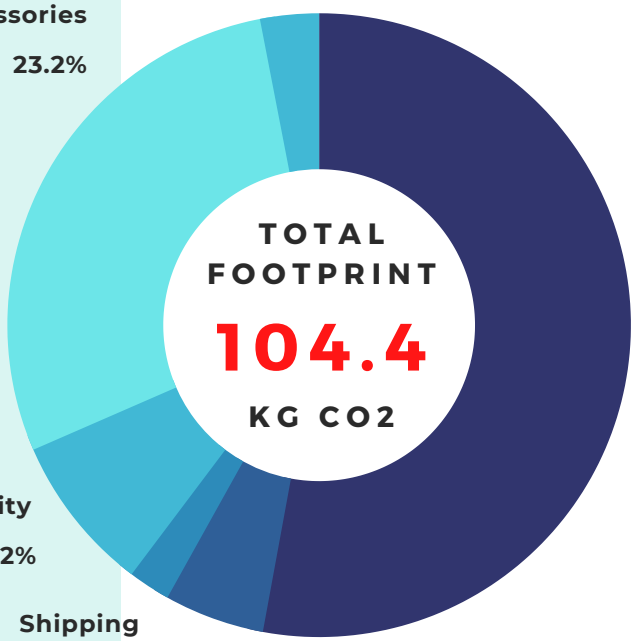
INFLATABLES

PRODUCTION

Starboard SUP Inflatables and WindSUP's have a similar carbon footprint on average to the composite boards, emitting around 70kg of CO2 each. Although this varies between models and technologies, However, overall the inflatable's carbon footprints come up higher as every inflatable we sell also includes with it several accessories. These accessories have, on average, 30kg of associated emissions, making the total carbon footprint of an inflatable board 'package' between 90kg and 130kg of CO2.

The following graph shows the emissions from the iGO SUP and accessories (pump, fins, bottle holder & board bag)

Board Model: iGO
Technology: Deluxe Single Chamber
Size: 10'8" x 33"



112 KG CO2

Is the average amount released by a Starboard inflatables package, including board, fins, pump, board bag and, for our touring boards', a magnetic bottle holder.

1905 TONNES CO2

Is the total amount released by the production of all Starboard Inflatable SUP and WindSUP boards' including standard accessories.

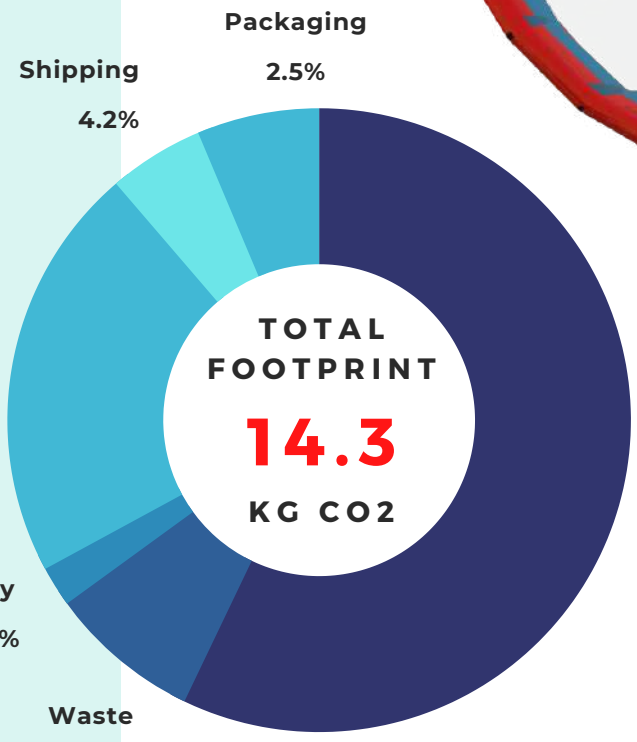
FREEWING

Model: V2
Size: 4sqm

PRODUCTION

2021 saw the launch of Starboard's very first Freewing range, in collaboration with Airush.

The lighter weight and simpler production process (primarily stitching) means that the total footprint for a Wing, averaging 14.5kg of CO2 is a lot smaller than that of a composite or inflatable board. You will notice that the raw materials make up the bulk of these emissions as the Wing is made primarily from polyester. A plastic based material made from crude oil which has a high emission factor,



14.3 KG CO2

Is the average amount released a Starboard X Airush Freewing. From the extraction of the raw materials to the boards' arrival with our distributors all over the world.

89 TONNES CO2

Is the total amount released by the production of all Starboard X Airush Freewings.

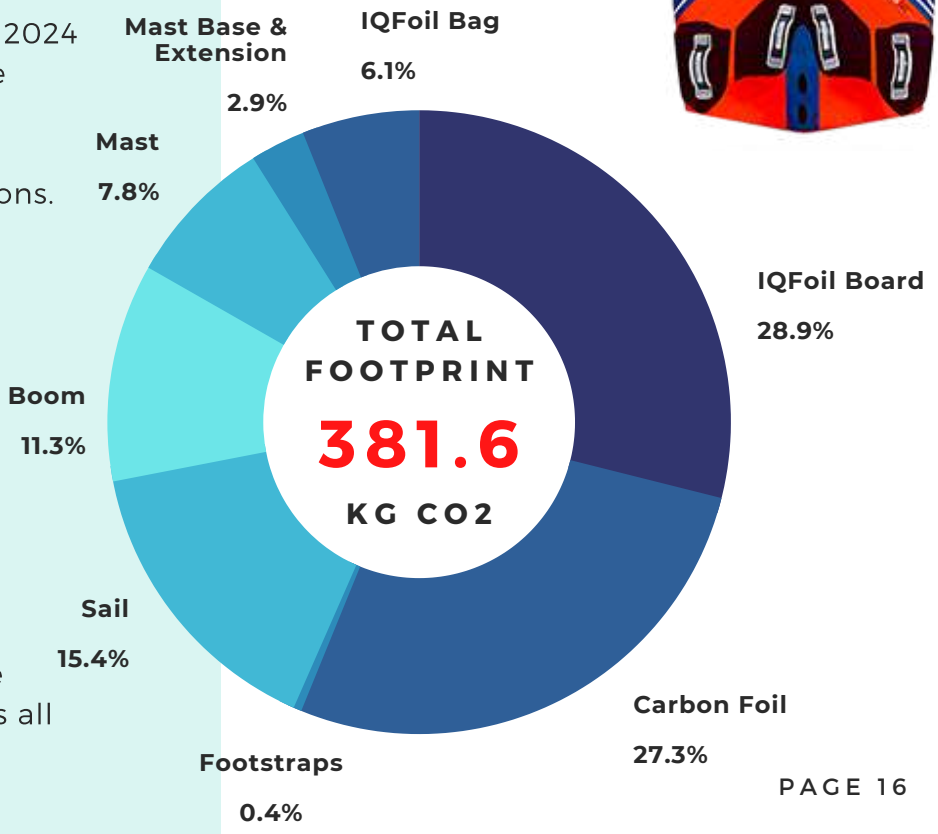
IQFOIL

PRODUCTION

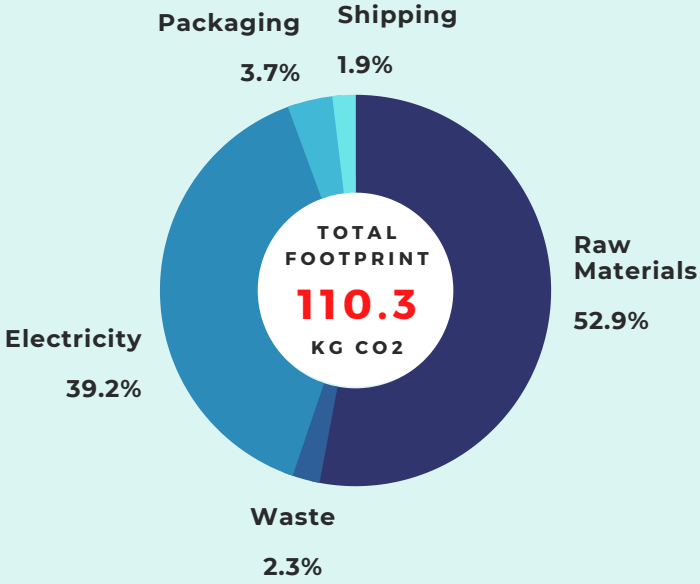
The IQFoil set up is the official windsurfing equipment of the 2024 Olympic games. Starboard are responsible for the production of the IQFoil Board, which was included in our 2020 calculations. However this year we have expanded our scope and are including emissions from the equipment produced by our sister brands Severne and FoilSport.

The IQFoil equipment is standardised until 2028 and therefore won't change.

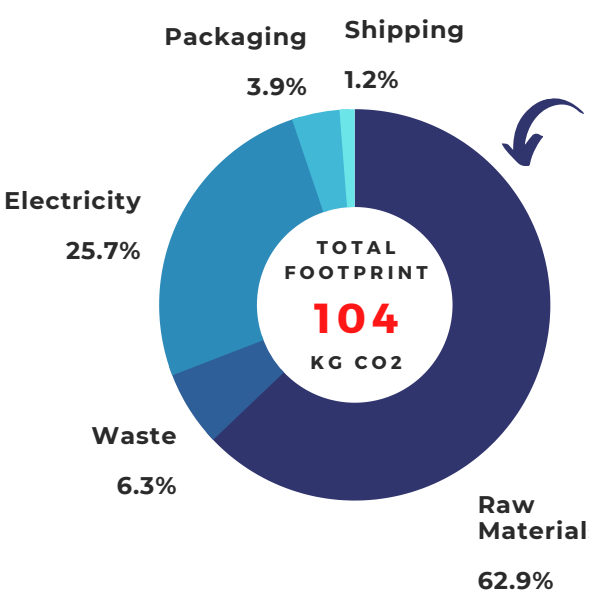
The following graph shows the breakdown of emissions across all items of the IQFoil set up.



IQFOIL 95

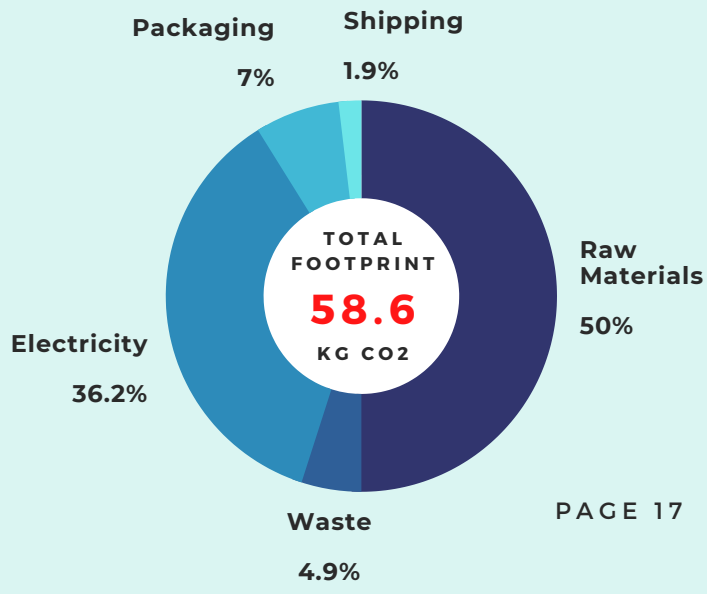


IQFIL CARBON FOIL

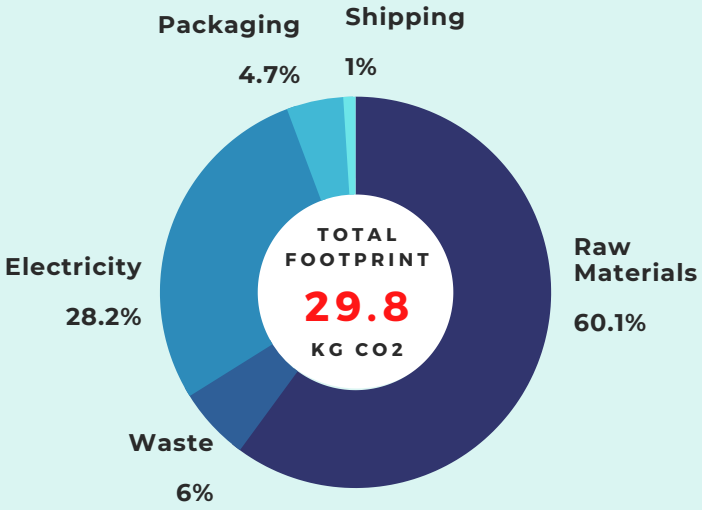


Note: *Raw material emissions make up the majority of the IQFOIL's footprint because the production of Carbon Fiber releases high levels of CO2. However this doesn't mean carbon fiber is all bad - it is incredibly durable, meaning our foils last for longer!*

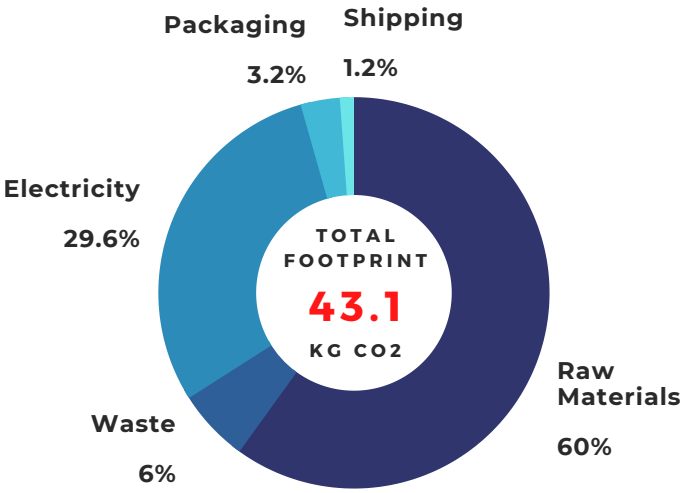
HYPER GLIDE OLYMPIC 9



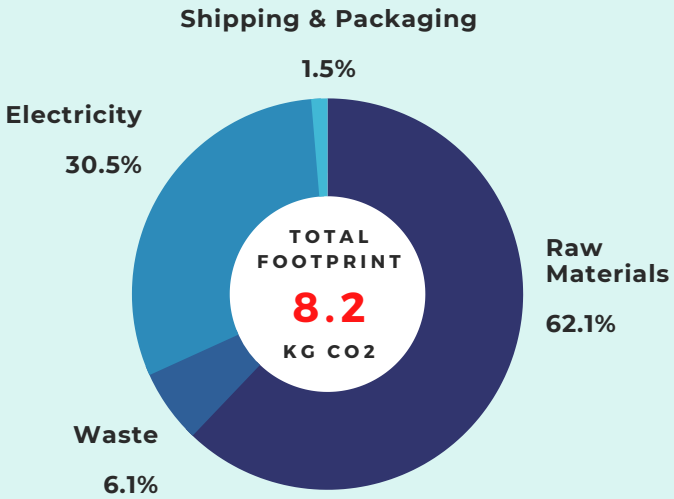
SEVERNE APEX MAST 530



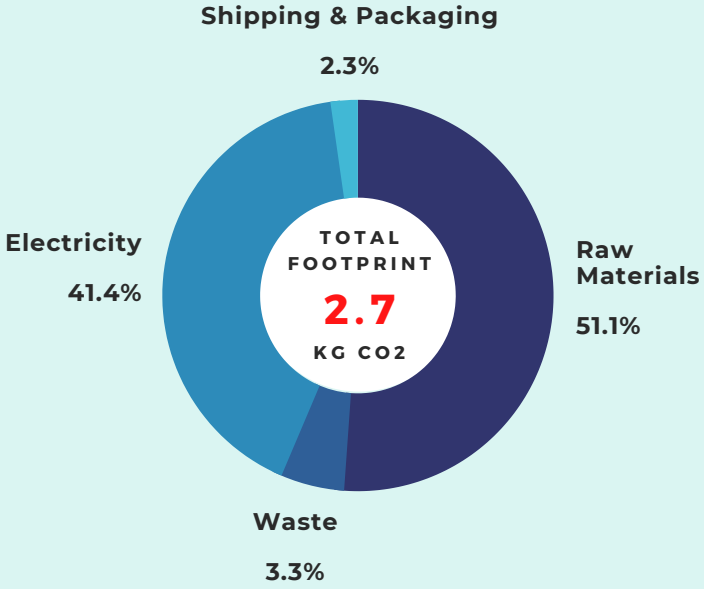
SEVERNE ENIGMA BOOM



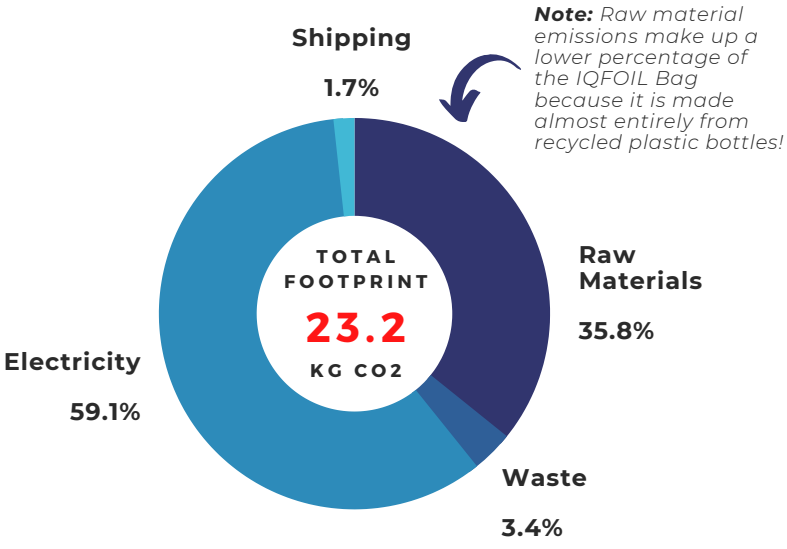
SEVERNE HD EXTENSION



SEVERNE EUROPIN BASE

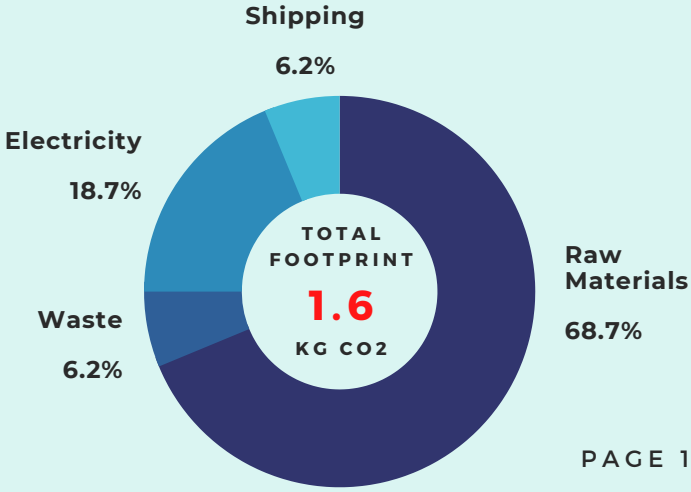


IQFOIL BAG



Note: *Raw material emissions make up a lower percentage of the IQFOIL Bag because it is made almost entirely from recycled plastic bottles!*

6 DRAKE FOOTSTRAPS



381.6 KG CO2

Is the approximate amount released during the production and distribution of a full IQFoil Men's Olympic equipment package. The womens set is slightly lower at 376.3kg CO2 due to the smaller sail and mast size.

749 TONNES CO2

Is the total amount released by the production of all Starboard and Severne IQFoil Equipment.

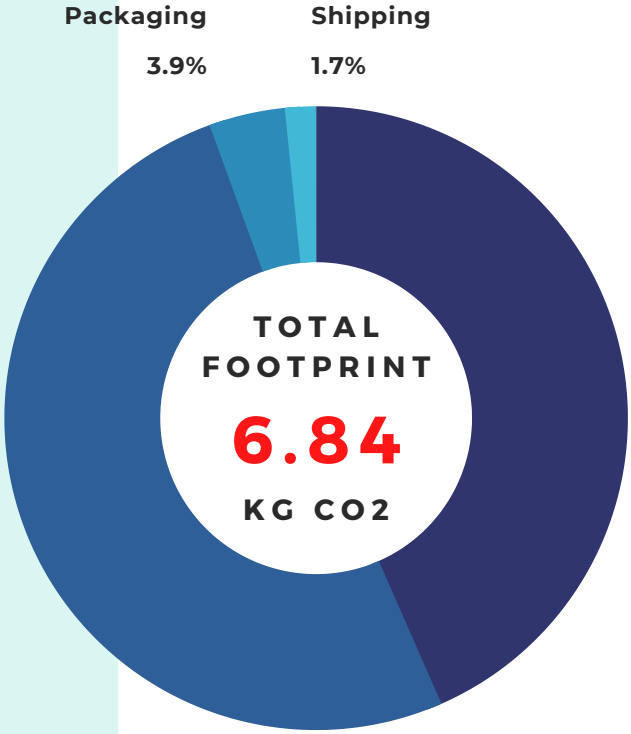
PADDLES

Paddle Model: Enduro
Technology: Balsa
Size: Medium, 29mm S40

OVERVIEW

We have a huge variety of paddles at Starboard, each made up of different combinations of blades, shafts and handles. Each of these combinations has a different associated carbon footprint due to their differing materials and features. However on average they are each responsible for the release of between 6kg and 9kg of CO2.

The following graph shows the breakdown of emissions across for the Enduro Balsa paddle. Our most environmentally friendly paddle construction.



7.63 KG CO2

Is the average amount released by a Starboard Paddle. From the extraction of the raw materials to each paddles arrival with our international distributors.

157 TONNES CO2

Is the total amount released during the production and distribution of all Starboard's paddles.

ACCESSORIES

OVERVIEW

Starboard produces a wide range of accessories across all product ranges. These include fins for Windsurf and SUP; pumps for inflatable boards and wings; foot straps for windsurf and wing boards; and an array board and paddle bags. Individually these accessories have a far smaller footprint than that of a composite or inflatable board. However when large quantities are produced this still adds up to a significant amount of emissions.

The following graph shows the carbon footprint breakdowns for some of our most popular accessories in each category:

- 650ml Stainless Steel Bottle
- SUP Dol-Fin 22 Net Positive
- SUP Day Bag
- Tiki Pump
- Drake Yulex Footstrap

8.31 KG CO2

Is the average amount released by a single product within Starboard's range of accessories. From pumps to board bags and fins to footstraps.

120 TONNES CO2

Is the total amount released during the production and distribution of all Starboard's accessories.

APPAREL

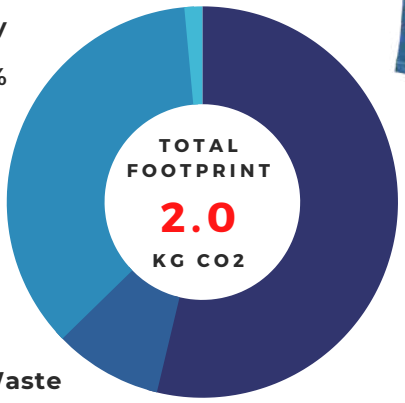
OVERVIEW

Apparel is the smallest product department at Starboard, but it is still important to measure, offset and reduce the emissions from these products.

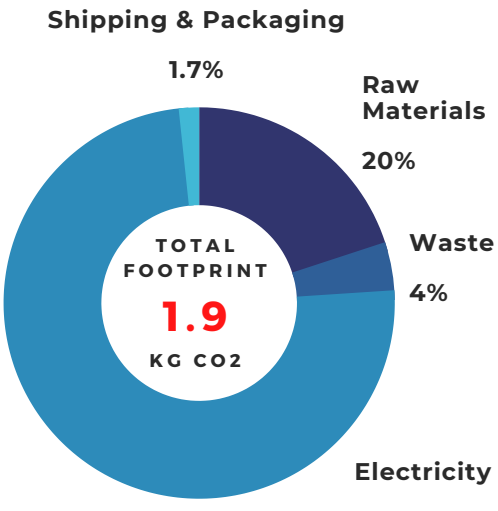
As with all products, the associated emissions per garment vary dependent on size and type of material. However, on average a garment will release between 0.5kg and 4.5kg of CO2 during its production and distribution.

One big way in which products emissions differ is due to the material used. The following graphs show the emission breakdowns for our Men's polyester watershirt vs organic cotton hoodie.

Style : Watershirt
Material: Polyester



Style : Jacket
Material: Organic Cotton

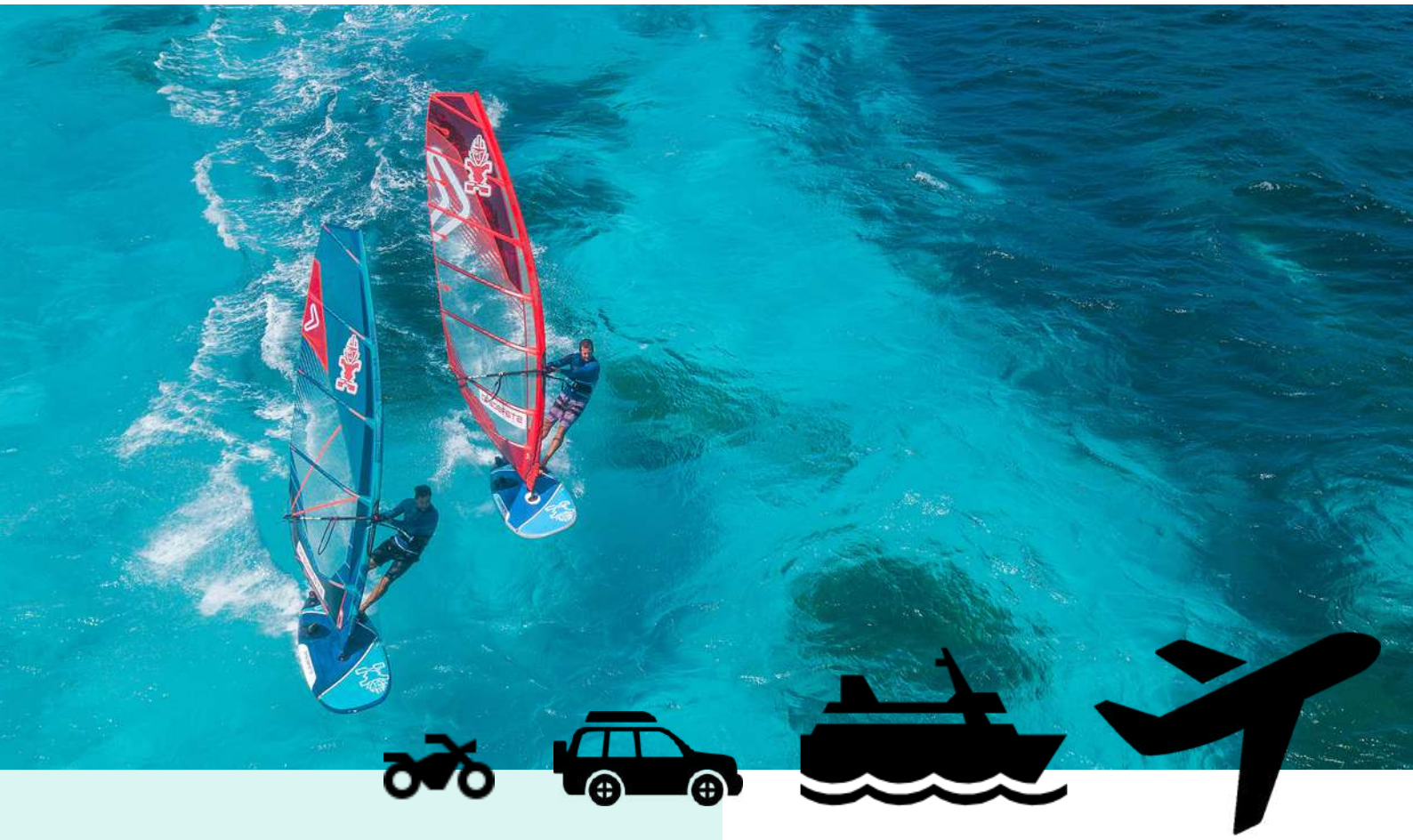


1.52 KG CO2

Is the average amount released by a single garment within Starboard's range of apparel. From the extraction and farming of the raw materials to its international distribution as a final product.

12.2 TONNES CO2

Is the total amount released during the production and distribution of all Starboard's apparel.



TRAVEL

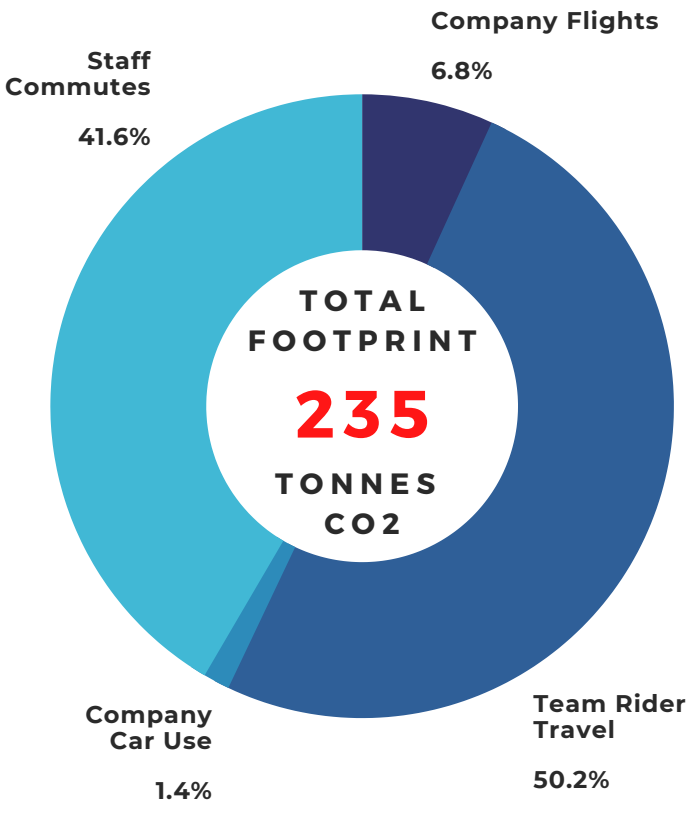
METHODOLOGY

To calculate the CO2 impact of Starboard's company travel we identified 3 main sources of emissions:

1. Flights & Ferries
2. HQ Commute
3. Company Car Use

We gathered data on the business journeys taken by Starboard staff and team riders either by plane, ferry, personal or company car. Then calculated the emissions using the free Carbon Footprint UK emission calculator.

The following graph shows the emission breakdown of Starboard's company travel.



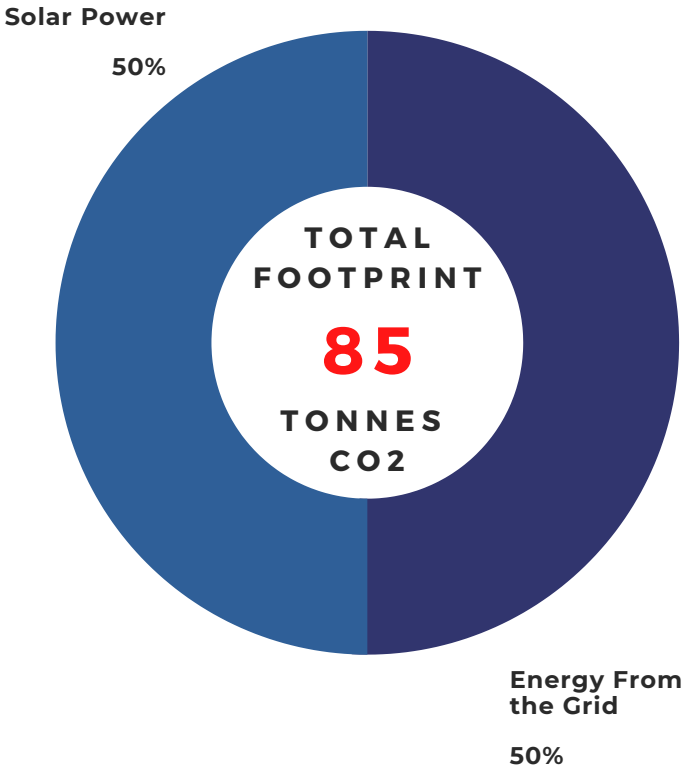
ENERGY

METHODOLOGY

The energy use at Starboard HQ is comprised of 50% Solar power and 50% Energy from the grid, as shown in the graph to the right. The solar power comes directly from a series of solar panels that are located on the roof of the Starboard offices and workshop.

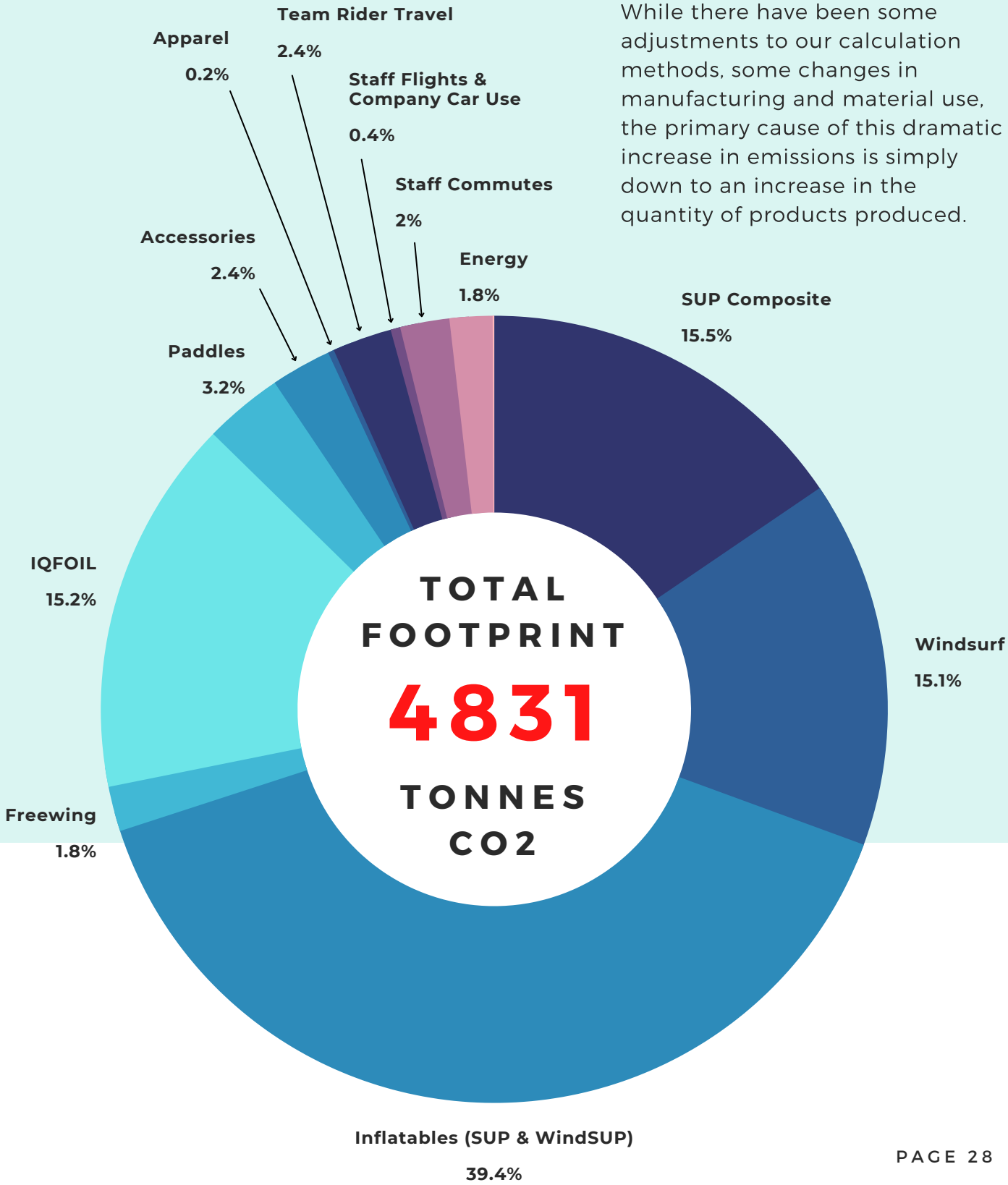
The energy emissions are calculated by multiplying the monthly kWh used from the grid by the energy emission factor for Thailand (The location of Starboard). As solar power is 100% renewable and has no associated emissions, it isn't included in the calculations. However, we have made a note of it because it has reduced our emissions by 85 tonnes of CO2 in 2021.

We will not stop here! In 2022 we have already installed enough solar panels to cover 100% of our electricity use during daylight hours. On most days we are even able to export some of that energy back to the Thai grid.



CARBON FOOTPRINT SUMMARY

Starboard's total carbon footprint for 2021 is **4831 tonnes CO2** - an 82% increase on our 2020 total of 2642 tonnes CO2. While travel emissions decreased by 50% this year and energy emissions stayed almost the same, production emissions more than doubled.



While there have been some adjustments to our calculation methods, some changes in manufacturing and material use, the primary cause of this dramatic increase in emissions is simply down to an increase in the quantity of products produced.

CARBON SEQUESTRATION

NATURE'S SOLUTIONS

Regardless of total emissions at the end of the year, Starboard always takes responsibility for their impact. We do so by planting mangrove trees in Myanmar in collaboration with Worldview International Foundation. Mangrove trees are amazing blue carbon solutions. They sequester approximately 1 ton of CO2 within the first 20 years of their life.

To reduce our impact as much as possible, we plant 1 mangrove tree per composite board, inflatable board and Freewing produced. For every iQFoil board, 10 mangroves are planted.

For any team rider who emits less than 1 ton of CO2 during the year, 10 mangroves are planted, as a 'thank you" for keeping emissions down.

Finally, we plant a mangrove tree for every 100kg of CO2 emitted via the production of accessories, paddles and apparel. CO2 emitted through travel and energy use is also included.

This adds up to a huge 73,530 mangrove trees planted, absorbing Starboard's 2021 emissions more than 10 times over.

TOTAL SEQUESTERED

73,530

TONNES CO2

TOTAL FOOTPRINT

4,831

TONNES CO2

WORLDVIEW

WHY MANGROVES?

Mangrove forests are classified as Blue Carbon Ecosystems, which many scientists consider the most efficient environments for storing carbon.

Plants in the Blue Carbon category are known to grow in more densely populated numbers than a typical forest. When it comes to carbon dioxide, they are highly productive at drawing it down and trapping sediment between the plants to create the ground store, which is where CO2 is sunk.

Blue Carbon ecosystems only cover 2% of the world, but they account for approximately 50% of carbon stores on the planet.

But Carbon Sequestration is just one of the many ways in which mangroves are so important to the health of our planet. Mangrove forests also:

- Enhance biodiversity by providing nesting, breeding and nursery habitats for fish, shellfish, birds and sea turtles.
- Improving local livelihoods by increasing fish stocks and creating new jobs as tree planters and guardians.
- Maintain water quality by trapping sediments and pollutants with their roots, protecting more fragile ecosystems such as seagrass meadows and coral reefs nearby,
- Protect coastal areas from soil erosion and shelters the local community from the impacts of tsunamis and tropical storms.

At Starboard, we plant mangroves in partnership with Worldview International Foundation (WIF) in Myanmar. WIF plants in areas where mangroves once thrived. The mangroves may have previously been destroyed for shrimp or salt farming or to be turned into coal.

Once planted, WIF's mangroves have a 96% survival rate. This is due to their in-depth knowledge of optimal planting areas and their incredible livelihood projects, which helps engage and employ the local communities as guardians of the forests.

CONCLUSION

In 2021 we have seen a large increase in our carbon footprint versus previous years. There are several key reasons for this:

IMPROVEMENTS IN ENERGY EMISSION CALCULATION ACROSS PRODUCTS.

While this increases our footprint, it also allows us to more accurately offset our emissions. in addition, it highlights energy use in manufacturing as a key area for us to focus on reducing in coming years. In fact as a result we are now working closer than ever with our suppliers to support them in making the switch to solar and other sources of renewable power.

INCLUSION OF RAW MATERIAL TRANSPORTATION EMISSIONS

At the end of last year's report, we stated our intentions to increase the scope of our calculations to include the raw material transportation emissions. We have successfully implemented this into our 2021 calculations. While this increases the total emissions we are accounting for, it also also allows us to take more responsibility for our impact.

INCREASES IN PRODUCTION

Increasing production quantities is the key reason for the 2021 emissions being so much higher than in 2020.

While increasing production is good for business, it also highlights that even the smallest eco improvements to a product can hugely reduce emissions when that product is made in large quantities.

IQFOIL SCOPE EXPANSION

This year to give a more comprehensive overview of our impact we have increased our IQFoil calculation scope to include products made by our sister companies Severne & Foilsport. Our 2020 calculations only included the production emissions from the IQFoil board, produced by Starboard. In 2021 we have included the emissions from additional 22,000 products including sails and foils.

SCIENCE BASED TARGETS

One of the primary reasons we calculate our Carbon Footprint is to help us identify where we can reduce our emissions and lessen our impact on the environment. In order to remain accountable to this goal Starboard have registered with the Science Based Targets Initiative to develop targets to reduce emissions in line with the '1.5 scenario' of planetary temperature increase.

Targets in line with the '1.5 scenario' are designed to reduce emissions in order to keep global temperature increase below 1.5 degrees. Therefore preventing many of the worst consequences of climate change.

Starboard have developed 2 reduction targets that we aim to hit by 2030. The first is an absolute target for reducing our Scope 1 and 2 emissions (our direct emissions); and the second is a relative target - to reduce our Scope 3 emissions per kg of product we produce. Below are our current emissions per scope:

Below are our current emissions per scope:

SCOPE 1: 3.2 Tonnes CO2
SCOPE 2: 85 Tonnes CO2
SCOPE 3: 4742.1 Tonnes CO2

SCOPE 1 & 2 TARGETS

Following the methodology set out by the Science Based Targets initiative we aim to reduce our scope 1 & 2 emissions by 90% from 88.2 to 8.8 tonnes CO2.

This is an absolute reduction to help limit the planets warming by 1.5oC.

SCOPE 3 TARGETS

At Starboard our scope 3 emissions heavily influenced by the amount of market share we hold and the quantity of products we manufacture.

Because of this we wanted to create a target that is achievable regardless of variation in sales performance - an intensity target. We aim to reduce our CO2 emissions per tonne of product produced by 42% from 9.8 to 5.7 Tonnes CO2 by 2030. This is our reduction target to help limit the planets warming by 1.5oC.

APPENDIX 1

CARBON FOOTPRINT VERIFICATION: BUSINESS OPERATIONS

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11 February 2022

Carbon Footprint Verification for Starboard Corporation

Dear Lizzy,

I am delighted to present the results of your successful carbon footprint verification. Carbon Footprint Ltd has reviewed the methodology used, and the sources of your energy, mileage and flight data for the calculation of Starboard Corporation's emissions footprint. The emissions associated with the manufacture, distribution and raw material use in Starboard Corporations products have been verified in a separate assessment completed by Carbon Footprint Ltd.

Starboard Corporation is a world leading water sports company specialising in the design and manufacture of cutting-edge windsurfing, surfing, and paddle boarding equipment and associated apparel. The majority of the organisational emissions footprint results from air travel as many of the Team Rider employees travel around the world to compete for the Starboard brand.

How was the carbon footprint calculated?

Starboard Corporation has used the online carbon calculator on www.carbonfootprint.com to calculate the emissions associated with its site and travel emissions for the period 1st June 2020 to 31st May 2021. The calculation uses the 2021 metrics developed by the Department for Business, Energy & Industrial Strategy (BEIS) for reporting GHG emissions.

The carbon footprint assessment includes:

- Air travel
- Board workshop electricity
- Car mileage
- Employee commuting

Data Sources and Accuracy

Carbon Footprint Ltd has discussed the data sources with Starboard Corporation (see table below).

Element of Footprint	Data Source	Data Accuracy
Air Travel	Employee survey completed with all required information provided, including full flight routes and cabin class details. The calculations have included the effects of radiative forcing.	Excellent
Workshop Electricity	Utility bills with kWh electricity consumption. The bills have not been reviewed by Carbon Footprint Ltd.	Good
Car travel	Business travel emissions have been modelled on a 240km round trip each week to Pattaya City in two diesel cars.	Estimated
Employee commuting	Employee survey completed with mode of transport and distance travelled provided. Specific vehicle details were not requested so the average car and unknown fuel factor was used for car commutes.	Good

Results

Your total carbon footprint for the period 1st June 2020 to 31st May 2021 is 322.83 tonnes of CO_2e. A breakdown of the results is shown in the table below with a comparison to the assessed footprint for the previous reporting years. Emissions this year have reduced significantly (-46%) due the decrease in air travel use as a result of Covid-19 travel restrictions. There are no catalogue emissions to report this year as Starboard now issues electronic copies.

Scope	Element of Footprint	Tonnes of CO_2e (2018/19)	Tonnes of CO_2e (2019/20)	Tonnes of CO_2e (2020/21)
Scope 1	Car Travel	3.67	5.62	3.22
Scope 2 & 3	Electricity generation (including transmission & distribution)	75.50	79.37	85.16
Scope 3	Air Travel	843.87	445.25	146.35
Scope 3	Employee commuting	49.1	49.10	88.10
Scope 3	Catalogues	15.68	15.13	-
Total emissions (tCO_2e)		**987.82**	**594.47**	**322.83**
Emissions per employee (tCO_2e)		**14.11**	**8.50**	**4.61**

carbon footprint

Conclusions

Starboard Corporation has successfully calculated its carbon footprint for the period 1st June 2020 to 31st May 2021, and so I have provided a 12-month license to use the 'Carbon Footprint – CO_2e Assessed Organisation' logo in Starboard Corporation's marketing materials.

Yours Sincerely

Stuart Fowler (BSc)
Senior Environmental Consultant
Carbon Footprint Ltd

carbon footprint standard
CO_2e Assessed Organisation

APPENDIX 2

CARBON FOOTPRINT VERIFICATION: STARBOARD PRODUCTS

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Quality Control

Report issue number:	1.0
Date:	18 February 2022

Verification summary

Verifier(s):	Stuart Fowler, Senior Environmental Consultant, Carbon Footprint Ltd
Report reviewed by:	Myles Howard, Senior Environmental Consultant, Carbon Footprint Ltd
Authorised by:	Dr Wendy Buckley, Director, Carbon Footprint Ltd
Level of assurance:	Limited
Assurance being given to:	Starboard World Ltd
Methodology used for the calculation:	GHG Protocol Product Life Cycle Accounting and Reporting Standard

1 Introduction

1.1. Scope of this report

As part of their wider sustainability programme, Starboard Corporation Ltd (henceforth referred to as Starboard) has assessed the product carbon footprints associated with its seven product ranges including; paddleboards, surfboards, apparel and accessories ranges. All calculations have been prepared in accordance with the Greenhouse Gas (GHG) Protocol's Product Life Cycle Accounting and Reporting Standard.

Starboard contracted Carbon Footprint Ltd to provide third-party verification, to a limited level of assurance, to verify that the boundaries, input datasets and calculations are reliable and accurate. Carbon Footprint Ltd conducted the auditing activities via an online teleconference with a representative of Starboard's Environmental Team, on the 12th and 26th January 2022.

1.2. Objectives

The objectives of the assessment were to:

- Provide assurance to Starboard that the GHG assertion is reliable and of sufficient quality.
- Provide recommendations on how Starboard can improve their product lifecycle calculations for future assessments.

1.3. Starboard Overview

Starboard is a World leading water sports company speciailising in the design and manufacture of windsurfing, surfing, and paddleboarding equipment and associated apparel.

1.4. Abbreviations

CO_2e	Carbon Dioxide Equivalent
EPA	Environmental Protection Agency (United States)
GHG	Greenhouse Gas
IEA	International Energy Association
ISO	International Standards Organisation
LCA	Lifecycle Assessment
kg	Kilograms
km	Kilometres
kWh	Kilowatt Hours

2 Starboard's Calculations

Starboard has provided emissions calculations for the following product ranges;

- Windsup
- SUP Composite
- Accessories
- Apparel
- Inflatables
- Windsurf composite
- IQ Foil

Emissions have been stated in terms of carbon dioxide equivalent (CO_2e).

2.1. Calculation Scope

The GHG calculations completed by Starboard cover product emissions from "cradle to gate", as well as downstream distribution to the end user. The scope of the calculation is summarised in Table 1 below.

Starboard has been unable to obtain raw material locations from its assembler for the following products: accessories, IQ Foil and the Freewing, meaning that the transport of raw material emissions could not be accurately modelled. **I recommend that when this information is obtained, the calculations are updated to ensure that this element is included within scope.**

Table 1: Boundary of product lifecycle assessment

Scope	
Includes:	Excludes:
• Raw materials (inc. offcuts and packaging) • Transport of raw materials (where available) • Energy used in manufacturing • Distribution to customers	• End of life disposal • Product use (N/A)

Overall Comments on Assessment Scope	Pass/Fail
The scope of the assessment is considered wide enough to provide sufficiently accurate calculations of Starboard's products. The materials transport emissions are only missing for a small share of the assessed products. The calculations should be updated to reflect the missing footprint elements when the data is obtained.	Pass

2.2. Methodology

Starboard has used the GHG Protocol Product Life Cycle Accounting and Reporting Standard for this assessment (please see section 4 'References' for full details). The emissions were calculated using factors from reliable and well-known sources, and were presented in $kgCO_2e$ per product. The calculation report was well structured including emission factors used (including references) and product specification sheets.

Overall Comments on Assessment Scope	Pass/Fail
Starboard has used a recognised calculation methodology set out in the GHG Protocol Product Life Cycle Accounting and Reporting Standard.	Pass

2.3. Data Source & Accuracy

The result of a product footprint assessment varies in accuracy depending on the data set provided. The more accurate the data supplied, the more accurate the final result which will subsequently allow for better targeting of areas where improvements can be made. Table 2 below provides the expected accuracy for each of the datasets included within the product footprint calculations.

Table 2: Accuracy and sources of data for GHG inventory

Element of Footprint	Data Source & Comments	Data Accuracy
Raw Materials (embodied)	Individual material details and amounts sourced directly from Starboard's product developers. The specification sheets for each product were provided to Carbon Footprint Ltd.	Excellent
Transport of Materials	Starboard has constructed a catalogue of materials and supplier locations, allowing the transport of material emissions to manufacture sites to be modelled.	Good
Electricity (manufacturing)	The Starboard manufacturer (Cobra) provided a total kWh consumption for the manufacture of one SUP Composite board. This kWh figure was then used to estimate the electricity manufacture emissions of all other products based on the product weight.	Estimate
Shipping (distribution)	Shipping emissions for each product have been calculated based on location of end customer.	Excellent

Comments on the overall accuracy of the data used in the assessment	Pass/Fail
Overall the data used is considered to be of good quality. This has enabled Starboard to calculate the emissions associated with each of their products to a sufficient degree of accuracy. **For Future assessments Starboard should look to obtain the kWh electricity consumption required for the manufacture of more products.** Instead of requesting a figure for every single product, Cobra could provide an electricity consumption figure for each product line, which would significantly improve the accuracy of the manufacture calculation. Starboard has been unable to obtain raw material locations from its assembler for the following products: accessories, IQ Foil and the Freewing, meaning that the transport emissions could not be accurately modelled. **Starboard should investigate completing the catalogue of supplier locations so that the full lifecycle for these products can be calculated in future.** The current visibility of supplier locations shows that most materials are sourced from within Thailand or nearby China, by sea or road freight. The error associated with not reporting these emissions is therefore minor.	Pass

2.4. Emission factors

An assessment of the emissions factors used is presented below.

Materials Emissions Factors (raw materials & packaging)
Many material emissions factors have been sourced from Ecoinvent (version 2.2), Bath University's Inventory of Carbon & Energy (ICE) database, or Defra 2021 (Department for Environment, Food and Rural Affairs). Where specific material factors were not available through these sources, Starboard sourced factors from published lifecycle figures available on manufacturer websites, or from other reputable sources. All emissions factors are presented in $kgCO_2e$ per kg of material.

As part of the audit process, Carbon Footprint ltd cross referenced some of the more commonly used emissions factors with the Ecoinvent v3.8 database. All the emissions factors checked were suitably comparable and therefore accurate for use in the product footprint calculations.

Transport Emissions Factors
The transport emissions factors were all sourced from the Defra 2021 freight factors.

During the audit, it was noticed that the t.km calculation methodology was not being correctly applied as the 'per km' emission factor was being used for the road freight journeys. The calculations have now been updated by Starboard to use the correct 't.km' emissions factor, to account for the weight shipped.

Comments on emissions factors used	Pass/Fail
The emissions factors used are considered accurate and reliable enough to provide a sufficiently accurate calculation of each product footprint. We recommend that Starboard purchases a license to the Ecoinvent 3.8 database so that the embodied raw material emissions can be calculated to a higher degree of accuracy.	PASS

2.5. Calculation Review and results

Given the number of product calculations that needed to be validated this year, a sample-based approach was taken to verification activities. The calculations that were reviewed by Carbon Footprint Ltd were clearly presented and completed to a sufficient level of accuracy. Therefore, there is no reason to doubt the accuracy of the remaining product footprint calculations that were therefore reviewed in lesser detail.

The products that were reviewed in detail as part of the sample-based approach are presented below in Table 3 with the verified footprint figures.

Table 5: Starboard verified product emissions

SUP Composite Boards	$KgCO_2e$ per product
14'0" x 23.5" Sprint Carbon Sandwich	112.7
10'0'' x 34'' WHOPPER ASAP	103.3
10'8''x31'' GO Lite Tech	105.2
WindSup Boards	**$KgCO_2e$ per product**
Ultrakode 82 Wood Sandwich	89.6
Foil Freeride 150 Starlite Carbon	92.2
iSonic 63 Carbon Reflex	81.7
FreeWing	**$KgCO_2e$ per product**
FreeWing	14.3
Inflatables	**$KgCO_2e$ per product**
iGO DDC (10'8" x 33")	108.4
Touring DDC (12'6" x 30")	115.4
Touring ZSC (12'6" x 30")	108.5
Accessories	**$KgCO_2e$ per product**
Starboard Tiki Pump	12.3
Starboard Inflatable SUP Deluxe I Board Bag	11.7
Starboard SUP Double Action Pump Fix Base	9.8
IQ Foil	**$KgCO_2e$ per product**
IQ Foil - Men's	381.6
IQ Foil – Women's	376.3
Apparel	**$KgCO_2e$ per product**
2021 Men T-Shirt	0.8
2021 Kids Boardshorts	0.6
2021 Men Watershirt	2.0

3 Verification Statement

Carbon Footprint Ltd has reviewed the product carbon footprint assessment carried out by Starboard on its seven product lines, in order to assess its compliance with the GHG Protocol Product Life Cycle Accounting and Reporting Standard.

This review included:

- Scope of calculation/boundary
- Input datasets and any assumptions made
- Emissions factors used
- Calculation methodology
- Calculation review and results

Based on the results of our verification process, Carbon Footprint Ltd provides a limited level of assurance (as defined by ISO 14064-3) for the GHG inventory of the specified items that no evidence was found to suggest it:

- is not materially correct;
- is not a fair representation of the GHG emissions data and information; and
- is not prepared in accordance with the GHG Protocol Product Life Cycle Accounting and Reporting Standard.

It is our opinion that Starboard has established appropriate systems for the collection, aggregation and analysis of quantitative data for determination of the GHG emissions for the stated calculation boundaries.

4 References

- World Resources Institute and World Business Council for Sustainable Development, 2011. *The GHG Protocol Product Life Cycle Accounting and Reporting Standard.*

Appendix 1

Carbon Footprint Ltd Verification Team

Our Company as enabled the completion of carbon footprints for over 20,000 businesses globally via our tools and consultancy. We are confident that we bring independent, ethical conduct, fair representation, due professional care and fresh insights to carbon management and verification activities. We work with a vast range of companies, from SMEs to multinational blue-chip corporations with goals to comply with legislation, cut the cost of carbon in their business, maximise sales by developing true sustainable credentials and prepare for future legislation.

We are a world leading carbon foot-printing company:

- We follow international standards, such as ISO14064-1, PAS2050, GHG Protocol, ISO14064-3 within our work
- We are ISO 14001:2015 and ISO 9001:2015 certified
- We are approved under the Quality Assurance Standard (QAS)
- We work with other businesses to complete/verify GHG emissions for their Mandatory GHG Reporting and CDP reporting requirements
- We run the Carbon Academy (for peer group learning)
- We provide input and advice to the government on low carbon legislation

Stuart Fowler
Senior Environmental Consultant
Stuart is an Environmental Consultant at Carbon Footprint Ltd, specialising in Greenhouse Gas assessments of organisations in line with ISO14064 and the GHG Protocol. He works with a large range of business customers ranging from SMEs to large corporates.

Myles Howard
Senior Environmental Consultant
Myles is a Senior Environmental Consultant at Carbon Footprint Ltd, with a Bachelor's degree in Environmental Sciences (Hons). He is a member of the Institute of Environmental Sciences. Myles has vast experience across a diverse range of environmental and sustainability services including bespoke tool development, GHG verifications and validations.

Dr. Wendy Buckley
Director
Wendy has a B.Sc. & Ph.D. in Physics and is also a Member of the Chartered Institute of Marketing with MCIM status. She has held various appointments across the globe in both the public and private sector. She has developed extensive knowledge in manufacturing, thermodynamic processes and low energy solutions. Wendy has won a number of business awards and is Chair Person of the Sustainable Business Network in North Hampshire.