

STARBOARD

Carbon Footprint

Fiscal Year 2018



Annual Report

Presented by Starboard Blue

Verified by Carbon FootprintTM

“As a business leader, I have the opportunity to impact our planet”

- Svein Rasmussen, Chief Innovator at Starboard

At Starboard, we have over the past years become more aware of our environmental impact and we are making powerful progress in the fields of sustainability and eco-innovation. It's important that we apply **corporate social responsibly** to our actions. As one of the biggest SUP and Windsurf board manufacturers – we are accountable for the pollutions we emit into the world.

We have found a way to reduce our negative impact and use our business as a force for positive change. We are cutting down on our emissions by introducing eco-friendlier material into production and finding better ways to shape our boards. This is lowering our carbon emissions – as well as decreasing our dependence on virgin materials.

Our Mangrove forest in Thor Heyerdahl Climate Park in Myanmar is continuing to expand as Starboard is going **carbon net positive** once again this year, planting more mangroves and sequestering more CO₂ than we produce. Additionally, we plant one mangrove per board sold – making every board ten times carbon net positive.

2017 was an important year for Starboard Blue – with many accomplishments with our eco-projects and significant advancement in developing more sustainable products. Starboard's R&D team is continuing to make headway in 2018 and is bringing you leading watersports equipment with lesser environmental impact and greater performance.

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Purpose

The purpose of this report is to disclose Starboard's **carbon footprint** for fiscal year 2018 (June 2017 – May 2018). The report is made public in an effort to be completely transparent about our emissions and our role as a polluter.

The report goes through the calculations of Starboard's CO₂ emissions and is an investigation into the **life cycle analysis** (LCA) of our different products. All calculations have been completed by the Starboard Blue team and verified by Carbon Footprint™. This third party verification has certified Starboard under the Carbon Footprint Standard.

If you have any questions or feedback, please contact us at: **blue@starboard.com**.

Mission and Goals

Our vision is to bring inspiration and innovation to the world of wind and water. For years Starboard has done this by making high-end watersports equipment available to watermen of all skill levels. Now, however, this commitment has become so much more.

Starboard has pledged to be an advocate for our planet and to use our brand to encourage all our stakeholders to practice an environmental friendly attitude. We hope to inspire others through our projects to protect the big blue playground that we share.

The product design team at Starboard has already made huge progress in lowering the environmental impact of our board by developing eco-friendly

innovations and ultimately cutting down on the carbon emission of each board produced.

For all that, our greater mission is to offset the emissions we *do* put out. This is why we conduct an annual investigation into our carbon footprint – so that we can invest in **carbon sequestration**.

For several years now, Starboard has partnered with the Thor Heyerdahl Climate Park in Myanmar and plant Mangroves to capture carbon from the atmosphere. One mangrove offsets one tonne CO₂ over the course of 20 years. As of May 2018, we have 136,500 trees in the ground. Our Mangrove forest is big enough to make Starboard carbon net positive several times over for the past two years.

Our goal is now to take it one step further and go **carbon past positive**. A concept Svein Rasmussen has been playing with is to really go carbon net positive by absorbing our emissions from the past.

“Can a business actually become carbon net positive? Instead of only reducing our pollution and making yearly offsets – can we even absorb emissions of the past? We hope to be able to say that we are 10 x net positive by next year – and if we succeed – we have created a master plan to fast accelerate the planet into a positive phase.

Can we showcase how easy it is to turn a company from negative to positive, motivating others to join? I believe so and our employees and customers support our dream. It’s the least I can do for the planet that has given me the opportunity to run a business and for my daughter. “

-Svein Rasmussen, Chief Innovator

GHG Reporting

Greenhouse Gas (GHG) reporting is an essential key to tackling climate change. In many countries, including the United States and United Kingdom, carbon emissions reporting is mandatory for large businesses in order to assess the impact from the private sector. Even though Thai regulations does not require Starboard to do GHG reporting, it has become important for us to do in order to be completely transparent with our customers and other stakeholders. It also allows us to set internal goals to reduce the negative impact of our activities.

In 2017 Starboard published its first Carbon Footprint report after our Blue Team did the first full calculation of our CO₂ emissions. Last year's report detailed the life cycle analysis (LCA) of several boards and Starboard's total emission – looking at production, air travel, energy and diverse. The previous report revealed how much carbon dioxide gas Starboard produced in the period June 2016 to May 2017 (FY 2017).

This report presents data about our carbon emissions from June 2017 to May 2018. In this report you will find the life cycle analysis for several Starboard products and a full, thorough breakdown of our CO₂ emissions for FY 2018.

Verification

Starboard's Carbon Footprint has been assessed and verified by Carbon Footprint™. The verification has been updated in May 2018; confirming that our 2018 footprint has been conducted accurately and even substantiate our LCA method and process.

For **carbon emission factors** we have used various sources for the most accurate numbers. See the bibliography on page 25.

Interpreting Changes in Data

Calculating the carbon footprint of manufacturing company is a complex and challenging process. There is not one correct way to do this and at Starboard we are continuing to learn and understand various methods in order to best complete an accurate and systematic presentation of data.

Our 2018 report will display a critical change in emissions. This is due to several factors. First and foremost – we can successfully announce that we have lowered our emissions significantly.

Secondly, we have developed our technique in LCA calculations to be able to work with more specific numbers. We have also included more product lines for 2018, such as apparel and accessories, which were not included in last year's calculations.

Development

Implementing green technology into our production and manufacturing has been an important development for Starboard over the past few years.

Eliminating virgin material from our boards has helped lower our emissions.

“We at Starboard work towards lowering our carbon footprint in the most efficient way. 50% of our electricity consumption is produced by our own solar energy system, and we target to install enough panels on the new workshop we are building to secure 100% solar coverage.

Within 2020 we wish to also have solar systems established for our main supply partners as most of their power currently comes from coal plants.

We scrutinize all our raw mats, shifting to recycled and biomaterials, also reducing our products' carbon footprint – aiming to have cut it by 50% in the period 2016 to 2020. “

-Svein Rasmussen, Chief Innovator

However, our goal has not only been to cut down on our greenhouse gas emissions, but also tackle other sources to pollution – such as plastic. We have worked to limit our dependence on plastic and instead source recycled and biomaterial for our products.

By investing in eco-friendly material and advocating for what we call **blue business** – we help steer the industry in a positive direction and change the competition of the game by not only focusing on selling the best boards in the world, but also the best boards *for* the world.

Reducing our Carbon Footprint

It's difficult to make an exact estimate of how much we have reduced our carbon footprint due to changes in method and the scope from last years' assessment. Be that as it may, we can with certainty say that emissions from production have been made lower through considerable changes in material and design.

Starboard's R&D Team has shown incredible effort in researching new technology that does not only benefit the performance of the boards – but also supports our goal and mission to take care of our planet. Here's what Starboard's SUP Product Manager, Ollie O'Reilly, have to say about working with environmentally focused goals:

“For Starboard to reduce its carbon footprint, it has to start from the products we make. My responsibility as SUP Product Manager is committed to redesigning the way we build our boards to ultimately be better for the planet. This involves scrutinizing the materials we use in search for high performance with low environmental impact.

Some of the many Eco Innovations that all contribute to lowering our carbon footprint are:

- Switching to 33% plant based bio resin reducing our footprint by 20.7%.
- Changing our plastic injection molded parts to be made from up cycled fishing nets, a reduction of 14.4% CO₂.
- All EVA pads will be made from postindustrial waste, reducing the amount of petroleum by 50% and CO₂ for 1 pad by 9.5%.

The key is that not one of these changes is going to solely reduce our carbon footprint, but when combined, reduces a larger overall CO₂ Saving. All in all this has not just lowered our CO₂ footprint, we have found that most of these materials have outperformed the original virgin materials.

If you look at board bags which are made from up-cycled plastic bottles, we effectively reduce the amount of plastic that probably would of entered the ocean, increase the overall strength of the bag and reduce our carbon footprint by 53% by switching to this material. It's a win-win!

By redesigning the way we build our products, we are able to reduce our carbon footprint to help preserve a healthier ocean and also improve the performance on the water!”

- Ollie O'Reilly, SUP Product Manager

Life Cycle Analysis

Method

For the life cycle analysis of the boards and other equipment we have used a cradle-to-gate assessment. This is the evaluation of how much carbon dioxide is emitted through the process; starting from the production of the raw material used for the products to the product being shipped to our distributors.

There are five stages we look out for the cradle-to-gate LCA:

1. Material

The production of the raw materials used for the boards.

2. Waste

The production of the raw materials that are left over.

3. Electricity

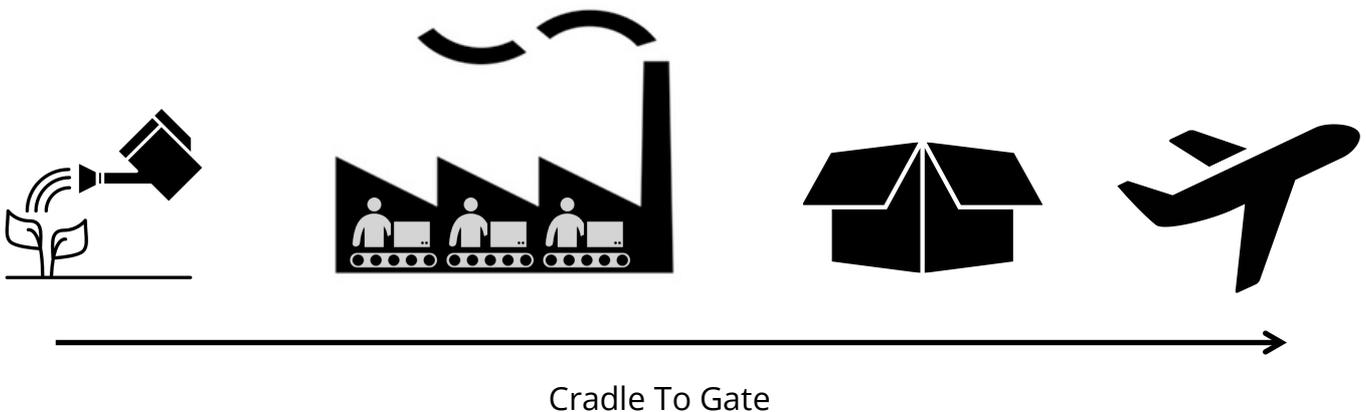
The energy used to produce the boards.

4. Packaging

The production of packaging material.

5. Shipping

The emission from air travel required to ship the boards.

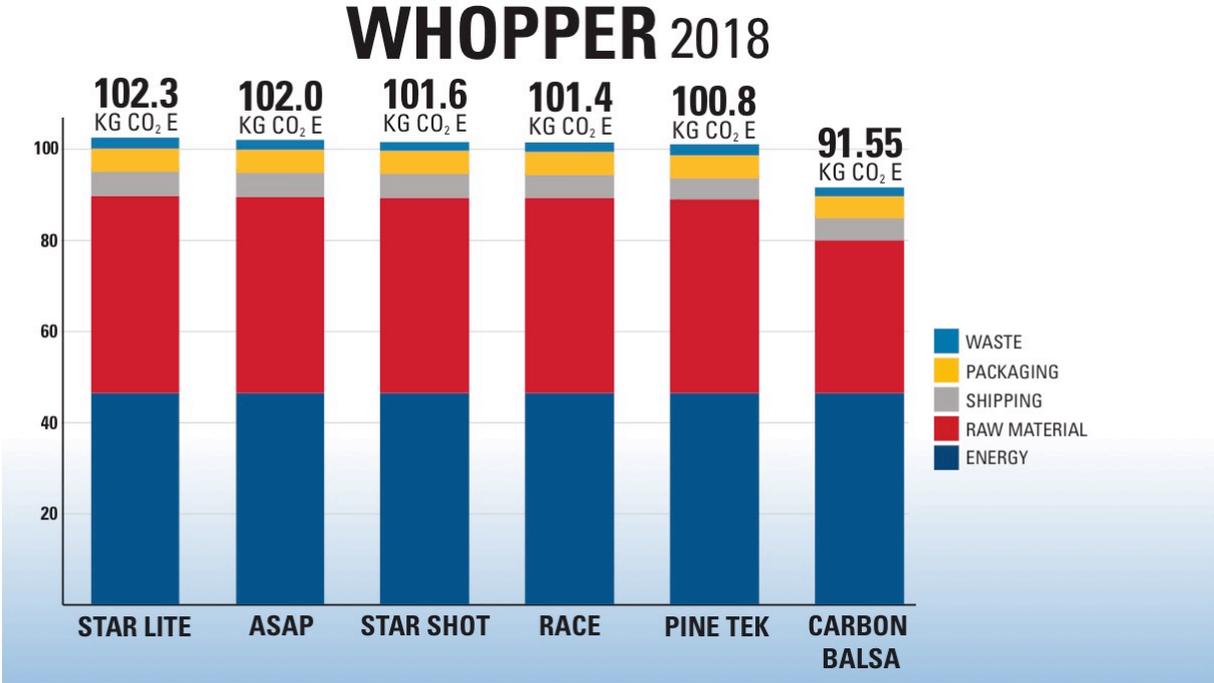


Stand Up Paddle – Composite Boards

In Starboard’s SUP hard board product range, there are five different main technologies, as well as three different race boards technologies. We did life cycle analyses on the five main technologies and on one race board.

To make an appropriate comparison, we used the same model with the same volume for all technologies – excluding the race board. The whopper board is one of the bestselling models, so we chose to use the 10’0” x 34” Whopper board for our breakdown.

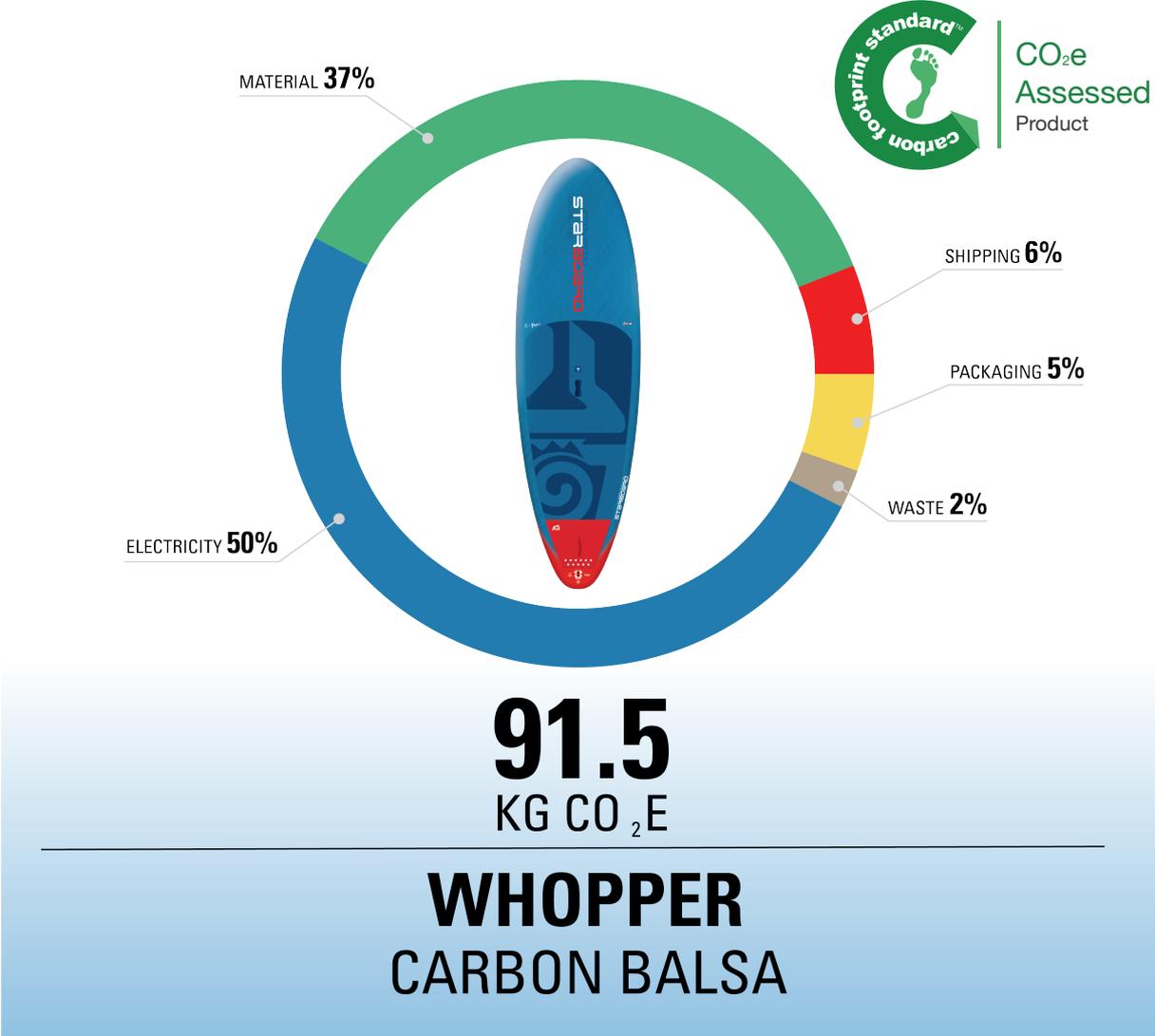
The bar graph below shows the carbon emissions of five Whopper boards with different technologies; **Star Lite, Asap, Star Shot, Pine Tek** and **Carbon Balsa**, and one race board of **Hybrid Carbon** technology.



Graph: Comparing kg CO₂ emitted from production, packaging and shipping of different boards from the SUP composite range.

The graph also breaks down the emissions according to the life cycle of the boards. Note that the emissions from energy use, packaging and shipping are more or less the same for each board. The difference to observe is in the production of raw material.

The Whopper with Carbon Balsa technology reveals a much lower carbon footprint compared to the separate models with other technologies. This is because end grain balsa has no carbon emissions, significantly reducing the board's raw material emissions, making this board the most eco-friendly composite SUP board Starboard has sold to date.



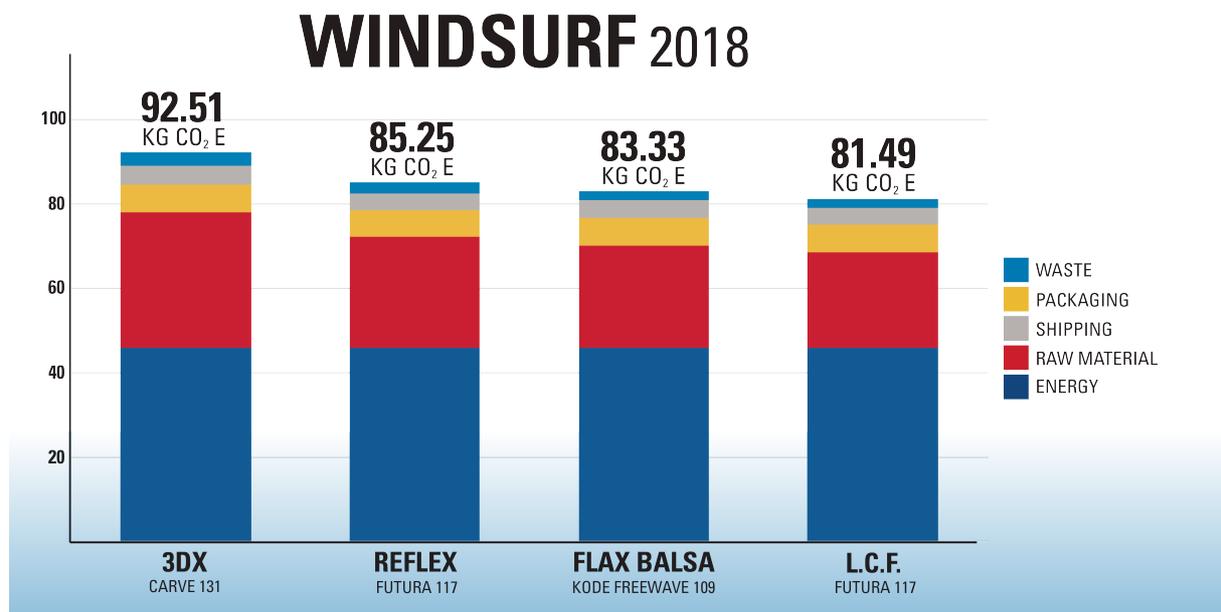
Graph: The Life Cycle Analysis of a Carbon Balsa board.

Windsurf Boards

Looking at Starboard's four windsurfing technologies, there are **3DX**, **Carbon Reflex**, **Flax Balsa** and **Carbon L.C.F** (Low Carbon Footprint). Unlike our SUP range the bestselling models does not exist in all technologies, so to compare the products we looked at the most popular boards with similar volume.

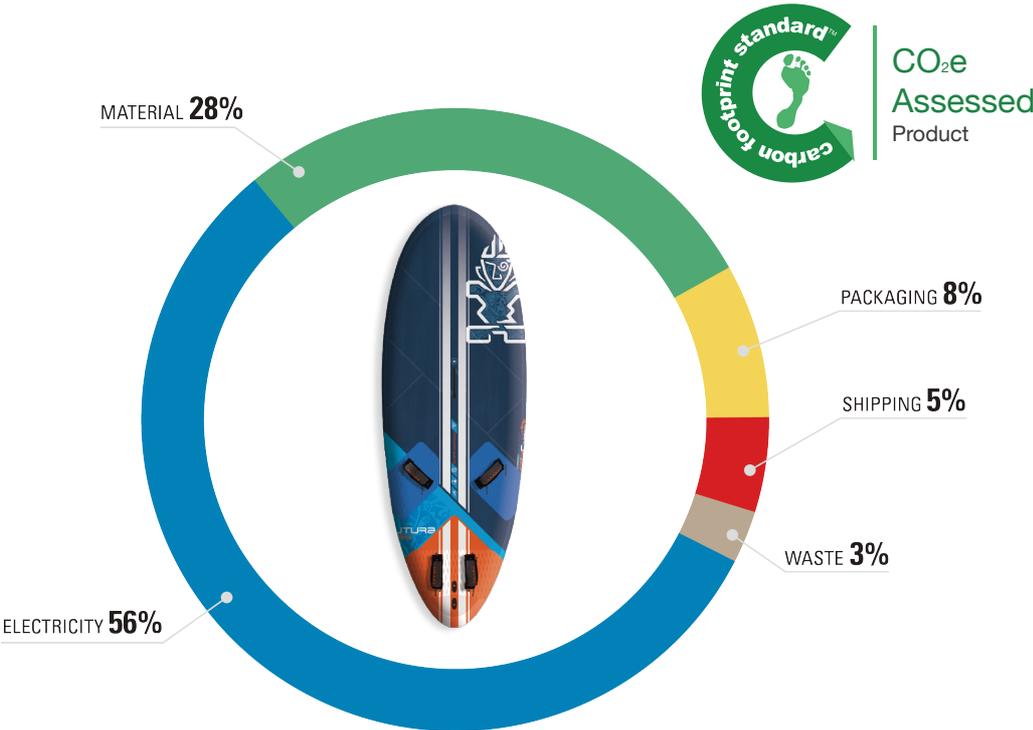
In the bar graph below you see the comparison of the carbon footprint of the four different windsurf constructions Starboard produces – breaking it down by energy consumption, raw material, waste, packaging and shipping.

Again the obvious difference comes down to what material goes into the boards. Boards with greater amounts of carbon give off greater emissions. By replacing carbon with more sustainable materials, such as balsa, the result is a smaller carbon footprint.



Graph: Comparing kg CO₂ emitted from production, packaging and shipping of different boards from the Windsurf range.

It is no surprise that the Carbon L.C.F board has earned its name, *Low Carbon Footprint*, as it has the lowest CO₂ emissions of all the windsurf boards. It's footprint is also lower than the composite SUP boards, however, this is due to windsurf constructions being smaller and weighing less; the more material that goes into the board, the more emissions goes out.



81.5
KG CO₂ E

FUTURA 117
CARBON L.C.F

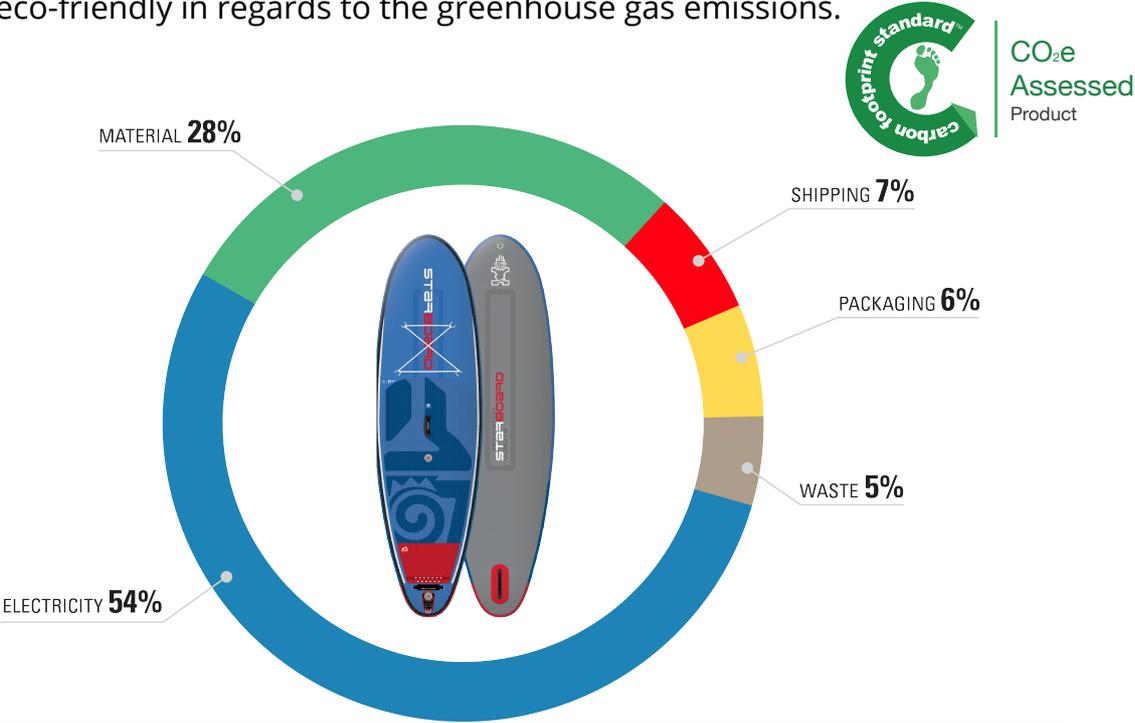
Graph: The Life Cycle Analysis of a Carbon L.C.F board.

Inflatable Boards

Out of all the boards Starboard sells, the inflatable boards have least impact in terms of carbon emissions. It requires less energy to produce the boards and because they are deflated they require less packaging.

In the diagram below you see the life cycle analysis of the new **Double Deluxe Chamber** technology. Its footprint is almost identical to a **Zen** construction of the same model.

While our inflatable boards score poorly on our **Plastic Footprint Report**, they are more eco-friendly in regards to the greenhouse gas emissions.



70.4
KG CO₂ E

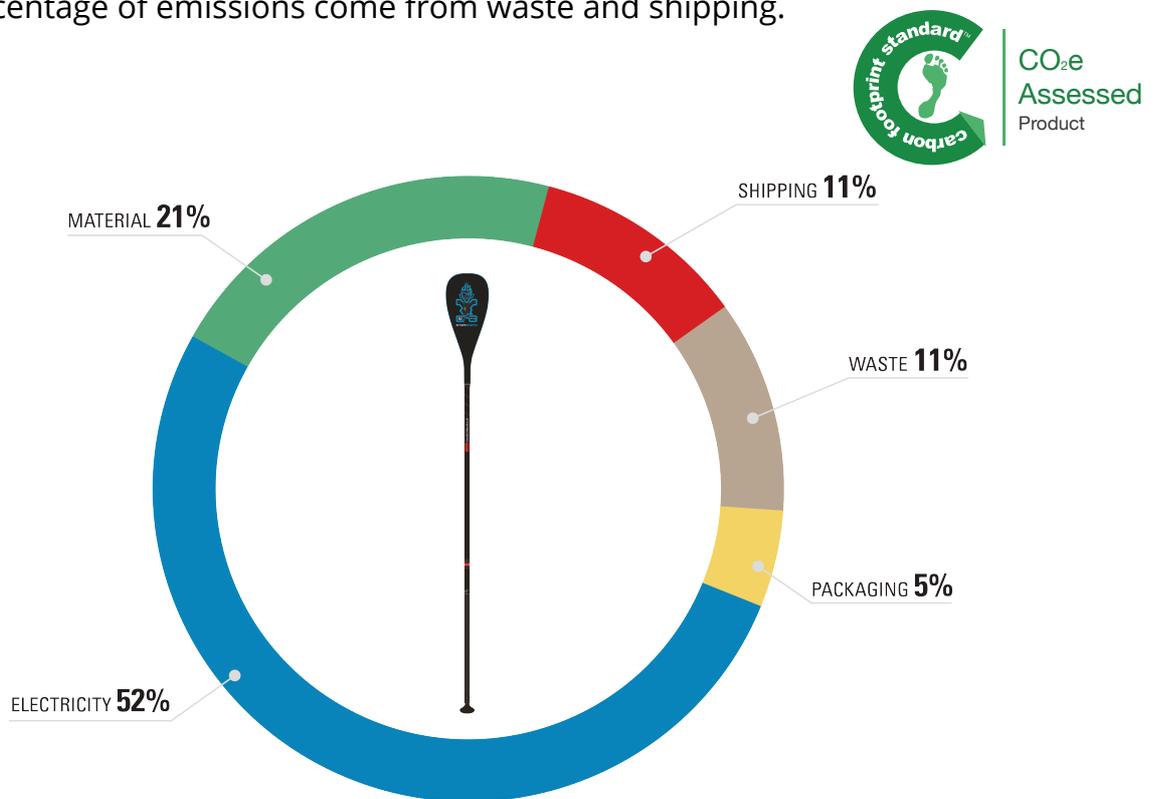
WHOPPER
DOUBLE DELUXE CHAMBER

Graph: The Life Cycle Analysis of a Double Deluce Champer inflatable board.

Paddles

In the Starboard paddle range; there is little difference between the paddles in terms of carbon emissions. The average footprint per paddle is 8.5 kg CO₂, with the largest emissions coming from the energy used in the production phase.

In the diagram below you see the life cycle analysis of a Enduro paddle with Carbon Balsa technology, which is amongst the bestselling paddles. Due to its low weight and density, the break down of the cradle-to-gate analysis shows a large percentage of emissions come from waste and shipping.



8.8
KG CO₂ E

ENDURO
BALSA CARBON

Graph: The Life Cycle Analysis of a Balsa Carbon paddle.

Progress

Comparing the LCA's of Starboard's 2018 production line to the previous year, we can without question say that there has been a detectable and definite decline in CO₂ emissions. All hard boards, inflatables and paddles, which were all analyzed in the 2017 report, have a lower carbon footprint this year.

The composite SUP boards' footprint has in average **gone down by 5%**, while emissions from windsurfing boards has **decreased by 6.2%**. Inflatables have seen a **reduction of 7.4%** and paddles has **cut 5.6%** of its emissions from last year.

While it's hard to quantify how much we have progressed with other products, such as apparel, board bags and other accessories that did not go through an LCA assessment last year, it's safe to say that Starboard is headed in the right direction.

Improvements and Targets

Even though Starboard has done great progress in decreasing the carbon footprint of the independent products we make, it is clear that there is still room for improvement. The most notable obstacle is energy consumption.

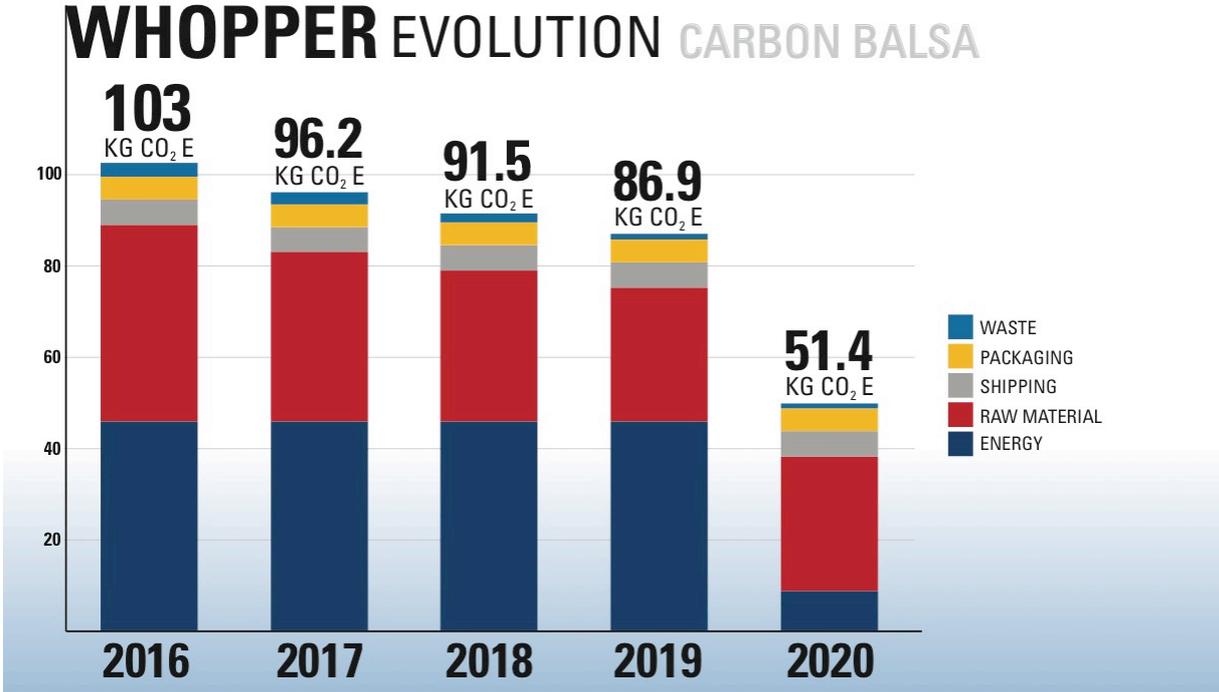
To date, all our products are manufactured in factories that are dependent on unsustainable energy sources, such as coal, oil and gas. For most of our products the energy consumption from production is responsible for at least 50% of the footprint.

In order to make a prominent reduction in emissions from production, we must make changes in the energy consumption. Starboard has invested in renewable

energy by installing solar panels on our workshops and office. Now we hope to influence our suppliers to also minimize their dependence on energy sources that negatively impact our planet, and go green with renewable energy.

In the graph below you can see how the Whopper, with of similar construction as 2018's Carbon Balsa, have evolved over the past year. In 2017, Blue Carbon has a carbon footprint of 96.2 kg CO₂ – almost 5 kg more than the current Carbon Balsa model.

The footprint of 2019's model has been determined to be 86.9 kg CO₂. By 2020, we hope to have solar panels installed at Cobra, which could almost cut our emissions from production in half.



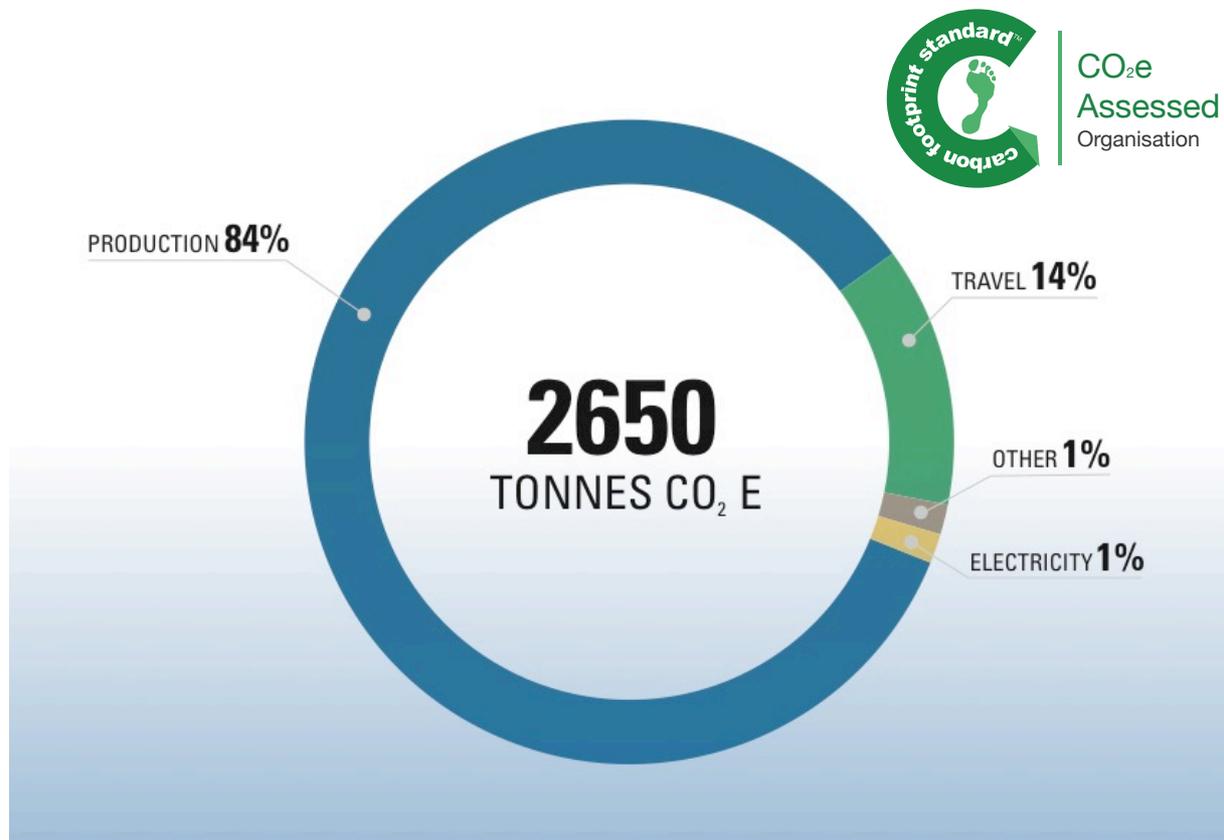
Graph: Comparison of the Carbon Balsa construction from year 2016 to 2020.

Carbon Footprint

Total Emissions

After completing life cycle analyses for all products, ranging from boards to accessories, we also looked at the emissions from Starboard's headquarter, travel and other activities. All these elements combined makes up for Starboard's total carbon footprint.

In the diagram below you see the full carbon footprint of Starboard, broken down by **production, electricity, travel** and **others**.



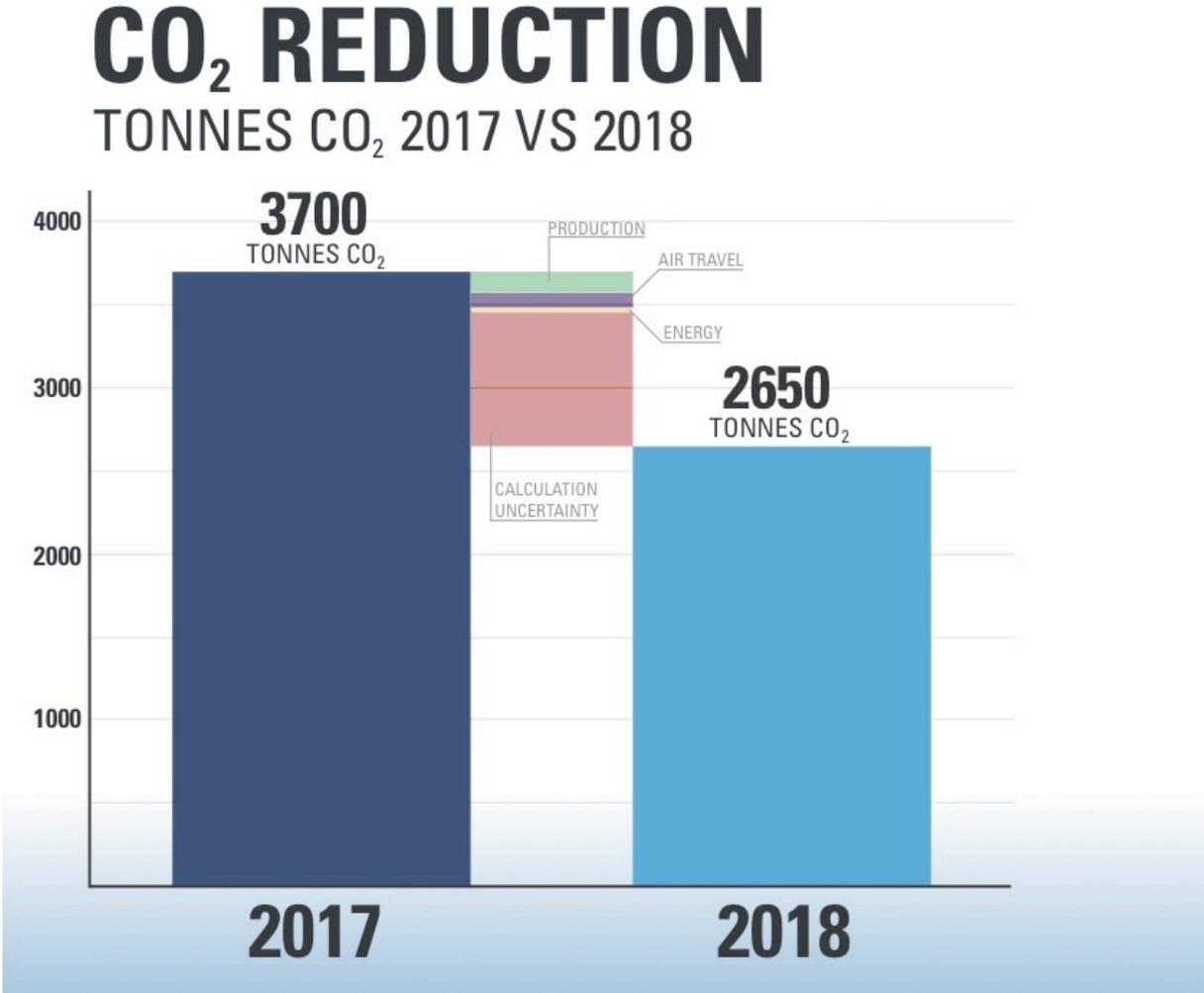
Graph: Total Carbon Footprint 2018

Production	SUP (composite)	Inflatables	Bags
	Windsurf (composite)	WindSup	Straps
	Paddles	Fins	Apparel
Travel	Air Travel	Commute (employees)	Weekend Testing
Electricity	Energy consumption at HQ	Others	Catalogues

Comparison

Weighing the result against our previous report shows that Starboard has a much lower carbon footprint than previously thought. Like stated earlier in the report, calculating the carbon footprint of an entire company is a complex and intricate process, resulting in uncertainties and sometimes errors. This is only the second time Starboard has completed its carbon footprint and we hope to continue to learn and become proficient in this task.

Nevertheless, we can also credit a lower footprint to Starboard’s efficiency in taking measures to reduce our emissions. In the graph below you see how Starboard’s carbon footprint has changes since last year.



Graph: Carbon Footprint 2017 VS 2018

Emissions from Starboard's production has decreased by 5%, while GHG emissions from energy consumptions at HQ has been reduced by 25% due to installing solar panels onsite in December 2017. For the past six months, our energy import has been cut in half and we are now up to 50% reliant on solar energy.

The majority of miscalculations in last year's report are for air travel carbon calculations. It's difficult to say exactly how much we cut our flight footprint, but as we have committed to being more dependent on Skype conferences and local meetings, we can assume that our emissions from air travel has been reduced.

Other emissions remain the same. Our focus is on reducing the footprint from our production as this is the company's biggest source of GHG pollution, and also because Starboard has the power to positively influence all water lovers with eco-friendly products.

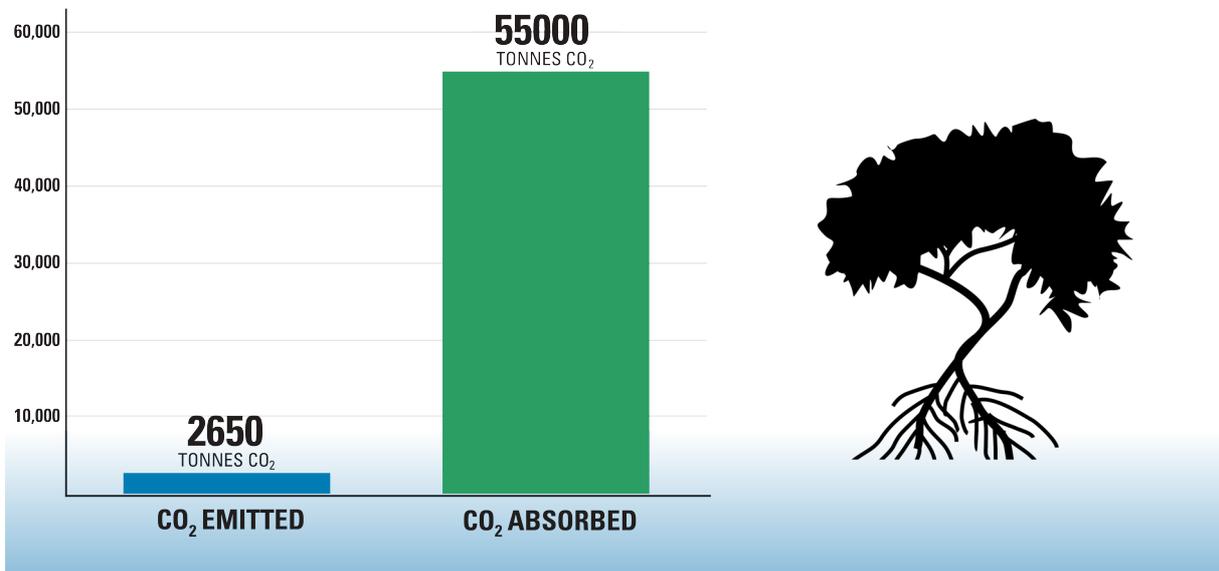
Carbon Offset

Starboard continues to invest in Mangrove trees to offset our carbon footprint. The Thor Heyerdahl Climate Park has not been officially recognized as a Blue Carbon Offset program, but will be verified in 2018. By investing in **Blue Carbon** we are not only going carbon net positive by capturing more CO₂ than we release, but we also invest in a healthy ocean habitat for several species and an amazing ecosystem that acts as a nursery for plants and animals.

In the graph below you see our CO₂ distribution for 2018. It is evident that Starboard goes carbon net positive for 2018 – however, it's important to note that it takes the trees up to 20 years to capture 1 tonne carbon dioxide.

CO₂ DISTRIBUTION

TONNES CO₂ EMITTED VS ABSORBED



Graph: Carbon Dioxide Distribution – Emitted VS Absorbed

Note: The graph represents mangroves planted in 2018 and CO₂ absorbed over the next 20 years.

Conclusion

Starboard has succeeded in reducing its carbon footprint using green technology and innovative material. Our goals for 2018 have been met and we are on good way to reach our future goals – which is to reduce our footprint from our model year, 2016, by 50% within 2020.

By developing sustainable solutions for our boards and investing in blue carbon sequestration, Starboard is headed in the right direction of becoming what we call '**Impact Positive**'. We want to leave the planet a better place than we found it and use our brand and company as a force for good.

Glossary

Corporate Social Responsibility (CSR)

Corporate Social Responsibility is a company's ability to assess and tackle social and environmental issues. A business with good CSR aims to produce a positive impact and values sustainability, social impact and ethics at the core of the corporation.

Carbon Net Positive

Being Carbon Net Positive means an individual or organization offsets more carbon dioxide than they release into the atmosphere, meaning they remove more carbon than they are responsible for, ultimately creating a positive change.

Carbon Footprint

A Carbon Footprint is the quantifiable amount of carbon dioxide gas released into the atmosphere as a result of the activities of an individual or organization.

Life Cycle Analysis (LCA)

A Life Cycle Analysis is a method to determine the environmental impact of a product, examining the different stages of the products life. These analyses look at raw material production, manufacturing, distribution and more.

Carbon Sequestration

Carbon Sequestration is the process of which carbon dioxide is captured from the atmosphere and stored long-termed to mitigate the impact on the planet.

Carbon Past Positive

An individual or organization can be Carbon Past Positive by taking responsibility for all past carbon emissions and offsetting more carbon dioxide from the atmosphere than they have released in total.

Greenhouse Gas

Greenhouse Gas is the term given to gases that absorb infrared radiation (IR) and release heat, and when released into the atmosphere contributes to climate change by trapping heat there. This is known as the *greenhouse effect*.

Carbon Emission Factor

A Carbon Emission Factor is the measurement of the average amount of carbon dioxide released into the atmosphere by a specific source. It's usually expressed as number of pounds or kilograms per unit of the sources.

Blue Business

Blue Business is a term Starboard uses for the business activities we do that benefits the ocean. Ocean friendly initiatives are implemented in the business model.

Blue Carbon

Blue Carbon is the carbon captured from the atmosphere by ocean and coastal ecosystems – such as algae, sea grass, mangroves and much more.

Impact Positive

Being Impact Positive means that an individual or organization has an overall positive impact on the planet through initiatives that aim to benefit the environment.

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