GREEN TRANSITION STRATEGY

SeaGoingGreen

FINAL REPORT
CLIENT: BOAT BIKE TOURS

APRIL 2020

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FOREWORD

International tourist arrivals increased by 4% in 2019, reaching the 1.5 billion mark ahead of forecasts for 2020, validating the resilience and leadership of the sector.

The tourism sector continues to be one of the most powerful drivers of economic growth and international development. Although, as a result of this tourism boom, in increased pressure has been put on natural resources and biodiversity, fueling tensions between visitors and their hosts over where the responsibility lies.

The marine environment has long been one of the most attractive settings for tourism. Visitors who interact with marine environments enjoy a wide spectrum of experiences including scuba diving, snorkeling, sailing, beach activities, and fishing. Even if visitors do not directly interact with a local marine environment through these activities, its quality is intrinsic to the destination's larger identity.

With the increased popularity of marine based excursions and direct contact with nature, we have seen a rise in the trend of responsible tourism and sustainable practices.

Preventing the degradation of the local environments has never been more relevant. Experts are predicting that as many as >90% of the world's coral reefs are expected to die by 2050, which means that there is no time to lose to prevent outcomes such as these.

Imagine diving in the great barrier reef – without the reef. Tourism may cause harm, but it doesn't have to.

Tourism has the potential to be a catalyst for the sustainable use of the natural environment, the conservation of marine environments and the raising of environmental awareness.

Working towards reaching milestones such as becoming plastic-free and CO2 neutrality will not only differentiate your brand, but elevate the image of Boat Bike Tours for increased revenue and name recognition. Communicating to guests that you are lowering your impact while giving back to local communities and the environment is important in showing your dedication as a sustainability leader in the tourism sector.

Not only can this attract eco-conscious guests and lead to re-occurring bookings, but it can also expand your reach to different target markets. Studies show that travelers overwhelmingly prefer companies that incorporate green practices into their operations, which encourages tourism customers to pay more for services from a company with a sustainable brand identity (especially Millennials and Generation Z).

Businesses looking to integrate green practices into their operations will gain a competitive advantage and a head start compared to their competition, which makes businesses stand out.

In the spirit of this, Boat Bike Tours has requested this Green Transition Strategy proposal from Sea Going Green to be designed for the purpose of incorporating and operationalizing the value of sustainability via alternatives to energy, fuel, waste-water and single-use plastics to further build credibility and legitimacy of your commitment to #GoGreenForTheBigBlue.

SeaGoingGreen

SCOPE

BOAT BIKE TOURS
THE NETHERLANDS 2019

Location: The Netherlands

BBT Office: 28 employees

PASSENGER NUMBERS AND SAILING
WEEKS IN TOTAL AND FOR BBT PER SHIP

SHIP NAME	WEEKS IN TOTAL	GUESTS IN TOTAL	WEEKS FOR BBT	GUESTS FOR BBT
Allure	29	500	16	309
De Amsterdam	29	3021	29	3021
Elizabeth	12	234	12	234
Fiep	43	1000	32	736
Fleur	29	663	21	503
Flora	29	520	11	212
Fluvius	36	1338	24	986
Gandalf	24	404	24	404
De Holland	27	1756	27	1756
Leafde fan Fryslân	28	673	25	598
Lena Maria	27	619	24	547
Magnifique	30	929	30	929
Magnifique II	30	1011	30	1011
Magnifique III	29	1236	29	1236
Mare fan Fryslân	26	750	20	540
De Nassau	18	1161	18	1161
Sarah	29	560	25	424
Wapen fan Fryslân	21	600	12	276
Zwaantje	25	500	12	323
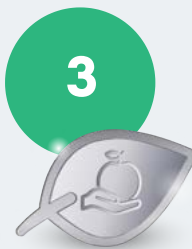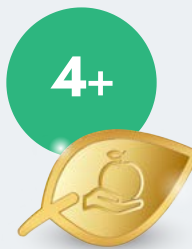
2019

SCOPE

AWARDED SUSTAINABILITY BADGES BY SEA GOING GREEN

With the information provided to us by the ship owners, we designed a scoring system to point out their efforts to reduce the environmental impact in ways that are not visible in the carbon emission calculations (e.g. eco-friendly cleaning products). More information about this scheme is provided on page 58.

CATEGORY	BRONZE	SILVER	GOLD
Plastic Free	3-5	6-9	10+
Sustainable Energy & Water Use	2-4	4-7	8+
Local & Organic Products	2	3	4+

2019

METHODOLOGY - ACTIVITY BASED CARBON FOOTPRINT ASSESSMENT

The Sea Going Green "Green Transition Strategy" including the Environmental Impact Assessment Carbon Emission Calculation has been modelled based on the World Resources Institute / World Business Council for Sustainable Development (WRI/WBCSD) Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition. Our methodology for the Environmental Impact Assessment includes an activity based carbon footprint of which materials have been used by the BBT Office (2019) and the entire fleet.

All figures and analyses were based directly on data given from Boat Bike Tours and the ship owners or skippers. Please take into account that the more data provided, the more accurate your footprint calculation will be. The carbon footprint can be defined as: "a measure of the exclusive total amount of CO2 emissions that is directly and indirectly caused by an activity or is accumulated over the life stages of a product" (Wiedmann & Minx, 2008).

Please note that our final calculations do not include any CO2 emissions from flights that were taken to travel to the port of departure, in this case: Amsterdam. With this accounted for, individual estimates for guests' footprints would be considerably higher, especially for trans-Atlantic guests. The average long-haul flight produces **2,000** kg of CO2 per round trip.

Filimonau, Dickinson, and Robbins (2014) conducted a study about the carbon impact of short-haul tourism and they support the idea that within tourism, transportation generates the largest carbon footprint. They concluded that the most significant carbon savings for a trip can be achieved by switching from air and car-based travel to train and coach journeys. Peeters and Schouten (2006) worked on the ecological footprint of inbound tourism and transport to Amsterdam. They also conclude that the main part of the environmental pressure of inbound tourism originates from transport (**70%**) and accommodation as well (**21%**) (Filimonau et al., 2014 Gössling, 2013; Rico et al., 2019).

METHODOLOGY - ACTIVITY BASED CARBON FOOTPRINT ASSESSMENT

Although transport is recognized as the highest contributor to the carbon footprint of tourism, many other tourism related activities contribute significantly to tourism greenhouse gas emissions because of their high energy intensity. In particular, these are accommodation and leisure related activities. When considering tourist accommodation, there are factors that take place on the same premises such as heating, and air-conditioning of the rooms, water-use, laundry and so on that must be taken in to account (Michailidou, Vlachokostas, Moussiopoulos, & Maleka, 2015). Therefore, we focus on such activity based footprints. The activity based carbon calculation methodology is an analytical method to quantify flows, stocks of materials and substances in a defined system, in this case during the BBT 2019 season.

The emission coefficients that we used for this method are pre- and post production since it is important to consider the entire life cycle of materials and products for tourism activity categories. Products, for instance, hold different carbon intensities.

For example, vegetable production in Europe is more carbon intensive than vegetable production in Asia, as Europe uses more carbon intensive means of production, such as artificially heated greenhouses. Cereal production in Asia is more carbon intensive than cereal production in Europe due to the difference in the type of cereal grown: rice on average has higher impact factors than wheat. Activities might involve services or infrastructures belonging to the public sector, so our calculations only account for the corresponding part of the impact allocated to tourism use. Our emission coefficients include all CO2 emitted before the concerning material for a tourism activity can be made and after it is used, making them the most comprehensive CO2 factors to be used for calculations. This calculation framework includes the 'direct' emissions from the obtaining of the raw materials needed for the activity or system. These are also known as pre-production emissions.

PRODUCT CARBON FOOTPRINT LIFE CYCLE
SOURCE: ACF NETWORK

METHODOLOGY - ACTIVITY BASED CARBON FOOTPRINT ASSESSMENT

Additionally, the framework includes 'indirect' post production phases, such as emissions from the management of the generated waste. The indirect carbon footprint thus arises from the non-use phases of a product or service life cycle; it is also embodied in the capital goods and infrastructure necessary to extract, transport and refine raw materials, manufacture a product or service, deliver it to a final user, regularly maintain and finally dispose of it (Frischknecht et al., 2007; Lenzen et al., 2003). Thus, within the carbon factors that are used for the calculations in this report, both direct and indirect (pre- and post production) emissions are included.

Carbon footprint calculation serves as an assessment tool in terms of greenhouse gas emissions and then, it serves to manage and reduce these emissions.

After calculating the carbon footprint, it's detailing helps to identify weaknesses - areas of high emissions that can be eliminated or improved. Thus, the carbon footprint can be perceived as an indicator of sustainable development (Radu et al., 2013; Rico et al., 2019).

OPERATIONAL BOUNDARIES & LIMITATIONS

The results provided by this report are based on data that is collected by means of questionnaires and ship visits. These questionnaires provided us with quantitative data that was filled in by ship owners or operational managers themselves. Therefore, the results are based upon the data that was given to us, and where applicable it was made sure that the data was accurate by verification through BBT's intermediary.

BASIS YEAR SELECTION

The pilot projects were done based on 2018 data, so the next step was to do the whole fleet based on 2019 data as little was changed operationally between 2018-2019.
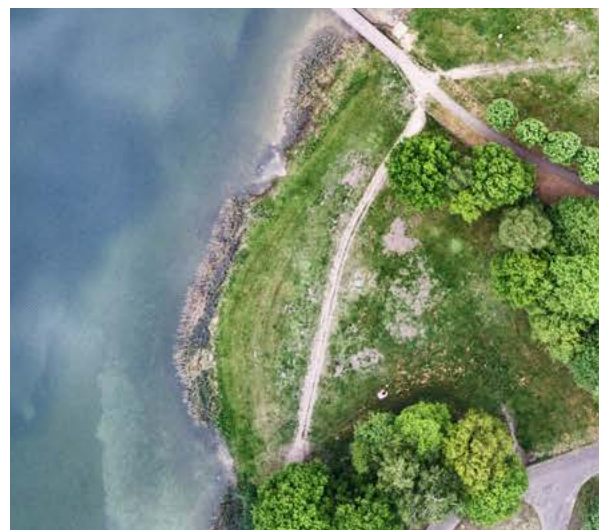
CARBON FOOTPRINT ANALYSIS & ASSESSMENT

Enables us to **identify** & **evaluate** the impact and pressures of current operations on the (marine) environment, **analyze** current emissions and practices and set objectives accordingly.

- Which areas of the business emit the most carbon emissions

- Which materials are the most carbon intensive

- Analyze data from stocklists provided by Boat Bike Tours

- Establish a baseline for the entire fleet

- Analyze & strategize alternative solutions for operations to avoid, mitigate or compensate adverse impacts

CARBON FOOTPRINT ANALYSIS & ASSESSMENT

- Conduct a carbon footprint assessment for baseline measurements of the BBT Fleet of 19 ships & the office to analyze data (with input from the Boat Bike Tours team ie. stock lists, contacting suppliers..etc.)

- Analyze the carbon footprints for the whole BBT fleet & the office , highlighting where the largest and smallest impacts are

- Highlighting solutions some ships in the fleet have already put in place to avoid, mitigate or compensate adverse impacts

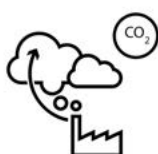- Setting up Key Performance Indicators to effectively lower BBT's CO_2 footprint

DELIVERABLES

CARBON FOOTPRINT ANALYSIS
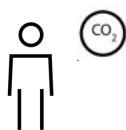
KEY PERFORMANCE INDICATORS

BBT OFFICE

TOTAL CO2 EMISSIONS IN 2019 FOR THE BBT OFFICE:

126,371 KG

CO2 FOOTPRINT FOR A BBT OFFICE EMPLOYEE IN 2019:
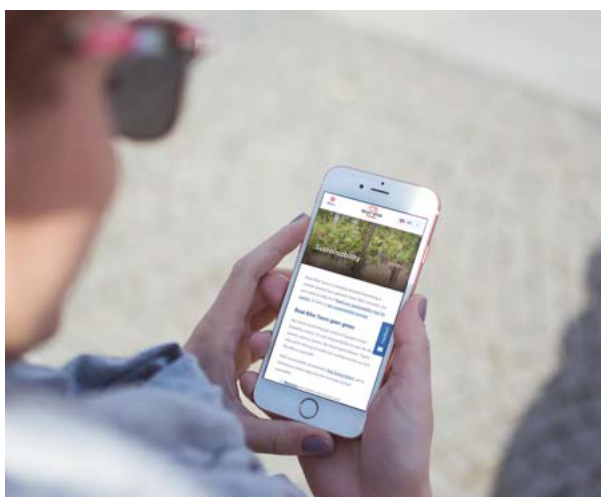
4,512 KG

NUMBER OF CO2 PRODUCED BY BBT OFFICE'S A4 PAPER USAGE:

2,865 KG

The calculations for the carbon footprint of the office were based on **52** weeks consisting of a **5**-day work week and **28** employees.

These included the calculation of travel to and from the office by employees and specific mode of transport. Modes of transport varied from (hybrid) cars running on diesel and regular gas, public transport, scooters and cycling. The total emissions of all travel using these modes of transport were **47,299.5** kg, which is a significantly higher number than **2018** emissions (**38,774.8** kg): an increase of almost **22%**. However, the number of employees was lower in **2018**.

The average CO2 emissions for travel to and from the office per employee amount to **1,762.5 kg** (**2018**) and **1,689.3** (**2019**): a decrease of **4.16%**. The above mentioned numbers do not include business flights: these caused **12,209** kg of CO2 emissions, with an average of **642.6** kg per return flight.

Paper sheets in A4 format contributed to **2,865** kg of CO2. As suggested last year, the amount of CO2 produced and the waste generated can easily be reduced by providing digital itineraries for guests via email or a Boat Bike Tours mobile app, which will cut down or eliminate the need to purchase and print on A4 paper. Employees can also limit their prints by using more digital communication methods. Furthermore, **3,172** plastic bags were used in and around the office. This number can be decreased by emptying the content of trash bins in containers, leaving the bin liners in. Many ship owners deploy the same method to limit their use of plastic bags.

BBT OFFICE CARBON EMISSION CALCULATIONS

FIGURE 1: BBT OFFICE

Material category	Kg of CO2
Employee travel to/from office	47,299.4
Business flights	12,209.0
Total water use	17.0
Energy use	44,040.9
Plastics	892.4
Paper	13,159.5
Office supplies and promotion materials	8,752.4
Total	126370.60

Per Employee:	4513.24

- Employee travel to/from office
- Business flights
- Total water use
- Energy use
- Plastics
- Paper
- Office supplies and promotion materials

BBT OFFICE EMISSIONS 2019

37.4%
9.6%
0.01%
35%
0.7%
10.4%
7%
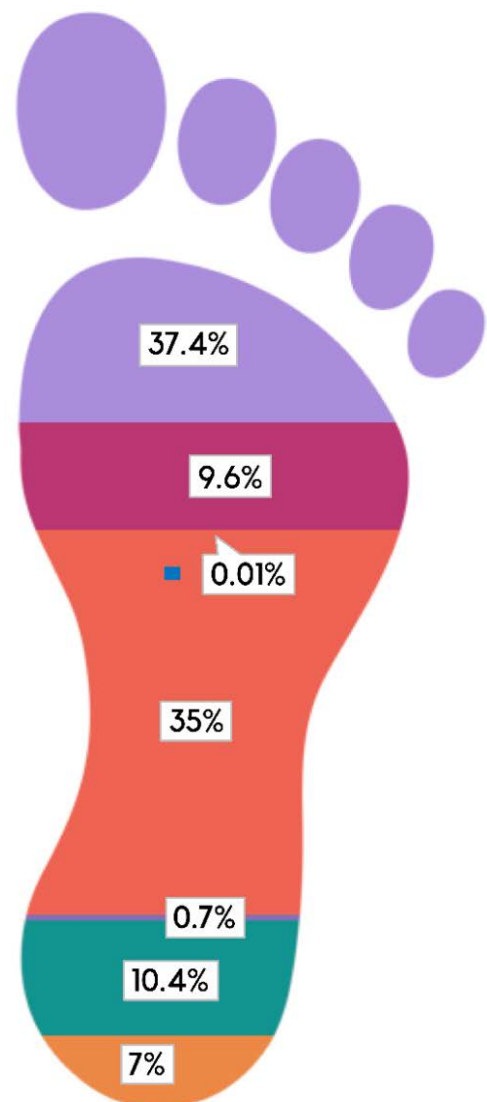
ALLURE

TOTAL CO2 EMISSIONS IN 2019 FOR ALLURE

74,181 KG

CO2 FOOTPRINT FOR AN ALLURE PASSENGER IN 2019
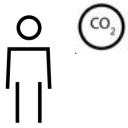
240 KG

FOOD AND DRINKS ALONE PRODUCED:

22,373 KG

In 2019, the Allure sailed a total of **29** weeks with **500** passengers. The calculations in this report are based on the **16** weeks the ship sailed for BBT with **309** passengers.

For two years the Allure has worked on the reduction of its plastic use, for example by keeping straws out of sight for guests and only handing them out on request.

Besides avoiding distributing new soap packages every week by using dispensers, the soap is also eco-friendly, as well as some cleaning products.

To save drinking water, the showers have a Comfortsaver and the toilets are flushed with outside water. Communicating the drinkability of the tap water to the guests helped to reduce the use of bottled water. Guests often have to leave their reusable water bottles behind because there is not enough space in their luggage. The ship owner had an idea on how to solve this issue: a foldable water bottle. This allows the guests to take their souvenir back home.

ALLURE CARBON EMISSION CALCULATIONS

The total number of emissions for Allure was **74,181** kg. The most significant CO2 impact was in the form of fuel, which produced **47,852** kg of CO2 from its **25,000** liters used throughout the BBT season. Other notable impacts included the consumption of food and beverages on board: **22,373** kg. Besides energy usage, which contributed **2,264** kg of CO2, all other impacts were well below this figure. The average footprint of a passenger on board Allure was **240** kg.

FIGURE 2: ALLURE

Material	Kg of CO2
Fuel	47851.85
Total water use	306.40
Energy use	2263.90
Laundry	1192.59
Plastics	128.22
Paper	65.38
Glass	0.00
Food & beverages	22372.67
Other materials	0.00
Total	74181.02

Per Passenger:	240.07

%	Color	Material
64.51%		Fuel
0.41%		Total water use
3.05%		Energy use
1.61%		Laundry
0.17%		Plastics
0.09%		Paper
0.00%		Glass
30.16%		Food & Beverages
0.00%		Other materials
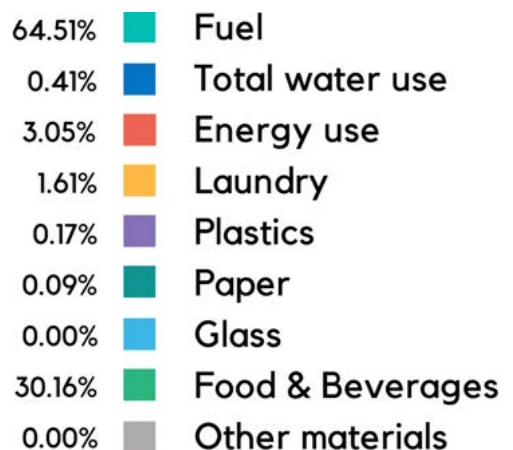
DE AMSTERDAM

De Amsterdam is by far the biggest ship sailing for BBT. In the season of 2019, it carried a total of **3,021** passengers in **29** weeks.

In addition to fulfilling the wishes of the many passengers, De Amsterdam is also working on reducing its impact on the environment. The crew serves meat only **4** days a week instead of **7**, which saves up almost **10,000** meat meals per season. Their creative cooks constantly reduce food waste by transforming leftovers into dishes for the next day or for the crew. The amount of plastic cutlery is down to 0 because passengers can already prepare their sandwiches for lunch during breakfast and therefore won't need cutlery later on.

Banning plastic bottles and only using BBT refillable bottles from this year on, as well as replacing plastic cups in the bathroom by glasses will reduce the plastic waste enormously.

The crew separates the waste and knows exactly at which spots to dispose of it. They also use the port of Enkhuizen to empty their wastewater on land.

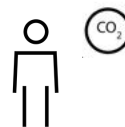When furniture is replaced, the old pieces are sold on Marktplaats or other second hand websites/stores. 'One man's trash is another man's treasure' and it makes a big impact on the national landfills.

TOTAL CO_2 EMISSIONS IN 2019 FOR DE AMSTERDAM:

943,273 KG

CO_2 FOOTPRINT FOR AN AMSTERDAM PASSENGER IN 2019

312 KG

THE AMOUNT OF BREAKFAST SPREAD PACKETS USED BY DE AMSTERDAM THIS SEASON:

26,100

DE AMSTERDAM CARBON EMISSION CALCULATIONS

The total emissions generated over the 2019 season for De Amsterdam was a gigantic **943,273** kg, which was the biggest footprint in the BBT fleet. The most carbon intensive impact came from fuel usage (**726,750** kg CO2), which created **77%** of their overall emissions. Food and beverage consumption was the second most significant contributor, **182,273** kg of CO2, yet only around **19%** of the total footprint. De Amsterdam's total footprint totalled **1,055,786** kg in 2018, and their total season of **29** weeks was the same amount as weeks the ship sailed for BBT in 2019. Compared with 2018's figures from the BBT pilot project, De Amsterdam lowered their overall footprint by **112,513** kg. Main reductions were via fuel (**10.24%**), food consumption (**13.19%**) among others. The average footprint per passenger in **2018** was **303** kg compared with **312** kg in **2019**, but this increase is due to a much lower number of passengers resulting in a higher average per person (**3480 in 2018 and 3021 in 2019**).

AMOUNT OF CO2 REDUCED FROM 2018 TO 2019

-112,513 KG

FIGURE 3: DE AMSTERDAM

Material	Kg of CO2
Fuel	726,750.0
Total water use	636.8
Energy use	8,598.6
Laundry	16,811.4
Plastics	5,399.1
Paper	2,329.0
Glass	475.5
Food & beverages	182,272.9
Other materials	0.0
Total	943273.34

Per Passenger:	312.24

77.05%	Fuel
0.07%	Total water use
0.91%	Energy use
1.78%	Laundry
0.57%	Plastics
0.25%	Paper
0.05%	Glass
19.32%	Food & Beverages
0.00%	Other materials

ELIZABETH

TOTAL CO2 EMISSIONS IN 2019 FOR ELIZABETH
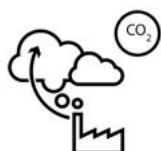
37,512 KG

CO2 FOOTPRINT FOR AN ELIZABETH PASSENGER IN 2019
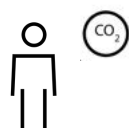
160 KG

THE AMOUNT OF FUEL USED BY ELIZABETH:

5,430 L

The three-mast clipper, Elizabeth, cruised for **12** weeks with a total of **234** passengers in the season of 2019.

The crew separates the waste on board and disposes of it in the ports along the route. In order to create less waste in the first place, the only time straws or plastic breakfast mini containers are used is to make their guests happy with a portion of hagelslag.

The cook minimizes waste by vacuum-packing food, so it stays fresh as long as possible. He is also asked to plan in advance which leftovers could be used for meals the following days — but no meat for Saturday, that is the set vegetarian evening.

ELIZABETH CARBON EMISSION CALCULATIONS

The total footprint generated by Elizabeth for the 2019 season was **37,512** kg. The biggest footprints on board were almost identical with fuel generating a footprint of **17,539** kg and food and beverages, **17,077** kg. Energy usage was the third biggest impact, contributing emissions of **1,841** kg of CO2 with **3,500** kWh. Laundry produced less than 1 metric ton of CO2 followed by small impacts from plastic and water consumption. The average passenger footprint was **160** kg.

FIGURE 4: ELIZABETH

Material	Kg of CO2
Fuel	17,538.9
Total water use	122.0
Energy use	1,841.0
Laundry	716.6
Plastics	131.7
Paper	29.9
Glass	54.9
Food & beverages	17,077.1
Other materials	0.0
Total	**37512.07**
Per Passenger:	**160.31**

46.76%	Fuel
0.33%	Total water use
4.91%	Energy use
1.91%	Laundry
0.35%	Plastics
0.08%	Paper
0.15%	Glass
45.52%	Food & Beverages
0.00%	Other materials
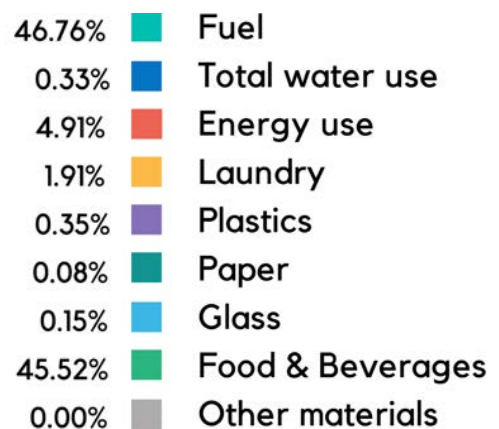
DE FIEP

The former cargo ship Fiep sailed **43** weeks in 2019, **32** of which was for BBT with **736** guests.

The Fiep is successfully cutting down on unnecessary plastic. Instead of little soap and shampoo bottles, dispensers are in place. Plastic, paper, cans and organic waste are all separated. By using lunch boxes, the Fiep avoids the waste of roughly **5,000** lunch bags.

There are water and energy saving measures in place, like comfort savers in the shower heads, outside water for flushing the toilets and LED lights.

For the coming season there are even more changes planned, like solar panels, extra filters for taps and waste water treatment. The Fiep is the only ship that already calculates its own carbon footprint before our pilot project.

The total emissions in 2019 for De Fiep were **125,892** kg of CO2. Fuel was by far the most significant producer of CO2 for De Fiep (**76%**) with **96,149** kg for **40,000** L used. Food and beverages were the second largest producer (**20,951kg**) followed by laundry (**4,558** kg) and energy use (**3,945** kg).

TOTAL CO2 EMISSIONS IN 2019 FOR DE FIEP

125,893 KG

CO2 FOOTPRINT FOR A DE FIEP PASSENGER IN 2019
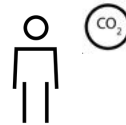
171 KG

THE AMOUNT OF LAUNDRY DONE BY DE FIEP:

3,500 KG

DE FIEP CARBON EMISSION CALCULATIONS

Compared with 2019, our calculations from 2018 show reductions in fuel by **40,405** kg of CO2, (**29.59%**). Other changes included laundry (**38%**) and food and beverages (**25.6%**). Electricity usage was estimated to be the same as the previous year. The average footprint per passenger was **171** kg in 2019 compared with **186** in 2018. A difference of **15** kg per pax from 2018 to 2019.

AMOUNT OF CO2 REDUCED FROM 2018 TO 2019

-60,246 KG

FIGURE 5: DE FIEP

Material	Kg of CO2
Fuel	96,148.8
Total water use	178.5
Energy use	3,945.0
Laundry	4,558.1
Plastics	83.9
Paper	14.9
Glass	12.4
Food & beverages	20,951.2
Other materials	0.0
Total	**125892.86**
Per Passenger:	**171.05**

%	Material
76.37%	Fuel
0.14%	Total water use
3.13%	Energy use
3.62%	Laundry
0.07%	Plastics
0.01%	Paper
0.01%	Glass
16.64%	Food & Beverages
0.00%	Other materials

FLEUR

TOTAL CO2 EMISSIONS IN 2019 FOR FLEUR

80,192 KG

CO2 FOOTPRINT FOR A FLEUR PASSENGER IN 2019
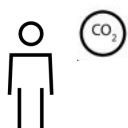
159 KG

THE AMOUNT OF DRINKING WATER CONSUMED ON FLEUR:

290,000 M³

In 2019, the passenger barge Fleur cruised **29** weeks in total and **21** of those for BBT. In the **21** weeks they had **503** passengers on board.

The Fleur endeavors to eliminate waste completely. The guests get reusable boxes for lunch, there are no straws available, the wholesaler was asked to deliver supplies in crates without plastic, juice and wine come from a tap and instead of baking paper, there is now a reusable baking mat.

So far there is no designated vegetarian night, but in 2020 the crew will ask the passengers every night if they prefer a meatless meal for the next day. This way the cook has a better idea of how much to defrost and if there is high demand, vegetarian nights can become standard. The meat and cheese are obtained from a sustainable Beemster farmer and the breakfast stays fresh over a longer period as the food is kept in a cooling cabinet.

Due to all these successful efforts, the Fleur is the only ship of the fleet to receive a Golden Badge in 2 categories.

FLEUR CARBON EMISSION CALCULATIONS

The total emissions for Fleur in 2019 were **80,192** kg. The three largest impacts were fuel (**55,106** kg), food and drinks (**19,255** kg) and energy (**3,788** kg). Fuel made up **67%** of overall emissions. Laundry was also a notable impact with a footprint of **1,681** kg. Fleur's plastic footprint was zero, which earned Fleur a golden badge. The average footprint for a Fleur passenger was **159** kg.

FIGURE 6: FLEUR

Material	Kg of CO2
Fuel	55,106.0
Total water use	311.7
Energy use	3,788.0
Laundry	1,681.3
Plastics	0.0
Paper	50.4
Glass	0.0
Food & beverages	19,254.7
Other materials	0.0
Total	**80192.14**
Per Passenger:	**159.43**

%	Legend
68.72%	Fuel
0.39%	Total water use
4.72%	Energy use
2.10%	Laundry
0.00%	Plastics
0.06%	Paper
0.00%	Glass
24.01%	Food & Beverages
0.00%	Other materials
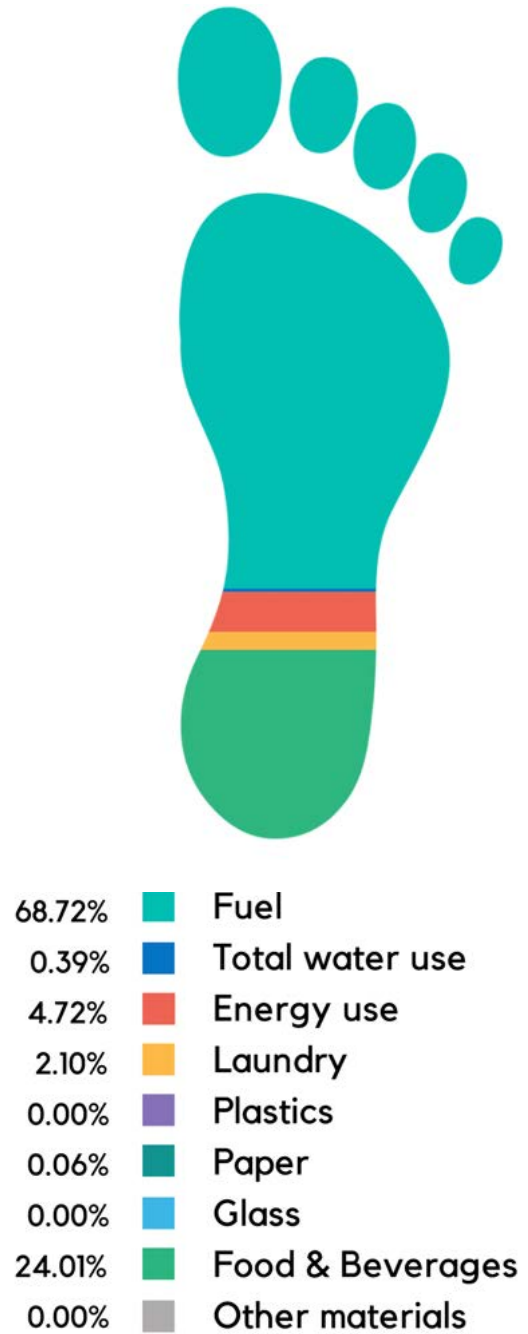
FLORA

The river barge, Flora, cruised the fresh waters for **29** weeks last season, of which 11 weeks for BBT. **503** of the total **663** passengers were carried for BBT.

The ship has banned single-used plastics completely, there are no straws, mini breakfast containers and even though packaging wrap is used as little as possible, the crew is still looking for a more sustainable alternative.

For lunch guests get a box and are responsible to keep it clean. The cook on board prevents food waste in very creative ways, for example by making a cake from leftover bread. One cook is vegetarian himself and will bring more vegetarian meals on board.

The soap and shampoo bottles were replaced by dispensers last winter. There are water saving measures in the showers and more water filters are to come.

The Flora is one of the few ships with solar panels and the only one with a dynamo on the main engine which produces even more sustainable energy.

TOTAL CO2 EMISSIONS IN 2019 FOR FLORA

33,887 KG

CO2 FOOTPRINT FOR A FLORA PASSENGER IN 2019
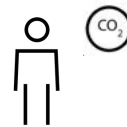
160 KG

THE AMOUNT OF ENERGY CONSUMED ON FLORA:

7,800 KWH

FLORA CARBON EMISSION CALCULATIONS

Flora's overall CO2 footprint for the 2019 season was **33,887** kg. Fuel followed by food and beverages were the biggest contributors emitting (**18,378** kg and **12,898** kg) of CO2 respectively. Other notable, yet less CO2-intensive footprints included those for energy (**1,556** kg) and laundry (**932** kg). Glass, paper and plastics were not used on board as reflected in the table. The average footprint per passenger was **160** kg.

FIGURE 7: FLORA

Material	Kg of CO2
Fuel	18,377.6
Total water use	122.8
Energy use	1,556.2
Laundry	932.0
Plastics	0.0
Paper	0.0
Glass	0.0
Food & beverages	12,898.2
Other materials	0.0
Total	**33886.74**
Per Passenger:	159.84

%	Category
54.23%	Fuel
0.36%	Total water use
4.59%	Energy use
2.75%	Laundry
0.00%	Plastics
0.00%	Paper
0.00%	Glass
38.06%	Food & Beverages
0.00%	Other materials
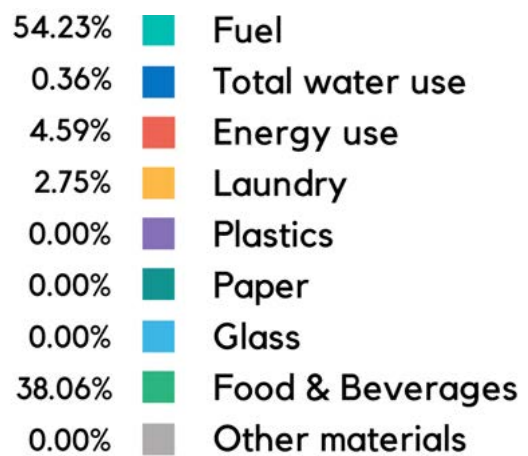
FLUVIUS

TOTAL CO2 EMISSIONS IN 2019 FOR FLUVIUS

148,514 KG

CO2 FOOTPRINT FOR A FLUVIUS PASSENGER IN 2019
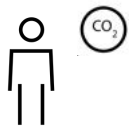
151 KG

PAPER LUNCHBAGS USED BY FLUVIUS:

9,366

From the **36** weeks that the luxury river cruise barge Fluvius sailed in the season of 2019, **24** weeks were for BBT with an amount of **986** guests.

Plastic on board is reduced by minimizing the use of plastic soap bottles and mini breakfast containers.

Good quality water and energy are saved as the toilets are flushed with outside water.

There is no standard vegetarian night, but the Fluvius always has an option for guests who prefer a meatless meal.

FLUVIUS CARBON EMISSION CALCULATIONS

The total footprint for Fluvius in 2019 was **148,514** kg. Fluvius' fuel footprint was **64,600** kg, closely followed by food and beverage consumption: **57,744** kg. The next largest impact making up **12%** of the total footprint was energy usage: **18,645** kg. The footprint from paper was considerably higher than the rest of the fleet (**721** kg). Their use of single-use items such as paper lunch bags (**9,366**) are likely the culprit of having a higher paper footprint. The average footprint per passenger on board the Fluvius was **151** kg.

FIGURE 8: FLUVIUS

Material	Kg of CO2
Fuel	64,600.0
Total water use	372.4
Energy use	18,644.9
Laundry	6,393.9
Plastics	32.6
Paper	721.2
Glass	5.3
Food & beverages	57,743.9
Other materials	0.0
Total	148514.11

Per Passenger:	150.62

43.50%	Fuel
0.25%	Total water use
12.55%	Energy use
4.31%	Laundry
0.02%	Plastics
0.49%	Paper
0.00%	Glass
38.88%	Food & Beverages
0.00%	Other materials
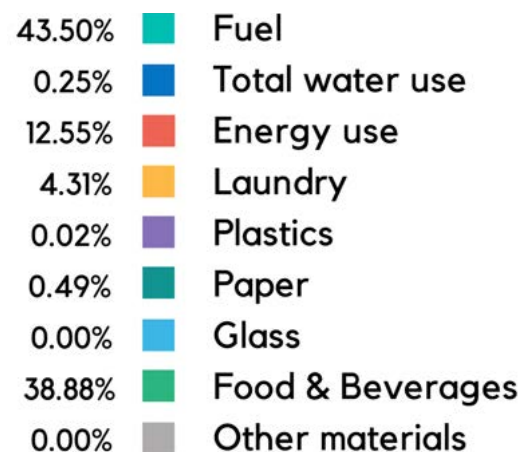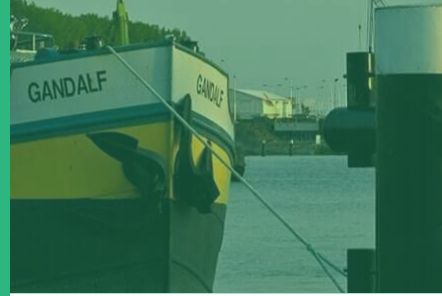
GANDALF

In 2019, the Gandalf sailed **24** weeks for BBT and carried **404** passengers.

The owner of the ship has ambitions to drastically reduce the waste on board. Mini breakfast containers will change into pots of jam and large packages of hagelslag, paper placemats will be replaced by washable ones and the current paper lunch bags could be turned into a box with a photo of the ship on it, so it can be used for lunch and as a souvenir.

If guests don't have their own shampoo, they can ask for one, but not having it in the cabins by default reduces its waste noticeably.

The Gandalf is doing especially well when it comes to sustainable energy and water use. **36** solar panels produce energy and the engine has been overhauled. Water is saved by using outside water for the toilets, measures in the showers, utensils are not washed under running water and a dishwasher that was specially selected for its water use.

For these efforts, the Gandalf is the only ship of the BBT fleet that receives a Golden Badge for Sustainable Energy & Water Use.

TOTAL CO2 EMISSIONS IN 2019 FOR GANDALF

97,977 KG

CO2 FOOTPRINT FOR A GANDALF PASSENGER IN 2019
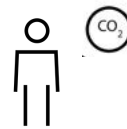
204 KG

BREAKFAST SPREAD PACKETS USED:

6,720

GANDALF CARBON EMISSION CALCULATIONS

The overall footprint for Gandalf in 2019 was **97,976.54** kg. Fuel was dominantly the biggest contributor of CO2 and **65%** of the total footprint which produced almost **64,000** kg. Food and beverages were the second largest contributor producing **28,360** kg of CO2. Energy followed by laundry were the third and fourth largest contributors (**3,682** kg and **1,379** kg) respectively. Though their plastic usage had a small CO2 footprint (**138.6** kg), they used many small single-use plastic items, especially individual packages of breakfast spread (**6,720**), which is planned to be changed in the coming season. The average footprint per passenger was **204** kg.

FIGURE 9: GANDALF

Material	Kg of CO2
Fuel	63,927.1
Total water use	252.8
Energy use	3,682.0
Laundry	1,378.7
Plastics	138.6
Paper	120.0
Glass	117.7
Food & beverages	28,359.7
Other materials	0.0
Total	**97976.54**

Per Passenger:	204.12

65.25% Fuel
0.26% Total water use
3.76% Energy use
1.41% Laundry
0.14% Plastics
0.12% Paper
0.12% Glass
28.95% Food & Beverages
0.00% Other materials
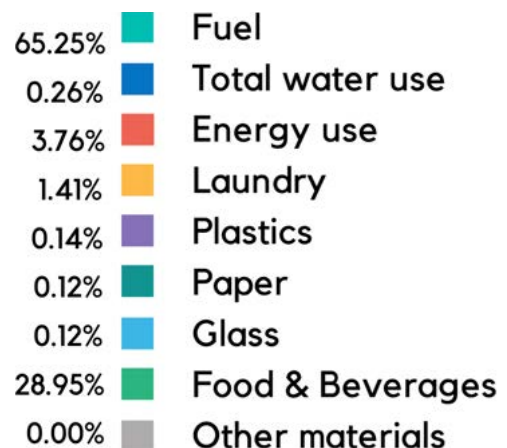
DE HOLLAND

TOTAL CO2 EMISSIONS IN
2019 FOR DE HOLLAND
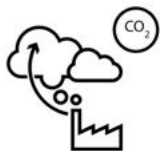
539,256 KG

CO2 FOOTPRINT FOR A DE
HOLLAND PASSENGER IN 2019
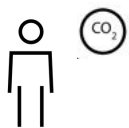
307 KG

FUEL USED BY DE HOLLAND
OVER THE 2019 SEASON:

117,391 L

Last season De Holland sailed **27** weeks with a total number of **1,756** passengers.

From 2020 onwards guests of De Holland will only receive BBT water bottles as all other plastic bottles vanish as the ship cuts down on plastic.

The plastic cups in the bathrooms will be replaced by glass and the wholesaler delivers most supplies in crates which significantly reduces the plastic on board.

Like De Amsterdam, discarded furniture is sold second hand.

De Holland is one of the few ships that has a separate grey and black water tank and treats the waste water before emptying it on land in Enkhuizen.

DE HOLLAND CARBON EMISSION CALCULATIONS

The overall footprint for De Holland over the 2019 season was **539,256** kg, the second largest footprint of the BBT fleet. The biggest impact came from fuel, a whopping **379,174** kg based on De Holland's **117,391** L usage, which made up **70%** of its total emissions. Food and beverages also had a very large footprint: **105,949** kg. Energy and laundry were the third and fourth largest contributors of CO2 (**34,084** kg and **11,697** kg) respectively.

Compared with the rest of the fleet, De Holland had a very large plastic footprint, **5,121** kg, considering plastics generally have a low footprint. Although, emissions for their plastic usage were less than **1%** of their total emissions. The average footprint of De Holland was **307** kg.

FIGURE 10: DE HOLLAND

Material	Kg of CO2
Fuel	379,173.9
Total water use	834.5
Energy use	34,084.1
Laundry	11,697.0
Plastics	5,120.8
Paper	1,408.9
Glass	988.2
Food & beverages	105,948.8
Other materials	0.0
Total	**539256.1326**
Per Passenger:	**307.09**

%	Category
70.31%	Fuel
0.15%	Total water use
6.32%	Energy use
2.17%	Laundry
0.95%	Plastics
0.26%	Paper
0.18%	Glass
19.65%	Food & Beverages
0.00%	Other materials

LEAFDE FAN FRYSLÂN

The three-mast barquentine, Leafde fan Fryslân, sailed for 28 weeks with a total of **673** passengers in 2019. Of these, **25** weeks were for BBT with **598** passengers.

To prevent plastic waste, but to still fulfil their guests' wishes, they switched from plastic straws to paper ones, but even the amount of those used is minimal. There are also no more plastic bottles on board and if guests would like to have a BBT water bottle, they can take one themselves from the bar.

Furthermore, there are stickers in the cabins that inform the guests about the use of water and towels.

The soaps are still packaged, but from an eco-label. Green soap and vinegar are also used for environmentally friendly cleaning.

How many vegetarian meals are served depends on the cook and the guests' preferences, but one vegetarian evening per trip is the goal.

TOTAL CO_2 EMISSIONS IN 2019 FOR LEAFDE FAN FRYSLÂN

104,448 KG

CO_2 FOOTPRINT FOR A LEAFDE FAN FRYSLÂN PASSENGER IN 2019
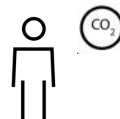
175 KG

SMALL GLASS BOTTLES THAT WERE RECYCLED:

1,200

LEAFDE FAN FRYSLÂN CARBON EMISSION CALCULATIONS

Leafde fan Fryslân had a total CO2 footprint of **104,448** kg for the 2019 season. On par with the rest of the fleet, fuel, closely followed by food and beverages were the biggest contributors of CO2: **56,525** kg and **39,294** kg. As a sailing ship, fuel usage combined with wind power was used to power the ship. Energy and laundry with footprints within the range of around **4,000** kg each were the third and fourth most polluting impacts. Additional footprints each fell below the **1,000** kg mark and individually represented less than **1%** of the total footprint. The average CO2 footprint per passenger was **175** kg.

FIGURE 11: LEAFDE FAN FRYSLÂN

Material	Kg of CO2
Fuel	56,525.0
Total water use	212.2
Energy use	3,762.7
Laundry	3,709.9
Plastics	619.8
Paper	317.7
Glass	6.4
Food & beverages	39,294.1
Other materials	0.0
Total	104447.71
Per Passenger:	174.66

%	Category
54.12%	Fuel
0.20%	Total water use
3.60%	Energy use
3.55%	Laundry
0.59%	Plastics
0.30%	Paper
0.01%	Glass
37.62%	Food & Beverages
0.00%	Other materials
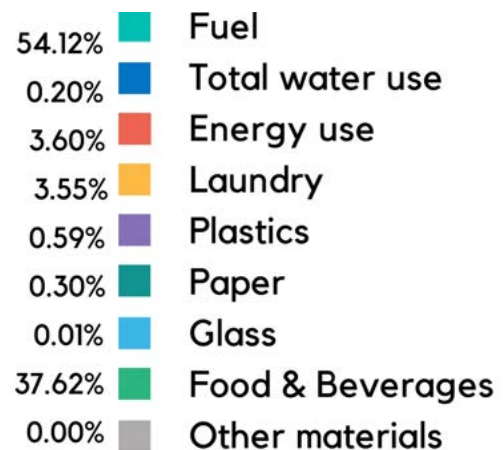
LENA MARIA

TOTAL CO2 EMISSIONS IN 2019 FOR LENA MARIA

104,938 KG

CO2 FOOTPRINT FOR A LENA MARIA PASSENGER IN 2019
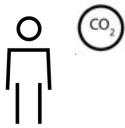
192 KG

PLASTIC FOOD-PREP GLOVES USED:

600

In the season of 2019, the Lena Maria sailed **24** weeks with **547** guests for BBT.

For **3** more weeks they sailed for another company. The Lena Maria is the only ship that uses cotton napkins which prevents a lot of waste and it is also one of the few ships that buys fresh products on the market daily.

On board there is hardly any plastic left. Guests get a lunch box for the week which they can request the kitchen staff to clean and the placemats are also reusable.

For its successful endeavors to ban plastic, the Lena Maria is one of two ships that receives the Golden Badge in the category Plastic Free.

LENA MARIA CARBON EMISSION CALCULATIONS

The total footprint of Lena Maria over the 2019 season was **104,938** kg. The most CO2-heavy footprint was fuel (**57,422** kg), making up almost **55%** of the overall footprint. Food and beverages had the second biggest impact with **41,546** kg. Energy and laundry were the third and fourth most CO2 polluting, making up **3.1%** and **2.3%** of the overall footprint. Other impacts such as paper, plastics and the use of similar materials had a minimal footprint of around 200-100 kg each. The average footprint per passenger was **192** kg.

FIGURE 12: LENA MARIA

Material	Kg of CO2
Fuel	57,422.2
Total water use	182.5
Energy use	3,272.9
Laundry	2,403.4
Plastics	100.8
Paper	0.0
Glass	10.1
Food & beverages	41,546.1
Other materials	0.0
Total	**104937.88**
Per Passenger:	**191.84**

%	Material
54.72%	Fuel
0.17%	Total water use
3.12%	Energy use
2.29%	Laundry
0.10%	Plastics
0.00%	Paper
0.01%	Glass
39.59%	Food & Beverages
0.00%	Other materials
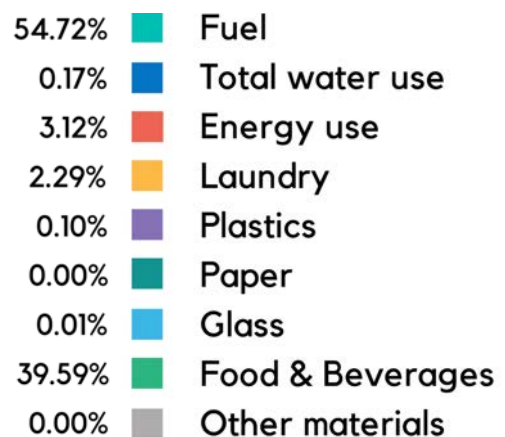
MAGNIFIQUE

The Magnifique carried **929** passengers for BBT in its 2019 season which lasted **30** weeks.

A lot of changes have happened on board to minimize plastic and waste in general. Pepper and Salt are now in refillable containers, plastic straws were replaced by paper ones and plastic bottles are not available at all. The crew tries to recycle as much as possible or give materials like cardboard back to the supplier.

Newly hung up plates inform guests about the towel and water policies. Every time something needs to be replaced on board, the management reconsiders if there is a more sustainable substitute.

By now, the soaps and cleaning products are bleach free and eco-friendly and the bedsheets are made from a sustainable material. For these reasons, the Magnifique is among the best rated ships in the category Local & Sustainable Products.

Also the efforts for vegetarian meals contribute to the achievement of this badge. **2** out of **3** cooks are vegetarian, as well as some members of the crew, which is why there are always meatless meals on the menu.

TOTAL CO2 EMISSIONS IN 2019 FOR MAGNIFIQUE

249,923 KG

CO2 FOOTPRINT FOR A MAGNIFIQUE PASSENGER IN 2019
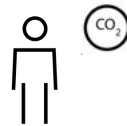
269 KG

THE AMOUNT OF PLASTIC TRASH BAGS USED ON BOARD MAGNIFIQUE

840

MAGNIFIQUE CARBON EMISSION CALCULATIONS

The overall footprint from Magnifique for the 2019 season was **249,923** kg. The impact from fuel was the largest on board contributing to **64%** of their total CO2 emissions: **159,197** kg. Food and beverages were the second biggest impact for Magnifique (**56,052** kg), **22.4%** of their overall footprint, followed by energy usage (**31,560** kg). While many plastics have been omitted from operations, items like plastic garbage bags (**840** items) and other single use items are still being used. The average passenger footprint on Magnifique was **269** kg.

FIGURE 13: MAGNIFIQUE

Material	Kg of CO2
Fuel	159,197.0
Total water use	19.5
Energy use	31,560.0
Laundry	2,519.9
Plastics	200.9
Paper	316.6
Glass	58.5
Food & beverages	56,051.5
Other materials	0.0
Total	249923.92
Per Passenger:	269.02

63.70%	Fuel
0.01%	Total water use
12.63%	Energy use
1.01%	Laundry
0.08%	Plastics
0.13%	Paper
0.02%	Glass
22.43%	Food & Beverages
0.00%	Other materials
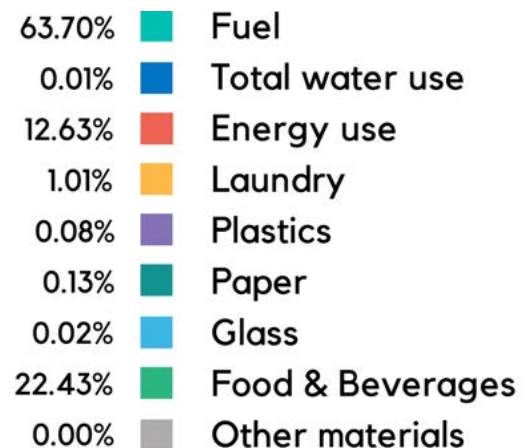
MAGNIFIQUE II

TOTAL CO2 EMISSIONS IN 2019 FOR MAGNIFIQUE II

185,360 KG

CO2 FOOTPRINT FOR A MAGNIFIQUE II PASSENGER IN 2019

183 KG

AMOUNT OF NAPKINS USED BY MAGNIFIQUE II:

13,000

During the 2019 season, the Magnifique ll welcomed **1,011** guests on board in **30** weeks for BBT.

In the **17** cabins' bathrooms the plastic cups were already replaced with glass and for the season of 2020 the mini shampoos will be replaced with dispensers.
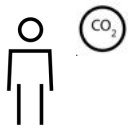
There are no straws on board and the trash bins used on board are made out of recycled plastic.
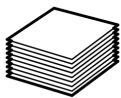
Cooling cabinets help to keep the cheese and meat fresh during breakfast times, preventing food waste.

A special feature of the Magnifique ll is that all of the lamps on deck run on solar energy.

MAGNIFIQUE II CARBON EMISSION CALCULATIONS

The overall footprint for Magnifique II was **185,360** kg. Fuel was by far the biggest impact, contributing to **116,280** kg of CO2 making up almost **63%** of the total emissions. Laundry followed by energy were the third and fourth biggest polluters (**3%** and **2.4%**) of overall emissions respectively. Water consumption, plastic and glass usage had bigger impacts than the majority of the fleet with around **1,000** kg of CO2 emitted for each. This is largely due to the use of items such as disposable napkins, of which **13,000** were used on board Magnifique II. The average footprint for a passenger on board the ship was **183** kg.

FIGURE 14: MAGNIFIQUE II

Material	Kg of CO2
Fuel	116,280.0
Total water use	1,024.8
Energy use	4,508.6
Laundry	5,573.1
Plastics	1,112.8
Paper	130.0
Glass	844.9
Food & beverages	55,885.8
Other materials	0.0
Total	**185360.05**
Per Passenger:	**183.34**

%	Category
62.73%	Fuel
0.55%	Total water use
2.43%	Energy use
3.01%	Laundry
0.60%	Plastics
0.07%	Paper
0.46%	Glass
30.15%	Food & Beverages
0.00%	Other materials

MAGNIFIQUE III

The Magnifique III sailed **29** weeks for BBT with a total of **1,236** passengers in 2019.

Like the Magnifique II, solar energy is used to power the lamps on the ship's deck and a cooling cabinet ensures that the food for breakfast stays fresh.

By banning straws, replacing plastic cups with glass and using recycled trash bins, they reduced their environmental impact.

The soaps provided for guests are from an eco-label. From the coming season onwards they will have dispensers for shampoo in the cabins.

TOTAL CO2 EMISSIONS IN 2019 FOR MAGNIFIQUE III

195,005 KG

CO2 FOOTPRINT FOR A MAGNIFIQUE III PASSENGER IN 2019
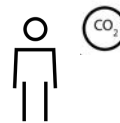
158 KG

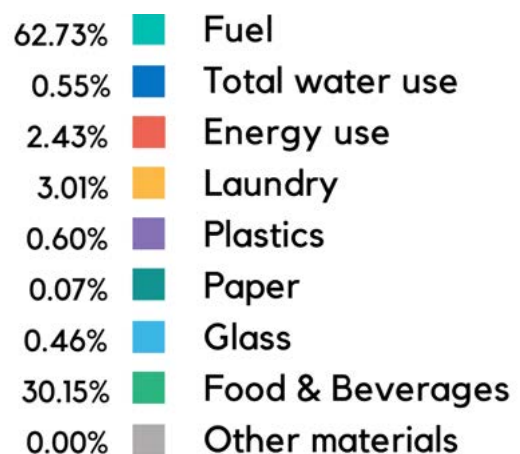**AMOUNT OF LARGE GLASS BOTTLES RECYCLED:**

2,500

MAGNIFIQUE III CARBON EMISSION CALCULATIONS

The overall footprint for Magnifique III in 2019 was **195,005** kg. Fuel was by and large the biggest emitter of CO2 producing **112,404** kg. Food and beverages had the second biggest footprint, **68,323** kg, on the ship. Laundry followed by energy use had the third and fourth largest impacts: **6,814** kg and **4,358** kg. Plastic usage, water consumption and glass were other notable contributors, which produced around one ton of CO2 each. As many as **2,500** large glass bottles were used on board and were recycled following their usage.

Compared with the 2018 season, which had an impact of **252,894** kg, the footprint of the Magnifique III was greatly reduced. Magnifique III shaved off **57,889** kg of CO2 from operations with most impressive changes coming from fuel (**17.43%**), food and beverages (**16.47%**) and laundry (**35%**). The average passenger footprint on Magnifique III was lowered from **221.8** in **2018** to **158** kg in **2019**, which is admirable.

AMOUNT OF CO2 REDUCED FROM 2018 TO 2019

CO₂ **-57,889 KG**

FIGURE 15: MAGNIFIQUE III

Material	Kg of CO2
Fuel	112,404.0
Total water use	990.6
Energy use	4,358.3
Laundry	6,813.5
Plastics	1,107.5
Paper	163.0
Glass	844.9
Food & beverages	68,323.3
Other materials	0.0
Total	195005.15

Per Passenger:	157.77

%	Legend
57.64%	Fuel
0.51%	Total water use
2.23%	Energy use
3.49%	Laundry
0.57%	Plastics
0.08%	Paper
0.43%	Glass
35.04%	Food & Beverages
0.00%	Other materials

MARE FAN FRYSLÂN

TOTAL CO2 EMISSIONS IN 2019 FOR MARE FAN FRYSLÂN

92,696 KG

CO2 FOOTPRINT FOR A MARE FAN FRYSLÂN PASSENGER IN 2019
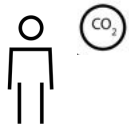
172 KG

AMOUNT OF PAPER PLACEMATS USED:
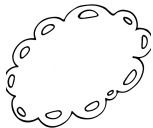
4,500

The three-mast sailing ship, Mare fan Fryslân, sailed for **26** weeks with a total of **750** passengers. **20** of those weeks and **540** of the guests were for BBT.

The Mare successfully banned most of its plastic, like straws and plastic bottles. If guests would like a water bottle for the cycling tour, they can take a BBT bottle from the counter.

To be informed about the water and towel policies on board, stickers are placed in the cabin.

Hand soap, as well as cleaning products are from an eco-label. The ship's cook is responsible for the menus, but the aim is to have at least one vegetarian night per trip.

MARE FAN FRYSLÂN CARBON EMISSION CALCULATIONS

Mare fan Fryslân's overall CO2 footprint in 2019 was **92,696** kg. Like the rest of the fleet, this boat's biggest footprint was fuel, even though the sailing ship used fuel in combination with wind power via sails. Fuel was the biggest contributor of CO2, generating **48,450** kg. Food and beverages (**37,727** kg) had the second biggest impact making up **40%** of the total footprint. Energy followed by laundry were the third and fourth biggest contributors (**3.9%** and **1.7%**) of the total impacts respectively. Plastics and paper had small, but notable impacts, which produced slightly over **500** kg of CO2 each.

The average footprint per passenger was **172** kg, the smallest footprint of the BBT fleet.

FIGURE 16: MARE FAN FRYSLÂN

Material	Kg of CO2
Fuel	48,450.0
Total water use	150.7
Energy use	3,612.6
Laundry	1,564.9
Plastics	585.2
Paper	525.3
Glass	80.3
Food & beverages	37,726.6
Other materials	0.0
Total	92695.60

Per Passenger:	171.66

52.27%	Fuel
0.16%	Total water use
3.90%	Energy use
1.69%	Laundry
0.63%	Plastics
0.57%	Paper
0.09%	Glass
40.70%	Food & Beverages
0.00%	Other materials
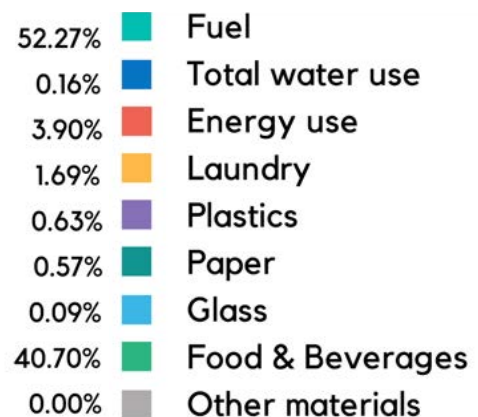
DE NASSAU

In the season of 2019, De Nassau welcomed **1,161** passengers on board within 18 weeks.

Like De Amsterdam and De Holland, De Nassau serves meat only **4** days a week which makes a big difference in the impact on the environment.

A clever way used to avoid plastic cutlery is by letting guests prepare their lunch during breakfast. De Nassau organized with their wholesaler to have supplies delivered in crates which changes the amount of waste drastically.

For the coming season they want to get rid of plastic bottles, only offer BBT bottles and replace the plastic cups with glass.

The crew of De Nassau knows exactly where spots are along their route where they can dispose of the separated waste, such as plastic, paper, glass and more.

As a next step, the management wants to have in-room information for their guests about what can be flushed down the toilet and the towel-change policy.

TOTAL CO2 EMISSIONS IN 2019 FOR DE NASSAU

415,742 KG

CO2 FOOTPRINT FOR A DE NASSAU PASSENGER IN 2019
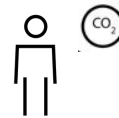
358 KG

AMOUNT OF DRINKING WATER CONSUMED:

600,000 M³

DE NASSAU CARBON EMISSION CALCULATIONS

De Nassau's total CO2 footprint for the 2019 season was a colossal **415,742** kg, third largest to that of De Holland and De Amsterdam. The footprint from fuel, the biggest contributor, was a large part of why De Nassau's footprint was so big; **323,000** kg was produced by fuel alone and made up **78%** of the overall footprint. Food and beverages also had a big footprint, **70,049** kg. Laundry followed by energy had the third and fourth biggest footprints, though both generated under **2%** of the total footprint each. While water use seems small in comparison to the aforementioned footprints, it is worth mentioning that De Nassau consumed **600,000** m^3 of drinking water. The average footprint of a De Nassau passenger was **358** kg.

FIGURE 17: DE NASSAU

Material	Kg of CO2
Fuel	323,000.0
Total water use	585.6
Energy use	6,858.4
Laundry	7,923.8
Plastics	3,890.9
Paper	967.8
Glass	2,466.0
Food & beverages	70,049.3
Other materials	0.0
Total	**415741.85**

Per Passenger:	**358.09**

77.69%	Fuel
0.14%	Total water use
1.65%	Energy use
1.91%	Laundry
0.94%	Plastics
0.23%	Paper
0.59%	Glass
16.85%	Food & Beverages
0.00%	Other materials
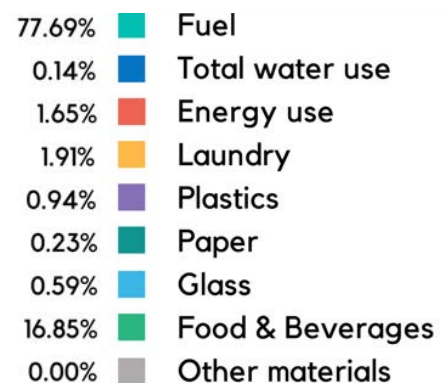
SARAH

TOTAL CO2 EMISSIONS IN 2019 FOR SARAH
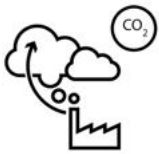
112,728 KG

CO2 FOOTPRINT FOR A SARAH PASSENGER IN 2019
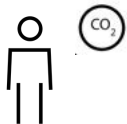
266 KG

BLACK WATER GENERATED BY SARAH:

759,500 M³

The Sarah sailed **25** weeks for BBT in 2019 and had **424** passengers on board.

The management has been working on the reduction of the ship's plastic use continuously for **2** years already.

Straws are not handed out to guests automatically, but available on request. Soap packages are avoided by using dispensers and the soap is eco-friendly, as well as some cleaning products.

To save water, the showers have water saving measures and the toilets are flushed with outside water.

To allow overseas guests to take their BBT bottle home instead of having to leave it behind, the ship owner has the idea to offer foldable bottles which fit in every suitcase.

SARAH CARBON EMISSION CALCULATIONS

The total footprint for Sarah over the 2019 season was **112,728** kg. Fuel (**69,612** kg) was the biggest emitter of CO2, making up over **60%** of the total footprint. The second biggest impact was food and beverages, **30%** of the footprint and produced 36,452 kg of CO2. Energy usage, consisting of **3%** of the total footprint generated over **3.5** metric tons of CO2 and other small, but notable impacts including laundry, water and paper created around or less than **1%** of the overall footprint. The average CO2 contribution per passenger was **266** kg.

FIGURE 18: SARAH

Material	Kg of CO2
Fuel	69,612.1
Total water use	527.0
Energy use	3,537.4
Laundry	1,943.1
Plastics	186.7
Paper	469.4
Glass	0.0
Food & beverages	36,452.0
Other materials	0.0
Total	**112727.68**
Per Passenger:	**265.87**

62.10%	Fuel
0.47%	Total water use
3.16%	Energy use
1.17%	Laundry
0.17%	Plastics
0.42%	Paper
0.00%	Glass
32.52%	Food & Beverages
0.00%	Other materials
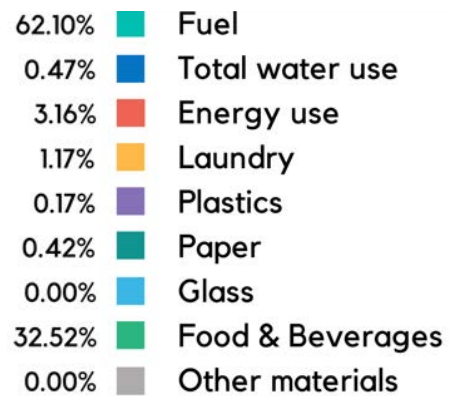
WAPEN FAN FRYSLÂN

Of the **21** weeks that the sailing ship Wapen fan Fryslân sailed in 2019, **12** were for BBT with a number of **276** passengers.

One time during each trip the Wapen has a barbecue evening and the night before that they have one set vegetarian menu.

During breakfast the crew puts small amounts of food on table to make sure it will be finished and not thrown away. However, the guests can always ask for more and after the first day, the crew can already estimate how much food will be needed.

TOTAL CO2 EMISSIONS IN 2019 FOR WAPEN FAN FRYSLÂN

98,263 KG

CO2 FOOTPRINT FOR A WAPEN FAN FRYSLÂN PASSENGER IN 2019
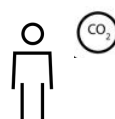
164 KG

THE AMOUNT OF COFFEE PODS USED ON BOARD:

500

WAPEN FAN FRYSLÂN CARBON EMISSION CALCULATIONS

The total footprint for Wapen fan Fryslân over the 2019 season was **98,263** kg. Fuel produced around **50%** of the total CO2 impact with **51,680** kg followed by food and beverages with **39,236** kg. It is worth noting that fuel usage was combined with wind power generated from the sails on board. Energy use (**3,156** kg) and laundry (**2,888** kg) were the third and fourth biggest contributors of CO2. While small, the footprint from plastic was notable at **672** kg. Single use plastics such as coffee pods were the biggest contributors to their plastic footprint; **500** coffee pods were used on board. The average footprint for Wapen fan Fryslân was **164** kg.

FIGURE 19: WAPEN FAN FRYSLÂN

Material	Kg of CO2
Fuel	51,680.0
Total water use	292.8
Energy use	3,156.0
Laundry	2,887.5
Plastics	672.1
Paper	326.3
Glass	12.6
Food & beverages	39,235.7
Other materials	0.0
Total	**98263.00**
Per Passenger:	**163.77**

52.59%	Fuel
0.30%	Total water use
3.21%	Energy use
2.94%	Laundry
0.68%	Plastics
0.33%	Paper
0.01%	Glass
39.93%	Food & Beverages
0.00%	Other materials
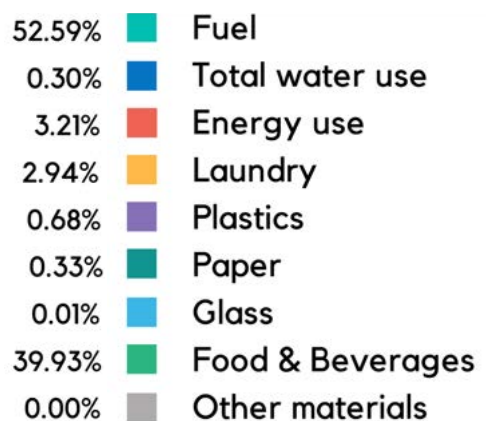
ZWAANTJE

TOTAL CO2 EMISSIONS IN 2019 FOR ZWAANTJE
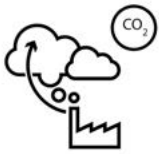
65,367 KG

CO2 FOOTPRINT FOR A ZWAANTJE PASSENGER IN 2019
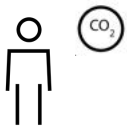
202 KG

THE AMOUNT OF PLASTIC SOAP DISPENSER BOTTLES:

1,200 KG

The Zwaantje sailed **12** out of **25** weeks for BBT and had **323** guests in those **12** weeks.

3 years ago they started to cut down on the plastic use on board. There are no more straws and bottled water is only available on request.

The guests of the Zwaantje enjoy **2** set vegetarian nights during each trip.

The ship has water filters in place and the cabins' showers have the comfort saver installed.

Another environmental measure implemented is the use of only eco-friendly cleaning soap without bleach.

ZWAANTJE CARBON EMISSION CALCULATIONS

The overall footprint for Zwaantje for the 2019 season was **65,367** kg. Fuel was the biggest producer of CO2: **38,760** kg. Food and beverages were the second largest producers of CO2, around **24%** of the total footprint: **15,694** kg. Besides energy use, the third most CO2-intensive impact (**9,089** kg), laundry and plastics were also notable footprints with **966** kg and **572** kg respectively. The plastic footprint on board was largely from the use of single use plastics including **1,200** kg of plastic soap dispensers used on board. The average CO2 footprint for a Zwaantje passenger was **202** kg.

FIGURE 20: ZWAANTJE

Material	Kg of CO2
Fuel	38,760.0
Total water use	106.2
Energy use	9,089.3
Laundry	966.0
Plastics	572.1
Paper	131.2
Glass	47.7
Food & beverages	15,694.3
Other materials	0.0
Total	65366.75

Per Passenger:	202.37

59.30%	Fuel
0.16%	Total water use
13.91%	Energy use
1.48%	Laundry
0.88%	Plastics
0.20%	Paper
0.07%	Glass
24.01%	Food & Beverages
0.00%	Other materials
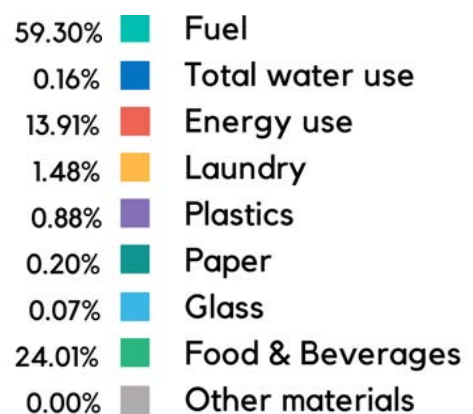
FINAL FIGURES CARBON EMISSION CALCULATIONS

FIGURE 21

Total CO2 emissions in 2019 for BBT Office & Fleet.

Material	Kg of CO2
Fuel	2,502,804.5
Total water use	7246.8
Energy use	196160.9
Laundry	81032.9
Plastics	20976.2
Paper	21246.3
Glass	6025.5
Food & beverages	927137.7
Other materials	0.0
Office supplies and promotion materials	8752.4
Employee travel	47299.4
Business flights	12209.0
Total	3,830,891.48

TOTAL USE OF ENERGY OF BBT FLEET AND BBT OFFICE IN 2019

372,930 KWH

TOTAL USE OF DRINKING WATER OF BBT FLEET AND BBT OFFICE IN 2019

24,318,121 L

TOTAL CO2 EMISSIONS IN 2019 FOR BBT OFFICE & FLEET

FIGURE 22

3,830,891 KG

TOTAL KG OF CO2

- Fuel
- Total water use
- Energy use
- Laundry
- Plastics
- Paper
- Glass
- Food & beverages
- Other materials
- Office supplies and promotion materials
- Employee travel to/from office
- Business flights
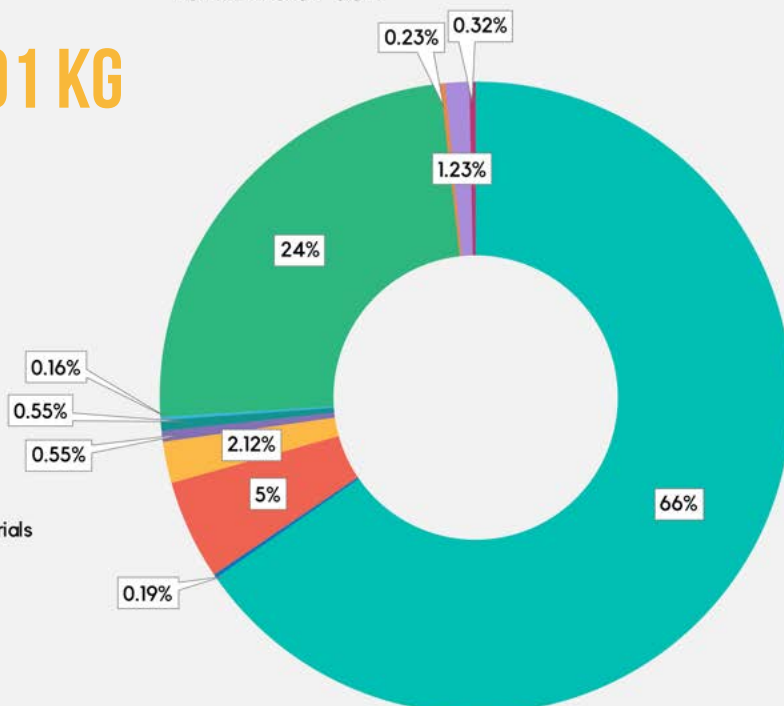
DISTRIBUTION OF CATEGORIES

Figure 23 shows that the total amount of CO2 produced by the fleet is **3,704,521** kg. Including the BBT Office this number is **3,830,891** kg. The average amount of CO2 per passenger was **244** kg for the **15,206** total passengers on all 19 vessels in 2019. As mentioned at the beginning of this report, the CO2 per passenger does not include flights or transport to the departure location, with this included, the figure would be considerably higher.

If we look at Figure 24 we can see that the biggest shares of the averages are made up by the carbon emissions pertaining to the usage of fuel and the consumption of food and beverages. These are the categories that have the highest percentages of carbon emissions within each passenger's footprint. A significant proportion of these averages is also contributed by the carbon emissions of energy usage.

This figure shows us that all three sailing ships are within the lower half of the average emissions, and the bigger ships are in the 'top' of average emissions per passenger. The shares of plastic and paper material use are less visible because they account for lower CO2 emissions compared to fuel i.e., but much more material waste. Production and amount of waste is not visible to display in a chart like this, but it is something to keep in mind.

AVERAGE CO2 FOOTPRINT FOR
A BBT PASSENGER IN 2019

243.62 KG

FIGURE 23

FIGURE 24

Material	Kg of CO2
Fuel	2,502,804.5
Total water use	7,229.8
Energy use	152,119.9
Laundry	81,032.9
Plastics	20,083.7
Paper	8,086.8
Glass	6,025.5
Food & beverages	927,137.7
Other materials	0.0
Total	**3704521**
Per Passenger:	**243.62**

AVG KG OF CO2 PER PAX

Allure — 240.07
De Amsterdam — 312.24
Elizabeth — 160.29
Fiep — 171.05
Fleur — 159.16
Flora — 159.82
Fluvius — 150.62
Gandalf — 204.12
De Holland — 307.06
Leafde fan Fryslân — 174.66
Lena Maria — 191.84
Magnifique — 269.02
Magnifique II — 183.34
Magnifique III — 157.75
Mare fan Fryslân — 171.66
De Nassau — 358.09
Sarah — 264.40
Wapen fan Fryslân — 163.75
Zwaantje — 202.39

■ Fuel ■ Total water use ■ Energy use ■ Laundry ■ Plastics ■ Paper ■ Glass ■ Food & beverages

DISTRIBUTION OF CATEGORIES

Out of the 19 ships, Fluvius produced the smallest amount of CO2 per passenger with **150.62** kg and **986** passengers. De Nassau was the biggest producer of CO2 per passenger with **1,161** passengers on board who were each responsible for **358.09** kg of CO2. Per passenger, the CO2 emissions for fuel consumption were 4.3 times as big on board De Nassau (278 kg) than on board the Fluvius (65.5 kg). The total fuel consumption of De Nassau was largely 10 times as big as that of the Fluvius.

FUEL CONSUMPTION OF SHIP WITH LARGEST AVERAGE FOOTPRINT COMPARED TO SMALLEST

X 10

Zwaantje had the largest share of energy use out of their total emissions: **13.91%**. De Fiep, De Nassau and Elizabeth all had the highest percentage of plastics in their total footprint; almost **1%** for each ship, In total for all 3 this was **740** kg of plastic. De Mare fan Fryslân used the most paper; **525.3** kg or **0.57** % of their total CO2 emissions.

Figure 25 shows the total emissions per ship, as compared to Figure 24 that shows the averages per passenger. There are bigger differences in Figure 25 and the material shares out of the total differ too, because each ship has a different number of weeks that it sailed for BBT and different passenger capacity. We do want to display these total numbers, but note that because of the aforementioned reasons it's difficult to compare the ships to each other. For that purpose, Figure 24 is more suitable.

FIGURE 25

TOTAL KG OF CO2 PER CATEGORY

Legend: Fuel, Total water use, Energy use, Laundry, Plastics, Paper, Glass, Food & beverages

Ship	Total
Allure	74,181
De Amsterdam	943,273
Elizabeth	37,512
Fiep	125,893
Fleur	80,192
Flora	33,887
Fluvius	148,514
Gandalf	97,977
De Holland	539,256
Leafde fan Fryslân	104,448
Lena Maria	104,938
Magnifique	249,924
Magnifique II	185,360
Magnifique III	195,005
Mare fan Fryslân	92,696
De Nassau	415,742
Sarah	112,094
Wapen fan Fryslân	98,263
Zwaantje	65,367

FIGURE 26: CARBON FOOTPRINTS PER PAX ORDERED TO SCALE

Legend:
- Fuel
- Total water use
- Energy use
- Laundry
- Plastics
- Paper
- Glass
- Food & beverages

ALLURE
240.07 KG

DE AMSTERDAM
312.24 KG

ELIZABETH
160.31 KG

DE FIEP
171.05 KG

FLEUR
159.14 KG

FLORA
159.84 KG

FLUVIUS
150.62 KG

GANDALF
204.12 KG

DE HOLLAND
307.09 KG

LEAFDE FAN FRYSLÂN
174.66 KG

LENA MARIA
191.84 KG

MAGNIFIQUE
269.02 KG

MAGNIFIQUE II
183.34 KG

MAGNIFIQUE III
157.77 KG

MARE FAN FRYSLÂN
171.66 KG

DE NASSAU
358.09 KG

SARAH
264.37 KG

WAPEN FAN FRYSLÂN
163.77 KG

ZWAANTJE
202.37 KG

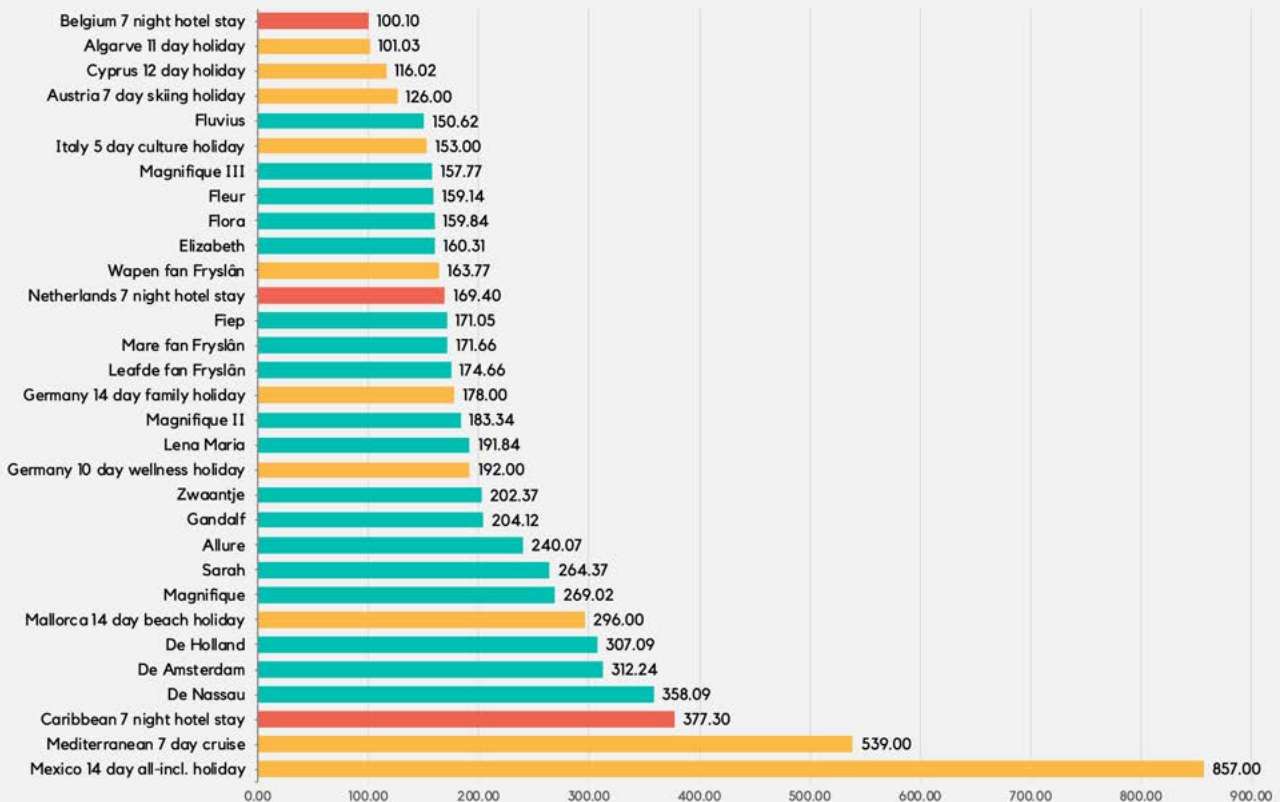# CARBON FOOTPRINT FINAL FIGURES: BENCHMARK COMPARISON

In order to understand how the average CO_2 emissions per passenger of BBT's fleet compare to others in the sector we will compare the carbon footprints to 2 different benchmarks: types of holidays (yellow) and types of 7-night hotel stays (red) which are visualized alongside the BBT fleet in Figure 27. The hotel stays are calculated for a 7 night stay in different regions, without activities, taking the average of what a person emits per night in a hotel in the concerned country. The carbon emissions from the holiday benchmarks do not include transportation to/from destination to keep them comparable to the BBT calculations (red), but do include accommodation, food and activities. The energy use and fuel emissions that are calculated for BBT's fleet fall under the category

of accommodation in these holiday comparisons, so these are the most reliable benchmarks to compare BBT's fleet footprints with. As we can see in Figure 27, a 5-day culture trip in Italy (**153** kg CO_2) that includes activities, is similar to the CO_2 emissions of a week trip on a smaller ship like the Fluvius, Fleur or the Flora. A 10-day wellness holiday in the German Bavaria region, including activities (**192** kg CO_2) is similar to what a passenger emits on board the Lena Maria or the Zwaantje. A 14-day beach holiday on Mallorca (**296** kg CO_2), including sightseeing by car and a diving class causes a comparable amount of CO_2 emissions as a trip on board De Holland or De Amsterdam. Only De Nassau comes close to what a person would emit during a 7-night hotel, without activities, stay in the Caribbean (**377.30** kg CO_2).

FIGURE 27

AVERAGE KG OF CO2 PER PERSON

Belgium 7 night hotel stay	100.10
Algarve 11 day holiday	101.03
Cyprus 12 day holiday	116.02
Austria 7 day skiing holiday	126.00
Fluvius	150.62
Italy 5 day culture holiday	153.00
Magnifique III	157.77
Fleur	159.14
Flora	159.84
Elizabeth	160.31
Wapen fan Fryslân	163.77
Netherlands 7 night hotel stay	169.40
Fiep	171.05
Mare fan Fryslân	171.66
Leafde fan Fryslân	174.66
Germany 14 day family holiday	178.00
Magnifique II	183.34
Lena Maria	191.84
Germany 10 day wellness holiday	192.00
Zwaantje	202.37
Gandalf	204.12
Allure	240.07
Sarah	264.37
Magnifique	269.02
Mallorca 14 day beach holiday	296.00
De Holland	307.09
De Amsterdam	312.24
De Nassau	358.09
Caribbean 7 night hotel stay	377.30
Mediterranean 7 day cruise	539.00
Mexico 14 day all-incl. holiday	857.00

SUMMARY OF KEY FINDINGS

Unsurprisingly, marine gas oil (MGO) was the overall biggest contributor of CO2 emissions for the BBT fleet (**68%**) followed by food and beverages (**25%**) offered on board to guests. Quick solutions with immediate results include switching to biofuels, which has a much lower footprint and introducing meat free days (3 times a week) while also featuring local and seasonal produce, which could cut down CO2 produced by food sourcing by up to **17** times by eliminating the shipping of far-flung items.

Energy usage was the third biggest producer of CO2 (**4%**) with laundry coming in as the fourth largest with largely **2%**. Green energy (solar, wind, biofuels) is the solution to lowering the impacts of energy-intensive activities such as powering BBT's ships and supplying electricity among others. Installing LED lights on board and in the office is also effective in improving efficiency and reducing overall energy usage.

While small in the grand scheme of total emissions, other notable impacts came directly from the BBT Office. Transport in the form of business flights and daily commuting (**47%** combined) were the most substantial contributors on top of energy usage (**35%**). Choosing alternative means of transport besides flying can lower this footprint as well as making use of tele-communicating services in the place of in person meetings and in-office work.
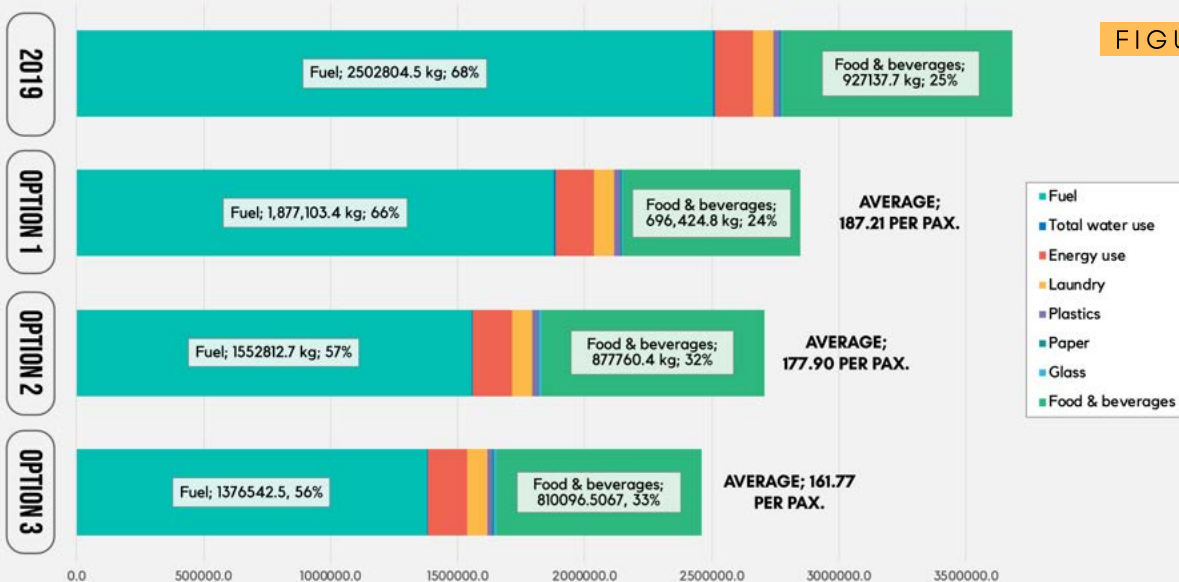
KEY PERFORMANCE INDICATORS FOR REDUCTION

Now that the calculations for measuring BBT's footprint have been completed and a baseline has been established, the next steps are creating Key Performance Indicators (KPIs). Using KPIs can help you gauge your performance and see if you are on track to meet your goals.

In line with BBT's goal to become carbon neutral by 2021, BBT has decided to compensate **160 kg** of CO2 per passenger and anything above this threshold will need to be compensated by the ship owners themselves. As BBT's CO2 per passenger is now **243.62** kg, the fleet needs to cut down their total emissions of **3,704,521 kg** to **2,432,960 kg** (**-35%**). The KPI is to reduce BBT's CO2 footprint per pax to **160** kg by switching to Biofuel (**30 % or 50%**) and switching to more vegetarian meals served, we have outlined **3** options. **Option 1** is if the whole fleet switches to a **30%** biofuel blend from GoodFuels, and if each ship introduces 2 (more) vegetarian nights (so 2 dinners without meat), the average footprint will come out to be **187.21** kg of CO2 per passenger. **Option 2** is if the 10 heaviest fuel users

(De Amsterdam, De Holland, De Nassau, Magnifique, Magnifique II, Magnifique III, Fiep, Sarah, Fluvius and Gandalf) switch to a blend with **50%** biofuel, and every ship in the fleet serves a maximum of **4** meals with meat per week (3 vegetarian nights), the average footprint per passenger will be **177.90** kg. **Option 3** is if the whole fleet switches to a **50%** biofuel blend and if every ship serves one meal without meat, the average footprint per passenger will then be **161.77** kg reaching the KPI. If BBT wants their fleet to achieve the goal of **160** kg per passenger alternatively to **Option 3**, measures must be implemented to reduce more CO2 such as LED lights and a Comfortsaver in the showers. Furthermore, installing solar panels on the fleet would drastically lower their carbon footprint. Solar panels would essentially reduce the amount of shore power needed and as a result, the consumption of fuel. Fuel consumption would also be drastically cut if ships were able to connect to shore power more often during their routes, of which Sea Going Green is currently working on an industry solution to make this possible.

FIGURE 28

KEY PERFORMANCE INDICATORS FOR REDUCTION: OFFSETTING

Based on operational changes alone, it is not currently plausible to aim for full CO2 neutrality without partnering with an offsetting project of your choice. The ultimate goal is to cut your footprint down as much as possible within operations and then offset your remaining footprint.

BBT has selected two offsetting projects: Dutch- founded **Justdiggit** and **Trees For All.** The mission of Justdiggit is to empower local communities in Kenya and Tanzania by having locals take part in tree restoration projects, which not only helps create livelihoods for **5,300** people, but is good for the environment since trees naturally absorb CO2 and "greening" can improve temperature control.

Trees for All focuses on tree-planting projects in places near and far from Costa Rica to The Netherlands. To offset their footprint, BBT will work directly

with Trees For All in determining their project involvement in planting trees here in The Netherlands.

AWARDED SUSTAINABILITY BADGES BY SEA GOING GREEN

OUR 3 BADGES: PLASTIC-FREE, SUSTAINABLE ENERGY & WATER USAGE, LOCAL & ORGANIC PRODUCTS

The activity based carbon footprint gives a good overview of the total emissions of each ship. However, it does not reflect the endeavors of the shipowners to reduce their impact on the environment. Whether an eco-friendly soap is used or filters are put in to treat the wastewater, these kinds of implementations do not show in carbon emission calculations. Nevertheless, it matters for the environment. For that reason, we categorized the efforts some ship owners are already making.

Below are the three categories and examples of what they include.

CATEGORY	BRONZE	SILVER	GOLD
Plastic Free	3-5	6-9	10+
Sustainable Energy & Water Use	2-4	4-7	8+
Local & Organic Products	2	3	4+

DEPENDING ON THE SCORE, A SHIP CAN GET A BRONZE, A SILVER OR A GOLDEN BADGE IN EACH CATEGORY AND 1 POINT = 1 ITEM.

AWARDED SUSTAINABILITY BADGES BY SEA GOING GREEN

With the information provided to us by the ship owners, we designed a scoring system to point out which ships are already performing well in a certain category. Below are examples of what kind of items per category were scored per ship.

PLASTIC-FREE,

- Separating waste;
- No plastic lunch bags (paper bags 1 point, reusable lunch boxes 2 points)
- No straws
- Reusing trash bins
- Dispensers (soap, shampoos, etc.)
- Reduced plastic packaging (in the kitchen and for deliveries)
- No plastic bottles
- No plastic cups
- no single-use packages (mini breakfast containers, salt & pepper, toothpicks)
- Etc. (other related activities)

SUSTAINABLE ENERGY & WATER USE

- Solar panels;
- LED lights;
- Efficient generators/ engine;
- water saving measures (shower, taps)
- Flushing toilets with outside water
- water filters;
- Emptying waste water on land
- Reduction of material waste (other than plastic);
- Cotton napkins
- Guest involvement (information posters, letting them take fresh towel themselves)
- etc. (other related activities)

LOCAL & ORGANIC PRODUCTS

- Vegetarian meals;
- Sustainable use of food/ food storing;
- Biological food;
- Products bought locally;
- Eco-friendly soap;
- Eco-friendly cleaning products;
- Etc. (other related activities)
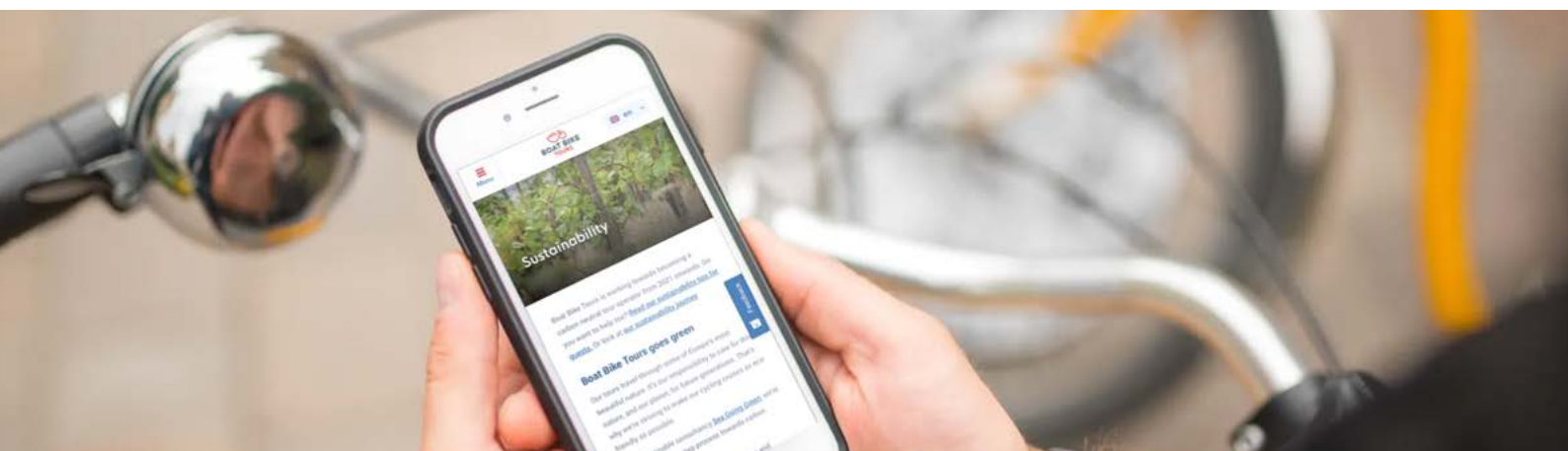
EXCLUDED DATA FOR BBT OFFICE & FLEET

The items listed below are items that are not included in the CO2 calculations because they have significantly limited shares in the total CO2 emissions of the entity that emits them, and no recent and reliable CO2 emissions factors were available for the items concerned.

Office

- For the office, it concerns the following items:
- Whiteboard markers
- Dymo label printer
- Dymo label tape
- Tipp-ex and glue
- Purchased bikes
- Bicycle rack bags
- Bicycle helmets
- Phone holder elastic bands (for steering wheels)
- Inner bicycle tubes
- First aid kits (for tour guides)

River cruise vessels

For all boats, purchased furniture is not included in the CO2 calculations. To keep all footprints comparable, they are excluded. Furniture purchasing patterns are very different since some ships have longer seasons and thus furniture is used more intensively, having an impact on the lifetime. Other owners purchase second hand furniture. Therefore, it is difficult to incorporate such differences in footprint calculations that are needed for baseline measurements.

During the CO2 calculation process certain standardized numbers have been used in order to fill in the gaps/missing data. These numbers have been based on assumptions of usages of the ships. This list sums up what assumptions have been made in the process, and which should be explained/noted in the disclaimer of the BBT report.

Survey averages

Within the ship questionnaires that were sent out to all the ship owners, there were questions about water and electricity use and the kilos of laundry that displayed images containing average numbers per type of ship, e.g. small, medium and large ships. The averages that were used for the images in the surveys have been based on the pilot projects in 2018, where the Fiep was classified as small, the Magnifique III as medium and De Amsterdam as large. The total footprint we calculated during the pilot was for BBT and other hotel guests the pilot ships have, so these figures were not just the BBT's guests' footprint, but the questions in the survey were applicable to the total footprint.

Grey electricity

When the ships have not specified what electricity they use, it's assumed that they use grey electricity as only 18% of electricity in the Netherlands is green. The CO2 coefficients for grey electricity have been used. When specified that green energy is used, this will be calculated accordingly.

Electricity use is unknown for a number of ships. If this were the case, the electricity use was estimated based upon the number of guests and weeks that the ship sailed and their capacity, taking into account similar sized ships with comparable operations.

Laundry

During the pilot project that was done for BBT, it was noticed that a lot of ship owners outsource parts of their laundry, and that it would be hard for them to gather information on the usage of water and electricity ascribed to doing laundry, depending on the laundry service provider. Therefore, a standardized number was calculated based upon a literature study that looked into typical laundry usages and emissions within tourism services. Laundry calculations are based upon a study conducted by Filimonau et al. (2011). This standardized number is per kilo of laundry. According to Filimonau et al. (2011) the average hotel room uses 4 pieces of linen (2 bed sheets, a pillow cover and a towel) per guest night, which amounts to 1.75 kg of CO_2 emissions. The aforementioned research has shown that 1 kg of laundry equals 4 pieces of linen. Our towel calculations are based upon the average weight of a hotel towel, namely 400 grams.

A guest night of a hotel room that is being used by 2 persons, equals 8 pieces of linen (4 bed sheets, 2 pillow covers and 2 towels). A bed linen change for a 2 person room, excluding towels, amounts to 6 pieces. If bed sheets are not changed during the week, it is assumed that the laundry per 2 person room excluding towels amounts to 6 pieces (3 pieces per passenger).

Fuel

Regarding the sailing ships that were built by the same builder, namely the Leafde fan Fryslân, Mare fan Fryslân and Wapen fan Fryslân, the most accurate data was received for the Wapen fan Fryslân. Therefore, the data that was lacking for the other two ships was settled to that of the Wapen fan Fryslân, as theirs was the most reliable for these specific types of ships.

Waste water

When the ships don't have seperate blackwater and greywater tanks, the conversion factor for wastewater is used, as this is a combination of the two. When the ships do have seperate tanks, the same factor is being used since a separate established factor for blackwater and greywater individually is unknown. When ships only provide data for a black water or grey water tank, it is assumed that only the tank that the data is provided for is present on the ship.

If the volume of the black water tank is unknown, average measures are used in calculating the amount of wastewater. A toilet flushes 4L of water on average per flush and 0.5 liters of fecal matter, and people use a toilet 4 times a day. This means one toilet in a 2 person cabin produces 4.5 liters times 8 flushes equals 36 liters of black water a day.

One shower a day per person amounts to about 50 liters of water. However, in a hotel guests tend to use more. It can be assumed that all guests take a shower once a day (after cycling) and some of them additionally shower in the morning as well as at night.

Our standardized assumptions are 18 liters of black water per person per day and 60 liters of grey water per person per day. If all drinking water goes into one tank, the average of 2 liters of drinking water per person per day is taken out.

Packaging vs. content of products

Our scope and method for CO_2 coefficients is activity based and quantifies flows, stocks of materials and substances. Therefore the calculations for individual ship consumption products that were not part of the standardization only consider the packaging materials and not the contents. For example, this concerns beer, wine and breakfast packaging as the food and beverage consumption is standardized.
If there was no specific carbon coefficient for the production of an item, the carbon coefficient is calculated based on the weight of the material that the product is made of.

Food

The standardization of the food for each ship is based on the pilot projects in 2018 as gathering information about exact food and beverage consumption of every ship turned out to be difficult. Furthermore, the standards provided by research proved to be very accurate and showed hardly any difference to the actual data provided by ship owners.

The standardization coefficient for the meat & fish is calculated based upon the assumption that on 'meat days' either beef, chicken, pork, lamb or fish will be consumed. The average CO_2 emission is calculated per passenger per day and/or per week. For meat consumption, this amounts to 2,5 kilos of CO_2 emissions per person per day that meat is served. The CO_2 emissions for non-alcoholic and non-soda drinks (including milk, coffee, tea & fruit juice) are 1 kilos per passenger per week. The CO_2 emissions for alcoholic drinks and soda are 2,8 kilos per passenger per week. Finally, for all other food the standardized CO_2 emissions are 35 kilos per passenger per week.
The weight of a breakfast spread single-use plastic package, such as for jam, peanut butter or hazelnut spread, is assumed to be 2 grams based on a producer's specifications.

The only exception is the Fiep, which has the same amount of passengers as last year so we used food numbers from last year instead of the standard as the pilot data from the Fiep is more comparable.

Alcohol & Soft drinks

The standardized alcohol calculations are based on 1 alcoholic beverage per person per night assuming that the average stay is 7 nights. Assumed is that some people don't drink, and that some people drink more than 1 alcoholic beverage, making this equal. Next to that, we have estimated one glass of soft drink per person on average too (7 beers and 7 soft drinks or 7 wines and 7 soft drinks per person per trip).

Biofuel emissions

The CO_2 emissions during use of 100% biofuel are set to zero due to the short-cycle nature of the carbon in these fuels. Although CO_2 is released, it does not contribute to the strengthening of the greenhouse effect. The emissions during the production of the fuel arise from the processing of waste oil and transport. A well-known type of fuel in this category is, for example, HVO (Hydrotreated Vegetable Oil) based on used cooking oils.

There are many developments in the biofuel market and taking into account the lack of recent scientific research in this area, there is reasonable doubt about the accuracy of the emission factors as they are now published. These values are considered as provisional/indicative and might be subject to a (possibly strong) change in the future.

Number of towels

The number of towels that guests get is known for each ship. Only for the Gandalf it is calculated since they proclaimed the amount depends on the guests' behavior, they get 1 towel standard and then they can change suiting their needs. The number of towels per passenger for the Gandalf, 3, is based upon the average number of towels of the small ships with comparable capacity, which is 3.045454545.

Amount of plastic wrap

For the Fluvius, the number of rolls of plastic wrap was not known and is therefore based on comparable passenger numbers of other ships.

Wine bottles

Wine bottles get crushed, so not re-used by their suppliers. Therefore they are calculated with CO2 coefficients for normal glass material, not glass material that is recycled like beer bottles.

Soap bottles

Lena Maria didn't fill out the amount of soap bottles, so this number is estimated based on other ships with the same capacity and passenger numbers.

Breakfast packages

If ships did not know the amount that guests used, we estimated 2 per person per day.

Beer bottles

Without numbers we used an estimate based on other ships, which was usually around 1.5 bottles per passenger in total (this concerns the material of the beer bottles; glass that is being recycled).

Materials

The amount of material used for cardboard boxes was estimated based on boxes with a size of 50x40x30 cm.

2019 settled to 2018 data

When we had a number for 2018 only, we converted it to 2019 based on the amount of weeks and passengers that was different. This was done for De Amsterdam, where there were no receipts for water usage, so the numbers for 2019 were based upon 2018 numbers.

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