

GREEN TRANSITION STRATEGY



SeaGoingGreen

—
FINAL REPORT

CLIENT: BOAT BIKE TOURS

FEBRUARY 2023
(2022 SEASON REPORT)

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FOREWORD

According to the latest UNWTO World Tourism Barometer, international tourist arrivals almost tripled in January to July 2022 (+172%) compared to the same period in 2021. The sector recovered almost 60% of pre-pandemic levels. The steady recovery reflects strong demand for international travel as well as the easing or lifting of travel restrictions to date (86 countries had no COVID-19 related restrictions as of 19 September 2022).

Even though tourism numbers have not reached 2019 levels yet, tourism continues to put pressure 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](#).



SCOPE

BOAT BIKE TOURS THE NETHERLANDS 2022



Location: The Netherlands

BBT Office: 26 employees

FIGURE 1: TOTAL PASSENGER NUMBERS AND SAILING WEEKS FOR BBT PER SHIP

SHIP NAME	5 DAY TOURS	8 DAY TOURS	11 DAY TOURS	15 DAY TOURS	GUESTS IN TOTAL
De Amsterdam		27			2203
De Holland		25			1172
De Nassau		23			1308
De Willemstad		19			1322
Elizabeth		13			236
Fiep		32			600
Fleur		23	1	1	457
Flora		14			279
Fluvius	3	24			966
Gandalf		9	4		192
Leafde fan Fryslân		22			512
Lena Maria		28			632
Magnifique II	2	24			798
Magnifique III		26			879
Magnifique IV	8	24			1023
Mare fan Fryslân		23			557
Poseidon		25			1624
Princesse Royal		25			678
Wapen fan Fryslân		23			463
Zwaantje		15			400
TOTAL					16301



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 during the BBT 2019 season.



PRODUCT CARBON FOOTPRINT LIFE CYCLE
SOURCE: ACF NETWORK

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.



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

Due to challenges in data collection posed by the impact of COVID-19 on BBT's 2021 season, our approach was modified to provide the best estimates of the environmental impact from the 2021 season.

The data provided in this report was extrapolated from 2020 data which was extrapolated from the 2019 season. For this season in turn, data was collected from questionnaires and ship visits. For 2021, numbers were calculated based on the number of weeks sailed and/or the amount of passengers on board in 2021.

Calculations for fuel, energy and water are constant and not reflecting individual passengers, but rather weeks sailed. Variables including food consumption, plastic usage and laundry have been calculated per passenger.

Due to the fact that the 2021 sailing season was challenging and affected by COVID-19, not all boats in the fleet were able to sail. The following boats were not part of the fleet that sailed in the 2021 season: Allure, Zwaantje, De Willemstad and Fiep. The Flora sailed different routes compared to 2019, and the Poseidon is a new ship, therefore these are not a 100% comparable. They are included in the fleet numbers.

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
- Compile and analyze the carbon footprints for the whole BBT fleet & the office, highlighting where the largest and smallest impacts are
- Award badges based on sustainability efforts and initiatives

DELIVERABLES



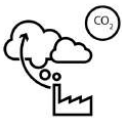
CARBON FOOTPRINT ANALYSIS



BBT OFFICE

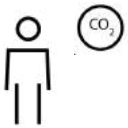


TOTAL CO₂ EMISSIONS IN
2022 FOR THE BBT OFFICE:



116,145.14

CO₂ FOOTPRINT FOR A BBT
OFFICE EMPLOYEE IN 2022:



5,037 KG

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

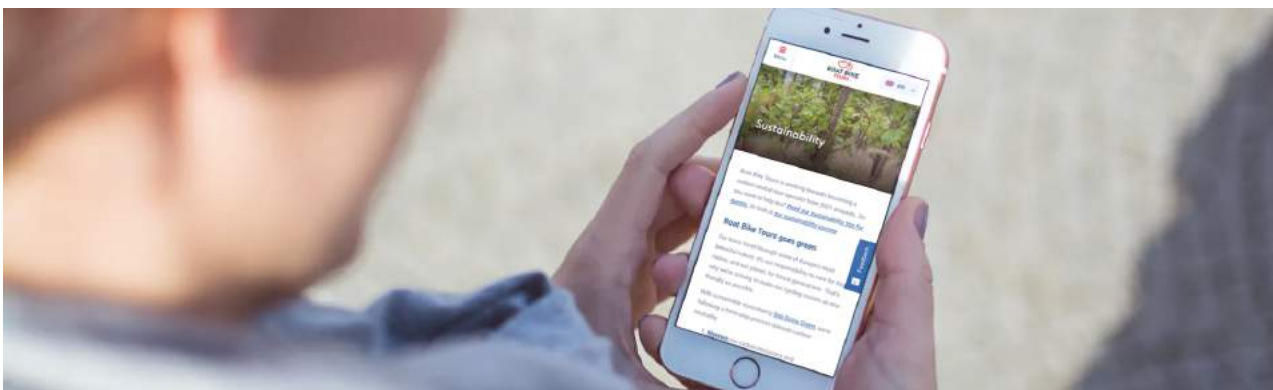


7,852.99 KG

The calculations for the carbon footprint of the office were based on **52** weeks consisting of a **5-day** work week and **26** employees.

These included the calculation of travel to and from the office by employees and specific mode of transport. Modes of transport varied from electric cars, (hybrid) cars running on diesel and regular gas, public transport, carpooling, scooters and cycling. Not all employees were working for BBT for the full year, which is incorporated in the calculations. The total emissions of all travel including business travel and flights were **62,888.25** kg. The employees traveled **143,391** km to and from the office, with average CO₂ emissions for commuting per employee amounting to **813.09** kg in 2022.

Paper format contributed to almost **7,853** kg of CO₂ this year, whereas energy use of the office contributed **42,737.90** kg of CO₂ to the total carbon footprint. The BBT Office received a bronze badge for their measures regarding the Plastic Free category in Sea Going Green's badge awarding system. Waste is separated in the office, and no plastic bottles, cups and straws are used.



BBT OFFICE CARBON EMISSION CALCULATIONS



FIGURE 2: 2022 BBT OFFICE

MATERIAL CATEGORY	KG OF CO2
Office supplies and promotion materials	542.67
Business travel incl. flights	44,138.29
Employee travel to/from office	18,749.96
Paper	7,852.99
Plastics	2,114.39
Energy use	42,737.90
Total water use	8.94
Food & beverages	3,940.47
TOTAL	116,145.14

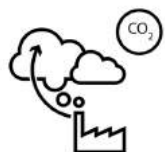
- 0.5 % ■ Food & beverages
- 0.0 % ■ Total water use
- 36.8 % ■ Energy use
- 1.8 % ■ Plastics
- 6.8 % ■ Paper
- 16.1 % ■ Employee travel to/from office
- 38.0 % ■ Business travel incl. flights
- 0.5 % ■ Office supplies and promotion materials



DE AMSTERDAM

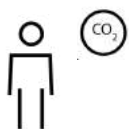


TOTAL CO2 EMISSIONS IN 2022 FOR DE AMSTERDAM:



902,427 KG

CO2 FOOTPRINT FOR A DE AMSTERDAM PASSENGER IN 2022



409.64 KG

FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)



76.77 KG

De Amsterdam has carried most passengers for BBT with a total of **2203** passengers in **27** sailings. The total emissions generated over the 2022 season was **902,427 kg**. The average footprint per passenger in 2018 was **303 kg**, **312 kg** in 2019, **351 kg** in 2020, and **410 kg** in 2022. This increase is due to partly the occupancy rate in 2022 and the limited availability of shore power. When shore power was not available, the ship had to use the generators. The emissions from their menu were calculated in 2022.



FIGURE 3: DE AMSTERDAM

MATERIAL	KG OF CO2
Fuel	701,490.0
Total water use	1,061.4
Energy use	12,624.0
Laundry	12,144.0
Plastics	3,937.2
Paper	1,698.3
Glass	346.8
Food & beverages	169125.4
Other materials	0.0
TOTAL	902427.18

- 77.7 % Fuel
- 0.1 % Total water use
- 1.4 % Energy use
- 1.3 % Laundry
- 0.4 % Plastics
- 0.2 % Paper
- 0.0 % Glass
- 18.7 % Food & Beverages
- 0.0 % Other materials

ELIZABETH



TOTAL CO2 EMISSIONS IN 2022 FOR ELIZABETH



CO2 FOOTPRINT FOR AN ELIZABETH PASSENGER IN 2022



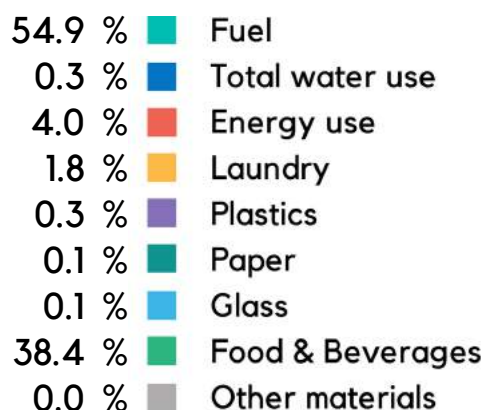
FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)



The three-mast clipper, Elizabeth, did **13** sailings for BBT with a total of **236** passengers in the season of 2022. The total footprint generated by Elizabeth's passengers for the 2022 season was **40,106.30 kg**. The average passenger footprint was **160 kg** in 2019, **191 kg** in 2020, and **170 kg** in 2022. The Elizabeth is a sailing ship and naturally uses less fuel than motor ships. They earned a gold medal in the local & organic products category, partly due to them offering 2 standard vegetarian meals per sailing.

FIGURE 4: ELIZABETH

MATERIAL	KG OF CO2
Fuel	22,018.4
Total water use	133.2
Energy use	1,601.1
Laundry	722.8
Plastics	132.8
Paper	30.2
Glass	55.4
Food & beverages	15412.42
Other materials	0.0
TOTAL	40106.30



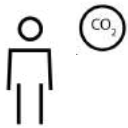


TOTAL CO2 EMISSIONS IN 2022 FOR FIEP



165.085.48 KG

CO2 FOOTPRINT FOR A FIEP PASSENGER IN 2022



275.14 KG

FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)



67.20 KG

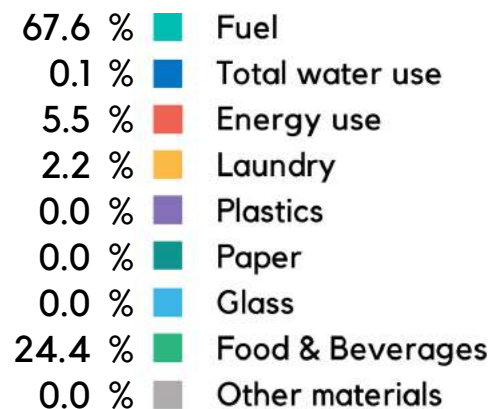
In 2022, the passenger barge Fiep did **32** sailings and had **600** passengers on board. The total emissions for the Fiep in 2022 were **165,085.48** kg. The average footprint for a Fiep passenger was **275** kg in 2022. The Fiep earned 3 medals, because it separates waste and has no plastic lunch bags, amongst other efforts. It sailed a lot of charter tours this season, with relatively more sailing hours per day. The passengers eat one standard vegetarian meal per sailing.

N.B.: The energy use of the Fiep is not comparable to previous years.



FIGURE 5: FIEP

MATERIAL	KG OF CO2
Fuel	111,680.00
Total water use	233.3
Energy use	9,089.3
Laundry	3,675.0
Plastics	67.6
Paper	12.0
Glass	10.0
Food & beverages	40318.26
Other materials	0.0
TOTAL	165085.48



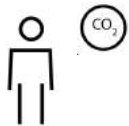


TOTAL CO2 EMISSIONS IN 2022 FOR FLEUR



117530.22 KG

CO2 FOOTPRINT FOR A FLEUR PASSENGER IN 2022



257.18 KG

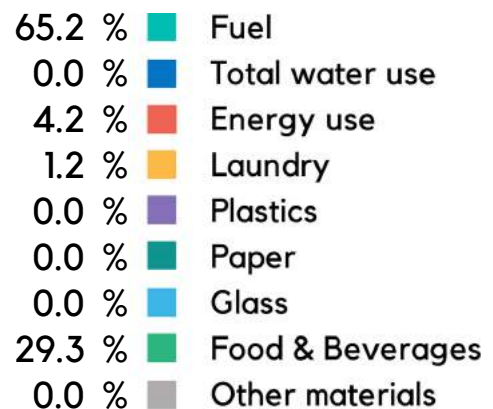
In 2022, the passenger barge Fleur cruised **23** 8-day tours, **1** 11-day tour and **1** 15-day tour carrying **457** passengers on board. The total emissions for Fleur in 2022 were **117,530.45** kg.

The average footprint for a Fleur passenger was **159** kg in 2019, **334** kg in 2020 and **257** kg in 2022. The Fleur owned 3 medals of which 2 are gold; they try to source food locally and use very little plastics, amongst other efforts. Next to that, they have solar panels on the ship. They are the only ship that has their own soda maker.



FIGURE 7: FLEUR

MATERIAL	KG OF CO2
Fuel	76,605.5
Total water use	231.8
Energy use	4,923.4
Laundry	1,399.6
Plastics	0.0
Paper	34.7
Glass	0.0
Food & beverages	34335.30
Other materials	0.0
TOTAL	117530.22



FLORA

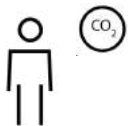


TOTAL CO2 EMISSIONS IN 2022 FOR FLORA



47,643.6 KG

CO2 FOOTPRINT FOR A FLORA PASSENGER IN 2022



170.77 KG

FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)



65.31 KG

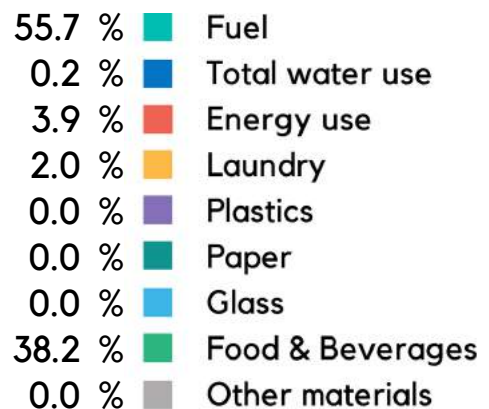
The river barge, Flora, cruised the fresh waters for **14** weeks last season. **279** passengers were carried for BBT. Flora's overall CO2 footprint for the 2022 season was **47,643.6** kg. The average footprint per passenger was **160** kg in 2019, **159** kg in 2020 and **171** kg in 2022. The Flora has a dynamo on the main engine and a heat pump. Guests eat standard vegetarian meals 2 times per week. The Flora is the *only* ship that earned 3 gold medals.



FIGURE 6: FLORA

MATERIAL	KG OF CO2
Fuel	26,524.0
Total water use	105.9
Energy use	1,841.0
Laundry	952.1
Plastics	0.0
Paper	0.0
Glass	0.0
Food & beverages	18220.61
Other materials	0.0

TOTAL 47643.55



FLUVIUS



TOTAL CO2 EMISSIONS IN 2022 FOR FLUVIUS

 **295,360.12 KG**

CO2 FOOTPRINT FOR A FLUVIUS PASSENGER IN 2022

 **305.76 KG**

FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)

 **58.68 KG**










The luxury river cruise barge, Fluvius, sailed **24** 8-day tours and **3** 5-day tours in the season of 2022 with an amount of **966** passengers. The total footprint for Fluvius in 2022 was **295,360.1** kg. The average footprint per passenger on board the Fluvius was **151** kg in 2019, **215** kg in 2020 and **306** kg in 2022. Fluvius' menu is calculated per passenger in 2023.



FIGURE 8: FLUVIUS

MATERIAL	KG OF CO2
Fuel	224,644.3
Total water use	0.0
Energy use	11,051.8
Laundry	5,325.1
Plastics	23.5
Paper	520.7
Glass	3.8
Food & beverages	53790.89
Other materials	0.0

TOTAL 295360.12

- 76.1 %  Fuel
- 0.0 %  Total water use
- 3.7 %  Energy use
- 1.8 %  Laundry
- 0.0 %  Plastics
- 0.2 %  Paper
- 0.0 %  Glass
- 18.2 %  Food & Beverages
- 0.0 %  Other materials

GANDALF



TOTAL CO2 EMISSIONS IN 2022 FOR GANDALF



CO2 FOOTPRINT FOR A FLUVIUS PASSENGER IN 2022



FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)



The river cruise barge Gandalf, sailed **9** 8-day tours and **4** 11-day tours in the 2022 season, whilst carrying **192** guests. The total footprint for Gandalf in 2022 was **34,962.73** kg. The average footprint per passenger was **251** kg in 2019 and **182** kg in 2022. Because of the high costs of shore power, the generator is used when needed in stead. The Gandalf has 3 medals. The ship has a lot of energy and water saving measures, solar panels and saves plastic as much as possible. Their menu has been calculated in 2022, whereas in 2019 averages were used, with higher CO2 emissions.

The river cruise barge Gandalf, sailed **9** 8-day tours and **4** 11-day tours in the 2022 season, whilst carrying **192** guests.

FIGURE 9: GANDALF

MATERIAL	KG OF CO2
Fuel	23,396.96
Total water use	106.6
Energy use	73.6
Laundry	655.2
Plastics	457.7
Paper	104.9
Glass	38.2
Food & beverages	10129.51
Other materials	0.0

TOTAL 34962.73



- 66.9 % Fuel
- 0.3 % Total water use
- 0.2 % Energy use
- 1.9 % Laundry
- 1.3 % Plastics
- 0.3 % Paper
- 0.1 % Glass
- 29.0 % Food & Beverages
- 0.0 % Other materials

DE HOLLAND

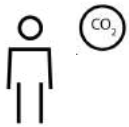


TOTAL CO2 EMISSIONS IN 2020 FOR DE HOLLAND



359,385.98 KG

CO2 FOOTPRINT FOR A DE HOLLAND PASSENGER IN 2022

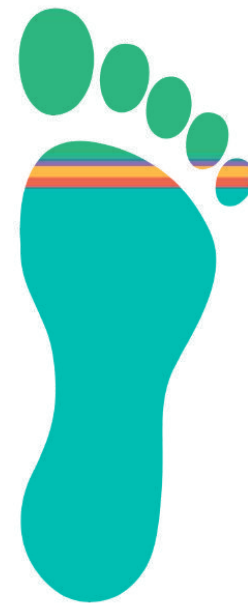


306.64 KG

In the 2022 season, De Holland sailed **25** weeks with a total number of **1172** passengers. The overall footprint for De Holland over the 2022 season was **359,385.98** kg. The average footprint per passenger of De Holland was **307** kg in 2019, **317** kg in 2020, and **307** kg in 2022. On board De Holland, there are no plastic lunch bags used and in the kitchen, food waste is being limited as much as possible.

FIGURE 10: DE HOLLAND

MATERIAL	KG OF CO2
Fuel	251,280.0
Total water use	603.7
Energy use	6,049.0
Laundry	6,460.7
Plastics	3,417.8
Paper	940.3
Glass	659.5
Food & beverages	89975.02
Other materials	0.0
TOTAL	359385.98



- 69.9 % Fuel
- 0.2 % Total water use
- 1.7 % Energy use
- 1.8 % Laundry
- 1.0 % Plastics
- 0.3 % Paper
- 0.2 % Glass
- 25.0 % Food & Beverages
- 0.0 % Other materials

LEAFDE FAN FRYSLÂN



TOTAL CO2 EMISSIONS IN 2022
FOR LEAFDE FAN FRYSLÂN



CO2 FOOTPRINT FOR A LEAFDE
FAN FRYSLÂN PASSENGER IN 2022



FOOD AND BEVERAGE EMISSIONS
P.P. PER SAILING (7 MEALS)

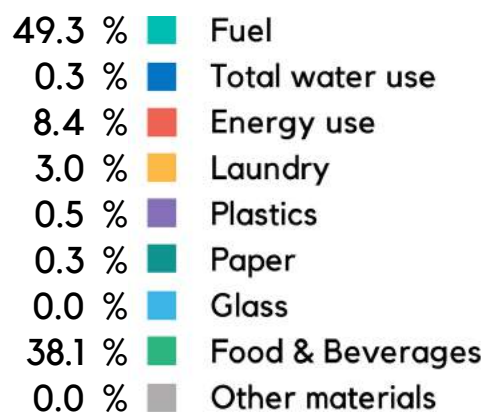


The three-mast barquentine, Leafde fan Fryslân, sailed for **22** weeks with a total of **512** passengers in 2022. Leafde fan Fryslân had a total CO2 footprint of **93,388.6** kg for the 2022 season. The average CO2 footprint per passenger was **175** kg in 2019, **149** kg in 2020 and **182** kg in 2022. The menu for the Leafde & Mare fan Fryslân has been calculated in 2022.



FIGURE 11: LEAFDE FAN FRYSLÂN

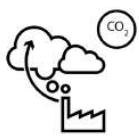
MATERIAL	KG OF CO2
Fuel	46,068.0
Total water use	317.2
Energy use	7,857.4
Laundry	2,822.4
Plastics	471.5
Paper	241.7
Glass	4.9
Food & beverages	35605.50
Other materials	0.0
TOTAL	93388.57



LENA MARIA

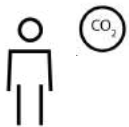


TOTAL CO2 EMISSIONS IN 2020 FOR LENA MARIA



120,801.34 KG

CO2 FOOTPRINT FOR A LENA MARIA PASSENGER IN 2020



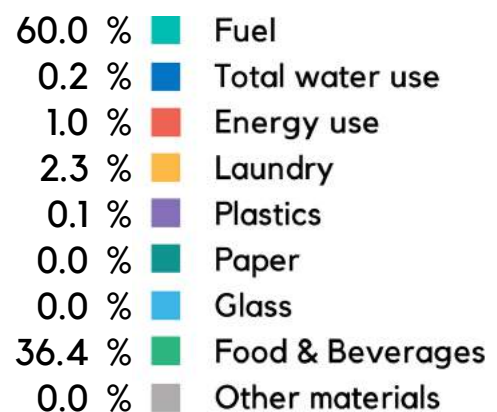
191.14 KG

In the season of 2020, the Lena Maria sailed **28** weeks whilst carrying **632** passengers. The total footprint of Lena Maria over the 2022 season was **120,801.34** kg. The average footprint per passenger was **192** kg in 2019, **240** kg in 2020, and **191** kg in 2022. The Lena Maria has been awarded 3 badges.



FIGURE 12: LENA MARIA

MATERIAL	KG OF CO2
Fuel	72,539.7
Total water use	212.1
Energy use	1,262.4
Laundry	2,760.6
Plastics	102.9
Paper	0.0
Glass	10.3
Food & beverages	43913.48
Other materials	0.0
TOTAL	120801.34



MAGNIFIQUE II

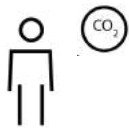


TOTAL CO2 EMISSIONS IN 2022 FOR MAGNIFIQUE II



239,108.04 KG

CO2 FOOTPRINT FOR A MAGNIFIQUE II PASSENGER IN 2022



299.63 KG

FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)



69.54 KG

The Magnifique II welcomed **798** guests on board in **24** 8-day tours and **2** 5-day tours in the 2022 season. The overall footprint for Magnifique II was **239,108.04** kg. The average footprint for a passenger on board the ship was **183** kg in 2019, **213** kg in 2020 and **300** kg in 2022. In this year's sailing routes there was only limited shore power available, and the generator was used more.

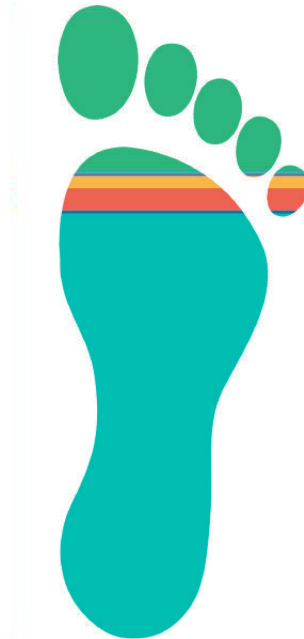
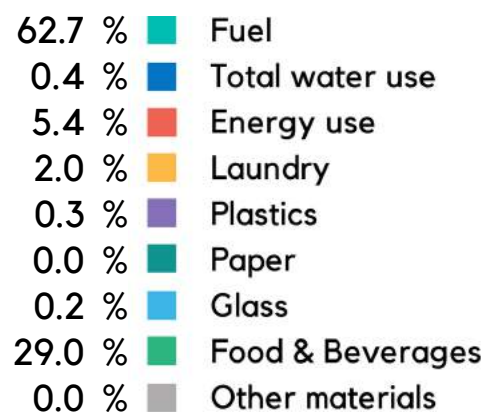


FIGURE 14: MAGNIFIQUE II

MATERIAL	KG OF CO2
Fuel	160,540.0
Total water use	859.3
Energy use	8,836.8
Laundry	4,399.0
Plastics	878.4
Paper	102.6
Glass	666.9
Food & beverages	62825.07
Other materials	0.0

TOTAL 239108.04



MAGNIFIQUE III

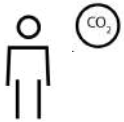


TOTAL CO₂ EMISSIONS IN
2020 FOR MAGNIFIQUE III



246,120.48 KG

CO₂ FOOTPRINT FOR A MAGNIFIQUE
III PASSENGER IN 2020



280.00 KG

FOOD AND BEVERAGE EMISSIONS
P.P. PER SAILING (7 MEALS)



81.12 KG

The Magnifique III sailed **26** weeks for BBT with a total of **879** passengers in 2022. The overall footprint for Magnifique III in 2022 was **246,120.48** kg. The average footprint for a Magnifique III passenger in 2018 was **228.67** kg, in 2019 **158** kg, in 2020 it was **310** kg and in 2022 **280** kg.

The ship received 3 badges. 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. For Sustainable Energy & Water Use, they received a bronze badge. The soaps provided for guests are from an eco-label and there are dispensers for shampoo in the cabins.

The food & beverages emissions were also calculated based on the menu used on the different Magnifique ships.

FIGURE 15: MAGNIFIQUE III

MATERIAL	KG OF CO ₂
Fuel	154,327.8
Total water use	879.2
Energy use	13,255.2
Laundry	4,845.5
Plastics	787.6
Paper	115.9
Glass	600.9
Food & beverages	71308.37
Other materials	0.0

TOTAL 246120.48

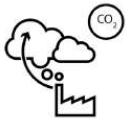


- 62.7 % Fuel
- 0.4 % Total water use
- 5.4 % Energy use
- 2.0 % Laundry
- 0.3 % Plastics
- 0.0 % Paper
- 0.2 % Glass
- 29.0 % Food & Beverages
- 0.0 % Other materials

MAGNIFIQUE IV

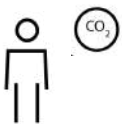


TOTAL CO2 EMISSIONS IN 2022 FOR MAGNIFIQUE IV



278,728.8 KG

CO2 FOOTPRINT FOR A MAGNIFIQUE IV PASSENGER IN 2022



272.46 KG

FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)



81.12 KG

FIGURE 16: MAGNIFIQUE IV

MATERIAL	KG OF CO2
Fuel	199,628.0
Total water use	934.4
Energy use	16,095.6
Laundry	5,639.3
Plastics	1,126.0
Paper	131.5
Glass	854.9
Food & beverages	54318.99
Other materials	0.0
TOTAL	278728.77

The Magnifique IV sailed **24** weeks for BBT with a total of **1023** passengers in 2022. The overall footprint for Magnifique IV in 2020 was **278,728.8** kg. The average passenger footprint on Magnifique IV was **327** kg in 2020 and **273** in 2022.



- 71.6 % ■ Fuel
- 0.3 % ■ Total water use
- 5.8 % ■ Energy use
- 2.0 % ■ Laundry
- 0.4 % ■ Plastics
- 0.0 % ■ Paper
- 0.3 % ■ Glass
- 19.5 % ■ Food & Beverages
- 0.0 % ■ Other materials

MARE FAN FRYSLÂN

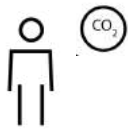


TOTAL CO2 EMISSIONS IN
2022 FOR MARE FAN FRYSLÂN



87,700.65 KG

CO2 FOOTPRINT FOR A MARE FAN
FRYSLÂN PASSENGER IN 2022



157.45 KG

FOOD AND BEVERAGE EMISSIONS
P.P. PER SAILING (7 MEALS)



69.54 KG

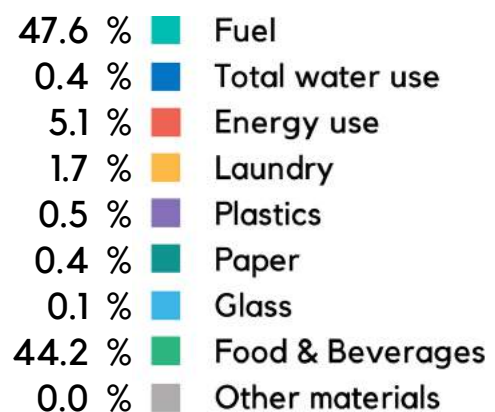
The three-mast sailing ship, Mare fan Fryslân, sailed for **23** weeks with a total of **557** passengers in the 2022 season. Mare fan Fryslân's overall CO2 footprint in 2022 was **87,700.65** kg. The average footprint per passenger was **172** kg in 2019, **132** kg in 2020 and **157** kg in 2022.



FIGURE 17: MARE FAN FRYSLÂN

MATERIAL	KG OF CO2
Fuel	41,740.4
Total water use	353.9
Energy use	4,476.3
Laundry	1,510.9
Plastics	434.6
Paper	390.1
Glass	59.6
Food & beverages	38734.89
Other materials	0.0

TOTAL 87700.65



DE NASSAU

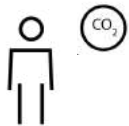


TOTAL CO2 EMISSIONS IN
2022 FOR DE NASSAU



381,907.6 KG

CO2 FOOTPRINT FOR A DE
NASSAU PASSENGER IN 2022



291.98 KG

FOOD AND BEVERAGE EMISSIONS
P.P. PER SAILING (7 MEALS)



76.77 KG

FIGURE 17: DE NASSAU

MATERIAL	KG OF CO2
Fuel	265,240.0
Total water use	605.1
Energy use	184.1
Laundry	7,210.4
Plastics	4,383.6
Paper	1,090.4
Glass	2,778.2
Food & beverages	100415.81
Other materials	0.0
TOTAL	381907.57

In the season of 2022, De Nassau welcomed **1308** passengers on board in **23** sailings. De Nassau's total CO2 footprint for the 2022 season was **381,907.6** kg. The average footprint of a De Nassau passenger was **358** kg in 2019, **488** kg in 2020 and **292** kg in 2022. Compared to 2019, De Nassau sailed much shorter distances and there was limited shore power available, so the generator was used more as well. The menu calculations were done for the menu of De Amsterdam, which is comparable.



- 69.5 % Fuel
- 0.2 % Total water use
- 0.0 % Energy use
- 1.9 % Laundry
- 1.1 % Plastics
- 0.3 % Paper
- 0.7 % Glass
- 26.3 % Food & Beverages
- 0.0 % Other materials

POSEIDON

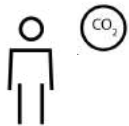


TOTAL CO2 EMISSIONS IN
2022 FOR POSEIDON



707,564.5 KG

CO2 FOOTPRINT FOR A
POSEIDON PASSENGER IN 2022



435.69 KG

FOOD AND BEVERAGE EMISSIONS
P.P. PER SAILING (7 MEALS)



76.77 KG

FIGURE 18: POSEIDON

MATERIAL	KG OF CO2
Fuel	561,890.0
Total water use	798.9
Energy use	6,838.0
Laundry	8,952.3
Plastics	2,902.4
Paper	1,252.0
Glass	255.6
Food & beverages	124675.29
Other materials	0.0
TOTAL	707564.48

The Poseidon has not had her emissions calculated before, and no ship visit was performed in 2019. The staff of the Poseidon welcomed a majestic **1624** passengers on board in **25** sailings. The Poseidon's total CO2 footprint for the 2022 season was a colossal **707,564.5** kg. The average footprint of a De Nassau passenger was **436** kg in 2022. The menu calculations were done for the menu of De Amsterdam, which is comparable.

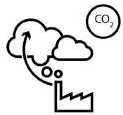


- 79.4 % Fuel
- 0.1 % Total water use
- 1.0 % Energy use
- 1.3 % Laundry
- 0.4 % Plastics
- 0.2 % Paper
- 0.0 % Glass
- 17.6 % Food & Beverages
- 0.0 % Other materials

PRINCESSE ROYAL

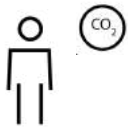


TOTAL CO2 EMISSIONS IN 2022 FOR PRINCESSE ROYAL



193,219.27 KG

CO2 FOOTPRINT FOR A PRINCESS ROYAL PASSENGER IN 2022



284.98 KG

FOOD AND BEVERAGE EMISSIONS P.P. PER SAILING (7 MEALS)



59.33 KG

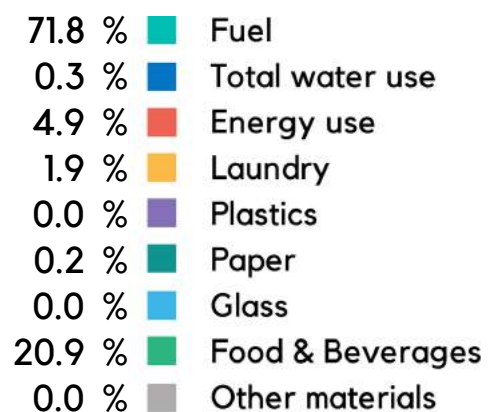
The premium ship Princesse Royal sailed **25** tours in the season of 2022 with an amount of **678** passengers. The total footprint for Princesse Royal in 2022 was **193,219.27** kg. Princesse Royal's menu is calculated per passenger in 2023. The ship has been awarded 3 badges; they use eco-toilet paper and have a water descaler amongst others.



FIGURE 19: PRINCESSE ROYAL

MATERIAL	KG OF CO2
Fuel	138,895.0
Total water use	527.1
Energy use	9,452.2
Laundry	3,737.5
Plastics	16.5
Paper	365.5
Glass	2.7
Food & beverages	40222.85
Other materials	0.0

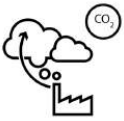
TOTAL 193219.27



WAPEN FAN FRYSLÂN

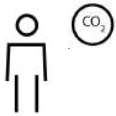


TOTAL CO2 EMISSIONS IN 2022
FOR WAPEN FAN FRYSLÂN



80,939.3 KG

CO2 FOOTPRINT FOR A WAPEN
FAN FRYSLÂN PASSENGER IN 2022



174.81 KG

FOOD AND BEVERAGE EMISSIONS
P.P. PER SAILING (7 MEALS)



69.51 KG

FIGURE 20: WAPEN FAN FRYSLÂN

MATERIAL	KG OF CO2
Fuel	41,740.4
Total water use	269.4
Energy use	3,750.4
Laundry	2,228.2
Plastics	518.6
Paper	251.8
Glass	9.7
Food & beverages	32170.79
Other materials	0.0

TOTAL 80939.29

The largest two-master schooner of the Dutch waters, Wapen fan Fryslân, carried **463** passengers in **23** sailings for BBT. The total footprint for Wapen fan Fryslân over the 2022 season was **80,939.3** kg. The average footprint for Wapen fan Fryslân's passengers was **164** kg in 2019, **348** kg in 2020 and **175** kg in 2022.



- 51.6 % Fuel
- 0.3 % Total water use
- 4.6 % Energy use
- 2.8 % Laundry
- 0.6 % Plastics
- 0.3 % Paper
- 0.0 % Glass
- 39.8 % Food & Beverages
- 0.0 % Other materials

DE WILLEMSTAD

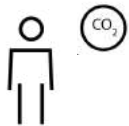


TOTAL CO2 EMISSIONS IN
2022 FOR DE NASSAUN



524,689.7 KG

CO2 FOOTPRINT FOR A DE
NASSAU PASSENGER IN 2022



396.89 KG

FOOD AND BEVERAGE EMISSIONS
P.P. PER SAILING (7 MEALS)



76.77 KG

FIGURE 21: DE WILLEMSTAD

MATERIAL	KG OF CO2
Fuel	404,840.0
Total water use	643.7
Energy use	6,838.0
Laundry	7,287.5
Plastics	2,362.7
Paper	1,019.2
Glass	208.1
Food & beverages	101490.60
Other materials	0.0
TOTAL	524689.74

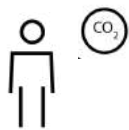
In the season of 2022, De Willemstad welcomed **1322** passengers on board in **19** sailings. De Willemstad's total CO2 footprint for the 2022 season was a colossal **524,689.7** kg. The average footprint of a De Willemstad passenger was **396.89** kg 2022. De Willemstad is together with De Poseidon, the 2nd biggest ship in the fleet of BBT. There was limited shore power available, so the generator was used relatively more. The menu calculations were done for the menu of De Amsterdam, which is comparable.



- 77.2 % Fuel
- 0.1 % Total water use
- 1.3 % Energy use
- 1.4 % Laundry
- 0.5 % Plastics
- 0.2 % Paper
- 0.0 % Glass
- 19.3 % Food & Beverages
- 0.0 % Other materials

ZWAANTJE

CO₂ FOOTPRINT FOR A
ZWAANTJE PASSENGER IN 2022



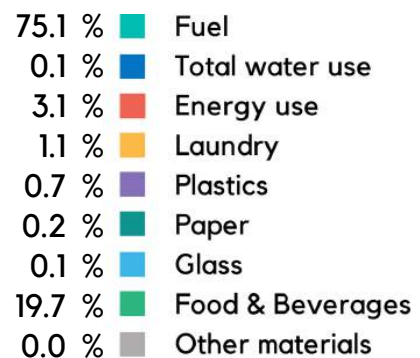
353.18 KG



FIGURE 22: ZWAANTJE

MATERIAL	KG OF CO ₂
Fuel	106,096.00
Total water use	194.8
Energy use	4,344.8
Laundry	1,610.0
Plastics	953.6
Paper	218.6
Glass	79.6
Food & beverages	27772.78
Other materials	0.0

TOTAL 141270.03



FINAL FIGURES CARBON EMISSION CALCULATIONS

For the 2020 season, the total emissions for the fleet were **1,383,802.65** kg CO₂. Including the office, this number amounted to **1,434,461.08** kg CO₂. The total footprint of the fleet in 2021 was **1,828,083.06** kg of CO₂, and with the office the total was **1,878,150.70** kg of CO₂. In 2022, the total emissions for the fleet were **5,057,851.4** kg of CO₂. When including the office, the emissions were **5,173,996.5** kg of CO₂. The table below outlines the total CO₂ emissions in 2022 for BBT Office & Fleet and per passenger for comparison.

	2020 SEASON	2021 SEASON	2022 SEASON
TOTAL CO ₂ EMISSIONS FLEET ONLY	1,383,802.65	1,828,083.06	5,057,851.4
CO ₂ EMISSIONS PER PASSENGER(FLEET)	314.3	317.98	269.91
<i>COMPARED TO PREVIOUS YEAR</i>		1.17%	-15.13%
TOTAL CO ₂ EMISSIONS FLEET + OFFICE	1,434,461.08	1,878,150.70	5,173,996.5
CO ₂ EMISSIONS PER PASSENGER (FLEET+OFFICE)	325.79	326.69	317.40
CO ₂ EMISSIONS PER OFFICE EMPLOYEES	2,303	2,635	5,037
TOTAL CO ₂ EMISSIONS OFFICE ONLY	50,658.43	50,067.64	116,145.14
AMOUNT OF PASSENGERS	4,403	5,749	16,301
AMOUNT SAILINGS IN TOTAL FOR BBT	153	184	463

TOTAL CO₂ EMISSIONS IN
2022 FOR BBT FLEET



5,057,851.4 KG

TOTAL CO₂ EMISSIONS IN
2022 FOR BBT OFFICE



116,145.14 KG

TOTAL CO₂ EMISSIONS IN 2022
FOR BBT OFFICE & FLEET



5,173,996.5 KG

TOTAL CO₂ EMISSIONS PER BBT
PASSENGER (FLEET ONLY)



269.88 KG

TOTAL CO₂ EMISSIONS PER BBT
PASSENGER INCL. OFFICE



317.40 KG

TOTAL CO₂ EMISSIONS
PER BBT EMPLOYEE



5,037 KG

CARBON EMISSIONS OF 2021 & 2022 FOOD MENU'S

Based on the menu's that were provided by the shipowners from the Leafde & Mare fan Fryslân, the Magnifique, the Gandalf, De Amsterdam, Fluvius, Princesse Royal and the Fleur, CO2 footprints were calculated per passenger per night. These numbers include dinner food items only, excluding drinks, breakfast and lunch (which is often made from breakfast items). Adding these would add **3.76** kg of CO2 per person per night, or **26.35** kg of CO2 per 7-night stay. *N.B.: The last dinner on Day 7 for the Magnifique is only served on the Magnifique III on their Noordroute and Antwerpen trips, and guests of the Princesse Royal eat dinner on shore on Day 4 (which is standardized).*

	LEAFDE & MARE FAN FRYSLÂN	MAGNIFIQUE	GANDALF	DE AMSTERDAM	FLUVIUS	PRINCESS ROYAL	FLEUR	
Day	2021	2021	2021	2021	2022	2022	2022	
1	3.16	3.39	2.75	6.13	6.62	6.62	5.23	kg of CO2 per person per day
2	6.63	9.21	6.03	6.45	2.54	2.54	3.06	
3	6.36	3.88	7.40	8.65	5.40	5.76	6.61	
4	7.17	11.72	2.10	7.70	5.48	6.32	10.42	
5	9.89	8.13	4.22	9.22	2.34	5.23	4.86	
6	3.37	14.37	4.64	4.69	3.66	3.87	8.83	
7	6.62	4.07	10.22	7.58	6.28	2.62	6.01	
Total	43.19	54.77	37.35	50.42	32.33	32.97	45.03	
<i>Incl. standard breakfast, lunch & drinks</i>	69.54	81.12	63.71	76.77	58.68	59.33	71.38	

In the next few pages, we will present the carbon emissions of each ship's menu's, over 7 dinners. Thereafter, for each ship, we will highlight some of the items in the daily menu's to unfold the CO2 emissions of certain food items and categories. We will give examples on how to reduce impact of daily menu's, i.e. by replacing certain food products and dishes with other ingredients.

CARBON EMISSIONS OF 2022 FOOD MENU'S: FLUVIUS

CARBON CALCULATIONS PER DAY PER PERSON

DAY 1

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Gambas in garlic cream	1.95
Pork tenderloin with pepper sauce, grilled vegetables and potato gratin roll	3.25
Vanilla ice cream with strawberries and whipped cream	1.27
Total	6.62

DAY 2

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Pumpkin soup with basil	0.28
Penne paste with salmon, roasted tomato and asparagus	1.46
Mango bavarois with coconut	0.64
Total	2.54

DAY 3

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Carpaccio	2.04
Chicken with lemon, oregano and sun-dried tomatoes, carrot, beans and roseval potatoes	2.28
Apple crumble with cream	0.92
Total	5.40

DAY 4

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Smoked salmon bonbon	0.64
Traditional lasagne	3.40
Nut cake with stracciatella ice cream	1.28
Total	5.48

DAY 5

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Goat cheese with honey and walnuts from the oven	0.11
Duck with red wine sauce and sweet potato, beans and yellow zucchini	1.56
Puff pastry with fruit and pastry cream	0.50
Total	2.34

DAY 6

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Broccoli soup with salmon	1.01
Cod rolled in serrano ham with tomato salsa, baby potatoes and cauliflower/pea pods	2.01
Chocolate mousse	0.48
Total	3.66

DAY 7

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Ham with melon	0.51
Steak with rice, oriental sauce with bell pepper and oyster mushrooms	5.17
Slice of cake	0.44
Total	6.28

CARBON EMISSIONS OF 2022 FOOD MENU'S: PRINCESSE ROYAL

CARBON CALCULATIONS PER DAY PER PERSON

DAY 1

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Gambas in garlic cream	1.95
Pork tenderloin with pepper sauce, grilled vegetables and potato gratin roll	3.25
Vanilla ice cream with strawberries and whipped cream	1.27
Total	6.62

DAY 2

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Pumpkin soup with basil	0.28
Penne paste with salmon, roasted tomato and asparagus	2.03
Mango bavarois with coconut	0.64
Total	3.11

DAY 3

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Carpaccio	2.04
Chicken with lemon, oregano and sun-dried tomatoes, carrot, beans and roseval potatoes	2.28
Nut cake with stracciatella ice cream	1.28
Total	5.76

DAY 4

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
<i>Dinner on shore</i>	6.16
Total	6.32

DAY 5

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Goat cheese with honey and walnuts from the oven	0.11
Steak with rice, oriental sauce with bell pepper and oyster mushrooms	4.23
Apple crumble with cream	0.89
Total	5.23

DAY 6

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Broccoli soup with salmon	1.01
Cod rolled in serrano ham with tomato salsa, baby potatoes and cauliflower/pea pods	2.22
Chocolate mousse	0.48
Total	3.87

DAY 7

Menu Item	KG of CO2
Coffee/tea + cookies and cake	0.16
Ham with melon	0.51
Duck with red wine sauce and sweet potato, beans and yellow zucchini	1.51
Slice of cake	0.44
Total	2.62

CARBON EMISSIONS OF 2022 FOOD MENU'S: FLEUR

CARBON CALCULATIONS PER DAY PER PERSON

DAY 1

Menu Item	KG of CO2
Mustard soup	0.99
Chicken thighs in red wine with pearl onions, celeriac, young leek and bacon, basmati rice and green salad	3.24
Panna cotta with vanilla, strawberry compote and almond crisp	1.01
Total	5.23

DAY 2

Menu Item	KG of CO2
Arugula salad with croutons, walnuts, roquefort and compote of dried figs	0.53
Haddock fillet with green asparagus and tagliatelle with basil sauce	2.03
Pear and cardamom tarte tatin with sabayon	0.51
Total	3.06

DAY 3

Menu Item	KG of CO2
Tomato salad marinated, buffalo mozzarella and basil and focaccia	1.63
Carpaccio	3.69
Homemade lasagna with celeriac and carrot, béchamel sauce and old cheese	1.28
Total	6.61

DAY 7

Menu Item	KG of CO2
French onion soup with cheese crouton	0.25
Stewed beef, bacon, mushrooms and carrot with mashed potatoes and haricots verts with bacon and garlic	9.53
Lava cakes of dark chocolate and creme fraiche	0.65
Total	10.42

DAY 5

Menu Item	KG of CO2
Roasted goat cheese with balsamico and salad, apple and pecan nuts	0.65
Salmon with saffron risotto and roasted vegetables, white wine sauce with green herbs	3.11
Marinated strawberries with basil, cookie crumble and yoghurt ice cream	1.09
Total	4.86

DAY 6

Menu Item	KG of CO2
Creamy roasted carrot soup with ras el hanout with coconut cream fraiche	0.24
Stewed lamb with red curry, tomatoes and lentils with rice and pappadums	7.95
Dutch cheesecake with summer berries	0.64
Total	8.83

DAY 7

Menu Item	KG of CO2
Mousse of puffed sweet potato and goat cheese with pickled tomatoes and smoked turkey	1.62
Confit duck leg with potato croquettes, chicory with orange and watercress salad	3.75
Cheese platter with port + chocolate fondant with salted caramel/vanilla ice cream	0.64
Total	6.01

CARBON EMISSIONS OF 2022 FOOD MENU'S: GANDALF

Gandalf menu reduction of portions

To show the effects of limiting the amount of meat and fish per person, we calculated the CO2 emissions of limited portion sizes, by reducing main course portions by 20%.

For Day 1, the the amount of chicken filet is reduced. On Day 2, the pork roast portion is reduced and on Day 3, the meat in the chili con carne is limited. For Day 4 we calculated the emissions for a limited portion of chicken and for Day 5 the cod in the lasagne. For the meals on Day 6, the meats in the curry's have been limited and on Day 7, we limited the portion size of the lamb stew.

If all portions would be limited, this would save **3.31** kg of CO2 per passenger per week. With 20 passengers on the Gandalf, that means saving an average of **66.2** kg of CO2 per week.

REDUCTION PER PERSON PER
WEEK WHEN LIMITING PORTIONS

 - **3.31 KG**

Day	kg of CO2 per person per day
1	2.75
2	6.03
3	7.40
4	2.10
5	4.22
6	4.64
7	10.22
Total	37.35

Day	kg of CO2 per person per day
1	2.48
2	5.72
3	6.77
4	2.05
5	4.15
6	4.22
7	8.65
Total	34.05
	- 3.31 kg

CARBON EMISSIONS OF FOOD MENU'S: ALTERNATIVE OPTIONS

Replacing meat diners with vegetarian options

Because some of the ships have been experimenting with vegetarian option and serving vegetarian meals to their guests (i.e. 1 or 2 times a week), we have explored what these initiatives would do in terms of total CO2 emissions.

The table below outlines some of these options.

	Average per day	Alternative 1: Gandalf Day 7 vegetarian	Alternative 2: Magnifique Day 6 vegetarian	Alternative 3: Fluvius/PRR Day 1 vegetarian	Alternative 4: 5 days average, 2 days vegetarian (alternative 1 + alternative 2)	Alternative: 1 veggie meal per week	Gandalf -20% portion size	kg of CO2 per person per day
Day 1	6.17	6.17	3.39	4.66	6.15	6.15	2.48	
Day 2	7.82	5.38	9.21	5.38	6.15	6.15	5.72	
Day 3	5.34	6.19	3.88	6.19	6.15	6.15	6.77	
Day 4	7.20	6.48	11.72	6.48	6.15	6.20	2.05	
Day 5	4.62	6.52	8.13	6.52	6.15	6.20	4.15	
Day 6	5.50	6.29	5.01	6.29	5.01	6.20	4.22	
Day 7	6.43	3.13	4.07	6.14	3.13	3.76	8.65	
	43.08	40.16	45.41	41.65	38.92	40.82	34.05	Total kg CO2 p.p.p.w.

1 day vegetarian main

1 day vegetarian main

1 day vegetarian main

2 days vegetarian main

Average vegetarian main course diner

Gandalf reduction p.p.p.w. -20% portion size

- 3.31 kg

Average per week + standardization breakfast/lunch/drinks/snacks

69.51 kg

Average per week, incl. 1 vegetarian main course dinner + standardization breakfast/lunch/drinks/snacks

67.18 kg

CARBON EMISSIONS OF 2021 FOOD MENU'S: MAGNIFIQUE

CARBON CALCULATIONS PER DAY PER PERSON

DAY 1

Menu Item	KG of CO2
Fennel soup with sambuca	1.12
Richly filled vegetable lasagna	1.28
Dame Blanche with lukewarm chocolate sauce	0.99
Total	3.39

DAY 3 - INDONESIAN NIGHT

Menu Item	KG of CO2
Rice with vegetables Chicken satay peanut sauce, thai fishcurry, kroepoek, atjar, spring rolls, gambas with tempura	4.00
Parfait with mango	0.52
Total	3.88

DAY 5

Menu Item	KG of CO2
Vitello Tonato	3.77
Dorade fillet, pinot grigio sauce, salad, pasta aioli	2.31
Tiramisu classico	2.04
Total	8.13

DAY 6

Menu Item	KG of CO2
Porcini mushrooms soup, smoked salmon bonbon with lemon cream and Dutch shrimps	2.15
Lamb roulade with stuffed bell pepper, spinach cream sauce, potato croquettes	10.70
Caramel cheesecake	1.52
Total	14.37

DAY 2

Menu Item	KG of CO2
Greek feta cheese salad	2.68
Slip sole with tartar sauce, chicory and homemade fries/Beef stew with beer, chicory and homemade fries	5.44
Apple dumpling with vanilla sauce	1.10
Total	9.21

DAY 4 - BBQ

Menu Item	KG of CO2
Sausages	0.88
Hamburgers	2.45
Spare ribs	2.27
Beef steak	3.92
Fish skewers	0.86
3 types of salad and sauces	1.25
Baked potatoes	0.09
Total	11.72

DAY 7

Menu Item	KG of CO2
Tomato basil soup	0.33
Marinated chicken thighs with honey thyme gravy, broccoli, baby potatoes with butter and parsley	3.04
Cheese board with pear chutney	0.69
Total	4.06

CARBON FOOTPRINT ANALYSIS OF MAGNIFIQUE

Magnifique Menu Highlights

On day 4, passengers on the Magnifique and sister ships are treated with a barbecue night. They are served sausages, hamburgers, spareribs, steak and fish kebab. These items are the reason for the relatively high CO2 emissions of Day 4 (11.72 kg) compared to the other days.

EXCERPT OF DAY 4 MENU

Menu Item	KG of CO2
Sausages	0.88
Hamburgers	2.45
Spare ribs	2.27
Beef steak	3.92
Fish skewers	0.86

On Day 1, the Magnifique serves a fennel soup, vegetable lasagna and a Dame Blanche for dessert. Without serving meat, this results in total emissions for dinner on Day 1, per passenger, in 3.39 kg of CO2. A considerable difference with Day 4.

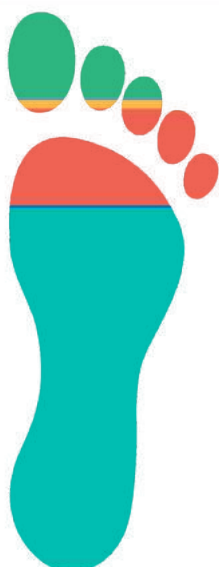
How to cut emissions and reduce impact?

If the hamburgers of this BBQ meal would be replaced with vegetarian hamburgers, this would result in a reduction of **2.152 kg** of CO2 per passenger. With 40 passengers, that means saving an average of **86 kg** of CO2 on Day 4.

VEGETARIAN HAMBURGERS CO2 REDUCTION FOR 1 DINNER



- 86 KG



65.0%	Fuel
0.4%	Total water use
17.3%	Energy use
1.4%	Laundry
0.2%	Plastics
0.03%	Paper
0.2%	Glass
15.5%	Food & Beverages
0.0%	Other materials

Day

1	3.39	kg of CO2 per person per day
2	9.21	
3	3.88	
4	11.72	
5	8.13	
6	14.37	
7	4.07	
Total	54.77	

CARBON EMISSIONS OF 2021 FOOD MENU'S: MARE & LEAFDE

CARBON CALCULATIONS PER DAY PER PERSON

DAY 1

Menu Item	KG of CO2
Vegetarian Poke Bowl	0.64
Peas puree with potato mousselin	1.65
Texel strawberries with whipped cream and mint	0.87
Total	3.16

DAY 3 - DUTCH DINNER

Menu Item	KG of CO2
Herring in a salty lemon dressing with radish, apple and mandarin	0.34
<i>Trio of:</i> Sweet potato and pumpkin stew with a meatball/Escarole stew with hashee/Red cabbage stew with raisin and apples with smoked sausage	5.22
Dutch cheese board with rye bread/nut bread and a reduction of cranberry	0.75
Total	6.31

EXCERPT OF DAY 5 MENU

Menu Item	KG of CO2
Gravad lax with mustard crème fraiche	0.69
Lamb stew with Texel beer, bell pepper and red potatoes	8.17
Limoncello panna cotta with red fruit	1.05
Total	9.89

DAY 2 - AMERICAN LUNCH

Menu Item	KG of CO2
American corn chowder soup	1.34
Hamburger, cajun wedges & American cowl slaw	4.53
Milkshake	0.77
Total	6.63

DAY 4

Menu Item	KG of CO2
Goat cheese croquette with pumpkin mousselin and cranberry dip	1.02
Veal escalope with forest mushrooms and red port reduction	5.67
Apple compote with raisins and vanilla mascarpone	0.48
Total	7.17

DAY 6 - ITALIAN

Menu Item	KG of CO2
Tuna tartare with avocado and gazpacho	1.74
Beetroot risotto with salmon fillet and broccoli	1.35
Granita of watermelon and lemon/mint sauce	0.28
Total	3.37

DAY 7

Menu Item	KG of CO2
Cauliflower soup with spring onion and chili flakes	0.33
Pork belly with hoisin sauce and jacket potato	5.43
Chocolate mouse with white choc crumbs and raspberry	0.86
Total	6.62

CARBON EMISSIONS OF 2021 FOOD MENU'S: MARE & LEAFDE

Mare & Leafde fan Fryslân Menu Highlights

On day 5, passengers on both vessels are served a 3-course dinner, with salmon, lamb stew and panna cotta. Lamb meat has the highest CO2 emission factor out of all types of meat. Serving lamb automatically means a meal with a considerable impact on the environment in terms of its carbon footprint.

DAY 5 MENU

Menu Item	KG of CO2
Gravad lax with mustard crème fraiche	0.686
Lamb stew with Texel beer	7.483
Grilled bell pepper (3 types)	0.456
Red potatoes	0.231
Limoncello panna cotta with red fruit	1.049
Total	9.89

On Day 1, the Magnifique serves a fennel soup, vegetable lasagna and a Dame Blanche for dessert. Without serving meat, this results in total emissions for dinner on Day 1, per passenger, in 3.39 kg of CO2. A considerable difference with Day 4.

CO2 REDUCTION OF REPLACING LAMB WITH POTATO PER DINNER

- 193.8 KG  Mare fan Fryslân

How to cut emissions and reduce impact?

If the lamb meat of this stew would be replaced with potatoes, for example as a potato curry, this would result in a reduction of **7.18** kg of CO2 per passenger. With 27 passengers on the Mare and 25 on the Leafde fan Fryslân, that means saving an average of **193.8** and **179.4** kg of CO2 respectively.

ONE PORTION OF LAMB STEW FOR DINNER PER PERSON

 **7.48 KG**

Day	kg of CO2 per person per day
1	3.16
2	6.63
3	6.31
4	7.17
5	9.89
6	3.37
7	6.62
Total	43.15

CARBON EMISSIONS OF 2021 FOOD MENU'S: GANDALF



CARBON CALCULATIONS PER DAY PER PERSON

DAY 1

Menu Item	KG of CO2
Bapao buns bean with bean sprouts salad	0.39
Chicken with cashewnuts	2.65
Stuffed crepes (flensjes)	0.56
Total	2.75

DAY 3 - MEXICAN

Menu Item	KG of CO2
Empanada's with green veggie dip	1.56
Chili con carne with corn salad	5.39
Tartlet	0.44
Total	7.40

DAY 5

Menu Item	KG of CO2
Carpaccio	2.04
Lasagna with cod/ Spaghetti with Gorgonzola sauce	1.12
Tiramisu	1.06
Total	4.22

DAY 7

Menu Item	KG of CO2
Potato salad with herring	0.33
Flemish lamb stew, Dutch salad with tomato	5.43
3 types of pudding (vanilla, chocolate and custard) with fruit	0.86
Total	10.22

DAY 2

Menu Item	KG of CO2
Broccoli cauliflower soup with warm bread rolls	0.76
Pork roast, mushroom sauce, potatoes, mixed salad, chicory with ham & cheese	4.15
Chocolate mousse white and pure with chatter head and forest fruits	1.12
Total	6.03

DAY 4

Menu Item	KG of CO2
Mustard soup	1.02
Italian Chicken with broad beans with bacon, red cabbage with apples, rhubarb, potato wedges and red beets salad with goat cheese	5.67
"Vlaflip" with orange	0.48
Total	2.10

DAY 6 - INDIAN

Menu Item	KG of CO2
Indian chicken soup with pita bread	1.05
Lamb curry/Vegetable curry/Lentil curry/Egg curry, tomato salad with cucumber, basmati rice, naan, raita, pineapple and mango chutney	10.90
Mango ice cream with pieces of mango	0.29
Total	4.64

CARBON EMISSIONS OF 2021 FOOD MENU'S: GANDALF



Gandalf Menu Highlights

On Day 7, the final day, passengers are served a 3-course dinner with beef stew as the main dish. Beef typically has a high CO2 emission factor. Serving beef therefore results in a meal with a considerable impact on the environment in terms of its carbon footprint.

EXCERPT OF DAY 7 MENU

Menu Item	KG of CO2
Potato salad with herring	0.544
Flemish beef stew	7.835
Mashed potato	0.086
Classic Dutch salad with tomatoes	0.587
3 kinds of pudding and fruits	0.700
Total	10.22

On Day 1, the Gandalf serves bapao breads, chicken filet with cashews, salad and Dutch crêpes (flensjes) for dessert. Although this meal includes meat, it has a considerably lower impact than when beef is used. This results in total emissions for dinner on Day 1, per passenger, in 2.75 kg of CO2. A difference of 7.47 kg with Day 7.

How to cut emissions and reduce impact?

If the beef of this stew would be replaced with a vegetarian alternative, for example falafel, this would result in a reduction of **6.59** kg of CO2 per passenger. With 20 passengers on the Gandalf, that means saving an average of **131.7** kg of CO2 in one day during dinner.

ONE PORTION OF BEEF STEW
FOR DINNER PER PERSON



7.83 KG

Day	kg of CO2 per person per day
1	2.75
2	6.03
3	7.40
4	2.10
5	4.22
6	4.64
7	10.22
Total	37.35

CARBON EMISSIONS OF 2021 FOOD MENU'S: AMSTERDAM

CARBON CALCULATIONS PER DAY PER PERSON

DAY 1

Menu Item	KG of CO2
Salmon tartar	0.62
Pork fillet in mushroom sauce and vegetarian frittata	4.60
Crepes suzette	0.91
Total	6.13

DAY 3

Menu Item	KG of CO2
Beef carpaccio	3.15
Hungarian goulash/ Mediterranean fish ragout and a cheese spätzle	5.06
Chocolate mousse	0.58
Total	8.65

DAY 5

Menu Item	KG of CO2
Caprese salad	0.73
Sauerbraten, bread dumplings (semmelknödel) and red cabbage/Pasta e pesto	7.67
Strawberry ice cream with fresh strawberries	0.82
Total	9.22

DAY 2

Menu Item	KG of CO2
Asparagus cream soup	0.52
Chicken breast in curry sauce/Tilapia in white wine sause and a vegetable strudel	4.31
Blackberry panna cotta	0.98
Total	6.45

DAY 4

Menu Item	KG of CO2
Mushroom cappuccino	4.07
Schnitzel with stuffed paprika	3.38
Apple strudel	0.26
Total	7.70

DAY 6

Menu Item	KG of CO2
French onion soup	1.01
Coq au vin/Sole fish in champagne sauce/ Eggplant parmigiana	2.30
Raspberry bavarois	1.38
Total	4.69

DAY 7

Menu Item	KG of CO2
Vitello tonato/Beef consomme and Eggs Royale	2.59
Chateaubriand, potato au gratin and a vegetable bouquet/Vegetable lasagna	3.91
Baked Alaska	1.08
Total	7.58

CARBON EMISSIONS OF 2021 FOOD MENU'S: AMSTERDAM

Amsterdam Menu Highlights

De Amsterdam serves a very distinguished menu to their guests. They often offer multiple choices for their main dishes, offering guests a choice between fish, meat and vegetarian for example. On Day 5, passengers are served a 3-course dinner with Sauerbraten as the main dish (or pasta e pesto). Sauerbraten is a traditional German roast of heavily marinated meat. As most meats, especially those used in stews, typically have high emissions factors, serving this dish means that the menu of Day 5 has leaves the guests with a relatively high carbon footprint.

DAY 5 MENU

Menu Item	KG of CO2
Caprese salad	0.73
Sauerbraten	6.57
Bread dumplings (semmelknödel)	0.33
Red cabbage	0.44
Strawberry ice cream with fresh strawberries	0.82
Total	9.22

How to cut emissions and reduce impact?

Sauerbraten is a typical dish, which makes it difficult to replace. To still show the impact that offering an alternative can make, let's look at serving a similar dish with vegetarian meatballs. This dish would mean a reduction in CO2 of **5.56 kg** per person, compared to Sauerbraten main course. At full capacity, De Amsterdam hosts 112 passengers. Replacing the meat with vegetarian meatballs for one dinner, i.e. on Day 5, means a reduction of **311.46 kg** of CO2, assuming half of the passengers eat pasta and half eats the meatballs.

REPLACING SAUERBRATEN WITH
VEGETARIAN MEATBALLS ON DAY 5



-311.46 KG

Day	kg of CO2 per person per day
1	6.13
2	6.45
3	8.65
4	7.70
5	9.22
6	4.69
7	7.58
Total	50.42

SCOPE

AWARDED SUSTAINABILITY BADGES BY SEA GOING GREEN



For the 2019 season, we designed a scoring system to point out ship owners' efforts to reduce the environmental impact in ways that are not visible in carbon emission calculations (e.g. eco-friendly cleaning products).

The activity based carbon footprint gives a good overview of the total emissions of each ship. However, 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 implementing.

In this report, we will explain the reasoning behind the awarded badges for each ship that is part of the scope of this year. The badge audits are based on the 2022 data.

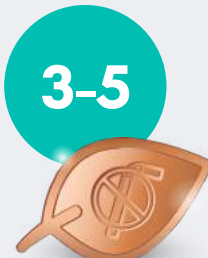

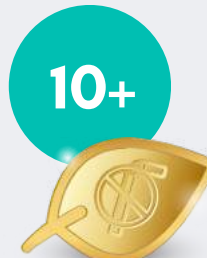






Our 3 badges are for the following categories: Plastic-free, Sustainable Energy & Water usage, Local & Organic Products. On the next page some examples of which measures fall under which categories are lined out.



SCOPE

AWARDED SUSTAINABILITY BADGES BY SEA GOING GREEN



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

On the next pages, an overview is provided outlining how the points for the badges are divided amongst the ships. Based on the points that the ships score for each category, a badge is awarded.

AWARDED SUSTAINABILITY BADGES OVERVIEW

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)
- The Flora has reusable lunch boxes instead of plastic/paper bags for lunch.
- The Lena Maria has washable placemats.
- On board the Fleur a reusable baking mat is used instead of baking paper.
- On the Leafde fan Fryslân passengers only get water bottles (bidons) if they ask for them.
- De Amsterdam sells their old furniture if it is being replaced.
- On the Gandalf the table cloths are being reused by washing them.

Next to the criteria outlined on this page, there can be points awarded if ships have extra measures beyond what is specified in the categories. Such examples of extra initiatives will be specified below.

AWARDED SUSTAINABILITY BADGES OVERVIEW

PLASTIC-FREE

	De Holland	De Willemstad	De Poseidon	De Amsterdam	De Nassau	Fluvius	Princesse Royal	Flora	Fiep	Magnifique II	Magnifique II	Magnifique IV	Gandalf	Sarah	Lena Maria	Zwaanije	Fleur	Wapen fan Fryslân	Mare fan Fryslân	Leafde fan Fryslân	Elizabeth	Office
Separate waste	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
No plastic bottles						1	1	1		1	1	1				1		1	1	1	1	1
No plastic soap bottles								1	1									1				1
No mini toiletries						1	1	1	1	1	1	1	1	1		1		1				
No plastic lunch bags (reusable boxes get higher score)	1	1	1	1	1	1	1	2	2	1	1	1	2	1	2	2	1	2				1
No straws								1	1				1					1				
No breakfast minis								1					1		1					1	1	1
No single packages (salt, pepper, toothpick)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Reusing cabin bins	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Trash bags from recycled material						1		1										1				
No plastic cups (incl. bathroom)						1			1	1	1	1	1	1		1		1			1	1
Kitchen: food container/reused packaging						1		1						1				1		1	1	1
Minimize waste of delivery (supplier)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Extras																		1		1	1	
Total	5	5	5	5	5	11	8	13	11	8	8	8	11	5	10	5	14	4	8	8	8	4

SUSTAINABLE ENERGY & WATER USE

	De Holland	De Willemstad	De Poseidon	De Amsterdam	De Nassau	Fluvius	Princesse Royal	Flora	Fiep	Magnifique II	Magnifique II	Magnifique IV	Gandalf	Sarah	Lena Maria	Zwaanije	Fleur	Wapen fan Fryslân	Mare fan Fryslân	Leafde fan Fryslân	Elizabeth	Office
LED lights	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Solar panels								1	1					1		1		1				
Water saving measures (shower)								1	1					1	1	1	1					
Water treatment/ filters	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1		1	1		1	1	
Toilet with outside water								1	1					1	1	1		1				
Empty waste water on land	1	1	1	1	1																	
Efficient appliances						1		2						2							1	
No aircondition								1						1	1	1			1	1	1	
Cotton napkins								1		1	1	1				1						
Guest involvement (info posters, they ask for towels themselves)						1	1	1	1					1	1	1	1	1	1	1	1	
Extras														1								
Total	3	3	3	3	3	4	4	10	6	3	3	3	10	6	7	4	5	3	4	5	3	

AWARDED SUSTAINABILITY BADGES OVERVIEW

LOCAL & ORGANIC PRODUCTS

	De Holland	De Willemstad	De Poseidon	De Amsterdam	De Nassau	Fluvius	Princesse Royal	Flora	Fiep	Magnifique II	Magnifique II	Magnifique IV	Gandalf	Sarah	Lena Maria	Zwaantje	Fleur	Wapen fan Fryslân	Mare fan Fryslân	Leafde fan Fryslân	Elizabeth	Office	
Biological/local food																1		1				1	
Vegetarian meals (fixed)								2	1	1				1	0		1	0	1	1	1	2	
Creative food use/ no food waste	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Eco soap						1	1	1						1		0	1		1	1			
Eco cleaning products						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Extras (specify if applicable)						1	1																
Total	1	1	1	1	1	4	4	5	3	3	2	2	3	3	3	3	4	3	4	4	4	4	

	Plastic Free	Energy & Water	Organic Products	Total Points awarded
De Amsterdam	5	3	1	9
Elizabeth	8	3	4	15
Fiep	11	6	3	20
Fleur	14	5	4	23
Flora	13	10	5	28
Fluvius	11	4	4	19
Gandalf	11	10	3	24
De Holland	5	3	1	9
Leafde	8	5	4	17
Lena Maria	10	7	3	20
Magnifique II	8	3	3	14
Magnifique II	8	3	2	13
Magnifique IV	8	3	2	13
Mare	8	4	4	16
De Nassau	5	3	1	9
Poseidon	5	3	1	9
Princesse Royal	8	4	4	16
Sarah	5	6	3	14
Wapen	4	3	3	10
De Willemstad	5	3	1	9
Zwaantje	5	4	3	12

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.

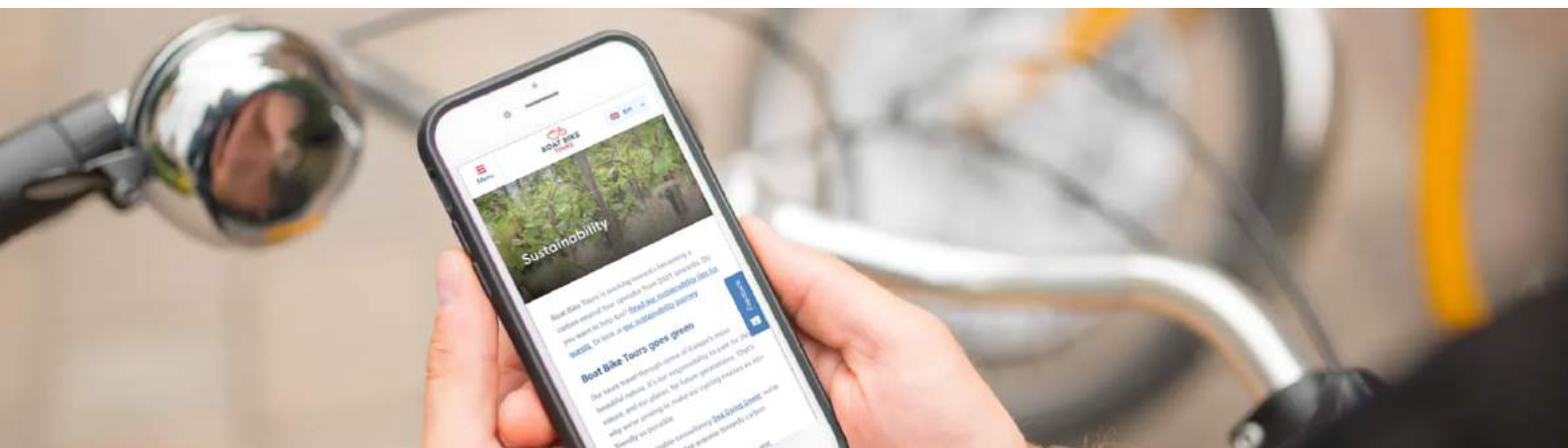
Office

For the office, it concerns the following items:

- Whiteboard markers
- Tipp-ex and glue
- Sanitary gel and disinfecting fluids
- Laminating materials and plastic covers (for binders)
- Rubber bands
- Purchased bikes
- Bicycle rack bags and helmets
- Phone holder elastic bands (for steering wheels)
- Inner bicycle tubes
- First aid kits (for tour guides)
- Calculators
- Tesa tape
- Keyboards
- Medicines
- Wet wipes
- Toilet cleaner blocks
- Binder tabs
- Dymo labeltape

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.



ASSUMPTIONS

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.

Electricity

For the original 2019 data, when the ships did not specify what type of electricity they used, it's assumed that they use grey electricity as only 18% of electricity in the Netherlands is green. When specified that green energy is used, this was calculated accordingly.

Laundry

For laundry, 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 CO2 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).

ASSUMPTIONS

Waste water

When the ships didn't have separate blackwater and greywater tanks, the conversion factor for wastewater was used, as this is a combination of the two. When the ships have separate 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.

For the 5 River Cruise Holding ships the total water use in terms of drinking water, black water and grey water was based on 2019 data. The deciphered division reflects 50% drinking water and 50% black and grey water of the total water use. The subsequent division then is 60% black water and 40% grey water, out of the 50% of the total water numbers.

For the Flora, the water usage was based on the numbers of Gandalf, and the division for black water usage was based on the numbers the Flora gave us in 2019.

Finally, for Zwaantje, the black water usage was based on 2019 numbers as well.

Packaging vs. content of products

Our scope and method for CO₂ 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 food and beverages calculations for each ship were based upon the menu calculations that were performed that were most relevant, mostly relating to the owners of the ships. For example, for all River Cruise Holding ships the menu of De Amsterdam was used. If the ship did not belong to any of the same owners as a ship for which the emissions of their menu were calculated, a standardized number was used that represents an average of all other menu's. For the 2022 season, this was based on 7 menu's in total. All food calculations for the ships include emissions for dinner, supplemented with the standardized number for breakfast, lunch, snacks and drinks. This number was based on the stock list of the Magnifique III, and updated for this season based on new conversion factors.

The CO₂ emissions for alcoholic drinks and soda are 2,8 kilos per passenger per week. Finally, for all other food the standardized CO₂ 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. Gelatine sheets are left out of the calculations.

ASSUMPTIONS

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.

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.

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).

ASSUMPTIONS - FOOD MENU CALCUALTIONS

Leafde & Mare fan Fryslân

On Day 1, for sushi noodles, unpolished rice factor is used. For white cabbage, the cauliflower factor is used. On Day 2, for chorizo, the pork factor is used. Instead of celery, chicory factor is used. For cheddar, it was Edam 40+ and for regular cabbage, kale factor is used. For Day 3, instead of cabbage, we used spinach. For cranberry reduction, jelly factor was used, for Frisian 'nagelkaas' we took 20+ cheese factor, for Texel sheep cheese we took goat cheese, and for Frisian farm cheese we took 'old cheese' factor. On Day 4, for bread crumbs we took oatmeal, for forest mushrooms we took regular mushrooms, for red port we took the regular liquor factor, for pods we took green beans. For raisins we took grapes, and for mascarpone the factor for cream. On Day 5, for salmon filet we took a combination of wild and farmed salmon. For limoncello, the regular liquor factor, and for red fruits the strawberry factor. For Day 6, we took the canned tuna factor, as no there is no Dutch fresh tuna factor available. For gazpacho we took the tomato sauce factor, and for beets the kale factor. For watermelon, the honey melon factor was used. On Day 7, for spring onions, we took the regular onions factor. For hoisin sauce, oriental sauce factor. For different types of chocolate, the same chocolate factor is used and for raspberry the strawberry factor.

Magnifique III

For Day 1, fennel soup with gamba's, pax are served 2 or 3 gamba's per person, so an average of 2.5 is assumed. On Day 2, for black olives the average olive oil factor is used. For lemon oil, we used the sunflower oil factor. For tartar sauce, which is made with mayonaise, we took the mayonaise factor. For homemade fries, an average for fresh and frozen fries. For the 'appelbol', the apple pie factor. For puff pastry, the regular dough factor. For the main dish, 50/50 was assumed as there were 2 choices. On Day 3, regular chicken factor for chicken saté. For peanut sauce, regular peanut factor. For leek, we took chicory and for white cabbage the cauliflower factor. For the fish in the Day 3 menu's, 50/50 was assumed between gamba's and fish curry. On Day 4, for spareribs the the pork chop factor was used. For fish skewers, the tilapia factor, for garlic sauce the frites sauce factor and for cocktail sauce that of oriental sauce. On Day 5, for capers we took the peas factor, for croutons the biscuit factor and for Dorade fish we took trout. For aioli, the mayonnaise factor, for 'lange vingers' (cookies used in tiramisu) we took biscuit.

ASSUMPTIONS - FOOD MENU CALCUALTIONS

On Day 6, for the salmon bonbon we took farmed salmon. For the cheese, the 48+ cheese factor. For potato 'kroketten' we took frozen fries, and for cream cheese the cheese spread factor was used. For maizena, the wheat flour factor was used. For caramel, the regular cream factor. On Day 7, for the assortment of cheeses, we took 20+ cheese factor, the goat cheese factor and the old cheese factor. For pear chutney, the apricot factor and for 'kletsoppen' the stroopwafel factor.

Gandalf

On Day 1, for Seroendeng we used the peanut factor. For flensjes, the regular pancakes factor. On Day 2, for garlic butter we used the regular butter factor. For roast beef, the pork meat factor. For cheese, we took Gouda 48+. For different types of chocolate, the same chocolate factor is used. For 'kletsoppen' the stroopwafel factor, and for red fruits the strawberry factor. On Day 3, for minced beef we took a combination of minced (runder) beef and half-om-half minced beef. For olives, the average olive oil factor, for lime the lemon factor, for tortilla chips the regular chips factor. For crème fraîche, the regular cream factor. For grated cheese, we took Edam 40+, and for the varying cake for dessert we took apple pie. On Day 4, for shallot, the regular onion factor was used. For mustard, the mayonnaise factor. For broad beans, the green beans factor was used. For red cabbage, the kale factor was used. For rhubarb, the chicory factor was used. For red beets we took the kale factor. For salad dressing, we took a combination of sunflower and olive oil. On Day 5, for carpaccio we took the roast beef factor. For 'lange vingers' (cookies used in tiramisu) we took biscuit. For the main dish, either fish lasagne or spaghetti, 50/50 was assumed as there were 2 choices. On Day 6, for lentils we took peas, and for mango chutney the mango factor, for mango ice cream the regular ice cream factor. For the 4 types of curry, we assumed 1/4 portion for each curry. On Day 7, for the pudding, we took the factor for 'vla' (Dutch custard).

ASSUMPTIONS - FOOD MENU CALCUALTIONS

De Amsterdam

On Day 1, for aioli we took the mayonnaise factor. On Day 2, for asparagus in can, we took green beans in can. For crème fraîche, we took the regular cream factor. For puff pastry, the regular dough factor was used, and for blackberry the strawberry factor. For the main dish, we assumed 50/50 between the choices. On Day 3, for leftover fish, like tilapia and cod, we assumed 50/50. For cheese, the Gouda 48+ factor was used. For different types of chocolate, the same chocolate factor is used and for raspberry the strawberry factor. For the main dish, 50/50 was assumed as there were 2 choices. On Day 4, for cheese, the Gouda 48+ factor was used. On Day 5, for leek, the chicory factor was used. For red cabbage, the green beans factor was used. For cranberry's, we took the grapes factor. On Day 6, instead of egg plant, we used the zucchini factor and for raspberry's the strawberry factor was used. On Day 7, for capers, the peas factor was used. For salmon, we took a combination of wild and farmed salmon factors.

Princesse Royal and Fluvius

The guests of the Princesse Royal eat on shore on Day 4. Therefore we used an average of all the other menu's for this day. For the cookies that guests eat in the afternoon with coffee and tea on both ships, we calculated an average out of 3 options, 1 piece of plum cake, 1 "appelkoek", for which we took the apple pie factor and 1 "gevulde koek". For gamba's we used Dutch shrimp factor. For eggplant the took courgette factor. For celeriac we used the raw carrot factor. For leek, the factor of chicory. For duck the same factor as chicken as they are similar types of poultry. For sweet potato we used the conversion factor of regular potatoes, and for red and forest berries that of strawberries. As for dark chocolate we used the factor of milk chocolate. Atjar was excluded of the calculations.

Fleur

For the menu calculations of Fleur, we used the onion factor for shallots, and the factor of mayonnaise for mustard. For bacon we used a "ontbijtspek" factor, and for basmati rice we used the factor of white rice. For an "amandelkrokantje" we used a factor of biscuits. For croutons, white bread, for roquefort, the factor of old cheese, and shrill we replaced with a cod factor. For liquor we used Jenever. For ice cream we used vanilla ice cream factors. For the cheese platter, we took 20+ cheese factor, we took goat cheese factor and old cheese factor. For lamb meat, there is still uncertainty in the industry with regard to the emissions of this specific type of meat. There have been ongoing political discussions about this, therefore the RIVM decided to withdraw the CO2 emission factor calculations. Because lamb was included in the other menu's as well, we decided to use the same for now as there is not going to be a solution for this soon.

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