

GREEN TRANSITION STRATEGY



SeaGoingGreen



FINAL REPORT

CLIENT: BOAT BIKE TOURS

F E B R U A R Y 2 0 2 2



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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, 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](#).



THE IMPACT OF COVID-19 ON BOAT BIKE TOURS' 2021 SEASON

In March 2020, the tourism industry came to a halt. The coronavirus (COVID-19) swiftly led to restrictions being put in place around the world, stopping the estimated 1.5 billion tourism arrivals from reaching their destinations as effortlessly as before. For the cruising industry, COVID also took its toll. In the Netherlands specifically, the ebb and flow of restrictions on tourism from June onward allowed for Europeans to join tours which was welcomed by cruising businesses as they shifted towards a domestic (EU) tourism strategy. Boat Bike Tours was able to offer a shortened summer season with condensed offerings to travellers. Negative travel advice issued by the governments of Germany and Belgium ended the season early with cancellations running through the end of the month effectively ending the season in September. **The 2021 season ran 184 weeks in total, with a total of 5749 passengers. Compared to the 2020 season with 4403 pax and 153, this is a 30,6% increase, and compared to 2019 a 62,2% decrease over 421 (2019 weeks) total weeks.**

In response to COVID-19, Boat Bike Tour's operations were overhauled under their new Corona Protocol. The protocol was created based on guidelines from the EU-Commission document (13-05-2020 / C(2020) 3251 final) "COVID-19 EU Guidance for the progressive resumption of tourism services and for health protocols in hospitality establishments". These adaptations, put into place in cooperation with the Dutch Government, added precautions to ensure that health and safety measures were prioritized for the well-being of guests on board and while cycling. Measures were implemented specifically per ship and in line with regulations from the ships' port of departure and route through other countries.

Operational changes included measures for guests including a pre-boarding questionnaire and free cancellation for guests to decrease the risk of virus transmission on board. Face masks (disposable) were supplied on board to be used by guests. For staff, extra hygienic care was prioritized to keep communal surfaces like door handles and devices clean. The advice for 1.5 meters distance was enforced from the ships' embarking to restaurant etiquette including when cycling. Plastic gloves and other single use items including face masks were made mandatory for chefs and kitchen workers, which were instructed to be changed frequently. Hand sanitizer and disinfectant soap were widely available. Instructions on health and safety protocol were discussed regularly on board. Table service over buffets, pre-selections for meals and bar self-service were introduced for additional safety. Throughout the journey, guests were asked for feedback on improvements and other suggested measures to ensure that guest expectations were met. Boat Bike Tour's full coronavirus protocol can be found [here](#).

Even with the restrictions and challenges posed by the coronavirus pandemic, Boat Bike Tours was able to provide memorable experiences for guests thanks to the hard work from captains and crew, who worked tirelessly to make the season possible. While it is unknown how the pandemic will impact travel and tourism for the 2022 season, Boat Bike Tours will continue its sustainability journey and mission to strive to become CO2 neutral by measuring the fleet's impact over the 2021 season. Insights gained will be used to create sustainability milestones for the upcoming season.

SCOPE

BOAT BIKE TOURS THE NETHERLANDS 2021



Location: The Netherlands

BBT Office: 19 employees

TOTAL PASSENGER NUMBERS AND
SAILING WEEKS FOR BBT PER SHIP

SHIP NAME	8 DAY TOURS	7 DAY TOURS	WEEKS FOR BBT	GUESTS IN TOTAL
De Amsterdam	17		17	959
Elizabeth	9		9	122
Fleur	3		3	47
Flora	6		6	80
Fluvius	10		10	251
Gandalf	3		3	48
De Holland	14	4	18	782
Leafde fan Fryslân	12		12	241
Lena Maria	10		10	211
Poseidon		11	11	700
Princesse Royale (Magnifique)	5		5	69
Magnifique III	12		12	279
Magnifique II	9		9	176
Magnifique IV	17		17	360
Mare fan Fryslân	12		12	278
De Nassau		15	15	886
Sarah	4		4	66
Wapen fan Fryslân	11		11	194
TOTAL			184	5749

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

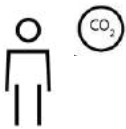


TOTAL CO2 EMISSIONS IN
2021 FOR THE BBT OFFICE:



50,068 KG

CO2 FOOTPRINT FOR A BBT
OFFICE EMPLOYEE IN 2021:



2,635 KG

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

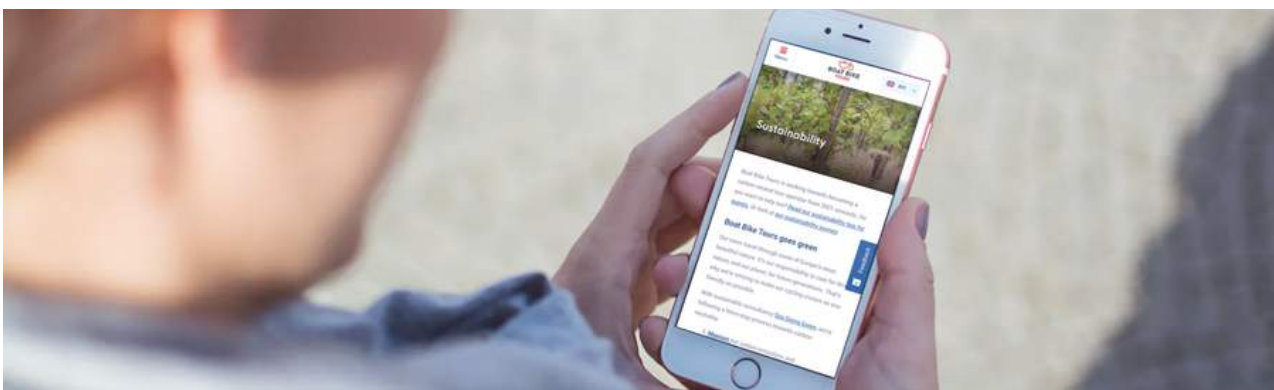


1,290 KG

The calculations for the carbon footprint of the office were based on **52** weeks consisting of a **5**-day work week and **19** 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 **15,017.13** kg. For calculating this, average employee presence was for the months that not everyone was there everyday due to COVID-19, namely January - May and October - December 2021. The average CO2 emissions for travel to and from the office per employee amount to **790.38** kg and **5319.29** kilometers in 2021.

Paper format contributed to **1,290** kg of CO2 this year, whereas other office supplies contributed **1,142** 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.



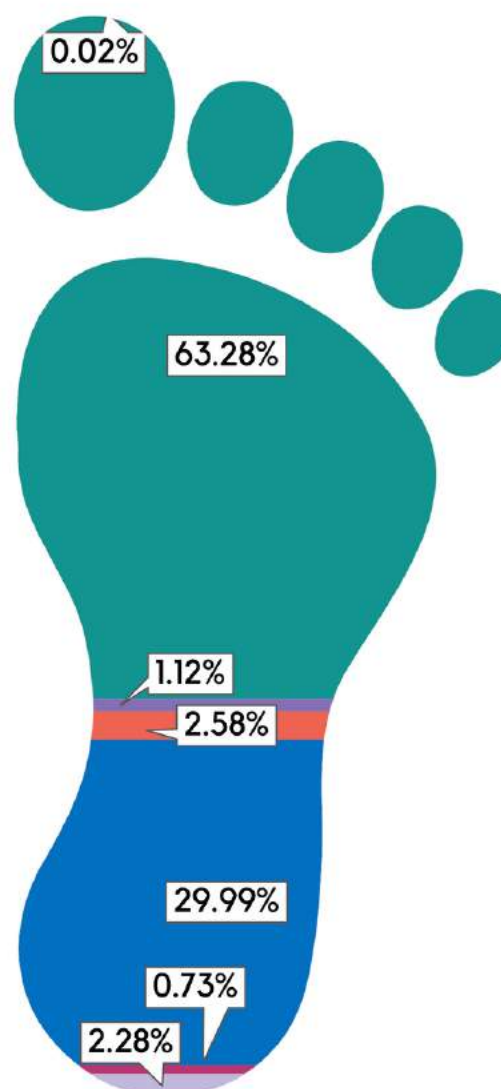
BBT OFFICE CARBON EMISSION CALCULATIONS



2021 BBT OFFICE

MATERIAL CATEGORY	KG OF CO2
Office supplies and promotion materials	1,142.14
Business flights	365.00
Employee travel to/from office	15,017.13
Paper	1,289.83
Plastics	561.05
Energy use	31,683.55
Total water use	8.94
TOTAL	50,067.64

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



MAGNIFIQUE III



The Magnifique III sailed **12** weeks for BBT with a total of **279** passengers in 2021.

The ship received 3 badges. A silver badge is awarded for the Plastic Free category. By banning straws, replacing plastic cups with glass and using recycled trash bins, they reduced their environmental impact.

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 final badge is silver, for Local/Organic products. 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 2021 FOR MAGNIFIQUE III



108,937 KG

MATERIAL CATEGORY KG OF CO2

Fuel	71,196.00
Total water use	409.90
Energy use	18,986.50
Laundry	1,537.99
Plastics	250.0
Paper	36.8
Glass	190.7
Food & beverages	16,329.02
Other materials	0.00

TOTAL 108,936.91

PER PASSENGER: 390.45

For the 2021 season, we received actual data for energy use. Therefore, this number did not have to be based on standardized data like previous years. Compared to 2019, the energy use is 10 times as high, using the accurate data provided by the Magnifique III. Furthermore, the food & beverages emissions were also calculated based on their menu, which is a 7 day menu used on the different Magnifique ships.

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 III

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
2	9.21
3	3.88
4	11.72
5	8.13
6	14.37
7	4.07
Total	54.77

kg of CO2 per person per day

FINAL FIGURES CARBON EMISSION CALCULATIONS

Total CO2 emissions in 2021 for BBT Office & Fleet. 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. Per passenger in 2020, this was a CO2 footprint of **314.3** kg CO2 (only fleet data). Including the emissions from the office, this was **325.79** kg of CO2. Per office employee, the footprint was **2302.66** kg CO2. The carbon calculations for 2021 were done with extrapolated data from 2020, and for each ship the average per passenger was multiplied with the amount of passengers except for the Magnifique III, for which a more comprehensive MFA was done. The total footprint of the fleet in 2021 was **1,828,083.06** kg of CO2, and with the office the total is **1,878,150.70** kg of CO2.

SHIP NAME	GUESTS IN TOTAL	WEEKS FOR BBT
De Amsterdam	959	17
Elizabeth	122	9
Fleur	47	3
Flora	80	6
Fluvius	251	10
Gandalf	48	3
De Holland	782	18
Leafde fan Fryslân	241	12
Lena Maria	211	10
Poseidon	700	11
Princesse Royale (Magnifique)	69	5
Magnifique II	176	12
Magnifique III	279	9
Magnifique IV	360	17
Mare fan Fryslân	278	12
De Nassau	886	15
Sarah	66	4
Wapen fan Fryslân	194	11
TOTAL	5749	184

FINAL FIGURES CARBON EMISSION CALCULATIONS

In the table below are the total CO2 emissions in 2021 for BBT Office & Fleet and per passenger outlined for comparison.

	2020 SEASON	2021 SEASON
TOTAL CO2 EMISSIONS FLEET ONLY	1,383,802.65	1,828,083.06
CO2 EMISSIONS PER PASSENGER(FLEET)	314.3	317.98
TOTAL CO2 EMISSIONS FLEET + OFFICE	1,434,461.08	1,878,150.70
CO2 EMISSIONS PER PASSENGER(FLEET+OFFICE)	325.79	326.69
CO2 EMISSIONS PER OFFICE EMPLOYEES	2302.66	2,635
TOTAL CO2 EMISSIONS OFFICE ONLY	50,658.43	50,067.64
AMOUNT OF PASSENGERS	4403	5749
AMOUNT SAILING WEEKS IN TOTAL FOR BBT	153	184

TOTAL CO2 EMISSIONS IN
2021 FOR BBT FLEET



1,828,083.06 KG

TOTAL CO2 EMISSIONS IN
2021 FOR BBT OFFICE



50,067.64 KG

TOTAL CO2 EMISSIONS IN 2021
FOR BBT OFFICE & FLEET



1,878,150.70 KG

TOTAL CO2 EMISSIONS PER BBT
PASSENGER (FLEET ONLY)



317.98 KG

TOTAL CO2 EMISSIONS PER BBT
PASSENGER INCL. OFFICE



326.69 KG

TOTAL CO2 EMISSIONS
PER BBT EMPLOYEE



2,635 KG

CARBON EMISSIONS OF 2021 FOOD MENU'S

Based on the menu's that were provided by the shipowners from the Leafde & Mare fan Fryslân, the Magnifique, the Gandalf and De Amsterdam, CO2 footprints were calculated per passenger per day. These numbers include food items only, excluding drinks. Adding drinks would add 0.5365 kg of CO2 per person per day. As can be seen in the table below, the last dinner on Day 7 for the Magnifique is only served on the Magnifique III on their Noordroute and Antwerpen trips.

Day	LEAFDE & MARE FAN	MAGNIFIQUE MENU	GANDALF MENU	DE AMSTERDAM	kg of CO2 per person per day
	FRYSLÂN MENU	2021	2021	MENU	
1	3.16	3.39	2.75	6.13	
2	6.63	9.21	6.03	6.45	
3	6.31	3.88	7.40	8.65	
4	7.17	11.72	2.10	7.70	
5	9.89	8.13	4.22	9.22	
6	3.37	14.37	4.64	4.69	
7	6.62	4.07	10.22	7.58	
Total	43.15	54.77	37.35	50.42	

**Additional Dinner (Magnifique III: Noordroute and Antwerpen – short trips)*

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 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 2019 data. Currently, some ships employ different measures than listed in that data, as the COVID-19 pandemic has had an impact on daily operations. This is mostly regarding plastic use, as ship owners are distributing much more individual packaged items and single-use plastics out of sanitary regulations and reasoning. Nevertheless, ship owners are planning on eliminating such packaging and products (again) when they are able to, as they did not use them before or were planning on eliminating them. Therefore, the use of such plastics is not included in the badge audit.










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 categorie are lined out.



SCOPE

AWARDED SUSTAINABILITY BADGES BY SEA GOING GREEN



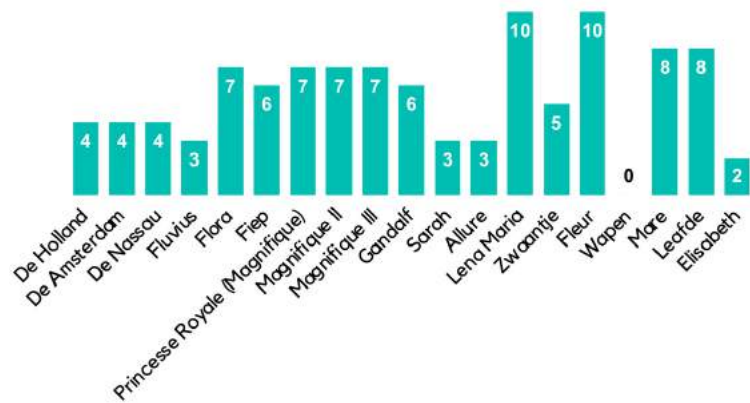
CATEGORY	BRONZE	SILVER	GOLD
Plastic Free	3-5 	6-9 	10+ 
Sustainable Energy & Water Use	2-4 	4-7 	8+ 
Local & Organic Products	2 	3 	4+ 

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

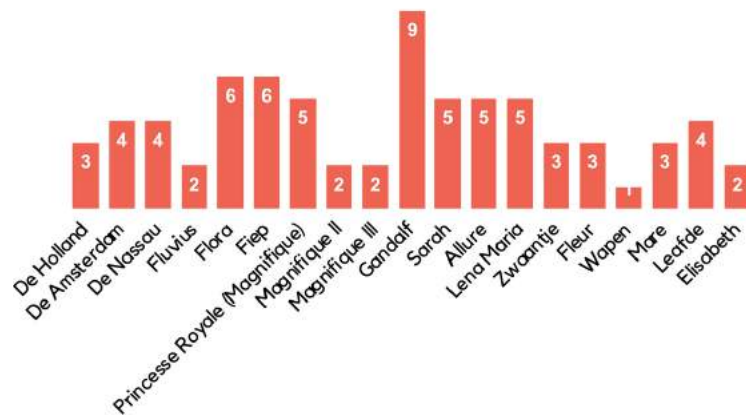
PLASTIC-FREE

- 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)



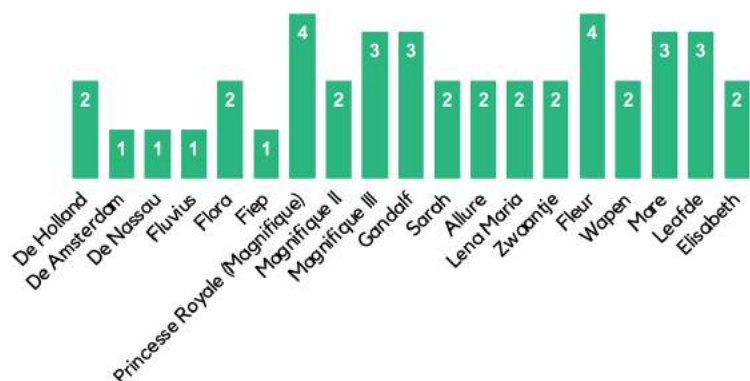
SUSTAINABLE ENERGY & WATER USE

- 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)



AWARDED SUSTAINABILITY BADGES OVERVIEW

PLASTIC-FREE

	De Holland	De Amsterdam	De Nassau	Fluvius	Flora	Fiep	Magnifique	Magnifique II	Magnifique III	Gandalf	Sarah	Allure	Lena Maria	Zwaantje	Fleur	Wapen	Mare	Leafde	Elisabeth	Office
Separate waste	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
No plastic soap bottles				1	1	1									1					1
No mini toiletries						1				1			1	1						
No plastic lunch bags (reusable boxes get higher score)	1	1	1	1	2	2	1	1	1	1	1	1	2	1	2				0	
No straws					1	1	1	1	1	1			1	1	1		1	1		1
No breakfast minis				1	1					1			1				1	1	1	
No single packages (salt, pepper, toothpick)							1	1	1		1	1	1	1						
Reusing cabin bins					1			1	1				1	1	1		1	1		
Trash bags from recycled material								1	1		1	1			1					
No plastic cups (incl. bathroom)							1	1	1											1
Kitchen: food container/reused packaging	1							1	1								1	1		
Minimize waste of delivery (supplier)		1	1				1			1					1		1	1		
Extras (specify if applicable)											0	0	1		1		1	1		
Total	4	4	4	3	7	6	7	7	7	6	3	3	10	5	10	0	8	8	2	5

SUSTAINABLE ENERGY & WATER USE

	De Holland	De Amsterdam	De Nassau	Fluvius	Flora	Fiep	Magnifique	Magnifique II	Magnifique III	Gandalf	Sarah	Allure	Lena Maria	Zwaantje	Fleur	Wapen	Mare	Leafde	Elisabeth	Office
LED lights	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			1							
Water saving measures (shower)					1	1				1	1	1	1	1						
Water treatment/ filters	1	1	1		1	1	1			1	1	1		1	1		1	1		
Toilet with outside water				1		1	1			1	1	1	1		1					
Empty waste water on land	1	1	1																	
Efficient appliances (watersaving dishwasher, overhauled engine that needs less oil now, generator with less emissions)										2								1		
No Aircondition					1					1									1	
Cotton napkins				1									1							
Guest involvement (information posters, they have to take fresh towel themselves)					1		1				1	1					1	1		
Calculating own CO2						1	1													
Extras (specify if applicable)		1	1							1										
Total	3	4	4	2	6	6	5	2	2	9	5	5	5	3	3	1	3	4	2	

AWARDED SUSTAINABILITY BADGES OVERVIEW

LOCAL & ORGANIC PRODUCTS

	De Holland	De Amsterdam	De Nassau	Fluvius	Flora	Fiep	Magnifique	Magnifique II	Magnifique III	Gandalf	Sarah	Allure	Lena Maria	Zwoantje	Fleur	Wapen	Mare	Leafde	Elisabeth	Office	
Biological/local food													1		1						
Vegetarian meals (fixed)	1	1	1	1	0	1	1			1	0	0		1	0	1	1	1	1	1	
Creative food use/ no food waste	1				1		1	1	1						1	1				1	
Eco soap					0		1		1	1	1	1		0	1		1	1			
Eco cleaning products					1			1	1	1	1	1	1	1	1		1	1			
Extras (specify if applicable)							1														
Total	2	1	1	1	2	1	4	2	3	3	2	2	2	2	4	2	3	3	3	2	

As mentioned in the tables above, if ships have extra measures beyond what is specified in the categories, they are awarded extra points. These extra points will be specified now.

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, and 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, and on the Gandalf the table cloths are being reused by washing them.

	De Holland	De Amsterdam	De Nassau	Fluvius	Flora	Fiep	Princesse Royale (Magnifique)	Magnifique II	Magnifique III	Gandalf	Sarah	Allure	Lena Maria	Zwoantje	Fleur	Wapen fan Fryslân	Mare fan Fryslân	Leafde fan Fryslân	Elisabeth	Office
PLASTIC FREE	4	4	4	3	7	6	7	7	7	6	3	3	10	5	10	0	8	8	2	5
ENERGY & WATER	3	4	4	2	6	6	5	2	2	9	5	5	5	3	3	1	3	4	2	0
ORGANIC PRODUCTS	2	1	1	1	2	1	4	2	3	3	2	2	2	2	4	2	3	3	2	0
TOTAL	9	9	9	6	15	13	16	11	12	18	10	10	17	10	17	3	14	15	6	5

ALLURE



In 2021, the Allure did not sail for BBT.

Allure received three badges in total. Allure has worked on the reduction of their plastics use, for example by keeping straws out of sight for guests and only handing them out on request. They received a bronze badge for the Plastic Free category.

Secondly, a silver badge is awarded to Allure. To save drinking water, the showers have a Comfordsaver 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.

Besides avoiding distributing new soap packages every week by using dispensers, the soap is also eco-friendly, as well as some cleaning products. Therefore, the final badge is bronze for the Local/Organic products category.



DE AMSTERDAM



De Amsterdam is by far the biggest ship sailing for BBT. In the season of 2021, it carried a total of **959** passengers in **17** weeks.

Regarding the badges for rewarding sustainability efforts on board, De Amsterdam received a bronze badge in the Plastic Free category. On this ship, waste is separated, there are no single-use plastic bottles and no plastic lunch bags.

Furthermore, the waste generated by suppliers for the delivery of goods is minimized and reduced as much as possible. For Sustainable Energy & Water Use, De Amsterdam also got a bronze badge. Whenever the interior is renewed, old furniture is not disposed of but is sold to second hand buyers, so it can be reused. Next to that, there are measures for water treatment/filtering and waste water is emptied on land. On board De Amsterdam vegetarian meals are regularly served to guests in their fixed menu.

ELIZABETH



The three-mast clipper, Elizabeth, cruised for **9** weeks with a total of **122** passengers in the season of 2021

On board De Elizabeth, waste is separated, and no mini packages of breakfast goods are used (like peanut butter or "hagelslag"). For their efforts regarding Sustainable Energy & Water Use, a bronze badge is awarded. LED lights are used and there is no air conditioning system on board. As well as for the category Local/Organic products, De Elizabeth received a bronze badge, since there are fixed vegetarian meals on the menu. In the kitchen, food and food waste is handled in a creative manner, to generate the least amount of waste possible.



DE FIEP



The former cargo ship Fiep did not sail in 2021 for BBT.

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. A fixed menu includes vegetarian meals for guests. The Fiep was the only ship that already calculated their own carbon footprint before our pilot project.

FLEUR



In 2021, the passenger barge Fleur cruised **3** weeks in total and had **47** passengers on board.

De Fleur is one of the few ships that got awarded two gold badges, and besides a bronze one as well. The first in the Plastic Free category, because there are no single-use plastic (soap)bottles or mini toiletries on board. Furthermore, guests are given reusable lunch boxed and there are no plastic straws. Cabin bins are reused, and their trash bags are made from recycled material. What is noticeable is that no baking paper is used, but instead a baking mat that can be used many times. Next to that, waste of deliveries from suppliers is minimized. Together with Lena Maria, De Fleur holds the top spot in this category.

For Sustainable Energy & Water Use, a bronze badge is awarded as there are LED lights, water treatment/filtering measures and toilets which use outside water on board. Biological and local food is used in the kitchen, in a creative manner trying to produce less waste. Finally, to minimize impacts on the sailing environment, ecological soap and cleaning products are being used. These efforts result in a second golden badge for the Fleur.



FLORA



The river barge, Flora, cruised the fresh waters for BBT for **6** weeks last season, with **80** passengers. The barge sailed a new route in Germany, which makes it not comparable to 2019 data.



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. There are soap and shampoo dispensers, water saving measures in the showers and water filters.

FLUVIUS



The luxury river cruise barge Fluvius sailed **10** weeks in 2021 for BBT with an amount of **251** guests.

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.



GANDALF



In 2021, the Gandalf sailed **3** weeks for BBT and carried **48** passengers.

The Gandalf has been awarded with 3 badges. For the first category, Plastic Free, there is a silver badge as waste is separated, there are no mini toiletries,

breakfast mini's and straws being provided to guests, as well as no plastic lunch bags. Where there are paper bags being used for lunch now, they are soon going to be replaced with reusable lunch boxes. There are plastic placemats which are being reused a lot of times. Furthermore, on this ship there are LED lights, water saving and treatment/filter measures, toilets flushed with outside water, no air conditioning system and solar panels. Additionally, there are efficient appliances on board such as a revised engine and new generators. There is no dishwasher to prevent soap and cleaning aids from polluting open waters, and for similar reasons the use of chemicals on board is minimized as much as possible. For these measures, the Gandalf got rewarded with a gold badge, with the highest score of all ships.

The final badge is silver, for Local/Organic products, as there is often a vegetarian meal option and food waste and leftovers are being used again. Regarding supplies, most of the deliveries are being combined.



DE HOLLAND



In the 2021 season De Holland sailed **18** weeks with a total number of **782** passengers.

On board De Holland, waste is separated, and in the kitchen food containers/reusable packaging is used for storage. For the guests' lunch, there are no plastic bags. Single-use plastic bottles are also eliminated from the ship. In the kitchen, left over foods are being stored in reusable containers/packaging. Therefore they are awarded a bronze badge for the Plastic Free category. Also for Sustainable Energy & Water Use, De Holland gets a bronze badge. There are LED lights, water saving and treatment/filter measures, and waste water is emptied on land. For the last category there is a bronze badge as well, as there are vegetarian meals in the menu and creative food use.



LEAFDE FAN FRYSLÂN



The three-mast barquentine, Leafde fan Fryslân, sailed for **12** weeks with a total of **241** passengers in 2021 for BBT. The Leafde fan Fryslân has been rewarded with silver badges in all categories. No single-use plastics are being used, such as straws, lunch bags and bottles, and no mini packages for breakfast items. The same goes for disposable gloves. In the kitchen, plastic use is being minimized for example for packaging and regarding supplies. Besides, waste is being separated. There are LED lights on the ship and an efficient motor/generator.



The toilets use outside water and the showers have water saving heads. The water is being filtered as well. Napkins and tablecloths are made from cotton and additionally, guests are informed of the possibility so reuse towels and limit water use in the shower. Guests are regularly served vegetarian meals, whereas food waste is minimized as well and leftovers are stored. Food is sourced locally as much as possible. Finally, cleaning products are ecologically based and the soap does not include microplastics.

LENA MARIA



In the season of 2019, the Lena Maria sailed **10** weeks with **211** guests for BBT.

Three badges have been awarded to the Lena Maria, respectively gold, silver and bronze. The first badge is for Plastic Free measures, as the Lena Maria separates waste, has reusable lunch boxes for their guests and reuses cabin bin bags after they have been emptied. They also have no plastic straws on board, no single packages for products like salt and pepper or breakfast mini's and toiletries and no plastic bottles. Besides, their placemats are washable. Together with the Fleur, Lena Maria has the highest score in this category. The next category, Sustainable Energy & Water Use, has a silver badge. Toilets



are flushed with outside water, there are water saving measures in the showers, LED lights and cotton napkins. In addition, this ship has solar panels. The final category has a bronze badge, as local food is sourced on the Lena Maria and ecological cleaning products are being used.

POSEIDON

The Poseidon is a medium-sized river cruise ship that has 48 cabins, each sleeping 2 persons. It can therefore host 96 guests in total. The ship sails in the Netherlands, Belgium and Germany. The Poseidon is a new ship in the BBT fleet, and therefore we are not able to award badges yet for its performance regarding these categories.

With the 2019 data, we were able to extrapolate data to give total emissions for its 2021 season. The Poseidon sailed for 11 weeks, with a total of 700 passengers.



PRINCESSE ROYALE (MAGNIFIQUE)



The Magnifique carried 69 passengers for BBT in its 2021 season which lasted 5 weeks.

On board this ship, there are no single-use packages for items like salt and pepper, no plastic cups in the bathrooms, and no plastic lunch bags, straws and bottles. Waste is separated on board, and minimized regarding deliveries from suppliers. Therefore, Magnifique received

a silver badge in this first category. For the second category, the ship got awarded a silver badge as well. There are LED lights on board, water treatment/filter measures and toilets that are flushed with outside water.

Sign in the cabins 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. Lastly, for the category regarding Local/Organic products, this ship received a bronze badge. They serve vegetarian meals to guests on a regular basis, and try to be creative with food use/waste. Bed sheets are made from ecological cotton, and soap and cleaning products are bleach free and eco-friendly.

MAGNIFIQUE II



During the 2021 season, the Magnifique II welcomed **176** guests on board in **9** weeks for BBT.

The Magnifique II has been awarded with 3 badges. For the first category, Plastic Free, there is a silver badge as there are no plastic lunch bags, breakfast mini's, bathroom cups and straws being provided to guests. Trash bags are made from recycled material, cabin bin bags are reused and in the kitchen there are food containers/reusable packaging. For the second category, there is a bronze badge. On this ship there are LED lights and solar panels. The final badge is bronze, for Local/Organic products, as food waste and leftovers are handled in a creative manner, minimizing waste.



MAGNIFIQUE IV

The Magnifique IV sailed **17** weeks for BBT with a total of **360** passengers in 2021. Like the Poseidon, the Magnifique IV was not part of the fleet in 2020 and 2019. Therefore, it has not been audited yet in order to award badges to the ship.



MARE FAN FRYSLÂN



The three-mast sailing ship, Mare fan Fryslân, sailed for **12** weeks with a total of **278** passengers.

The Leafde fan Fryslân is also a three mast sailing ship, like sister ship Leafde fan Fryslân. Similarly, this ship has been rewarded with silver badges in all categories. No single-use plastics are being used, such as straws, lunch bags and bottles, and no mini packages for breakfast items. The same goes for disposable gloves. In the kitchen, plastic use is being minimized for example for packaging and regarding supplies. Besides, waste is being separated.

There are LED lights on the ship and an efficient motor/generator. The toilets use outside water and the showers have water saving heads. The water is being filtered as well. Napkins and tablecloths are made from cotton and additionally, guests are informed of the possibility so reuse towels and limit water use in the shower. Guests are regularly served vegetarian meals, whereas food waste is minimized as well and leftovers are stored. Food is sourced locally as much as possible. Finally, cleaning products are ecologically based and the soap does not include microplastics.



DE NASSAU



In the season of 2021, De Nassau welcomed **886** passengers on board within **15** weeks.

On board De Nassau, there are no plastic lunch bags being used. The same goes for plastic bottles, and waste is separated and minimized when goods are delivered on board by suppliers, as this prevents a lot of plastic from entering the ship. Therefore De Nassau got a bronze badge in the first category. For Sustainable Energy & Water Use, De Nassau is awarded a bronze badge as well. There are LED lights on board and waste water is emptied on land to prevent chemicals from ending up in open waters, and water is treated/filtered on board. Whenever the interior is renewed, old furniture is not disposed of but is sold to second hand buyers, so it can be reused. The guests of De Nassau are also served vegetarian meals regularly.



SARAH



The Sarah sailed **4** weeks for BBT in 2021 and had **66** passengers on board. The Sarah has been awarded three badges in total.

For Plastic Free, they received a bronze badge. There are no single-use packages for items like salt and pepper, no plastic lunch bags and the trash bags in the cabins are made from recycled material. For Sustainable Energy & Water Use there is a silver badge awarded: there are water saving measures in the shower, treatment/filter measures and toilets are being flushed with outside water. Guests are also informed about how they can reduce their environmental impact, and there are LED lights on board. Next to that, the Sarah uses ecological soap and cleaning products, and therefore they have a bronze badge for the Local/Organic products category.



WAPEN FAN FRYSLÂN



The sailing ship Wapen fan Fryslân sailed **11** weeks in 2021, carrying a total of **194** 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. Guests can always ask for more and after the first day, the crew can already estimate how much food will be needed. The ship also had LED lights on board.

ZWAANTJE



The Zwaantje did not sail for BBT in 2021.

Zwaantje received three badges for their sustainability efforts; all bronze. There are no more straws on board this ship 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.



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.

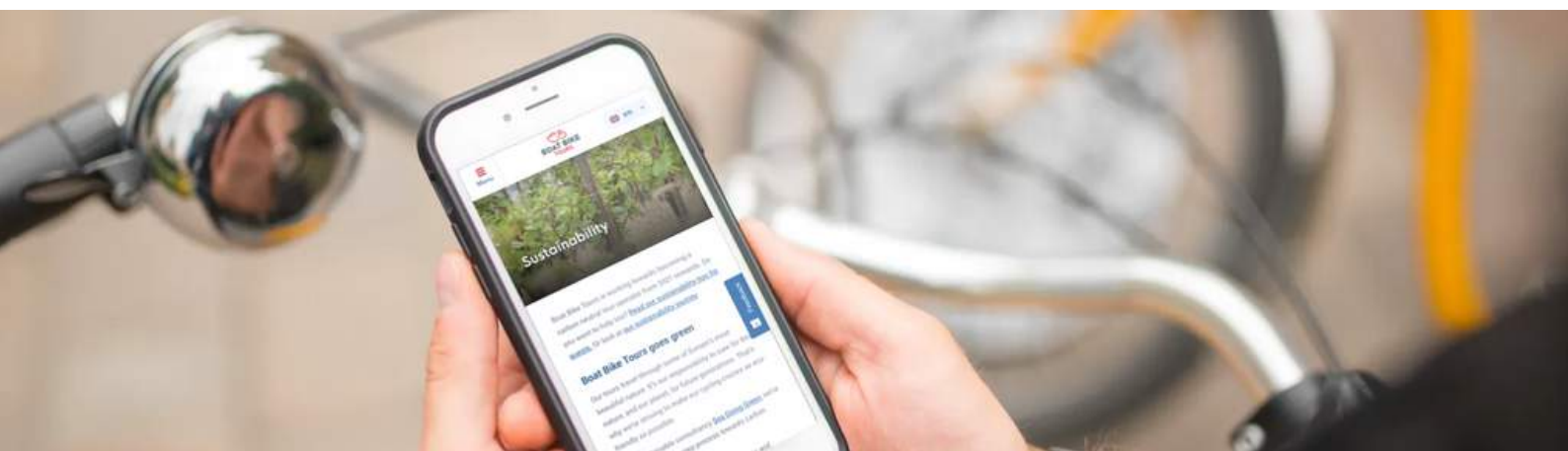
Office

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)
- A3 foldable leaflets (not distributed)

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.

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.

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.

Magnifique III is the only ship in the 2021 fleet for which a full MFA was performed. For this carbon footprint calculation, actual data was provided. For electricity use, the numbers depend on the use of airconditioning on board. As we were not provided with the use per day, an average between the lowest and highest usages was assumed.

ASSUMPTIONS

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).

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.

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.

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 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 CO₂ emission is calculated per passenger per day and/or per week. For meat consumption, this amounts to 2,5 kilos of CO₂ emissions per person per day that meat is served. The CO₂ emissions for non-alcoholic and non-soda drinks (including milk, coffee, tea & fruit juice) are 1 kilos per passenger per week. 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.

The only exception is the Fiep, which had the same amount of passengers in 2019 in 2018 so we used food numbers from that year instead of the standard as the pilot data from the Fiep was more comparable.

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.

ASSUMPTIONS

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 CO₂ emissions during use of 100% biofuel are set to zero due to the short-cycle nature of the carbon in these fuels. Although CO₂ 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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