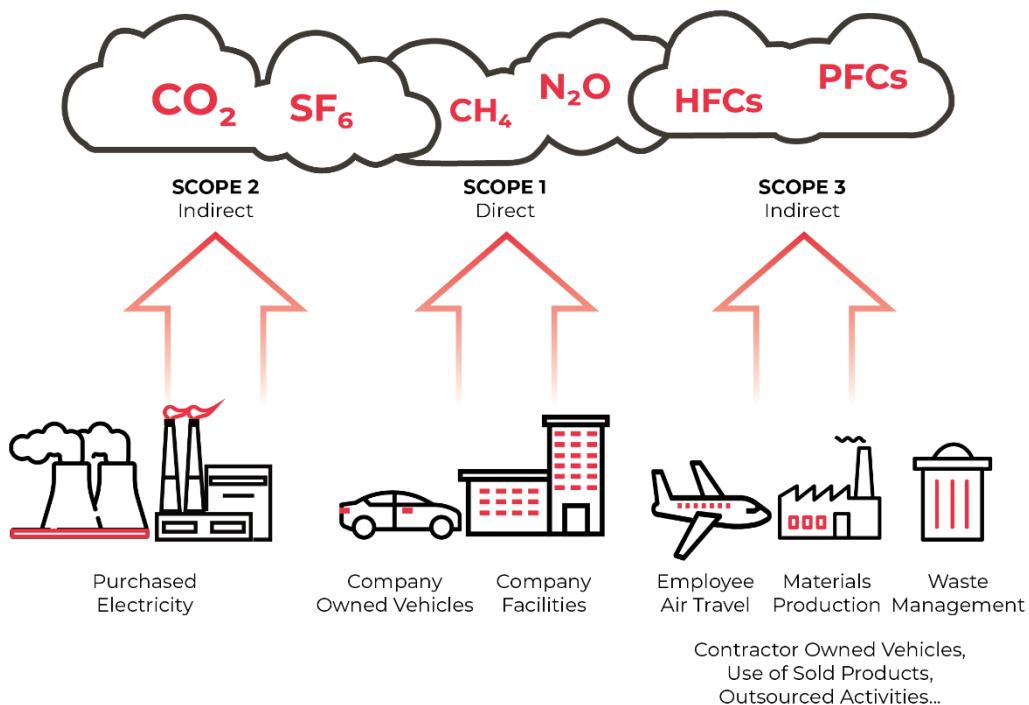


Doing Good Can Be Done Better: Making a Greener World by Calculating and Offsetting MzN's operational Carbon Footprint.

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For our first year, here's how we did it!

In a recent company meeting, the assembled staff discussed MzN's commitment to going "carbon neutral" (or possibly even "carbon positive") and how to develop a credible estimate of our own Greenhouse Gas (GHG) emissions for the 2019 operational year. As a first step, we began to look at MzN's GHG emissions based on the standard categories that define various sources of GHGs. This includes, as illustrated in Greenfleet Trust graphic below, our own direct emissions (Scope 1), the indirect emissions related to purchased electricity (Scope 2), and other "indirect emissions" (Scope 3).



Scope 1 (Direct Emissions) - In an office environment, Scope 1 (Direct Emissions) relates to the purchase and direct combustion of hydrocarbon-based fuels (i.e. petrol, diesel, natural gas) and the loss of refrigerant gases used by air conditioning and refrigeration systems. Although the loss of refrigerant gases is usually small in terms of volume, many of these gases have a very large Global Warming Potential (GWP) relative to the impact of CO_2 . For example, a more commonly used refrigerant gas, Honeywell's patented R410A, is a CFC replacement with no impact on the thinning of the stratospheric ozone ("the ozone layer"), but it has a GWP that is 2,088 times more powerful than the equivalent amount of CO_2 (GWP = 1).

As a first step, we confirmed that MzN doesn't own any petrol-powered vehicles or smaller equipment (i.e., lawn mowers and snow blowers) and does not actually own the building currently housing its Hamburg offices. This means that MzN is not directly purchasing any hydrocarbon-based fuels for owned transportation (i.e., automobiles, buses), does not own any boiler in the building that might be using natural gas combustion or fuel oil for heating, and does not own the building's Heating, Ventilation and Air Conditioning (HVAC) system. Also, as MzN in Hamburg is strictly an office environment with no on-or off-site manufacturing processes of any kind, we can conclude that our direct GHG emissions (Scope 1) from all potential sources is essentially ZERO.

Scope 2 - Indirect GHG Emissions related to Energy Consumption - Our next step was to calculate the indirect Scope 2 GHG emissions related to our energy consumption. This category of GHG emissions relates to CO₂ and other GHG gases (i.e., methane - CH₄ and nitrous oxide - N₂O) resulting from purchased energy, particularly the kilowatt hours of grid electricity produced for MzN's eventual consumption. Although electricity comes from a number of larger-scale grid-linked sources (i.e. coal, nuclear, hydro-, geo-thermal, solar, or wind), a national average is reported each year that can be used for Scope 2 emission calculations. For example, according to the Germany's Federal Environmental Agency (UBA), the 2017 national average emissions for each kilowatt hour (KWh) of generated electricity for national consumption and export was 489 grams of CO₂e. (This national average is actually a 36% reduction over 1990 levels and is evidence of Germany's stronger policy commitment to reducing the GHG emissions associated with grid energy sector.)

In looking deeper, we found that MzN is already a voluntary consumer of "green energy" for its entire annual electricity use. According to the US Environmental Protection Agency (EPA), green power is defined as "a subset of renewable energy and represents those renewable energy resources and technologies that provide the highest environmental benefit." This includes renewable energy production such as solar, wind, geothermal, biogas, biomass, and hydroelectric sources. (Although the energy derived biomass and biogas related-energy are derived through direct combustion and as a result, do release CO₂e, the carbon source is organic and not derived from a hydrocarbon-based fossil fuel.)

As all the electricity used by MzN is purchased as "green energy", the Scope 2 indirect emissions are calculated as ZERO for this part of our exercise.

Scope 3 - Other Indirect - These Scope 3 GHG "other indirect" emissions are defined as those related to MzN's operations or "value chain". For MzN, the main source of their Scope 3 emissions is related to business travel, including air travel and hotel stays. They are counted as indirect because some entity other than MzN owns the emission source and burns the purchased fuel (i.e., an airline). For example, we can say that Lufthansa or British Airways owns the aircraft that combusts the fuel that they purchase. For them, it is a source of Scope 1, but MzN contributes indirectly as uses the services of the airline. With that in mind, we concluded that there are some Scope 3 "other indirect" GHG emissions associated with MzN staff travel.

Air Travel – We haven't been tracking each individual flight this past year, but we estimated that MzN staff make an combined average total of 3 long-distance trips per month by air and assumed our average was one shorter roundtrip (RT) flight, one medium, and one long. Based on this estimated average, we calculated the total CO₂e emissions using the air travel emissions calculator developed by UN's International Civil Aviation Organization (ICAO).

Their calculation method is based on the use of “the best publicly available industry data to account for various factors such as aircraft types, route specific data, passenger load factors and cargo carried.” The ICAO-calculated results for our annual air travel are presented in Table 1 below:

Table 1 Estimate of average annual CO ₂ e emissions for MzN Staff Air Travel (2019)								
Flight Distance	Flight From	To	RT per month	Km (one-way)	Km CO ₂ e (one-way)	Kg CO ₂ e (RT)	RTs per year	Total Kg CO ₂ e/year
Short	Hamburg	New York (via LHR)	1	6,280	432	864	12	10,368
Medium	Hamburg	New York (via LHR + JFK)	1	8,889	646.5	1,293	12	15,516
Long	Dhaka	New York (via LHR)	1	13,570	679.9	1,359.8	12	16,317.6
TOTALS			3	28,715	1,758.4	3,516.8	36	42,201.6
Resource: ICAO Carbon Emission Calculator						MT CO ₂ e ►	42.2	

Hotel Accommodation – In our back-of-the-envelope estimate, we thought that the MzN staff also averaged about 10 nights of hotel room stays per month. Of course there is a wide variation in actual emissions depending on the hotel and the country, but in 2018, the Hotel Carbon Measurement Initiative (HCMI) set a hospitality industry-accepted benchmark standard of 31.1kg CO₂e per room night. We are applying this HCMI measure in Table 2 to calculate MzN’s estimated annual GHG emissions:

Table 2 Estimate of average annual CO ₂ e emissions for MzN Staff Hotel Lodging (2019)				
Hotel night per month	Kg CO ₂ e emissions per day	Total Kg CO ₂ e emissions per month	No. of months per year	Estimated Total Kg CO ₂ e per year
10	31.1	311.0	12	3,732.0
Resource: Hotel Carbon Measurement Initiative (HCMI)			TOTAL MT CO ₂ e ►	3.7

De Minimus “Other Indirect” CO₂e Emissions - Many current GHG emission inventory methodologies discuss the need to report *de minimis* CO₂e emissions. This refers to assumed GHG emissions coming from smaller sources that represent a minimal contribution (3% - 5%) to the organization’s annual total and that do not have to be reported in detail. For MzN, this might include ground travel (i.e., buses, taxis) when we travel, the impact of MzN-sponsored training workshops, office waste, home office use, and other smaller unidentifiable sources. For this exercise, using the 5% *de minimis* threshold, we estimate that the additional emissions would be approximately an additional 2.3 MT of CO₂e (5% of our 45.9 MT).

In addition to this *de minimis* standard, MzN is opting to apply a larger *de minimus* rate, 50%, to ensure that purchased offsets cover all potential emissions and in an effort to move MzN beyond being “carbon neutral” in preference of moving toward a “carbon positive” standard. The calculation for the *de minimus* GHG emissions at the 50% rate and our total estimated GHG emission for the 2019 operational year are presented in Table 3.

Table 3 Estimate of MzN's total CO ₂ e emissions from all sources (2019)									
Estimated Annual CO ₂ e Emissions (kg)				Sub -Total Est. Annual CO ₂ e Emissions	<i>De minimis</i> level applied (50%) (voluntary)	Total - all CO ₂ e emissions			
Scope 1	Scope 2	Scope 3							
		Air Travel	Hotel Lodging						
0	0	42,201.6	3,732	45,933.6	22,966.8	68,900.4			
				TOTAL MT CO ₂ e ►		68.9			

Please keep in mind that this 2019 estimate is based on some assumed averages, but for 2020, we will be able to do a more refined estimate as we add a CO₂e emissions calculation worksheet to all our travel claim forms. Rather than focusing on an annual business-scale estimate at the end of the year, our staff will be reminded of their contribution of Greenhouse Gases emission each and every time they travel.

NOTE: This is a very broad estimate of MzN’s contribution of greenhouse gases in 2019 based on the assumptions that we have described, but for 2020, we will be able to do a more refined estimate as we add a CO₂e emissions calculation worksheet to all our travel claim forms. Rather than focusing on an annual business-scale estimate at the end of every year, our staff will be reminded of their contribution of Greenhouse Gases emission each and every time they travel. We’ve always known that:

DOING GOOD CAN BE DONE BETTER!