SubNet

ENVIRONMENTAL REPORT

[G41_1]

Nowadays we are facing a huge environmental challenge that keeps increasing every year. This is why we have realized that a change is necessary to flip the situation. Recognizing the urgent need to address the negative impact of CO2 (carbon dioxide) emissions on our planet, we are embarking on our own initiatives and environmental plan to reduce our carbon footprint and the impact we cause to nature.

1. QUANTIFICATION

Here we are going to calculate the specific consumption of resources and energy we have used to develop our project.

TRANSPORT:

Each member of the group uses a different mode of transport:

-Three members of the group use public transport to come to the lab, more specifically FGC which uses 100% of renewable energy, emitting no CO2 (0 gCO2).

-The other two use their own car, a medium-sized gasoline car emits on average about 143 grams of CO2 per kilometer.

One drives 5km:

$$143\ \frac{gCO_2}{km} \cdot 5km\ \cdot 2\ (go\ and\ return)\ = 1430\ gCO_2$$

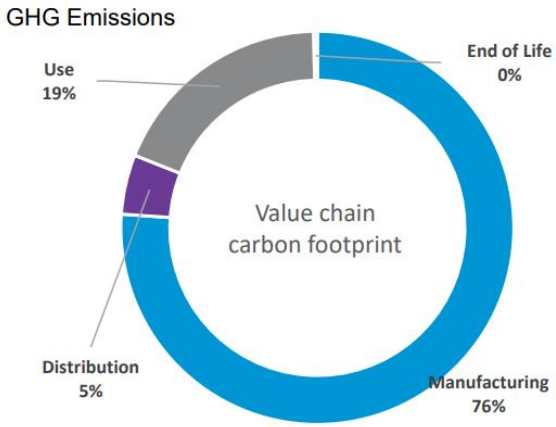
The other one drives 4km:

$$143\ \frac{gCO_2}{km} \cdot 4km\ \cdot 2\ (go\ and\ return)\ = 1144\ gCO_2$$

Total = $(1430\ gCO_2\ + 1144\ gCO_2\ )\ \cdot\ 12\ weeks$ = 30,88 kg of CO2.

COMPUTERS:

In the lab we used 3 14-15 inch HP laptops.



-Embodied energy: 206 kgCO2.
-Estimated useful life: 4 years.

$\frac{206\ kgCO2}{4\ years} = 51.5\ kgCO_2/year$

$$\frac{51.5\ kgCO2/year}{365\ days} =$$

$$\frac{141gCO_2/day}{24h} = 5.8gCO_2/hour$$

3 hours/week, 12 weeks: $211.6\ gCO_2$

-65 Watts consumption
-Emissions caused by generation of electricity: 195 gCO2 / KWh (average in Spain).

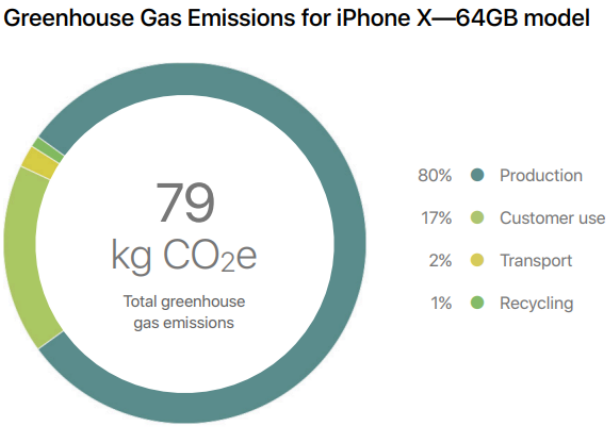
3 hours/week, 12 weeks: $65\ Watts \cdot 3\ hours \cdot 12\ weeks = 2340\ Wh$

$2.340\ kWh \cdot 195\ \frac{gCO_2}{KWh} = 456.3\ gCO_2$

Total: ($456.3\ gCO_2$ + $211.6\ gCO_2$) · 3 laptops = 2 kg of CO2.

PHONES:

To do the calculations, we will suppose we all have an iphone X as we think is the average in terms of CO2 emissions.



-Estimated useful life: 4 years.

$$79\ \frac{kgCO_2}{4\ years}\cdot\frac{1year}{365\ days}\cdot\frac{1\ day}{24\ hours}=2.25\ gCO_2/hour$$

$$2.25\ gCO_2/hour\ \cdot\ 3\ hours\ \cdot\ 12\ weeks\ =\ 81\ gCO_2$$

-Consumption: 5W
-Emissions caused by generation of electricity: 195 gCO2 / KWh (average in Spain).

$$5\ Watts\ \cdot\ 3\ hour\ \cdot\ 12\ weeks\ =\ 180\ Wh$$
$$0.18\ kWh\ \cdot\ 195\ \frac{gCO_2}{KWh}\ =\ 35.1\ gCO_2$$

Total: $(35.1\ gCO_2\ +81\ gCO_2)\ \cdot\ 5\ phones$ = 580,5 g of CO2.

ELECTRICITY:

Electricity required tools in the lab:

-Electrical solder iron (60 W)
-Bank drill (800 W)
-Workspace light (35 W)
-Power supply (200 W)
-Oscilloscope (150 W)
-Air conditioning (1350 W) (average)

We estimate we consumed 55,8 kWh
-Emissions caused by generation of electricity: 195 gCO2 / KWh (average in Spain)

Total: $55{,}8\ kW/h\ \cdot\ 195\ \frac{gCO_2}{KWh}$ = 10,88 kgCO2

COMMUNICATION:

WhatsApp Messages:
Each WhatsApp message sent contributes 0.2 gCO_2 to our carbon footprint. Given that we've exchanged approximately 1684 messages within our group chat, the total CO_2 emission from WhatsApp communication amounts to 336,8 gCO_2.

Emails with Images:
Our email communications, which frequently include images of the ROUV, contribute to a carbon footprint of 50 gCO_2 per email. As of now, we have sent a total of 15 such emails, resulting in a cumulative emission of 750 gCO_2.

TOTAL CONSUMPTION:

Area	**Quantity**
Transport	30,88 kgCO2
Computers	2 kgCO2
Phones	580,5 gCO2
Electricity	10,88 kgCO2
Communication	1,08 kgCO2
TOTAL: 45,42 kgCO2	

2. STEPS TAKEN TO REDUCE THE ENVIRONMENTAL IMPACT

As everybody knows we have a worldwide issue with climate change. A huge part of this climate problem has been caused by expelling CO2 to the atmosphere. In order to stop or at

least reduce the speed with which climate change worsens we have to think and follow some steps that will lead to it.

The first step is linked to the construction's materials of the ROUV. Main parts of the ROUV are reused from previous years and the others are recyclable. All the components added after building up the initial version of the ROUV are also reusable. It also helps the modular design of our ROUV cause it will be easier to repair some components if it's needed.

The second step is to increase the energy efficiency by changing the consumption in some different areas such as transport, electric consummation specifically in the lab and reduce the number of electronic devices (computers and phones).

To reduce the electricity consumption we should use all the electronics devices and electric power supply machines (e.g: power suppliers, waveform generators, bank drill and oscilloscope among others) the shortest time possible.

In conclusion, we've followed a really well designed plan aware of the climate change situation that affects everybody. We have also thought about some improvements that would reduce even more the expulsion of CO2 to the atmosphere thus reducing the terrible impact of it.