

## **Introduction**

In an era where environmental sustainability is paramount, understanding and mitigating our carbon footprint has become essential. Our application aims to provide users with the tools to track, understand, and reduce their carbon emissions through a comprehensive and user-friendly platform. Below, we outline our methodology for calculating carbon emissions, the sources of information we use, and our business model.

## **How Do We Calculate Carbon Emissions?**

Our approach to calculating carbon emissions involves considering various factors such as fuel type, distance traveled, and energy efficiency. We utilize established formulas that comply with Euro Emissions Standards to ensure accuracy and reliability. By inputting trip details such as distance, vehicle type, fuel type, and the number of passengers, users can calculate their emissions and compare different transport options like cars, bikes, and public transport.

We use this General Formula for each means of transport:

$$\text{CO}_2 = d \cdot (fe/p)$$

fe : emission factor in CO<sub>2</sub>/km

d : distance

p: amount of passenger

## **Means of transport**

### **Cars :**

According to the Worldwide Harmonised Light Vehicles Test Procedures (WLTP) in 2019, CO<sub>2</sub> emissions for cars by fuel type are the following :

Gasoline: 120 – 180 g/km

Diesel: 100 – 160 g/km

Hybrid (gasoline) :50 – 100 g/km

Electric: 26 g/km (tailpipe) - In the Nordic countries but depends on electricity generation

LPG / CNG : 100 - 130 g/km

Exemple to understand with a gasoline car:

If it consumes 6 L / 100 km, it emits approximately:

$$6 \text{ L} \times 2.3 \text{ kg CO}_2/\text{L} = 13.8 \text{ kg CO}_2 / 100 \text{ km}$$

Or 138 g CO<sub>2</sub> / km

(Gasoline produces approximately 2.3 kg of CO<sub>2</sub> per litre burnt, diesel ~2.6 kg/L).

### **Train :**

In Norway, bus transportation is managed through a collaboration among several companies. We will incorporate data provided by Vy. Specifically, the emission factor for electric buses will be directly sourced from Vy's data.

Non-renewable energy

Diesel: 27 g/km

Biodiesel: 14 g/km

Electric train in the Nordic countries : 13 g/ km

### **Plane :**

The French agency of the ecological transition (ADEME) has calculated CO<sub>2</sub> emissions for flights :

Domestic flights (less than 600 km): 250–300 g CO<sub>2</sub>/km. Bergen-Oslo for example

Short hauls (600-3700 km): 150–200 g CO<sub>2</sub>/km. Bergen-Paris for example

Long hauls (>3700 km): 90–130 g CO<sub>2</sub>/km. Oslo-New York for example

It is important to note that these figures vary according to the type of aircraft, the load factor and the class of travel.

For example, the business class can emit 2 to 3 times more than the economic class, because one seat occupies more space in the aircraft. For one row of seats, we can fit six seats of economic class and only two or three of business class. However, the plane needs the same amount of fuel to fly the same distance.

### **Buss :**

According to a study of Chalmers tekniska högskola - Metodrapport för Klimatsmartsemester version 4.1 and NHO Transport, available on Vy's website :

Diesel bus : 30 g/km

Electric bus in the Nordic Countries : 13 g/km

CNG bus : 28.5 g/km

### **Motorbike :**

Motorbike: engine size and emissions :

Electric scooter : 0 g/km (direct)

Small scooter ( $\leq 125$ cc) (Light city usage, efficient) : 60–100 g/km

Medium motorcycle (125–500cc) (Urban + peri-urban use) : 90–150 g/km

Large motorcycle ( $\geq 500$ cc) (Touring, highway bikes) : 130–200+ g/km

A motorbike is generally a bit better than a car in CO<sub>2</sub>/km, especially small scooters.

BUT! Motorbikes emit more of certain local air pollutants (like CO, HC, and NO<sub>x</sub>) than modern cars, especially older models or 2-stroke engines.

### **Ferry :**

According to FerryGogo, CO<sub>2</sub> emissions for ferry are the following :

Diesel Ferry (foot passenger) : 19 g/km

LNG Ferry : 14.25 g/km

### **Walk and bike :**

Walking and using bikes produce zero emissions, making them the most environmentally friendly modes of transportation.

## **Euro Emissions Standards**

Our calculations adhere to Euro Emissions Standards, which set strict limits on pollutant emissions from vehicles. These standards ensure that our estimates are accurate and comply with regulatory requirements, providing users with reliable data to make informed decisions about their transportation choices.

## **Sources of Information**

To develop our application, we rely on credible sources of information:

- Michelin Website: Provides data on tire energy efficiency and its impact on emissions.
- Chalmers University: Offers academic research on greenhouse gas emissions and transport technologies.
- Future in Our Hands: Supplies information on sustainable initiatives and environmental best practices.
- Vy Website, public transport company based in Norway.
- WLTP, the Worldwide Harmonised Light Vehicles Test Procedure

These sources ensure that our data is up-to-date and accurate, allowing users to trust the emissions calculations provided by our application.

## **Economic Model**

Moreover, we want our application to operate on a Freemium Model, a strategy that balances accessibility and revenue generation. This model allows us to offer basic features to all users for free, ensuring widespread adoption and engagement. Meanwhile, advanced features and services are available through subscription plans, providing a steady revenue stream that supports the app's development and maintenance. We think it is the best way to be profitable in the long term.

During the creation of the company we expect to raise money thanks to donations from investors and anonymous at different scales. In investing in our project, people are raising awareness and providing actionable insight of their carbon footprint.

## **Subscription Plans**

The subscription plans are tailored to different user needs and budgets, ranging from \$4.99 to \$9.99 per month. These plans offer an ad-free experience, and integration with fitness and transport apps. Subscribers also benefit from monthly carbon offset contributions, which are

verified to ensure transparency and impact. This not only enhances the user experience but also supports global sustainability efforts.

The main gamification features are :

- **Achievements and Badges:** Users can earn badges and achievements for reaching specific milestones, such as reducing their carbon footprint by a certain percentage or using eco-friendly transport options consistently.
- **Leaderboards:** Compete with friends or other users to see who can reduce their carbon emissions the most. Leaderboards can be filtered by different categories, such as weekly or monthly performance.
- **Challenges and Quests:** Participate in weekly or monthly challenges that encourage users to adopt more sustainable habits. Completing these challenges rewards users with points, badges, or even real-world rewards.
- **Rewards System:** Users can redeem points earned through achievements, challenges, and other activities for various rewards, such as discounts on eco-friendly products, carbon offset contributions, or premium app features.
- **Progress Tracking:** Visualize your progress over time with detailed graphs and charts. See how your efforts are making a difference and set new goals to continue improving.
- **Community Engagement:** Join or create groups with friends, family, or colleagues to collaborate on reducing carbon emissions together. Share tips, encourage each other, and work towards common sustainability goals.

## **Partnerships & Sponsorships**

Collaborating with green energy companies, electric vehicle manufacturers, and sustainable brands is a key component of our economic model. These partnerships allow us to feature sponsored eco-friendly products and services within the app, providing users with exclusive offers and promotions. By aligning with companies that share our vision for a greener future, we create a synergistic ecosystem that benefits both our users and partners.

In spite of these partnerships and sponsorships, we want to keep our independence, not be influenced by big corporations. We are focused on our objective to help consumers.

### **Carbon Offsetting Marketplace**

Our app includes a carbon offsetting marketplace, where users can donate to verified carbon offset projects, such as reforestation and renewable energy initiatives. By facilitating these donations, we take a small commission from each transaction, contributing to our revenue while supporting environmental projects worldwide. This feature empowers users to take direct action against climate change, fostering a sense of community and responsibility.

### **B2B Solutions for Companies**

We offer enterprise-level solutions for businesses seeking to track and reduce their carbon footprint. Our fleet tracking and corporate sustainability analytics provide detailed reporting tools that help companies meet their environmental goals. This service is offered through a paid enterprise dashboard, providing a comprehensive suite of tools for corporate clients. By supporting businesses in their sustainability efforts, we expand our impact and generate additional revenue streams.

### **Affiliate Marketing & Rewards**

Our affiliate marketing program offers users discounts on public transport, electric vehicle (EV) rentals, and sustainable products. By partnering with eco-friendly service providers, we earn commissions from each referral, creating a mutually beneficial relationship. This not only incentivizes users to adopt more sustainable habits but also drives revenue growth for our application.

In conclusion, our economic model is designed to promote sustainability while ensuring the financial viability of our application. By offering a mix of free and premium services,

fostering strategic partnerships, and empowering users to contribute to environmental projects, we create a robust ecosystem that supports both our mission and our users' goals.