FedEx SMART Hackathon

ECOयात्रा

Dynamic Route Optimization and Emission Reduction System

- **Description :** ECOयात्रा is an intelligent Route Optimization and Emission Reduction System designed to revolutionize navigation by providing eco-friendly travel routes.
- **GitHub :** https://github.com/arushree16/ECOyatra
- **Website :** https://ecoyatra-1.onrender.com

Team Name : Girl Code
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College Name : Indira Gandhi Delhi Technical University for Women(IGDTUW)

BUSINESS CHALLENGES

KEY PROBLEMS

- **High Fuel Costs:** Logistics companies spend 30% of their budget on fuel. Fuel efficiency improvements can cut costs by 12-18% (IEA).
- **Carbon Emissions:** The logistics industry contributes 8% of global CO_2 emissions. FedEx aims for carbon-neutral operations by 2040 (World Economic Forum, 2023).
- **Operational Inefficiencies and Redundancies:** Redundant logistics networks cause millions in losses. Delivery delays reduce revenue and customer satisfaction (Wall Street Journal, 2025).

ISO — Standards Sectors About ISO Insights & news Taking part Store Search

Towards a net-zero logistics sector
Moving cargo around the world is a carbon-intensive business, and new guidance launched at Davos will go a long way to getting freight back on track.

5 minutes to read

¿Hablas español?   会说中文吗

Published on 19 January 2023   Share on Twitter, Facebook, Linkedin

The World Economic Forum's Annual Meeting held in January 2023 saw the launch of new guidance to support the logistics industry on its journey to net-zero emissions. Davos attendees got a first glimpse into how companies can better understand and track their logistics emissions. Released by Smart Freight Centre and the World Business Council for Sustainable Development, the guidance sets out to help businesses in the implementation of their decarbonization strategies.

This new publication highlights the usefulness and benefits of ISO 14083, a much-anticipated International Standard offering the first universal method for logistics emissions accounting. A game changer for climate action, the forthcoming standard is

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Home / Research and Publications / Research Reports / Reports / How Fuel Costs Affect Logistics Strategies
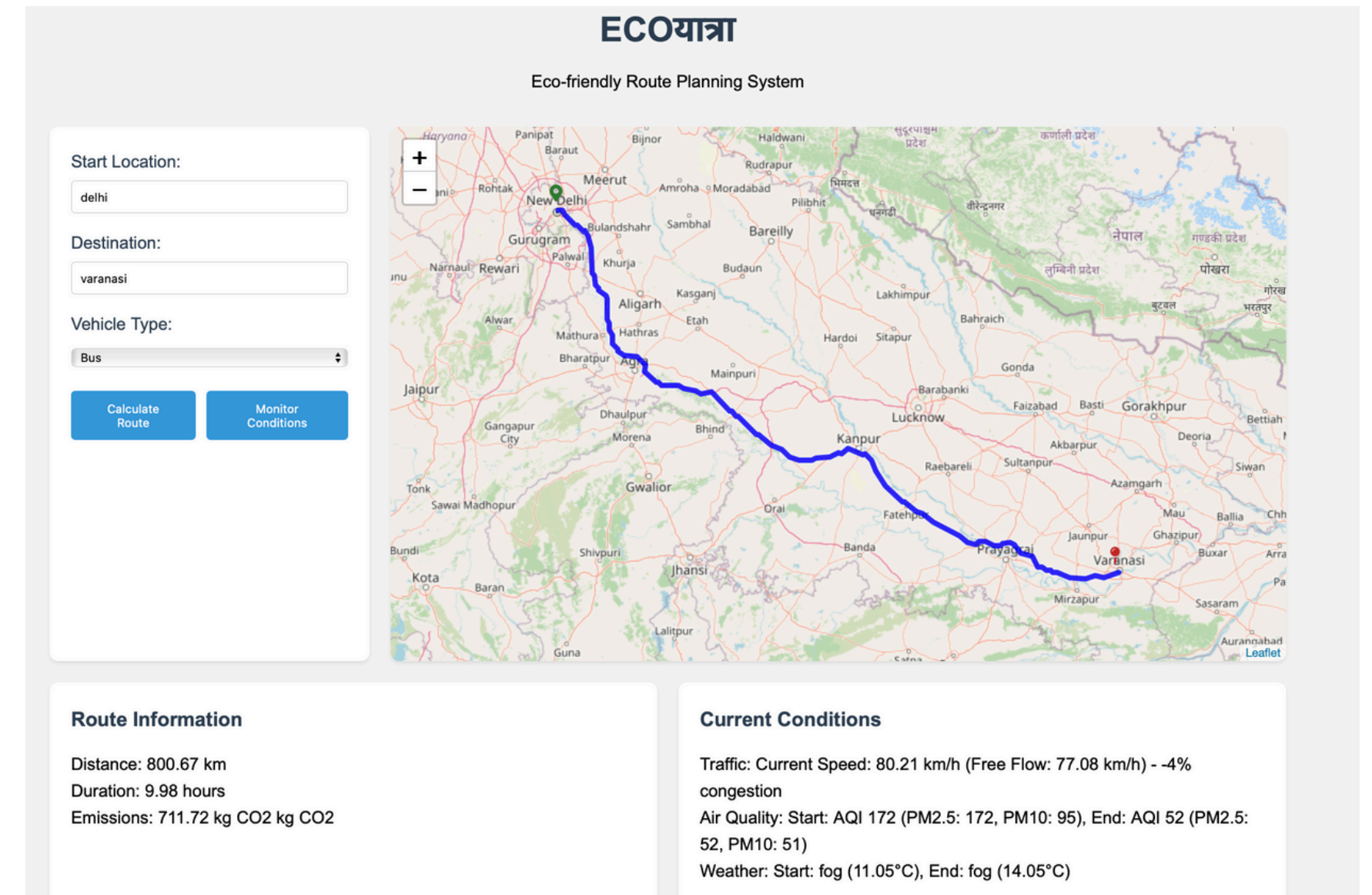
How Fuel Costs Affect Logistics Strategies

By: Leonard Sahling
Release Date: February 2012

NAIOP | RESEARCH FOUNDATION

IDEA TITLE

IDEA

ECOयात्रा is a sustainable route optimization platform that helps users minimize their carbon footprint while ensuring efficient and safe travel. It offers:

- **Smart Route Optimization:** Provides eco-friendly routes with the lowest emissions based on traffic and road conditions.
- **Emission Tracker** – Estimates and tracks CO_2 emissions for every route.
- **Dynamic Traffic and Weather Integration:** Ensures safe navigation with updates based on traffic congestion and weather alerts.
- **Smart Rerouting:** Based on disaster and emergency updates, notifies users of hazards like accidents or roadblocks and reroutes automatically.
- **Air Quality Monitoring:** Monitors pollution levels along routes, ensuring eco-friendly travel.

ECOयात्रा
Eco-friendly Route Planning System

Start Location:
delhi

Destination:
varanasi

Vehicle Type:
Bus

[Calculate Route] [Monitor Conditions]

Route Information

Distance: 800.67 km
Duration: 9.98 hours
Emissions: 711.72 kg CO2 kg CO2

Current Conditions

Traffic: Current Speed: 80.21 km/h (Free Flow: 77.08 km/h) - -4% congestion
Air Quality: Start: AQI 172 (PM2.5: 172, PM10: 95), End: AQI 52 (PM2.5: 52, PM10: 51)
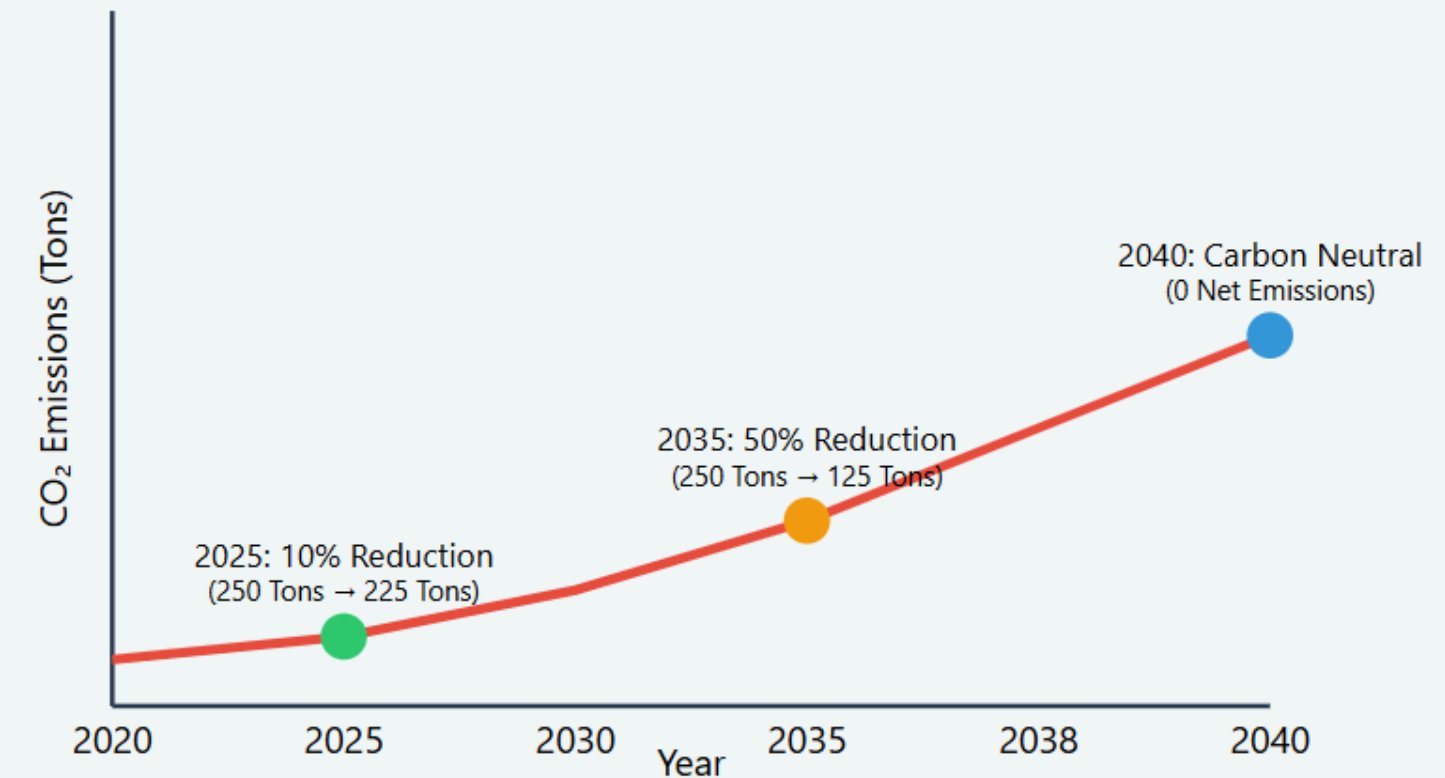Weather: Start: fog (11.05°C), End: fog (14.05°C)

ECOयात्रा empowers users and logistics companies like FedEx to achieve their sustainability and efficiency goals, setting a new standard in transportation innovation.
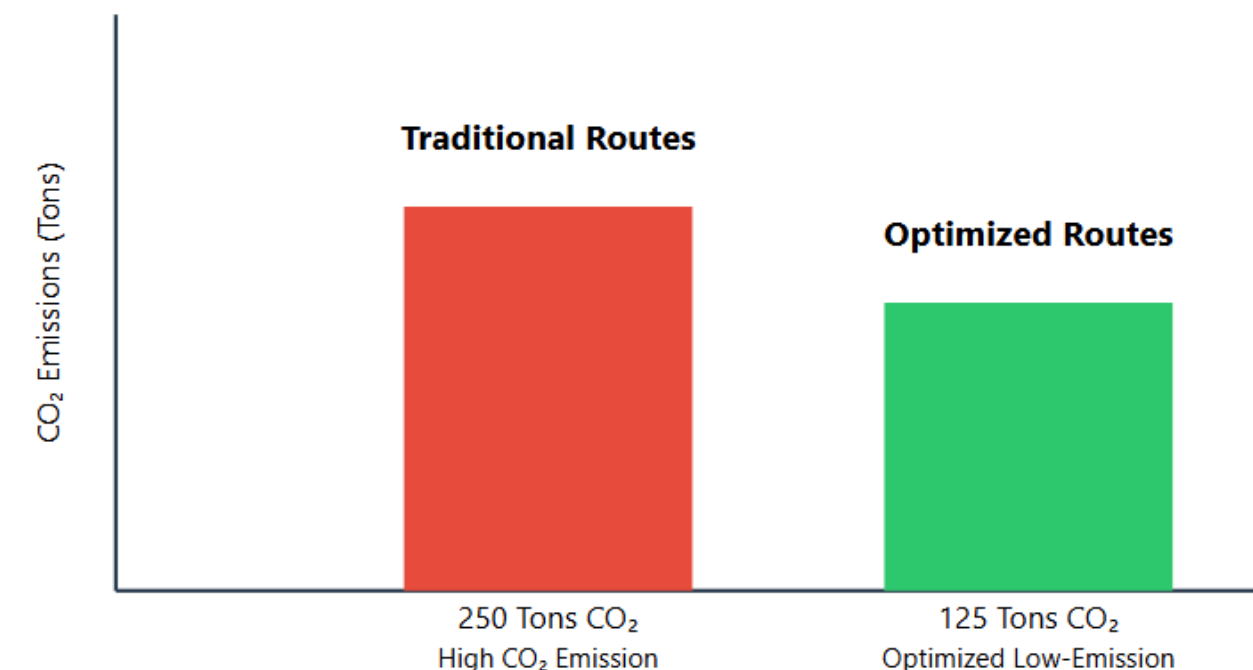
USP

ECOयात्रा - **integration of sustainability, efficiency, and advanced real-time intelligence**

- **Emission Tracking and Reduction:** Directly supports FedEx's goal of achieving carbon neutrality by 2040. (MercuryGate International)

- **Cost Efficiency :** Reduces fuel costs by **10–30%,** making it a cost-effective solution that guarantees ROI.

- **Health-Conscious Routing:** AQI monitoring ensures routes selected to **minimize exposure to pollution**, aligning with FedEx's commitment to employee well-being.

- **Green Technology:** As governments and corporations focus on sustainability, **worthy investment** in the green tech space.

FedEx Carbon Emission Reduction Roadmap

CO_2 Emissions (Tons)

2040: Carbon Neutral
(0 Net Emissions)

2035: 50% Reduction
(250 Tons → 125 Tons)

2025: 10% Reduction
(250 Tons → 225 Tons)

Year: 2020   2025   2030   2035   2038   2040

Emissions Comparison: Traditional vs Optimized Routes

CO_2 Emissions (Tons)

Traditional Routes

Optimized Routes

250 Tons CO_2
High CO_2 Emission

125 Tons CO_2
Optimized Low-Emission

BUSINESS MODEL

REVENUE STREAMS

- **Dynamic Routing Software Licenses (B2B):** Offer AI-powered software for route optimization and emission tracking to logistics companies and fleet operators.

- **IoT Hardware Integration Sales (B2B):** Sell IoT-enabled devices (emission sensors, GPS trackers) for real-time vehicle monitoring and data collection.

- **Subscription Service for Emission Analytics (B2B):** Provide a subscription-based platform with detailed emission analytics, performance reports, and carbon offset recommendations.

- **Government Collaborations (B2G):** Partner with governments to implement emission reduction solutions for public fleets and urban transport.

- **Consultancy Services (B2B, B2G):** Offer expert consultancy on optimizing logistics operations and achieving sustainability goals.

- **API Access for Third-Party Developers (B2B):** Provide API access for third-party developers to integrate route optimization and emissions data into their platforms.

- **Mobile App Subscription (D2C):** Offer a mobile app for individual drivers and small businesses for route optimization and emission tracking.

- **Eco-Friendly Driving Hardware Sales (D2C):** Sell devices like GPS trackers and emission monitors to consumers for personal use.
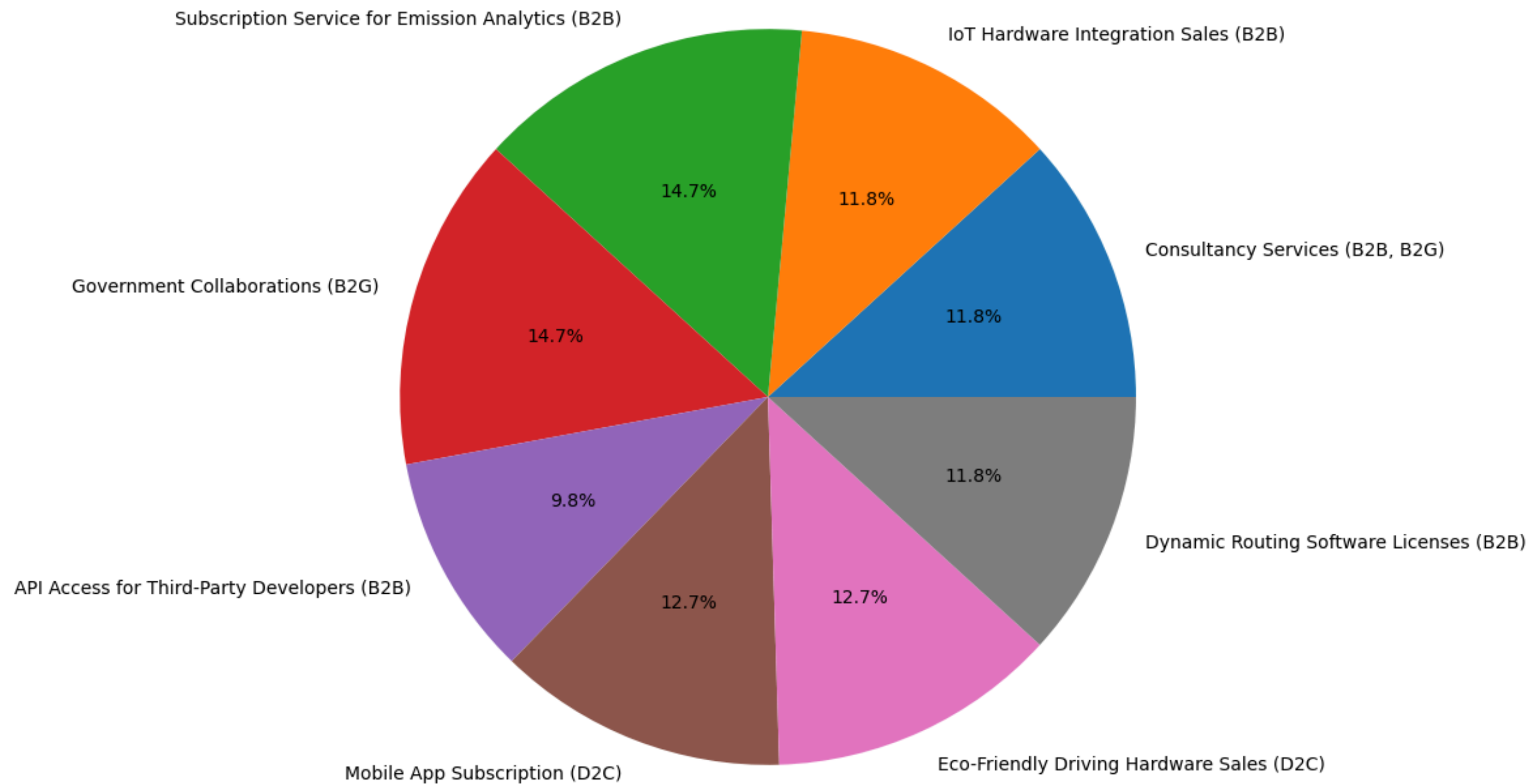
EcoYatra Revenue Streams Breakdown

SOFTWARE SPECIFICATION

FRONTEND

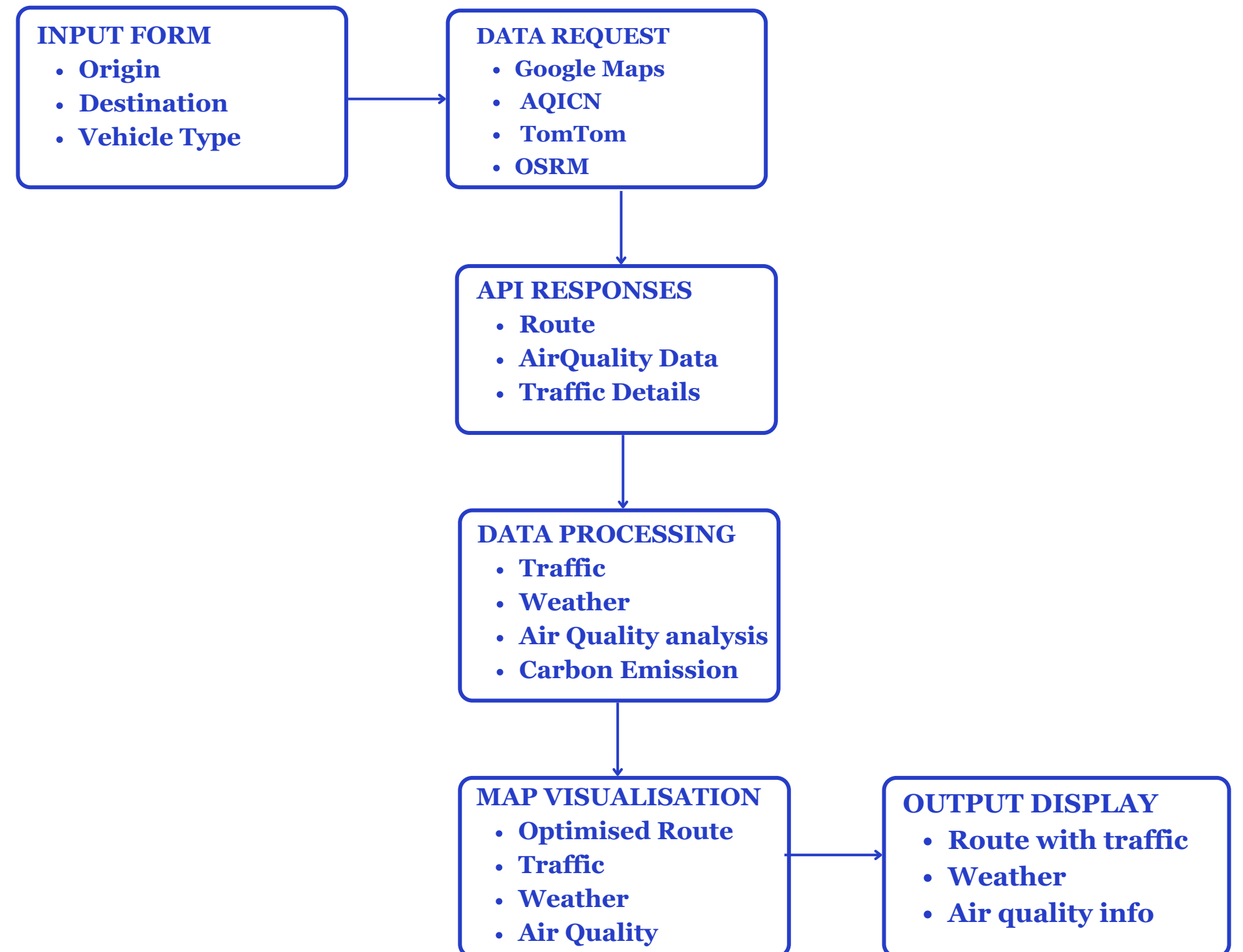HTML,CSS and JavaScript for building user friendly UI

BACKEND

Python (Flask) for handling routing, API integration and server side logic

APIs & LIBRARIES

- Google Maps API – For route optimization and mapping.
- OpenWeatherMap API – For weather data.
- TOMTOM API – For traffic analysis.
- AQICN API – Tracks environmental impact metrics
- OSRM API – Generates optimal routes.
- Folium or Leaflet.js – For map visualization and rendering.

Project's Pipeline

INPUT FORM
- Origin
- Destination
- Vehicle Type

DATA REQUEST
- Google Maps
- AQICN
- TomTom
- OSRM

API RESPONSES
- Route
- AirQuality Data
- Traffic Details

DATA PROCESSING
- Traffic
- Weather
- Air Quality analysis
- Carbon Emission

MAP VISUALISATION
- Optimised Route
- Traffic
- Weather
- Air Quality

OUTPUT DISPLAY
- Route with traffic
- Weather
- Air quality info

IMPACT AND USE CASES

IMPACT

ECOयात्रा is a route optimization and emission reduction platform that empowers logistics companies to enhance operational performance while reducing their environmental footprint.

- **Reduced Carbon Footprint:** Promotes green travel by reducing CO_2 emissions with optimized routes.
- **Cost Savings:** Helps logistics companies save fuel costs by providing the most fuel-efficient paths.
- **Operational efficiency:** Reduces delays with real-time rerouting based on traffic, weather, and hazard alerts, improving delivery success rates.
- **Health-Conscious Routing:** integrating air quality monitoring, ensuring routes minimize exposure to polluted areas.
- **Disaster Management:** Enhances safety through disaster alerts and rerouting in emergencies.

Before EcoYatra

- Inefficient Logistics
- High Fuel Consumption
- Significant Carbon Footprint
- Costly Operations

After EcoYatra

- Optimized Logistics Network
- Fuel Costs ↓ 15%
- Carbon Emissions ↓ 20%
- Reduced Operational Costs

FUTURE SCOPE

- **Petrol Consumption Tracker:** Monitors each user's petrol usage and highlights potential savings through optimized routes.

- **Database Integration:** Maintains detailed records of monthly fuel consumption and CO_2 emissions for analysis and reporting.

- **EV Route Optimization:** Suggest routes with charging stations for electric vehicles.

- **AI-Powered Analytics:** Predict traffic, road conditions, and emissions for smarter routes.

- **Blockchain Carbon Credits:** Reward eco-friendly travel with carbon credits.

- **Multi-Modal Transport:** Integrate public transport, shared mobility, and cycling.

- **Global Localization:** Provide region-specific data and multilingual support.

- **IoT Integration:** Real-time updates via smart cars and IoT devices.

- **Voice-Activated Navigation:** Use AI voice commands for hands-free navigation.

ROUTE PLAN OPTIMIZATION

BEFORE   AFTER
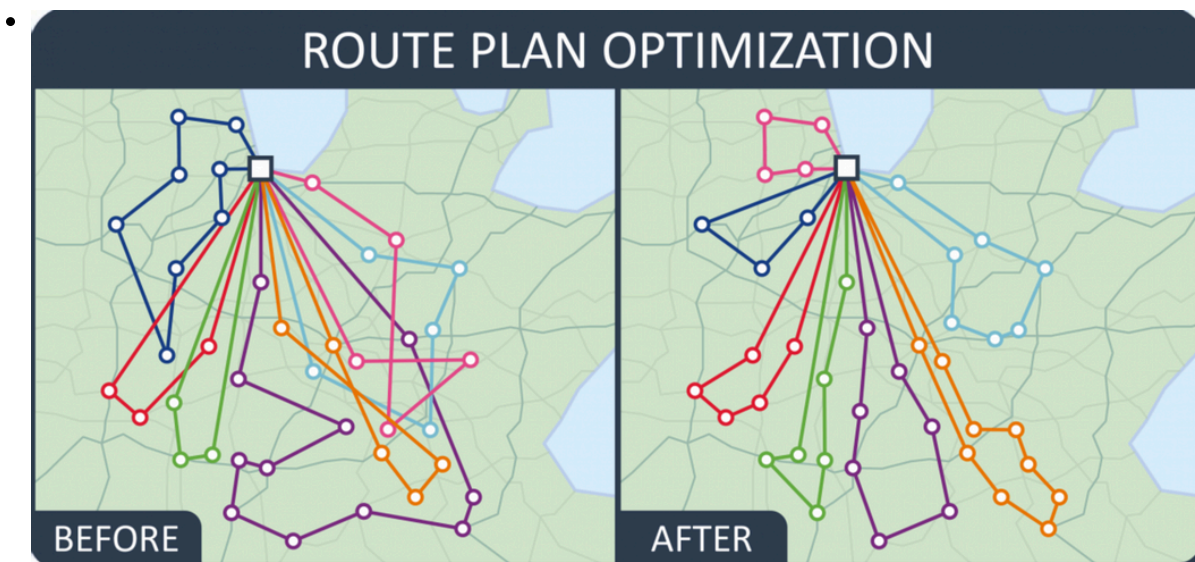
REFERENCES

- [Directly supports FedEx's goal of achieving carbon neutrality by 2040.]

- [Reduces fuel costs by 10–30%, making it a cost-effective solution that guarantees ROI.]

- [As governments and corporations focus on sustainability, investing in green tech is increasingly seen as a worthy investment.]

HOW IS ECOयात्रा BETTER THAN GOOGLE MAPS?

Feature	Google Maps	ECOयात्रा
Route Optimization	Basic time/distance-based	Time, emissions, health, and eco-friendly
Emission Tracking	Not available	Comprehensive, route-specific
Air Quality Monitoring	Not available	Real-time pollution-level data
Disaster and Hazard Alerts	Limited	Proactive alerts and smart rerouting
Future Technology Integration	Limited	EV-ready, blockchain-enabled, AI-powered

ROI OF GOOGLE MAPS VS ECOयात्रा

Green: ECOयात्रा   Blue: Google Maps

Cost Savings: 85 (green), 25 (blue)
Sustainability: 90 (green), 15 (blue)
Tech Integration: 95 (green), 30 (blue)
Operational Efficiency: 88 (green), 20 (blue)