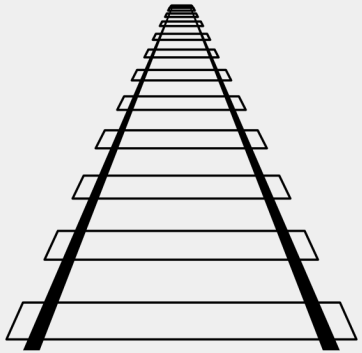
# Rail or Road?

Comparing the carbon footprint of passenger train versus car travel



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# Why this topic?

# Concern about climate change

# Love for travel

# Project on flight emissions by Metis alum

Origin Country

Select or type location

Origin City

Select or type location

Destination Country

Select or type location

Destination City

Select or type location

Per Passenger Emissions Limit (kg)

1995

0 1995

## Welcome to Flight Impact!

Flying is one of the most carbon-intensive ways that we can spend our time as individuals, and its use is dominated by a small group: in 2018, only **11% of the global population** took a flight, and just **1% of the population was responsible for 50% of aviation emissions** (Time, 2021). If flying is a part of your life, there are ways to reduce your air travel emissions, and you can start here! Explore route options, understand your flight's carbon impact, and inform your decisions with EPA data.

**How to get started:**

- Compare the carbon emissions of multiple routes by choosing locations from the left-side dropdowns or filtering your search to an emissions limit
  (*For reference, the EPA estimates that a typical passenger vehicle emits about 4.6 metric tons (4600 kg) of CO2 per year*)
- Hover over the routes on the map, zoom in, and drag left and right to explore the route map
- Check out the table at the bottom of the page for alternative routes, emissions comparisons, and additional ways to travel consciously

# Data Engineering Pipeline

## Data Ingestion

AMTRAK

WIKIPEDIA

*Websites*

climatiq

*APIs*

## Processing and Storage

pandas

*Processing*

GitHub

clever cloud

MongoDB.

*Storage*

## Deployment

Streamlit

pandas

# Interactive Web App

Origin city

Select or type location

Amtrak Route

Destination city

## Rail or Road?

The purpose of this web app is to allow users to compare the carbon footprint of train versus car travel between cities serviced by the same Amtrak route.

**User instructions:**

1. Select an origin city
2. Select an Amtrak route
3. Select a destination city
4. View the distance and emissions **per passenger** by train versus car
5. View and/or zoom in on a map that plots the cities on the Amtrak route between the origin and destination cities

### Train results...

### Car results...

# Interactive Web App

Origin city

Chicago, Illinois

Amtrak Route

Southwest Chief

Destination city

Los Angeles, California

## Train results...

**Distance**: 2291 miles

**Carbon Emissions**: 403 kg

Cities in route:

1. Chicago, Illinois
2. Naperville, Illinois
3. Mendota, Illinois

## Car results...

**Distance**: 2015 miles

**Carbon Emissions**: 622 kg

The exact route is unknown; Google's Distance Matrix API (which was used to calculate distance) returns distance based on the recommended route between start and end points, as calculated by the Google Maps API.

# Interactive Web App

Origin city

Sacramento, California

Amtrak Route

Coast Starlight

Destination city

Davis, California

## Train results...

**Distance**: 14 miles

**Carbon Emissions**: 14 kg

Cities in route:

1. Sacramento, California
2. Davis, California

## Car results...

**Distance**: 14 miles

**Carbon Emissions**: 4 kg

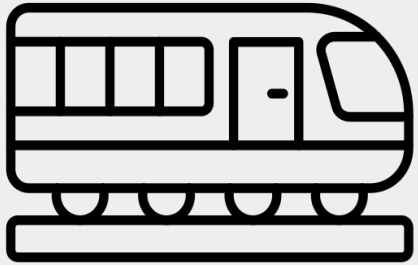
The exact route is unknown; Google's Distance Matrix API (which was used to calculate distance) returns distance based on the recommended route between start and end points, as calculated by the Google Maps API.

# Takeaways

- Usually, train travel has a smaller carbon footprint compared to car travel

- However, there are exceptions to this general pattern

  (e.g., Sacramento and Davis, CA)



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# Future Work

- Add a map showing paths between cities on train *and* car routes

- Incorporate connections between Amtrak routes,

  so users are not limited to selecting cities on the same route

*OR*

- Seek to auto-populate the route drop-down for cities in only one route

# Sources

- Railroad by Ataur Rahman from NounProject.com
- Road by Sergey Krivoy from NounProject.com
- Train by SAM Designs from NounProject.com
- Car by DinosoftLab from NounProject.com
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