TIL6022 Group assignment

Part 1: Project proposal

Group 17

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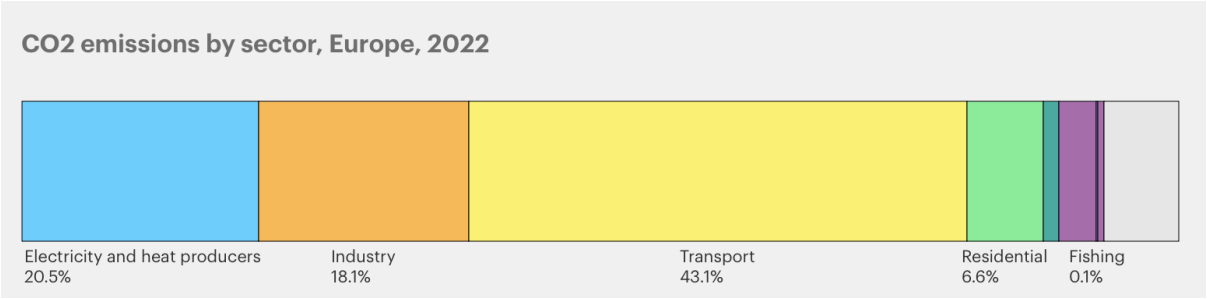
Introduction

Europe emitted 1 092.345 of Mt CO2 in 2022, in which two big influential factors in the energy-related CO2 emissions are the Electricity and Heat Production (20% of total energy-related CO2 emissions) and Transport (43% of energy-related CO2 emissions). Moreover, it is also possible to analyze the emissions of different European countries, where it is noticed that the Netherlands is currently the eighth country in Europe per emissions.



(Europe – Countries & Regions - IEA)

Given the significant impact that transportation has in Europe and , consequently, in the Netherlands, the government has tried to introduce several environmental policies to encourage the citizens to adopt more sustainable forms of transportation in the country. This essay will explore the impact of the policies implemented by the Dutch government in the adoption of sustainable transportation, such as electric vehicles (EVs), bicycles, and public transport.

To answer our main research question three sub-questions that each go into detail about a particular policy impact have been examined.

The central research question guiding this investigation is: *How have European environmental policies influenced the adoption of sustainable transportation methods in major European cities over the past ten years?*

To address this question comprehensively, we will explore three sub-questions that delve into specific policy impacts:

1. How do Dutch tax incentives impact the increase in electric vehicle registrations?

This sub-question regards the impact of European policies on the electric vehicle (EV) subsidies. Our analysis examines the differences before and after the introduction of the financial incentives by the European Commission and the Dutch Government. The impact of such policies is studied by conducting a quantitative analysis to show the change in personal mobility usage.

This sub-question investigates the effectiveness of financial measures in driving EV adoption. By conducting a quantitative analysis of electric vehicle registrations before and after the introduction of tax incentives, we will evaluate the significance of these incentives on EV uptake. Statistical models will be used to assess the direct impact of such policies, and the results will be visualized to highlight temporal trends in different Dutch cities.

Line chart showing the trend of each vehicle market, x axis: timeline of the different policies, y axis: percentage of the market. In this way we can evaluate the impact of each policy, and also show the trend. Grouped Bar chart showing the percentage of EV 10 years ago and now. x axis: cities grouped by policies, y axis: percentages of the vehicle market (includes both electric and combustion vehicles) or a Line chart with the trends of each city during the years(boring choice). We could even include the number of registered vehicles divided by income (FIND INFOS)

2. **To what extent have investments in cycling infrastructure increased the use of bicycles as a daily means of transport?**

Investments in cycling infrastructure have been positioned as a means to encourage more sustainable and active transportation. This sub-question aims to map new cycling infrastructures and correlate them with bicycle traffic increases. Comparative analyses between cities with varying levels of investment will provide insights into how infrastructure investments influence cycling habits. Additionally, geospatial visualizations will be used to illustrate the development of cycling networks and their impact on daily commuting patterns.

We can use two Choropleth Maps to show the number of infrastructures and the percentage of bike users in different areas of The Netherlands. Use the best one as a benchmark and highlight it in a line chart the trend of people cycling during the years, x axis: years(with different steps) y axis: percentage of people using a bike in relation to the total population. We can also analyze the policies taken by the benchmark city/region and draw the conclusion about the relation between policies and increasing use of bicycles. It would finally be interesting to analyze who is more incentivized to use bikes, so we could include infos about the occupation or income of users and put it in a scatterplot.

3. **How have urban traffic restriction policies (e.g., low-emission zones) changed public transportation usage following the guidelines of meeting European emission goals?**

Urban traffic restrictions, such as low-emission zones, aim to decrease road congestion and reduce air pollution. This sub-question focuses on quantifying the changes and the effectiveness of these policies in private, public, and commercial transportation usage and CO2 emissions following the implementation of these policies. By analyzing data before and after adopting traffic restrictions and creating predictive models, we will estimate the long-term environmental and social impacts of such measures.

We need to establish the correlation between CO2 emissions and the introduction of restriction policies. We can create a timeline showing the different laws and policies. Then show the trend of the different means of transport during the years, scatter plot, x axis: time (highlighting the steps taken), y axis: number of private and commercial vehicles, colors differentiate the types of vehicles. To highlight the impact of restrictions we must consider the impact on road congestions, using a line chart highlights the trend over the years.

The findings from this project will provide a holistic view of how European environmental policies have shaped sustainable transportation trends over the last decade. Ultimately, the study aims to offer insights into which policies are most effective, thereby informing future policy decisions to accelerate the transition to sustainable mobility in European cities.

Indicated data pipeline

- **https://data.overheid.nl/datasets?facet_theme%5B0%5D=http%3A//standaarden.overheid.nl/owms/terms/Verkeer_%28thema%29&facet_theme%5B1%5D=http%3A//standaarden.overheid.nl/owms/terms/Natuur_en_milieu&sort=score%20desc%2C%20sys_modified%20desc**
- https://data.overheid.nl/dataset/530-motorbrandstoffen--afzet-in-petajoule--gewicht-en-volume#panel-description This table provides information on the sales in the Netherlands of motor fuels. Data available from: 1946
- https://data.overheid.nl/dataset/15488-energieverbruik-in-het-wegverkeer- Energy consumption in road traffic, Data available from: 1991 Frequency: annual
- https://data.overheid.nl/dataset/rn8ir9sagjviaw CO2 emissions since 1990 according to Emission Registration (Amsterdam Metropolitan Region)
- https://wallbox.com/en_uk/newsroom/netherlands-ev-incentives.html Incetives electric cars Netherlands
- https://opendata.cbs.nl/statline/portal.html?_la=en&_catalog=CBS&tableId=84687ENG&_theme=1187 (Total transport performance by NL region and mode of transport) https://data.overheid.nl/dataset/22412-milieuzone Emission free zones Eindhoven
- Public transport data https://travic.app/?z=12&x=260915.3&y=6251439.5&l=osm_standard&ol
- Emission data: https://map.carbonspace.tech

- https://opendata.cbs.nl/statline/#/CBS/en/dataset/83300ENG/table?dl=ADA77
  Emissions to air by the Dutch economy; national accounts

References:

- *Europe – Countries & Regions - IEA*, https://www.iea.org/regions/europe/emissions
- Statista. (2024b, July 19). *Carbon dioxide emissions in the European Union 1965-2023*. https://www.statista.com/statistics/450017/co2-emissions-europe-eurasia/