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FAU

Relationship between the Charging Point Infrastructure and Electromobility in Germany

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Introduction

Motivation + Goal

- Alternative energy sources are a big topic in nowadays society
- In mobility one alternative are electric powered cars
- Full-electric cars and plug-in-hybrids need charging points

Is there are relationship between the number of charging points available and the number of new registrations of electric powered cars?

- Analyzing the amount of charging points, combining standard charging points (SCP) and fast charging points (FCP), at a start of the year and the new registrations of electric powered cars over the course of the year
- Looking at the development over the time and distribution on the German states

Introduction

Datasources

Charging Infrastructure in Germany

- By Bundesnetzagentur
- Provides the number of charging points for every German state in a in a three-month cycle since 2017
- https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/E-Mobilitaet/Ladesaeulenkarte/start.html

New Registrations of Motor Vehicles with Alternative Drive Systems

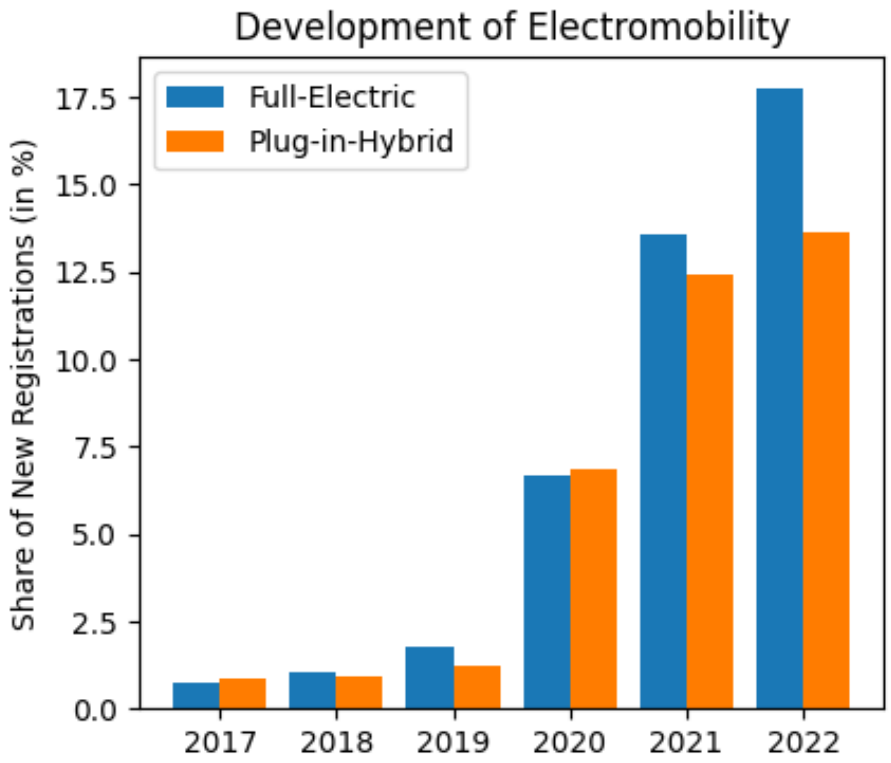
- By Kraftfahrt-Bundesamt
- Provides the new registrations of motor vehicles with alternative drive systems for each month since January 2016
- Provides the new registrations of motor vehicles with alternative drive systems for each German state in a specific month, based on the version of the excel sheet, and summed up over the course of the year
- https://www.kba.de/DE/Statistik/Fahrzeuge/Neuzulassungen/Umwelt/n_umwelt_node.html

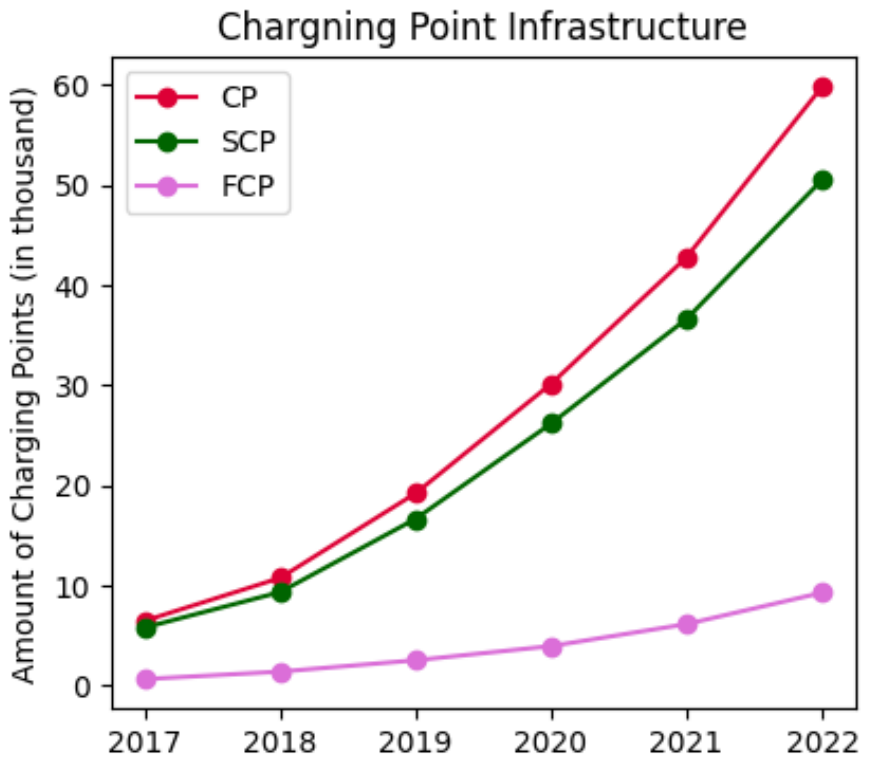
German States with Capitals by Area, Population and Population Density

- By Statistisches Bundesamt
- Provides the area and population for each german state and their capital city
- https://www.destatis.de/DE/Themen/Laender-Regionen/Regionales/Gemeindeverzeichnis/Administrativ/02-bundeslaender.html

Analysis

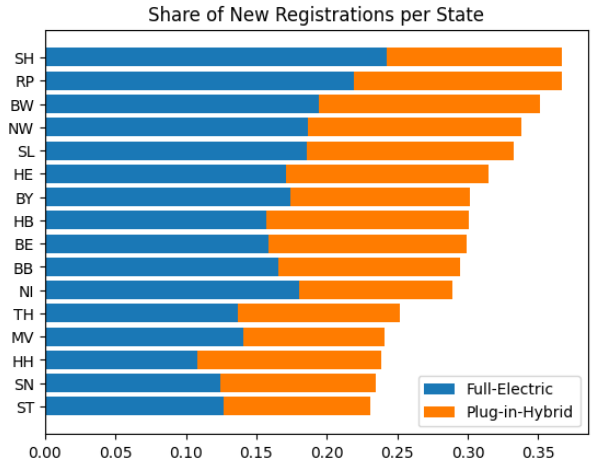
Development over the years

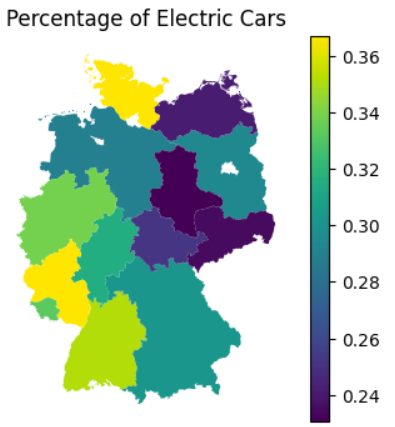


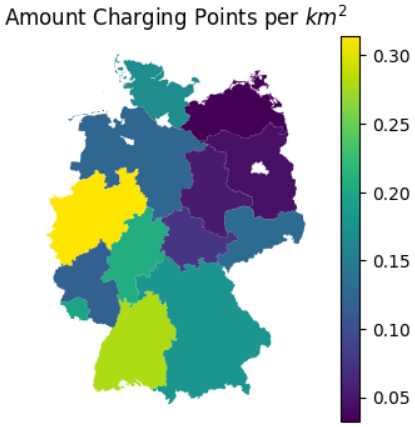


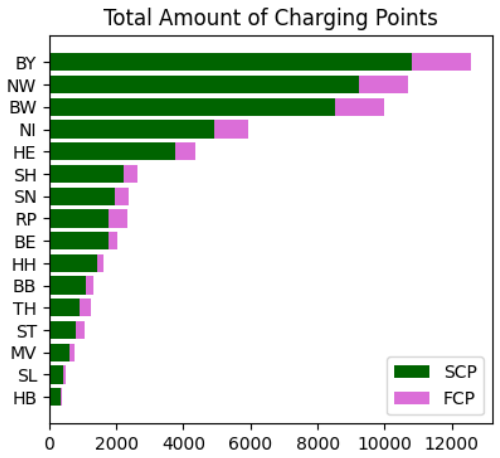
Analysis

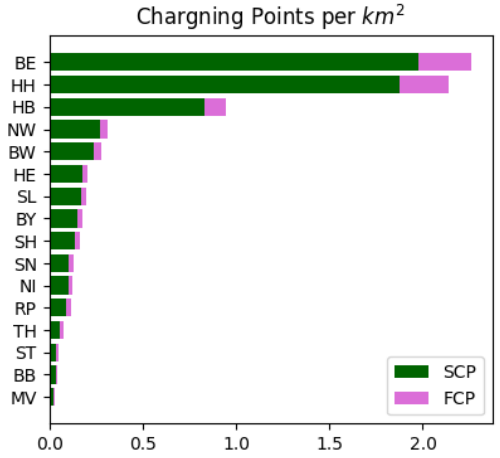
Comparison between the different German States











		Correlation Coefficient	p-Value
Percentage Plug-in-Hybrid	FCP per km²	0.784702	0.001489
	CP per km²	0.779542	0.001678
	SCP per km²	0.771761	0.001998
Percentage Electric	FCP per km²	0.689617	0.009106
	CP per km²	0.653076	0.015511
	SCP per km²	0.642030	0.017988
Percentage Full-Electric	FCP per km²	0.535684	0.059188
	CP per km²	0.487002	0.091441
	SCP per km²	0.475752	0.100329

Conclusion

- Electromobility and charging infrastructure in Germany are growing steadily due to changes in society and the car industry
- A good correlation was found between the rate of electromobility and the charging point infrastructure, particularly between plug-in hybrids' new registrations and the number of fast charging points per km^2
- Higher availability of charging points is associated with a greater willingness to drive electric cars, especially plug-in hybrids
- The analysis used just 13 data points, which may limit the reliability of the correlation
- Future work should include more data points and other influential factors should be considered
- Despite limitations, the project provides interesting findings on the relationship between charging points and electromobility in Germany
- Understanding the factors that influence mobility choices is crucial for guiding a greener and more sustainable future

Thank you very much for your attention!