Can Nuvve's V2G Technology Mitigate Global CO2 Emissions?

Our Work
- Analyzed CO2 emissions in different regions where Nuvve operates
- Generated visualizations and models to quantify CO2 emissions
- Assessed Nuvve's impact on emissions

Why?
- In a global transition towards cleaner energy, bidirectional charging reduces the need for energy production from high carbon emitting sources
- Our collective aim is to incentivize the use of this technology by showing how V2G can mitigate CO2 emissions and reduce consumer’s cost in energy markets.

Regional Total CO2 Emission Over Time
- We analyzed the CARB and ENTSO datasets and calculated the total carbon emission of each industrial sector relative to their power consumed. We then represented these findings, compared them with the total CO2 emission of these sector and generated a bubble map whereby the area of each component is directly proportional to it shared CO2 contribution. As we can see, in California, the biggest contributor is Transport Fuel Supplier vs Electricity generation in Denmark.

How V2G Can Impact Carbon Emissions
- This visualization uses historical data from two merged datasets:
  - Nuvve Fleet Data
  - CO2 Emissions Data from Denmark
- The red line follows the daily carbon emissions trend throughout the day (in g/kWh) and the blue line is representative of when vehicles are providing energy to the grid. Our future goal is to create a predictive model that could better optimize the charging times of vehicles so that the power provided more closely follows when CO2 emissions are high, as that is when V2G can have the greatest impact.

Future Work
- Plan to address the optimization of when vehicles are plugged into a V2G station by creating a predictive model that can estimate when carbon emissions will be the highest on a given day
- Determine Nuvve’s impact on houses served from V2G, further expand our regional scope
- Look into energy markets to further incentivize policy and customer interest

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