## 3. Optimising the EVolution

### Context

As the world moves towards a greener future, transport lies at the heart of that journey. The rise in electric vehicle production has led to an increased presence of electric vehicles (EVs) on our roads. The success of EVs hinges on the ability to charge them conveniently, making the location of charging stations crucial.

PikaSpark Energy Solutions has earmarked £2 million for the establishment of an EV Hub, a dedicated forecourt for electric vehicles. The forecourt is to be strategically situated either at a bustling holiday hotspot or a busy motorway. The challenge is twofold: determining the ideal location for this forecourt and ensuring the appropriate number of EV chargers are installed to meet the anticipated customer volume at the selected location.

The CEO of PikaSpark is keen on a swift return on investment. Hence, alongside long-term profitability, the duration to recoup the invested £2 million will significantly influence the choice of the optimal location.

### Your task

As a data analyst at PikaSpark, you are expected to make a compelling suggestion for the location of forecourt and the number of EV chargers to be installed.

i. Use the demand data to demonstrate why investing in EV hubs is a good idea. You can create charts, work out percentage increases, forecast future demand etc.
ii. Holiday destinations can expect 0.01% of cars on the road to use the EV hubs and Motorway can expect 0.008% of cars on the road to use the EV hubs. Analyse the traffic data to calculate the expected daily customers and shortlist the best locations.
iii. Based on the cost data, decide the optimal number of EV chargers needed at the forecourt for the shortlisted locations. Consider that, on an average, each visiting customer spends one hour to charge their vehicle and the forecourt remains open for 12 hours a day.
*Note*: *You want to have enough capacity to service the demand, but you don't want your capacity to go to waste either.*
iv. Using the profits estimate data and the cost for your proposed forecourt, establish how long it will take to recover the initial investment.
v. Use all the information you have worked out above to provide a data driven recommendation on the optimal holiday destination and the optimal motorway destination. While the PikaSpark CEO will take the final call on which of the two to choose, present your case as to why one option holds merit over the other. Leverage the results of your data analysis to justify that your suggestion is the optimal solution!
*Hint: Find the daily average of all major components like expected customers, costs, income etc. to make your calculations simpler.*

### Data provided

- Historical demand data for EVs.
- Traffic data on holiday destinations and motorways.
- Data on the costs to build the forecourt, expected charging costs and sales, and additional income streams.