MOTION-S

OVERCOMING EV-TRANSITION FEARS FOR FLEETS AND CONSUMERS

Insights on acceptance issues for electric vehicles and how to address them with accurate profiling on fuel consumption, eco scoring, and EV transition potential

In the early years of electric vehicles, many of them had an inferior reputation for the range they could reach between two charging cycles. Even more, the availability of charging stations was a critical limitation for early adopters of EV models. The worst thing about these two facts: they remain stuck in the consumer's head until today.

Today, when asked what factors prevent them from switching to an electric vehicle, consumers usually raise the following points:

1. **Range anxiety:** worry on the part of a person driving an electric car that the battery will run out of power before the destination or a suitable charging point is reached.
2. **Missing charging infrastructure:** inadequate charging points at the trip end location
3. **Acquisition cost:** relatively high prices for buying an EV compared to a combustion-powered vehicle

Consumers mostly underrate the clear advantages of EV. Lower costs of mobility due to affordable electricity is still considered as an advantage. Nevertheless, regarding sustainability and environmental friendliness, many consumers are indifferent, especially given the lower CO_2 emissions.

These concerns are not only present with private consumers, but also on the level of commercial fleet managers. With fleet vehicles being renewed regularly to reduce maintenance costs and limit possible downtimes, fleet operators and managers need to have deep insights in their overall fleets mobility patterns, such as average trip distances, idle times available for charging, charging infrastructure at trip end locations and along the most common routes, among others.

This information is crucial to optimize the fleet's composition in terms of regular combustion, hybrid or electric vehicles. With more and more regulations in force, limiting CO_2 emissions on corporate levels, reducing the environmental footprint through switching to sustainable mobility modes, is a must already today.

DOES ANYONE WANT TO SWITCH TO EV?

Consumer concerns & the critical impact on the automotive industry

Creating an objective assessment if the transition to EV is favorable for an individual driver, relies on multiple factors: the driving style (e.g., aggressive driving, harsh acceleration,...), the anticipation and adaptation to the route topology, the average trip distance, the time between charging cycles, among other factors.

Motion-S is collecting trip data via mobile SDKs that automatically detect the start and end of a trip. The timestamped GPS location data is transmitted to the contextualization platform and augmented with rich map data (e.g., type of road, slopes, traffic signs, traffic density).
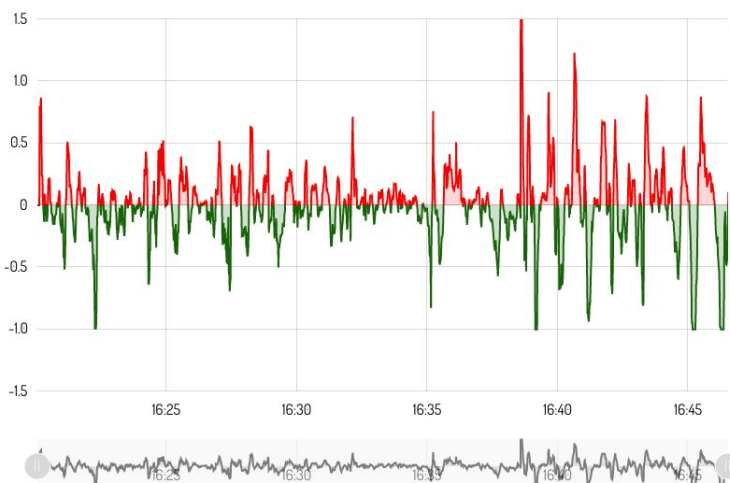
Based on the augmented data, the platform can profile trips, meaning calculating scores and metrics:

1. **Fuel consumption estimation**: using fuel and electricity consumption models based on the driving profile and the road topology
2. **Eco score**: as an indication of the driver's driving profile efficiency, compared to an ideal driving of the route
3. **EV score**: indicates the potential to switch to electric vehicles for a given profile
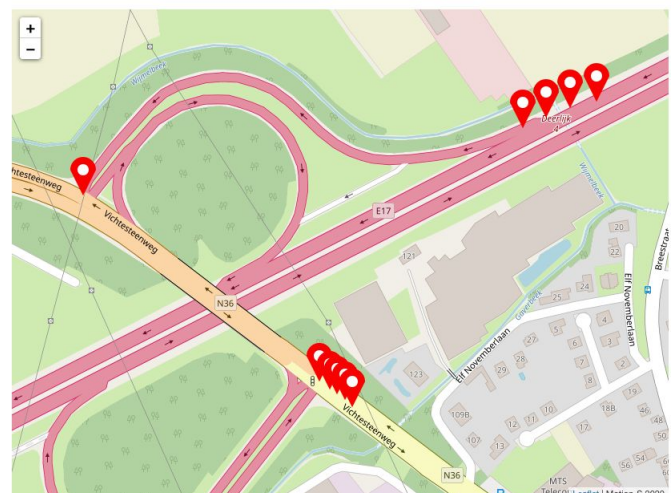
MOBILITY PROFILES BASED ON TRIP DATA

Collecting driving data to create accurate scores

Real / Ideal fuel consumption

Top 10 eco inefficient locations

THE SOLUTION

Fuel consumption, eco score and EV transition potential

FUEL CONSUMPTION

Estimating fuel consumption relies on a calculation of how much energy has to be used to perform a specific trip based on driving behavior and road topology. In the case of a hybrid/electric vehicle, Motion-S can also compute an 'electric consumption' that takes into account their specificities, such as their ability to charge instead of consuming when going downhill.

ECO SCORE

Our eco score calculates the difference between the energy consumed for an actual trip and the route's ideal trip, meaning the minimum consumption for that specific route. The score considers route conditions and individual driving behavior (e.g., aggressive driving, harsh acceleration, driving of slopes, etc.).

EV TRANSITION SCORE

Based on the first two scores, the EV transition score aims at quantifying the likelihood of the user being satisfied when switching to full EV driving. It includes factors that might hinder or foster the use of an electric vehicle.
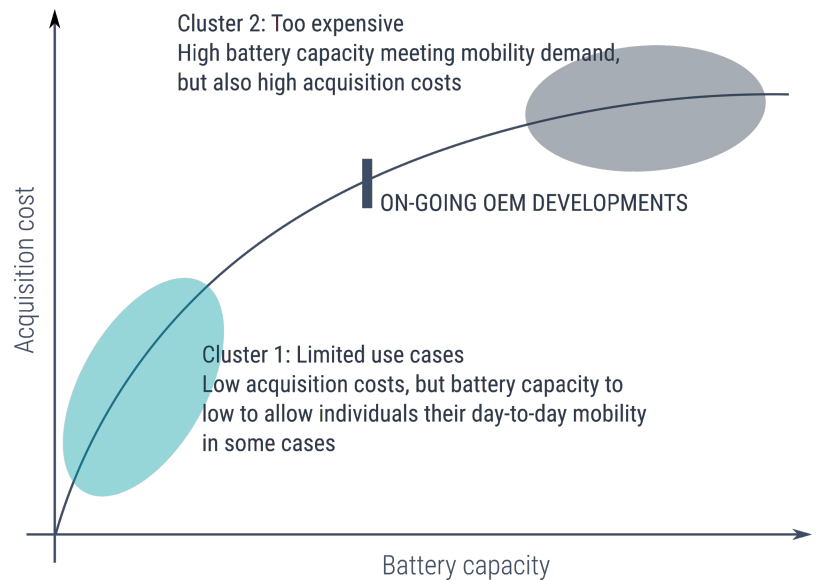
1. **Range**: For an individual driver, it's not that important how many kilometers he/she can drive with one charging cycle (as most trips are shorter than the maximum range), but they are interested in how many days they drive their usual trips without charging.
2. **Proximity of chargers**: Convenience is a big issue in mobility; thus, the availability of chargers and the type of charging stations at the trip end location is essential.
3. **Cost reduction**: For every trip, the platform calculates the approximate amount of money a driver would save thanks to the lower costs of electricity vs. the higher costs of fuel (gasoline or diesel).The estimate is based not only on the distance and time of the trips but on actual driving behavior and the potential for charging into different networks (e-Chargers, work, residential) at different price tags.
4. **Required battery capacity**: The metric is calculated based on assuming that a driver charges the vehicle every two days. Same as above, it takes into account personal driving behavior, the average distance of trips, duration, and much more.

TOWARDS ACCEPTANCE OF EV

A matter of costs and availability of adequate car models

The decision to buy a new car has always been difficult, even in days when only combustion engines were available. Today, with hybrid and full-electric vehicles coming to the market in many variations and with different battery capacities, it is even more complex.

So what is the customers' price acceptance?

Cluster 2: Too expensive
High battery capacity meeting mobility demand, but also high acquisition costs

ON-GOING OEM DEVELOPMENTS

Acquisition cost

Cluster 1: Limited use cases
Low acquisition costs, but battery capacity to low to allow individuals their day-to-day mobility in some cases
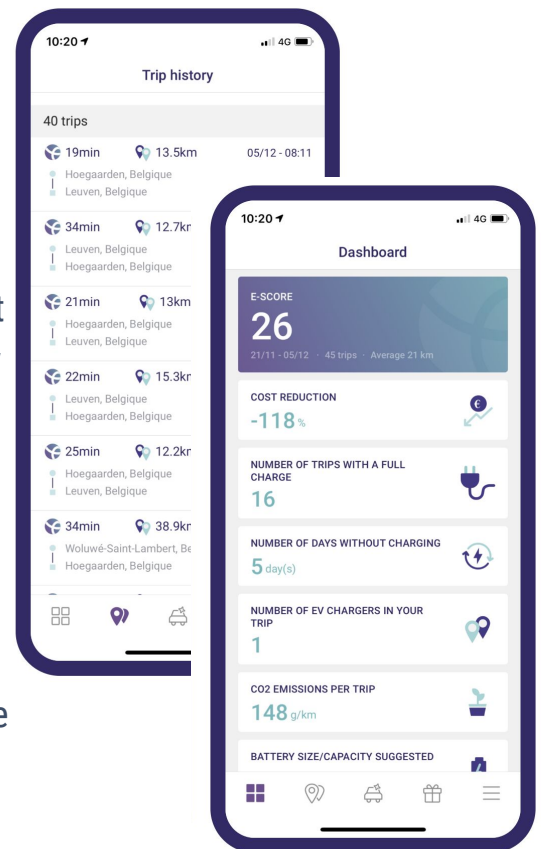
Battery capacity

The answer: It all depends on the battery capacity and the current investment in traditional combustion-powered vehicles. An underlying assumption is that today, people own a car in the price range in between both extremes. When switching to an electric vehicle, there is a high probability that they will stick to their current price range and search for or wait for an electric car in this price range. With more and more car manufacturers bringing new models to the market, the gap between high-performance cars and short-range electric vehicles will hopefully be closed shortly, allowing more people to choose an environmentally friendly individual transport mode. Fiscal or other monetary stimuli granted by governments are excluded from the analysis as they differ from country to country but for sure play a crucial role during the buying decision phase.

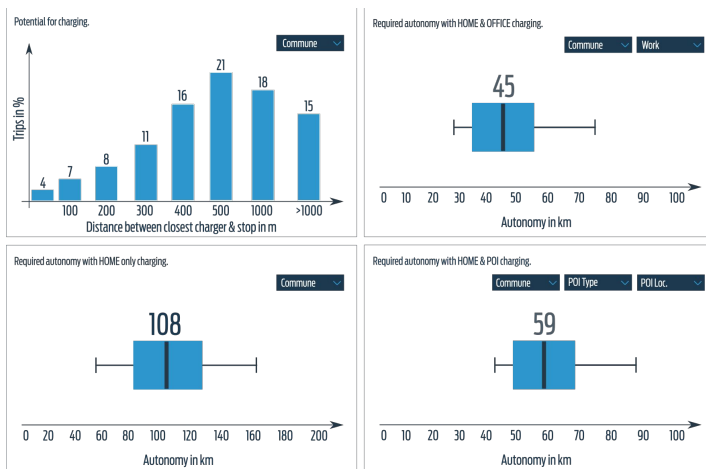## A MOBILE APP TO ESTIMATE EV SCORE

Recently, many car manufacturers launched new EV models - nevertheless, sales of electric vehicles are only taking up slowly. FEBIAC, as the organizer of the yearly Brussels Motor Show, got in contact with Motion-S, to launch a mobile app that helps car buyers evaluate whether an electric car would satisfy their needs.

AskLee, our mobile companion, was developed based on our platform: integrating our mobile Android and iOS trip detection software (SDKs) in the mobile app and using our platform to calculate accurate eco profiles. The app has collected more than 150 thousand trips covering over 2.5 million km during the past months. It has been a real added value for potential customers in their decision-making process.

PRE-SALES SUPPORT FOR OEM, CAR DEALERS & THE AUTOMOTIVE SECTOR

Targeting end consumers, the automotive sector needs to convince them that electric vehicles are the right choice. We provide a web-based EV Sales Estimator: a platform that is receiving fleet information (number of cars, drivers, typical trips, etc.), and generates an EV Transition report for the customer, either based on reference data sets, data from the customer's fleet from existing telematics systems or by integrating our mobile SDK in the corporate mobile apps.

FLEET OPTIMIZATION

Mobility analytics for fleets allow customers to better plan and optimize fleet composition in terms of trip duration and time, offer and demand of electric charging stations (chargers), and their characteristics (availability, power, supplier).

USE CASES ON HOW TO SPEED UP THE TRANSITION TO EV

Mobile apps, pre-sales support & fleet optimization

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