

# MSc Proposal: Bottom-up modelling of the diffusion of electric vehicles in Switzerland

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Electric mobility is key for decarbonising road transport. Its uptake in Switzerland and other countries has slowed down recently, threatening important progress in climate mitigation. This project will empirically explore some of the reasons why this is happening.

Factors that play a role in the uptake of electric mobility can be categorised in personal/social, techno-economic, and contextual factors. Examples for the personal/social kind of factors are attitudes toward climate change, travelling and driving behaviours, and the influence of the social circle. Among the techno-economic factors are aspects such as the cost of driving, and the range or the acceleration of the car. Lastly, the availability of alternatives (public transport) or the availability of charging stations are examples of contextual factors. All these factors have been shown to be important in stated preferences studies – studies, in which respondents state their preferences and reasoning in a hypothetical setting. In contrast, we will analyse people’s actual decisions to buy or not buy an electric vehicle within a revealed preference study in this project.

The uptake of new technologies is traditionally modelled using S-curves, in which the technology evolves out of a niche, first slowly then steadily, to eventually reach its full market potential. The literature on the topic is vast and spans across many disciplines. A range of alternative models have been identified which are able to explain more complex diffusion patterns that do not perfectly fit the classic S-curve diffusion. In this project, we will build on these models (1) to explain the deviation of the S-curve seen in Switzerland and elsewhere and (2) to be able to associate personal, social, or contextual decision factors to the growth.

This project is suitable for you if you are not only interested in understanding the patterns of EV uptake but also in exploring new ways of performing causal inference with technology diffusion models. You will develop a range of methods to identify factors driving diffusion, some of which will fail. The general approach will follow three steps: First, you will develop a causal model on paper that lays out the main variables and their interactions. Second, you will derive one or several probabilistic models based on the causal relationships that are able to generate synthetic diffusion data as sort of what-if scenarios. Third, you will build statistical models (likely Bayesian), test them on the synthetic diffusion data, and, if successful, apply them to the actual Swiss data. A solid foundation in data science, or the willingness to develop it, will be necessary.

If you are interested in this proposal, or if you have any questions about it, please get in touch.

## **Supervision:**

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