

Poland, as an EU member, has committed itself to reducing greenhouse gas emissions by at least 55% between 1990 and 2030. This commitment is particularly important for the energy and automotive sectors and will have effects at every level of the economy. Households are also encouraged to make changes. One measure enabling this is subsidizing the purchase of electric cars, which have not yet attracted much interest among Poles. In 2020, only 8 099 plug-in electric vehicles (PEVs- which include both pure electric and hybrid vehicles) were sold in Poland. Does this mean that Polish consumers are not sensitive to eco-innovations?

On the other hand, Poland is experiencing a real photovoltaic (PV) boom. Last year, the capacity of newly installed PV cells in Poland was double that in 2019, due to the high interest in the "My Electricity" ("Mój Prąd") programme addressed to individual households. The next edition of this grant is expected in 2021, when not only investments in both micro photovoltaic installations (MPI) and home PEV chargers will be subsidized. The author's survey of social opinion indicates that 81% of PEV owners can charge their car at home, confirming the relevance of such a facility. Such interest in MPI in Poland raises the question of whether PEVs are also likely to develop dynamically in the near future. The energy transformation needs integrated actions and investigating this situation may lead to cracking the 'chicken or egg' nature of **charging points and PEV adoption**.

**The main aim of this project is to model the diffusion of PEVs on the Polish market among households interested in using MPI using an agent-based model (ABM).**

The project also aims to assess which internal and external factors, such as demographics, intervention policies, personal norms, social influence are critical to the successful diffusion of MPI and PEVs in Poland as well as measure the correlation between acceptance and willingness to pay for MPI and PEVs.

Based on the findings from a survey of consumers, the author will assess possible scenarios of MPI and PEV diffusion and test whether there is a preferred order in the adoption of such eco-innovations among consumers.

The author will calibrate the ABM using the results of a survey to be specially designed and conducted on a representative sample of 1000-1500 Polish consumers regarding their interest in adopting MPI and/or PEV (this gives a maximal mean error in estimating a population proportion of  $\pm 3\%$ ). This work will be supported by a reliable research agency, which will select respondents and collect the data. The data will be analysed using the R and SPSS programs. To analyse possible scenarios of MPI and PEV diffusion using ABM, the author will develop code and model real-world network structures using the NetLogo platform.

This research will combine consumer questionnaires with the theoretical approach of ABM. This will lead to a better understanding of how ABMs may be calibrated to model the diffusion of innovation when the adoption of one innovation potentially influences the success of another. This is a novel approach for agent modelling of the Polish market to the author's best knowledge.

The results will be published in journals from the JCR list and open access journals (e.g. Innovative Energy & Research) and presented at international conferences, such as the International Conference On Energy and Environment Research (ICEER). In addition, the project will propose recommendations to public and private institutions regarding the development of the MPI and PEV markets.