Title
Prediction of Photovoltaic System Adoption at Building Scale in the Netherlands

Author
Wierikx, Thomas

Date
2022-11-16

Abstract
Understanding the characteristics of photovoltaic system (PV) adopters can help policymakers realise energy transition more effectively. In this study, we developed a model that predicts PV adoption per building using geometric and socioeconomic variables. Seven geometric variables were created by processing building registration data, airborne laser scanning data and 3D building models based on airborne laser scanning data. Additionally, eight socioeconomic variables were generated from building registration data and socioeconomic postal code statistics. The random forest machine learning model, which was trained and evaluated on 646 000 buildings in the province of Overijssel, The Netherlands, displays good overall performance with an AUC of 0.77. Moreover, the model demonstrates that buildings have an increased probability of PV adoption if they (i) have a suitable area above 30 m2, (ii) have a rooftop higher than 6 m, (iii) have a non-flat roof, (iv) were built after 1970, (v) only have one address registered and (vi) are used for residence. Similar experiments involving a different type of machine learning model (i.e. a neural network) and province (i.e. North Holland) yield similar results. Future improvements of the model could focus on increasing performance in residential areas and studying the effect of PV stimulation by including a temporal component.