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Energy production simulation of Agrivolatic Systems

Christian Mikovits, Theresa Krexner, Iris Kral, Alexander Bauer, Thomas Schauppenlehner, Martin Schönhart, Erwin Schmid, and Johannes Schmidt
University of Natural Resources and Life Sciences (BOKU), Institute for Sustainable Economic Development, Department of Economics and Social Sciences, Wien, Austria (christian.mikovits@boku.ac.at)

The European Union set the goal to meet 32% of its final energy consumption from renewable sources by 2030. Other than fossil or nuclear electricity generation, VRE produce electricity not at a few individual locations, but distributed throughout a country. Even though solar PV can be generated on urban infrastructure, e.g. on rooftops or above parking spaces, this potential is limited and costs are usually higher than those for ground mounted PV. It is therefore likely that substantial amounts of solar PV have to be deployed as ground mounted PV and land use conflicts may arise from this infrastructure expansion. Mainly land which is currently under agricultural use would be available for that purpose. As this would imply a competition between food, feed, and electricity production, expansion on that kind of land is discussed controversially. One option for minimizing this conflict is an integrated use of agricultural land, producing both agricultural products and electricity from PV. To better understand the synergies and trade-offs, A thorough analysis of integrated PV and agricultural production on a large scale is necessary.

This work presents a simulation framework to determine electricity as well as crop production of APV systems at high temporal and spatial resolution. Radiation data, digital height data and land cover data function as input data to find suitable areas and simulate the APV system power output.