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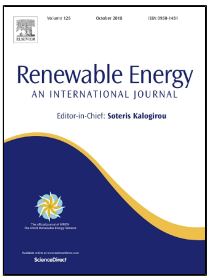

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D. Anagnostos, T. Schmidt, S. Cavadias, D. Soudris, J. Poortmans, F. Catthoor

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A Method for Detailed, Short-Term Energy Yield Forecasting of Photovoltaic Installations

D. Anagnostos[1,3], T. Schmidt[4], S. Cavadias[1], D. Soudris[1], J. Poortmans[2,3], F. Catthoor[2,3]

[1]National Technical University of Athens, Heroon Polytechneiou 9, Zographou Campus 157 80 Athens – Greece
[2]imec, Kapeldreef 75, 3001 Heverlee , Belgium
[3]Katholieke Universiteit Leuven, Kasteelpark Arenberg 10, 3001 Heverlee, Belgium
[4]DLR Institute of Networked Energy Systems, Energy Systems Analysis, Carl-von-Ossietzky-Str. 15, 26129 Oldenburg, Germany

***Abstract*—The global shift towards renewable energy production combined with the expected penetration of electric cars, increasing energy usage of cloud computing centers and the transformation of the electricity grid itself towards the "Smart Grid" requires novel solutions on all levels of energy production and management. Forecasting of energy production especially will become a major component for design and operation in all temporal and spatial scales, creating opportunities for optimized control of energy storage, local energy exchange etc. To this end, a method for the creation of detailed and accurate energy yield forecasts for PV installations is presented. Based on sky-imager information and using tailored neural networks, highly detailed energy yield forecasts are produced for a monitored test installation, for horizons up to 15 minutes and with a resolution of 1 second. Thermal effects are included in the calculations and error propagation is minimized by reducing the modeling steps. The described method manages to outperform state of the art models by up to 39% in forecast skill, while at the same time retaining temporal resolutions that enable control schemes and energy exchange in a local scale.**

***Keywords*— Energy yield forecasting, Sky-imager, Neural Networks.**