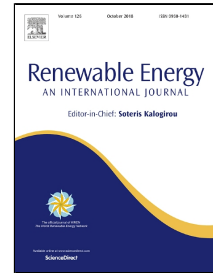


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A Method for Detailed, Short-Term Energy Yield Forecasting of Photovoltaic Installations

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

20 ***Keywords***— Energy yield forecasting, Sky-imager, Neural Networks.
21

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