



The *Meteorological Institute of the Ludwig-Maximilians-Universität Munich (LMU)* invites applications for a

PhD student Position (3 years, 75% E13 TV-L)

for the development of improved solar irradiance forecasting methods for photovoltaic power generation in a combined PV-biogas-power plant. Within the project NETFLEX (funded by BMEL, Bundesministerium für Ernährung und Landwirtschaft), a self-learning control system for the weather dependent operation of the combined renewable power plant will be developed, together with the Technical University Ingolstadt, Institute for new Energy Systems (THI InES), as well as power plant and grid operators. Aim is to provide constant power output, maximizing the contribution of solar energy and minimizing the need for biogas plant operation.

Aim of the PhD project at LMU is an extension of commercially available cloud and solar irradiance forecasts with respect to spatio-temporal resolution. Today, forecasts resolutions of 15 minutes and several kilometres are available. Temporal resolution in the range of minutes and spatial resolution below one kilometre will be necessary for accurate automatic management of two renewable energy sources within one plant.

Cloud camera systems directly at the power plant as well as geostationary satellite data will be used to reach these requirements. Setup of the camera and additional sensors at the power plant close to Munich is part of the work. The work builds upon preliminary methods of LMU and DLR (Deutsches Zentrum für Luft- und Raumfahrt) Oberpfaffenhofen regarding cloud and irradiance forecasts; and upon plant control systems at THI Ingolstadt. Forecast tools developed at LMU will be integrated into the mathematical models of the self learning plant control.

Requirements

We expect a strong background in physics, mathematics, meteorology or atmospheric sciences. Knowledge in cloud physics, radiative transfer, remote sensing as well as programming skills would be beneficial. A contribution to teaching at LMU is possible. A good Master level degree in physics, atmospheric physics or a comparable degree is required.

Applications

Interested candidates should send a CV; a cover letter describing background, training and research interests; certificates; and the contact information of two referees as a single PDF to tobias.zinner@lmu.de. The position is open until filled.

Selection

The selection for the positions will be based solely on merit without regard to gender, religion, national origin, political affiliation, marital or family status or other differences. Among equally qualified candidates, handicapped candidates will be given preference.