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Description of research project: "Photovoltaics Power Generation Predictor"

With the proliferation of PV penetration and integration inside the power grid, the need for accurate power generation prediction model becomes a must. This is due to the intermittent behaviour of such power generation sources which complicates significantly the scheduling and planning process from the smart grid perspective.

Several prediction models have been proposed in the literature which differ with the level of complexity, accuracy as well as the ease with which the corresponding relevant parameters can be captured. To this end, a power generation model have been proposed by TZE in Ruhstorf which is based on solar irradiance. The model is checked against one year of power generation data collected at the local premises. The obtained results show certain level of discrepancy between the measured and computed values.

The proposed Master's research project, to be realized in collaboration between Chair of Computer Networks and Communications at University of Passau and the TZE in Ruhstorf during a duration of 6 months, focuses on the provision of an accurate PV power generation prediction model. Consequently the following structure for the aforementioned project is envisaged:

- Analysis of the current model together with the state-of-the-art existing models.
- In-depth analysis and understanding of the available power generation data and extraction, using mathematical techniques, of the most relevant parameters.
- A great deal of attention need to be dedicated to a model by taking into account temperature as a relevant parameter.
- Open source implementation using Java programming language of the new proposed model and integration inside the system of TZE in Ruhstorf.

To achieve the above mentioned objectives of the Master research project, the following will be available to the researcher:

- A one year of both estimated (per hour basis) and measured (per minute basis) data will be available to the researcher. However, access to the Database can only be realised at the local premises in Ruhstorf.
- A clear definition of the environment including the PVs and their corresponding power generation capabilities.
- The current PV power generation estimation model based on the solar irradiance.

It is worthwhile to mention that the PVs **are not** equipped with any temperature monitoring sensors.