

Design and Construction of a Low-Cost Meteorological Station (Poster)

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Africa's immense solar, wind and hydro power offer a huge potential for the deployment of renewable energy systems. The physical location of the solar, wind and hydro plants is an important factor for the sustainable success of renewable energy generation. For optimal project siting, meteorological data collection and analysis is required. Existing meteorological stations are very expensive and are often not suitable for the deployment in remote areas, which therefore lack location-specific data. This project aims to develop a low-cost meteorological station especially designed for the deployment in remote areas.

The station's design is based on a Raspberry Pi system with the appropriate measurement technologies. The developed station provides reliable measurements for long-term acquisition of meteorological information, including wind speed, temperature, rainfall and solar radiation. The self-sufficient station is powered by an external solar cell in combination with acid batteries. Furthermore, the station is connected to the internet via a UMTS stick and automatically sends data to a central FTP server. This data is then published on an internet site, where it can be further analyzed. The equipment prototype was site tested in Zimbabwe and Nepal. The findings from these installations were implemented as hardware and software updates enabling the current version to be used in remote locations in development countries.

Workshops and construction manuals will be provided without costs to enable students, researchers, and companies in Africa to rebuild the station at different locations. The low price for the materials and the possibility for local manufacturing with the open source idea are the important points for the sustainability of the project. The project's vision is to establish a wide station network, which can help to determine Africa's renewable energy potential and the optimal locations for renewable energy systems.

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