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COMPARISON BETWEEN PV PACKAGES SOFTWARE AND REAL PV PLANT PERFORMANCE

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Abstract

Background: The growing demand for sustainable and clean energy has driven significant investments in photovoltaic (PV) systems. To ensure technical and financial feasibility, simulation software tools such as (PVsyst, HOMER Pro, SAM, etc...) are widely used to estimate energy production before installation. However, discrepancies between simulated and actual performance have been observed, leading to uncertainty in project evaluation and investment decisions.

Objectives: Our project focuses on finding the perfect and more accurate PV software that can be used for projects, research, and to predict the power production from PV module.

Methods: The project includes data collection from real plants with a one-year age minimum, simulating this data in simulation software, and using comparison tools to provide the most reliable software. SAM and PVsyst are good software to be reliable, and together is more powerful

Improving the efficiency, productivity, and financial reporting of future projects by determining the most appropriate and accurate solar energy simulation programs, and this comparison depends on indicators (total production energy, total DC power, losses, monthly energy production, not limited to it only), which also help in reducing carbon emissions.

Make a comparison between design programs (PVsyst, Homer Pro, and SAM (System Advisor Model)) on previously established projects that are at least one year old, and based on the simulation results and actual results indicators: average energy =production, irradiation, losses, monthly energy production, and not limited to it only. Depending on this, the efficiency of the programs is determined. After summing the scores for each software. Determining which software is suitable to use now is important. Each software has passed in category and failed in another one

Results: SAM has the highest score but failed in category A (main one) , pvsyst is the second one, it is failed in category B, the last one (Homer pro), failed in two categories and has the lowest percentage.

Conclusions: Based on the results obtained from the South Hebron project regarding productivity, radiation, efficiency, etc., and the parameters that were used for comparison, it will be able to determine which programs are the best and most accurate for simulating projects in Palestine. Due to the increasing demand for solar energy projects, this project will help companies to do so, and by using formulas to calculate the error rate and the presence/absence criteria, the decision depending on the comparison is

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determined. The SAM is the perfect software, and to be honest, using two software programs of them together makes the work more accurate."
Key Words: SAM, PVsyst, comparison, score, Homer pro.

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