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Energy solutions: How to organize and monetize data

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Big data is changing the way the world does business and is set to revolutionize the utility industry as well. In the past, utility information was collected just once a month, it can now be collected in 15 minute intervals (and even more frequently in some situations), an incredible 35,000 times a year. Analytic tools are capable of making sense of this information and providing insight for verifiable business decisions paving way for serious ROI. A new generation of technologies are being designed to extract economic value from these large swaths of previously unavailable data. Yet having all of the data in the world will not positively influence your bottom line unless you know how to organize it and how to analyze it. This data can be used for making internal operations more energy efficient while simultaneously being monetized as it relates to the utility company billing in both regulated and deregulated markets. Are heating and cooling systems operating at the same time? Is equipment being activated at off-hours, are motors and drives properly calibrated? All this can be discerned from the data, it is even possible to know what equipment is being operated and when from the analysis of the data. The more granular the data, the greater the opportunity for conservation and savings.

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Design and implementation of a novel search technique to the global maximum power point under partial shading conditions

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The partial shading issue is one of the most critical problems facing the maximum power point tracking (MPPT) algorithms. This paper presents the design and implementation of a novel search technique for global maximum power point (GMPP) under partial shading conditions (PSC). It utilizes a two-stage algorithm to overcome the partial shading issue. In the first stage, it uses the genetic neural algorithm (GA) to determine the nearest point to the GMPP. In the second stage, it starts from the optimum point obtained in stage one and applies a new and smart MPPT algorithm to increase the searching speed. In order to determine the performance parameters and evaluate the validity and efficiency of the new method, a complete experimental prototype is implemented. The experimental results prove that, under all possible partial shading conditions, the new technique reaches directly the GMPP with very limited steady state oscillation. Moreover, it tracks the maximum power point (MPP) much faster than the traditional methods. Consequently, the new technique has a significant improvement in energy extraction efficiency from the photovoltaic array to the load.

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