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How to boost wind farm profitability with smart automated operations

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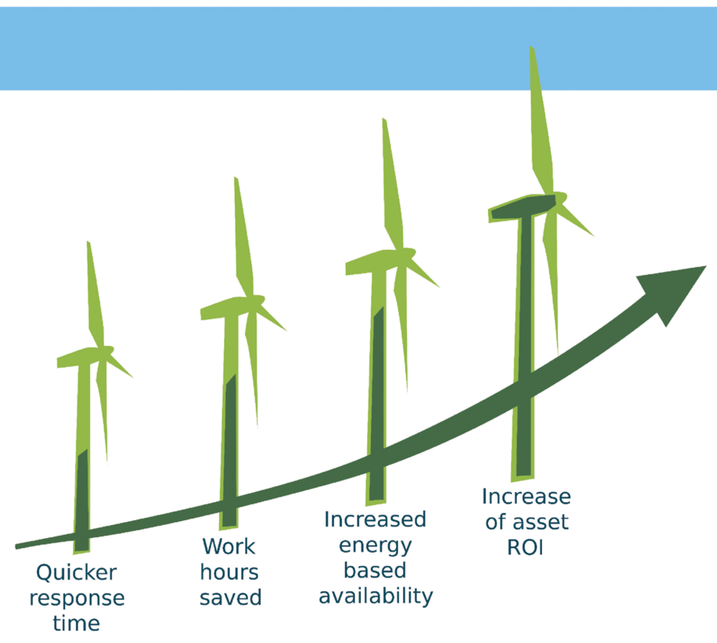
Abstract

The levelized cost of renewable energy continues to decrease each year worldwide, making wind and solar energy even more competitive than conventional sources. As a consequence, this new energy market situation lifespan requires constant improvement and optimization of Operation & Maintenance activities to preserve the long term viability of investments. However, as prices decrease, so do the margins of the entire supply chain. How low can the cost of an Operation and Maintenance service be while still preserving the viability and quality of the Operation and Maintenance service? Will the demand for low cost services negatively impact the lifespan of wind farms?

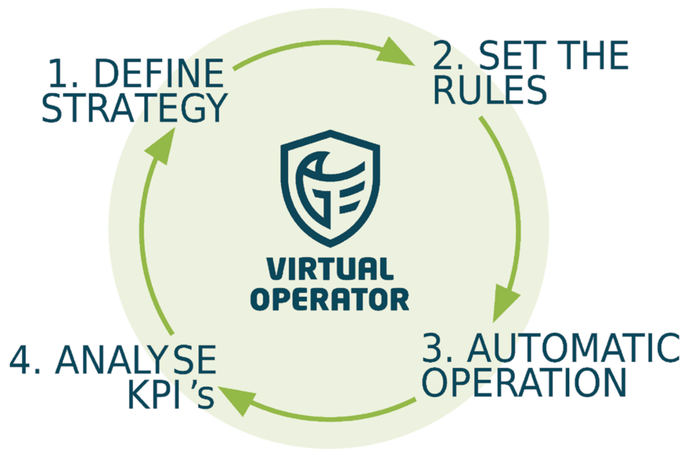
Objectives

Our research has focused on finding the most cost effective Operation and Maintenance strategy to minimize downtime and maximize wind energy yield.

With this innovative technology, CompactSCADA® Virtual Operator, wind farm operators are capable to perform an immediate but also smarter response to wind turbine errors, alarms or events. The benefit of using this new technology is minimizing production losses due to resettable errors, increasing availability, and improving production.



Methods



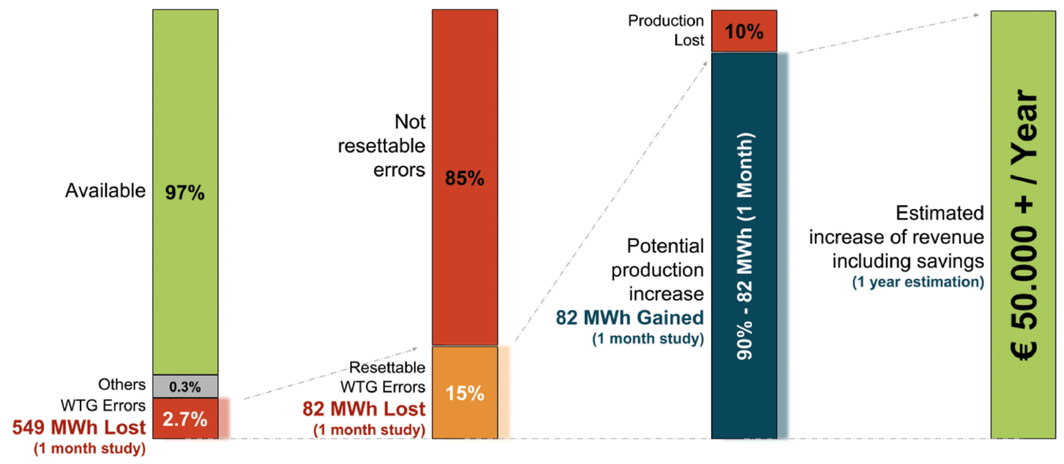
By automating the decision making in remote operations, it is possible to customize the operations protocol up to single turbine level, taking into account not only errors, events or alarms coming from the turbine, but also meteorological data, energy pool price, field technicians availability or any other input that the operator would like to introduce in the operations protocol.

The new procedure consists in implementing a circular workflow in which the operator is continuously looking for the wind farm availability improvement, both energy and economic based.

Results

In this study, we have analyzed the results of implementing this new wind farm operation strategy in five different wind farms located in Spain and equipped with GAMESA, MADE and NORDEX technologies.

We would like to highlight a business case of the implementation of the solution, CompactSCADA® Virtual Operator, in a Spanish wind farm, with a total installed capacity of 49MW. The results show an estimated yearly savings of over €50.000 and improve turbines operations after implementing the new strategy.



Conclusions

Smart automated operations is becoming an essential tool for wind farm operators to enhance assets performance, improving its availability ratios, and as a consequence its profitability. More than 80% of worldwide capital transactions are managed by smart automated algorithms, so wind farm operations can't wait any longer to introduce this modern technology to optimize operation and increase profitability.

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