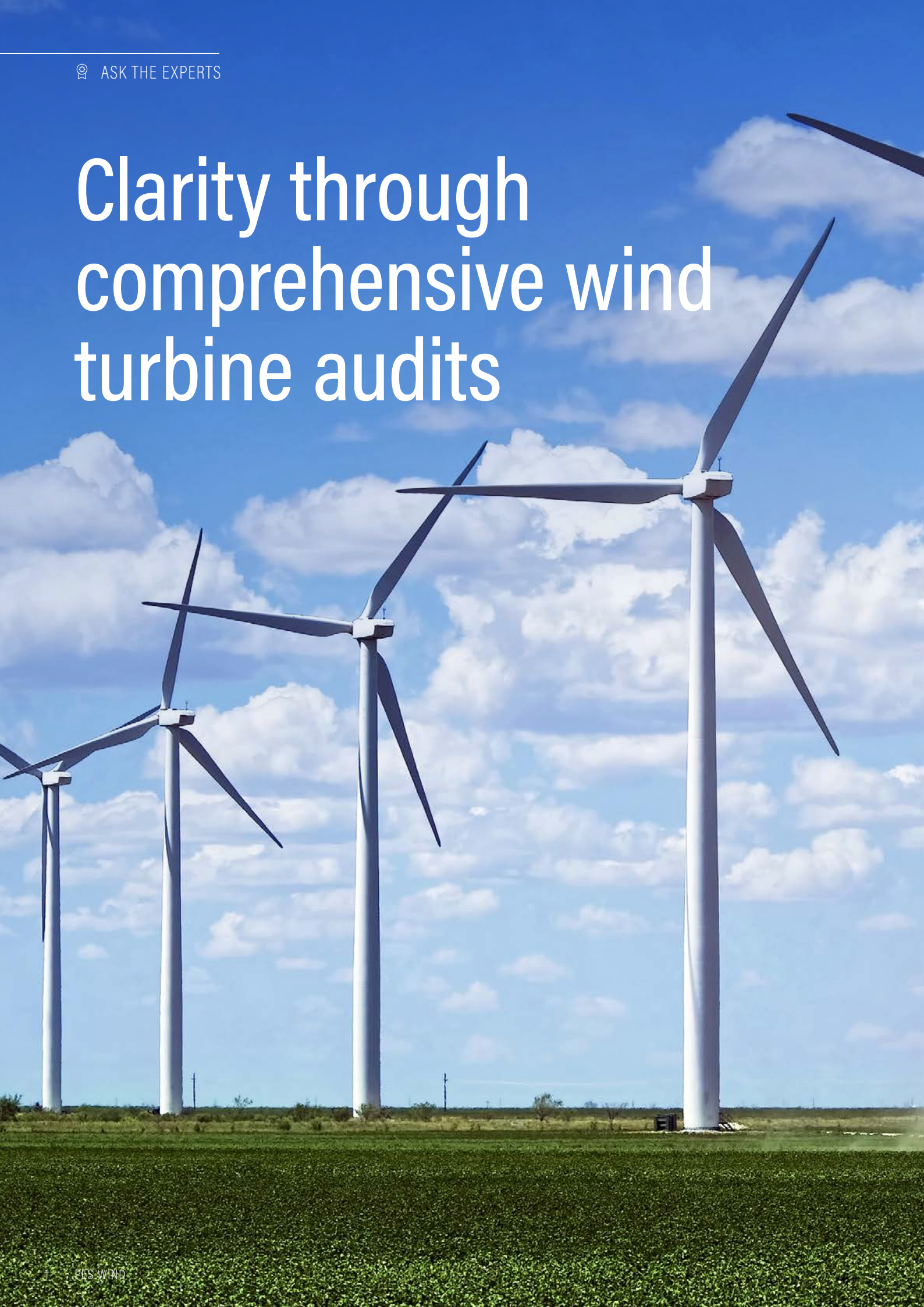
Clarity through comprehensive wind turbine audits



In the realm of wind energy, downtime is the nemesis of productivity. Maintenance audits act as the first line of defense against unexpected breakdowns, minimizing downtime and averting the need for unplanned repairs. By addressing issues preemptively, audits keep turbines spinning steadily, maximizing their uptime and energy output. PES spoke to Garrett Calaway, CEO of Calaway Solutions, to discover some of the latest tools on the market.

PES: Welcome to PES Wind Garrett, could you provide an overview of Calaway Solutions and its role in wind turbine maintenance?

Garrett Calaway: Thank you for having us. Calaway Solutions stands at the forefront of the wind energy industry as the leading provider of inspection and maintenance audit services. With over four decades of combined experience in renewable energy and recycling, our dedicated team of experts is committed to delivering exceptional solutions in the renewable energy sector. We take pride in our unwavering attention to detail and our continuous integration of cutting-edge technology, setting us apart as the best-in-class choice for your inspection and maintenance needs.

The unique Calaway Solutions Maintenance Audit (CSMA) is at the heart of our offering. This comprehensive 360-point inspection covers every aspect of your assets, combining visual and endoscopic assessments. Our clients benefit from a clear understanding of their assets' current condition, supported by enhanced reporting that evaluates the quality of maintenance performed.

PES: What is the role and importance of maintenance audits in the lifecycle of wind turbines?

GC: Maintenance audits are vital for the lifecycle of wind turbines. They help identify potential issues before they escalate into major problems, ensuring the turbines operate efficiently and safely. Regular audits extend the life of turbines, reduce downtime and unplanned, and save costs in the long term by preventing major repairs.

PES: Can you describe the typical process you go through with a client's assets?

GC: Our protocol is proprietary and would take a lot of time to discuss in detail. Our process is a comprehensive 360-point inspection, combining visual and endoscopic assessments. Our technicians, working in teams of two, go through the structured checklist, completing detailed reviews starting at the base and working up. This includes internal blade inspection, main bearing, gearbox, generator, and everything in between. Externally, we look at the blades and the entire tower, top to bottom.

PES: How does Calaway Solutions incorporate technology and innovation in maintenance audits?

GC: We are at the forefront of incorporating technology in our audits. Our partnerships with technology leaders like Thread and Wind Power Labs allow us to use advanced drone technology and AI/ML-powered platforms for precise and efficient inspections.

This provides several benefits for our clients, including consistent reports, regardless of region or inspector that performs the work. This allows are clients to look at asset types and look for systemic issues and degree of severity and make informed decisions that meet their criteria and ultimately be more proactive. The reports are accessible from anywhere, so our clients do not have to think about who has the report and where to find it.

In summary, this allows our clients to have easy to read, consistent reports that are easily accessible by all authorized personnel to make better, more informed decisions about their assets.

PES: How do maintenance audits help ensure the environmental efficiency of wind turbines and compliance with industry regulations and standards?

GC: Regular maintenance audits help identify inefficiencies and potential environmental impacts early. This ensures that turbines operate within the prescribed environmental standards and comply with industry regulations, contributing to sustainable energy production.

PES: Can you discuss the cost implications of regular maintenance audits versus the costs of major repairs or failures?

GC: Regular maintenance audits are far more cost-effective than major repairs or

failures. They prevent prolonged downtime and expensive repairs, ensuring our clients a better return on investment.

We propose that clients do not wait for the end of the warranty before interrogating asset health. Rather, we propose clients start at the Commercial Operation Date (COD). Surprisingly, there are often issues with newly installed turbines that the owner/operator is unaware of. If it is not caught by the manufacturer or installation crew, it is simply ignored until it becomes a problem.

A baseline audit of a new turbine or fleet ensures that things are installed correctly. Once a farm is baselined, a percentage of the farm can be audited annually. For example, if an owner has a five-year warranty, 25% of that farm can be inspected every year, and then in the final year, a determination can be made about what towers to audit based on the previous audit findings, combined with the operational and maintenance records of the farm. This optimizes the spending and benefits, including owner operators, as we discussed earlier.

OEMS also have a great opportunity to audit their installation and maintenance crews with the audit. This ensures they are performing the work they want to deliver to clients and can catch quality issues before they become more expensive.

Independent third-party audits of assets can be advantageous for insurance underwriters prior to providing coverage. Such audits ensure the existence and full functionality of wind farms and their turbines, and can also verify the condition of each tower. This can lower claim costs and detect potential issues before they potentially become catastrophic later.

Moreover, Mergers and Acquisitions (M&A) activities can also gain from this approach. In recent years, we've witnessed numerous asset transactions. Conducting a comprehensive independent audit by either the buyer or seller of a wind farm can be beneficial. For sellers, presenting audit data can act as a unique selling proposition, potentially leading to a higher sale price.

From the buyer's perspective, such audits provide assurance about the farm's asset integrity and operational status. This insight into potential operational expenses offers crucial metrics for determining viability of the purchase

Garrett Calaway

PES: Is the audit protocol just for owners/operators, or do other client segments also gain advantages from it?

GC: Great question; we find that there are four key client areas with significant

PES: How has technological advancement influenced how these are carried out?

GC: Advances in technology have transformed our methods significantly. The

use of drones and artificial intelligence has made inspections quicker, more precise, and safer. Embracing this technology-driven strategy enables us to deliver data that is both more comprehensive and trustworthy to our clients.

PES: Could you share any specific case studies or examples where maintenance audits significantly impacted the performance or safety of a wind turbine?

GC: In a recent wind farm project, our comprehensive maintenance audit identified critical blade issues that were not visible externally. This early detection allowed for timely repairs, preventing potential failures and ensuring uninterrupted operation.

There was a more extensive audit of 30 turbines at another client site. We discovered there that the turbines had not been maintained according to the documentation, and Calaway recommended that 20 of the 30 stay shut down for level 4 severity issues.

In this case, this discovery of what ended up being of 50+ of millions of dollars. The good news is the customer found out and was able to negotiate with the manufacturer who was maintaining the turbines to bring this situation to a resolution.

PES: What kind of training and skills are essential for the Calaway team in this area?

GC: Our team comprises experts with extensive training in wind turbine technology, safety protocols, and the latest inspection technologies. Continuous learning and adaptation to new technologies are key to our expertise.

PES: How do you foresee future developments and trends evolving?

GC: We anticipate further integration of AI and machine learning in inspections, greater use of predictive maintenance, and continued drone and robotic technology innovation.

PES: What advice would you give to other companies in the wind energy sector regarding the implementation of maintenance audits?

GC: Look at the overall cost of ownership for wind farms. We find that owners/operators become myopic in the annual budget and, for the most part, neglect the total cost of ownership and forget to look strategically at the assets. Most operators look at the tactical quarter-to-quarter or annual budgets; however, they tend to look past the 'what could we do to lower the overall 5-year operational costs.'

The maintenance audit and the Calaway team create an opportunity to do just that; look at the bigger picture of the operation. We advise embracing technological advancements and prioritizing regular maintenance audits. This proactive approach ensures turbine longevity and efficiency and contributes to the overall sustainability of wind energy.

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