The Excel effect: building bigger, not better

The wind energy industry stands at a crossroads. On one side, there's the allure of groundbreaking innovations and ever larger turbines promising increased efficiency. On the other is a growing realization that rapid advancement might be coming at the cost of reliability and maintainability. This article explores the tension between innovation and practicality in the wind energy sector, arguing for a more measured approach to technological progress.

The promise of innovation

'Build a better mousetrap, and the world will beat a path to your door.' This adage, often misattributed to Ralph Waldo Emerson, encapsulates the American spirit of innovation. Thomas Edison, the famed inventor, expressed a similar sentiment: 'There's a better way to do it - find it.'

These ideals have driven American inventors, scientists, and engineers for nearly a century, pushing the boundaries of what's possible across various industries. However, as we apply these mottos to established industries like wind energy, we must ask: are we pushing too hard, too fast?

The reality: challenges in wind turbine maintenance

At the recent AMI Wind Turbine Blades event in Boston, Massachusetts, industry insiders painted a sobering picture of the current state of wind energy. While academic presentations showcased cutting-edge engineering concepts, conversations with operators and maintenance professionals revealed a different story.

The rate of blade composite defects and factory blade repairs has reached alarming levels, overwhelming operators. As a result, companies are scrambling to assemble teams of blade composite experts to address a mountain of structural issues. Operations and maintenance (O&M) repair budgets are skyrocketing, and there's a critical shortage of qualified blade composite technicians to complete necessary repairs. This situation raises a crucial question: how did we arrive at this point?

The Excel effect: how spreadsheet decisions impact real-world operations

Surprisingly, part of the answer lies in a ubiquitous piece of software: Microsoft Excel.

When viewing wind turbine purchases on a spreadsheet, companies often lose sight of the complex machinery behind the numbers. In creating a new wind farm project, the turbine is just one of many inputs into the financial model. However, the reliability of that turbine and the actual maintenance and operations costs are challenging to estimate accurately.

Complicating matters further, operators frequently purchase wind turbines while they're still in development. This means there's no real-world data about their reliability. Estimates are usually based on previous turbine models or simple predictions by the manufacturer. The result? Operations and maintenance teams receive wind turbines with no historical data because they looked good on a spreadsheet.

This 'Excel effect' has far-reaching consequences. Turbine development can be pushed to the production sequence when it should remain in the qualification and certification process. Due to this quick innovation process, multiple iterations of blades, drivetrain, and control systems are often needed, gradually improving with quantity. But by then, the turbines are already in the field, and any problems become the responsibility of the operations team.

The cycle of inadequate information and costly repairs

After turbine installation, the profitability of any site falls to the operations team of managers, engineers, and technicians. Their job is to control and reduce overall spending on the turbines. However, their ability to do so is severely limited, especially with newer models. Little information exists about the turbines, particularly the blades. Communication with Original Equipment Manufacturers (OEMs) is often strained.

Instead of making prescribed decisions about maintenance, operations teams must decode the OEM design, create a fix, and implement it quickly and at a low cost. This task becomes nearly impossible to do at scale. Without adequate information about their turbines, each fix takes more time, money, and effort than it should.

The job of maintaining these complex machines becomes a costly guessing game, draining resources and eroding the projected profitability that looked so promising on those initial Excel spreadsheets.

The push for bigger turbines: at what cost?

Despite the challenges faced with current turbine sizes, there's still a push for even larger offshore turbines, as the industry aims for 20+ MW. This drive for ever bigger machines raises a critical question: At what cost? The political and financial fallout from the struggles with 13 MW turbines in the US is still unknown. Yet, we seem poised to repeat the cycle, chasing after larger turbines that promise better numbers on spreadsheets but are likely to bring a host of new, unforeseen challenges in real-world operations.

Breaking the cycle: recent industry moves

Some Western OEMs are taking steps to address the situation. Both GE Vernova and Vestas leadership are halting offshore turbine growth at around 15 MW. GE Vernova is also


VICTOR
ABOUT US
We're over 125 years old & have sold over 1 billion mouse traps.
IF YOU NEED TO DO IT,
DO IT RIGHT.™
victorpest.com

reducing the variety of onshore turbine offerings, thereby reducing the variety of manufactured components.

These moves will naturally force developers and financiers to look towards OEMs that promise higher-power turbines, all to make their Excel spreadsheets show higher margins. However, this approach may be short sighted given the current struggles with 13 MW turbines in the US offshore wind industry.

This shift in strategy represents a significant departure from the industry's previous focus on continual size increases. By prioritizing optimization and reliability over sheer power output, these companies are acknowledging the real-world challenges faced by operators and maintenance teams.

The case for incremental improvement

If OEM leadership can withstand the initial onslaught of the 'Excel marauders,' then engineers, technicians, and manufacturing employees can focus their efforts on drastically improving existing products.

The difficulty and the importance of this work has largely been ignored or discounted by the non-technical community. Incremental improvement, deep in the bowels of a manufacturing facility, is what pushes an industry toward higher quality and lower costs.

This approach may not produce the flashy headlines or impressive spreadsheet projections of larger turbines, but it can lead to more reliable, efficient, and ultimately more profitable wind energy production.

Lessons from the mousetrap

Consider the humble mousetrap. Over its 100-year history, it has undergone seemingly minimal changes. Yet, these incremental improvements have resulted in a device so effective that over 1 billion have been sold. It's a profitable and stable business; notably, something that wind energy, for all its promise and growth, has not yet achieved.

The wind energy industry could learn valuable lessons from this approach. Rather than constantly chasing after the next big leap in turbine size or power output, perhaps it's time to focus on refining and perfecting the technology we already have. By prioritizing reliability, maintainability, and incremental improvements, the industry could move toward the stability and profitability it needs for long-term success. Innovation in wind energy doesn't always have to mean building bigger. Sometimes, it means building better, one small improvement at a time.

As we look to the future of wind energy, let's not forget the wisdom in Edison's words: 'There's a better way to do it - find it.' And let's also remember that finding that better way often comes through patient, methodical improvement rather than dramatic leaps.

The path forward for wind energy may not be as simple as building a better mousetrap. But by focusing on incremental innovation, improved reliability, and a more balanced approach to growth, the industry can work towards a future where the world truly does beat a path to its door; not just for the promise of green energy, but for its demonstrated reliability and efficiency.

www.weatherguardwind.com