



ARMSA  
ACADEMY

# The Great Leap Forward

Why changing the way that wind companies invest in improving managerial decision making skills will be a huge evolutionary jump towards wind farms that run optimally



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## Summary

### **The wind industry has been through a transformational decade.**

However, the focus on reducing costs and investing in digital asset management is taking attention away from how companies invest in another crucial area: how best to improve the skills of employees who plan, design, build, manage and maintain wind farms. This is an element often forgotten in the drive to run projects optimally.

This report includes insights from experts across the wind industry about how wind farm operators and original equipment manufacturers (OEMs) currently invest in the skills of their workforce. These experts told us there is strong commitment from wind companies to safety at projects, but it can be lost amid other commercial concerns.

We also discuss how wind can evolve to tackle 2 issues key to profitability:

- Investing too little in skills that help projects run optimally
- Investing too often in training methods that are inefficient

Finally, we set out an approach that we expect to change the wind industry for the better, both in terms of project safety and productivity. This is based on ARMSA's long-standing experience in wind and our partnerships with other industry experts.



# Introduction

## What got you here won't get you there.

Fans of business self-help books will recognise the sentiment that made up the title of Marshall Goldsmith's 2007 classic. In that book, he explained how executives can stall in their careers because the habits that helped them get to a particular level can be a barrier to progressing any further. Their approach needs to keep evolving.

It's a lesson that wind companies need to reflect on.

There is no denying that the global wind industry has seen remarkable growth during the last 10 years. Total installed capacity more than trebled to 651GW in the 2010s, while the global weighted average cost of onshore wind fell 35% between the start of the decade and 2018 according to the International Renewable Energy Agency.

These steep cost falls followed the introduction of competitive auctions, larger turbines, and increased corporate appetite for wind. IRENA has also forecast that costs could fall by a similar percentage between now and 2050. But in order to do so, companies need to evolve the ways they optimise wind farms.

## Embracing digitalisation

One area operators and OEMs have shown great proactivity is in digitalisation.

DNV GL carried out a survey of 2,000 industry stakeholders in 2019 and found 42% of respondents in onshore wind saw digitalisation as key to their company's strategy, with 45% in offshore wind. Companies have shown they are willing to invest in areas such as advanced analytics, automation, cloud computing and data visualisation.

The use of digital technology to optimise mechanical assets will play a huge role as wind businesses eye continued growth for their industry in the 2020s.

But companies have shown less appetite to invest in improving skills of the people who work at all stages of the project life cycle, both on- and off-site.

On the next page, we begin to explore why this is happening and what impact it has on returns from wind farms.

Yet we're also confident the industry can change. In the second half of this report, we set out a new approach that will enable operators to use technology to improve the performance of their staff. This can help improve returns from assets by using optimised human performance and decision-making as a catalyst for increased availability, less turbine downtime, safer colleagues, and fewer organisational siloes.

It's an approach to help wind get where it's going.

## Impacts of cost-cutting

*“Every project has the goal of being constructed safely, to time, budget, and quality. From my perspective, safety is number one. It absolutely has to be.”*

That is the view of Will Wason, director of project delivery at utility Vattenfall, where he has worked for 13 years. Vattenfall develops and operates onshore and offshore wind farms totalling 3.3GW, made up of 1,100 turbines, in 5 countries and aims to grow its portfolio to 7GW in operation by 2023. Wason focuses on onshore wind.

He explains that budget, quality, safety and time are the 4 main pillars that firms in the wind industry use to determine whether a project is successful. But he adds there can be a trade-off between the factors as “they all pull in slightly different directions”.

“It might be possible to make a project safer, but you may have to double the amount of time and money associated with it. It’s about getting that balance right: where safety is never compromised and you are still able to hit the other metrics,” he says.

This means operators and OEMs often find themselves squeezed by 2 competing pressures. On one hand, they need to reduce development and operational costs of their wind projects and, on the other, they also need to keep improving performance, which they tend to achieve by investing in digital asset management platforms rather than their people. This means investing in professional and craft skills can end up being ignored.

### Commercial pressures

Yet this is less about workers on-site. Yes, their own skills are crucial, but they are also on the receiving end of every decision made by asset managers, construction and operations managers, procurement managers and project managers.

It can be easily forgotten the impacts that professionals in each of these roles have on every aspect of projects, from budgets and quality to safety and timing.

Rod McLay, who was until recently HSSE (health, safety, security and environment) manager at 630MW UK offshore wind farm London Array, agrees that cost pressures in the offshore wind industry can mean commercial concerns may take priority over safety. This can be exacerbated by managers who are unable to balance these priorities.

For example, low strike prices in recent offshore wind auctions in Europe have been putting pressure on companies throughout the value chain to make savings.

McLay adds this too often causes extra risks to safety: “Just because safety is the first point on the agenda, that doesn’t make it the most important. The performance of a wind farm, the commercial side, is often the number one priority in reality. A balance needs to be found.”

There is no reason to doubt the sincerity of operators and OEMs when they say that safety is important, but there is also no denying that it can fall short when firms are under pressure to cut costs across projects.

What they overlook, however, is that when safety suffers, optimisation does too.



## Wind's digitalisation deficit

The world's 650GW wind fleet produces 400 billion data points each year, according to research from Swedish renewables asset manager Greenbyte in April 2020.

It is little surprise that wind operators and OEMs see this as vital to optimising their assets, and are investing in it. This is a veritable mountain of data. But it's one thing to collect data. It's quite another to know how to use it to make smarter decisions to optimise assets – and this is where too many wind companies are falling down.

Jimmy Hansson, managing director and co-founder of operations and maintenance specialist EcoVento, told us that many operators are being drawn in by the potential improvements they could make by embracing digitalisation. But he adds that many wind companies lack the experience or understanding to use this data properly.

He explains: "There are lots of companies collecting data, but I think there's still some lack of understanding about how to utilise the data in order to get a better performance or a safer outcome, or trying to optimise the cost associated with that activity."



### Lack of experience

Hansson identifies 2 reasons for this.

First, he says that companies in renewables have less established practices around how to optimise their assets than their counterparts in sectors such as gas, nuclear and oil. Second, it is because a failure in one turbine doesn't necessarily affect a whole project.

"If you have an oil platform and you run into a failure, that stop costs an awful lot of money... You start to think about what could go wrong next. What components or equipment do I need to check to see if there's still a condition or not? And you think about preventative activities to replace potential components that could trip or stop your plant in the future."

He expects wind to catch those sectors, and says firms could make quicker progress by looking at key performance indicators related to operations and maintenance, focusing on reliability of equipment, such as mean time between failures; loss production factors; and which improvements in a turbine would be most beneficial for that individual machine and the wind farm as a whole.

Yet despite these concerns, it is digitalisation that dominates when operators look at ways to increase profit margins at their assets. Companies are more concerned with finding ways to design humans out of their processes – via artificial intelligence and automation – than improving the skills and decision-making of the individuals at all levels in their teams.

But there are some companies bucking this trend.

## Why optimisation matters

**W**e have seen that wind companies are under pressure to cut costs. We have heard about the potential pitfalls as companies race to digitalise, which is set to take focus and investment away from improving employees' skills. But does it really matter?

Yes, missing out on a minor boost to a project's profits is annoying, but does it really have significant impacts on an operator or investor? Well yes, it does.

One managing director at a global investor, who does not want to be identified, tells us that failing to optimise a project correlates with worse investor returns. If you want to optimise returns from a wind turbine then reducing visits by workers is vital.

### Minimise visits

He sums it up with a wind industry adage.

"If you want the turbine to run, don't let anybody in. As soon as they go in, stuff starts to break because someone's been in and disrupted something. It's the people in the turbines who are driving your returns," he says. Conversely, excellent work pays off.

On sites, he says well-trained, motivated technicians carry out high-quality work that leads to fewer costly stops, and so are able to maximise electricity production.

This means there are good reasons to invest in both digitalisation technology, which helps identify potential problems early, and in improving worker skills, so problems can be fixed in as few visits as possible through properly planned projects or work activities. It all helps to improve turbines' performance.

But it also means there are good reasons to invest in improving the skills of people that spend more time in a boardroom than the blade. They take decisions that have an impact on the safety and performance of projects, which can either design risks out or ensure they can be fixed early. If they can make choices and design processes that minimise visits and operational interventions from technicians, then the result is less project disruption and higher project returns.

"There are inherent reliability issues with certain technology, but you can improve on current performance by having quality work done. And you'll see it. You'll see fewer stops of the machine, and the mean time between stops should be longer because you fixed it properly the first time, not go back in 2 or 3 times," he says.

They are the metrics where companies can see the value of investing in competency of their employees wherever they are in the project life cycle.



## Fast-moving market

All these skills will be vital given the changing nature of the wind sector. The growth of wind will mean a wider range of machines is being installed globally in the 2020s .

In Asia and North America, we expect to see new problems at offshore turbines as a result of harsh typhoon and hurricane conditions. In addition, we expect to see new players entering the market who lack experience in onshore and offshore wind, such as oil and gas giants. These are just 2 trends that will challenge wind operators.

Thankfully, there are ways to help people at all levels to better manage these risks.



## How training is changing

*"The Covid-19 pandemic has definitely shifted things, and accelerated the growth of self-directed learning types. It has accelerated and it probably will more next year."*

Ross McNally became programme manager for the Irish Wind Energy Association in July 2019, and previously spent 3 years at the Irish trade body in roles including training and research manager, network manager, and health and safety coordinator. He says Covid-19 is taking training out of classrooms and into more flexible systems.

"I think we've been getting up to speed for this last 6 months with different training providers, and pivoting away from a model that has been mainly in the classroom to this virtual space," he says.

### The current approach

The experts we spoke to for this report confirmed that companies have traditionally sought to improve skills in a classroom setting.

While there, teaching has focused largely on basic safety that makes an important contribution to the smooth running of a wind farm, but focuses mainly on mitigating losses rather than ensuring that turbines perform optimally.

McNally adds that high-quality training has a clear impact on financial performance.

"If people are well trained then it leads to less downtime on assets and potentially less incidents as well. It all adds to the bottom line," he says. But he agrees that it can be tough for employees to use their 'book knowledge' weeks, months or even years after they'd learn it in a classroom.

Whilst there are also pockets of innovation in technician skills training, none focus on management decision making.

Stephen Booth, director of special projects at offshore turbine maker MHI Vestas, says the company is augmenting technical training courses with digital technology, such as a smartphone app and virtual reality simulator software for technicians.

This can be used in the classroom: "We have a specially configured large screen in front of us, and we can simulate that we're in the nacelle, the power conversion module, or wherever. Then we give them a fault code and they have to figure out where to go and what to look up. They can then fix it with interactive tools, so they can simulate troubleshooting with the tools they will have access to when on the turbines."

Booth says troubleshooting an interactive turbine can help workers to logically solve problems without going into a turbine. These systems offer flexibility for workers to learn or refresh their skills when the weather is too bad for them to work offshore.

Wind is starting to move beyond a narrow focus on classrooms and compliance.



## What happens next?

**D**igital technology can help employees build skills that lead them to optimise projects they work on, and the experts we spoke to agreed that managing safety well is a key indicator of the good financial health of a project. People are key to optimisation.

In order to achieve this, safety cannot just be on a conventional daily check list or a set of rules learnt parrot fashion. Operators and OEMs also need to instil a mindset of individual accountability and problem-solving, which is backed by communication between the different departments and organisations that might work on a project.

In short, companies need to unlock this human intelligence in order to make informed decisions as early in the asset lifecycle as possible.

### Training versus coaching

We also see a distinction between training and coaching.

Training tends to focus on how staff learn the essential skills and standards they need to just start working. Coaching goes deeper, as it provides long-term support and advice to employees about how to solve problems in practice. For technicians, this is in the turbines, but it is applicable for everyone involved in project delivery.

Booth from MHI Vestas says focusing on coaching as well as training helps mitigate risks while ensuring that work is “done in the most effective and optimised way, and leaves turbines in the best state”. We see other OEMs doing similar.

Ann Meyer Duedahl, head of training excellence at Siemens Gamesa, has been with the firm for 14 years and has focused on training since 2011. The company has eight training facilities globally where it helps its estimated 10,000 technicians to master its turbines, as well as providing training on softer business skills to its other staff.

She says there has been strong progress in the last decade in how firms standardise safety training and work together: “Coming together in a standardised way saves a lot of money overall as you’re not having to spend time and money retraining people on the basic stuff,” she says, adding this does not compromise safety or quality.

Duedahl says Siemens Gamesa is looking to use digital systems, such as e-learning and virtual platforms, to make further progress: “Due to Covid-19, we have extreme challenges in getting our technicians to training facilities and so forth,” she explains.

This applies to workers at other levels too as everybody has been impacted on some level by Covid-19 restrictions.

For technicians, Siemens Gamesa’s approach is to train for basic skills they need to get on-site. These new technicians are then supported on-site by more experienced colleagues, until they reach a higher level of competence. By that point they have to work more under their own initiative and solve problems more independently.

This coaching culture is an important aspect of teaching skills to people at all levels of a company – but can leave them floundering when that mentor approach ends.



## Learning in the flow of work

This type of mentoring is a practical example of how the wind sector is embracing one of the most exciting theories in skills development: workflow learning.

If you read Harvard Business Review, it won't be new to you. In February 2019, the publication released an article called 'Making Learning a Part of Everyday Work' that said the best way to help workers learn the skills they need for their day-to-day work is to ensure that learning fits around their working days.

The focus of the article was knowledge workers, who the report said only carved out 5 minutes for formal learning on average each day. It also explained that learning happens better while you're going about your daily job.

This bears out the view of many of the experts interviewed for this report, who argue that the lessons learnt in the classroom can be forgotten when most needed.

### Knowledge flow

The health and safety director at one utility told us that it's all very well for employees to get their basic training, but they still need to be able to fresh their memories later.

He argues that all employees could better optimise their skills if they could access a virtual platform when facing an uncommon problem, and would optimise projects. He gave a practical example of the wasted time and effort that this could save. This may be focused on a technician, but the simile applies for decision-making at all levels of a project life cycle.

"They might rock up in a van on a remote hillside somewhere and have to change a particular widget that they've never changed before, or something they haven't done for a number of years. Rather than travel hundreds of miles back to base to get the manual out, they could go and look at the laptop in the back of the van in real time. That's the sort of resource they need and that's the way we're going," he says.

The digital approach would help that worker, and it would help everyone tasked with improving safety and performance of a project. This would enable the wind industry to bring the best of established 'workflow learning' practices into the 2020s.

That's where we have a potential solution.

On the next page, we explain how our ARMSA Academy platform does just that, and can help to optimise the financial performance of wind farms in the decade ahead.



# Introducing ARMSA Academy

Operators and OEMs should look at investing in 'workflow learning' platforms to help address the pressures raised in this report. This will also help them to respond to the changing trends in e-learning that are speeding up due the Covid-19 pandemic.

All employees must be able to access information vital to their jobs where and when they need. This is key to increased safety and productivity at wind farms.

It's why we are launching our ARMSA Academy platform.

This digital performance support platform will help employees learn vital skills during the daily flow of their work, and make the decisions that they need to optimise their professional performance – and, ultimately, the financial returns of the projects they work on. Improved safety is an inevitable consequence of this approach.

We have developed this platform with support from players across the wind industry.

It gives workers in 5 pivotal roles, from project manager to lead technician, touch-of-a-button access to insight, learning and good practice of direct relevance to any one of 40+ challenges they may encounter on a project. In addition, it enables social learning among wind industry professionals worldwide.

Digital performance support like this helps employees to learn through active problem solving, via bite-sized content delivered on site against CPD-accredited decision-orientated roadmaps.

Our plan is based on extensive research in the sector, as well as over a decade of direct experience of seeding in the global wind industry a philosophy of informed decision-making.

## Making the case

During August and September 2020, ARMSA carried out research with wind power professionals about the knowledge they needed to acquire on how best to integrate safety into their business decisions to optimise the financial performance of projects. We also looked at how to streamline operational decision-making in wind projects.

Our research showed there were 3 main priorities for companies that are working out how to invest most smartly in improving skills. They mainly want programmes to:

- Encourage cross-departmental working
- Increase the predictability of their teams
- Show safety is a result of informed decision making

All trialists to have used the platform so far agreed that digital performance support can help the wind industry to further reduce levelised costs in both construction and operation.

We believe this is a disruptive system that represents a huge evolutionary leap in how companies in the industry optimise the performance of both wind farms and staff, while drawing on the best aspects of firms' mentoring cultures.

By doing this we can embed a culture of informed decision-making in the wind sector that delivers safer and more productive projects. The working practices that have got us where we are must change if wind is to continue to thrive in the 2020s.

# Conclusion

## Wind farm operators are leaving money on the table.

While companies continue to invest in the digitalisation of wind assets, we heard in this report that approaches such as artificial intelligence and automation cannot drive optimisation on their own. Companies often miss out on opportunities to improve due to a lack of data expertise, and still need people to go in to fix troublesome turbines.

In addition, the commercial drive to cut costs will sometimes come at the expense of investing in the skills of workers in all stages of the project delivery process.

The experts in this report are among the top names in wind industry health and safety, and yet many have told us of the pressure to prioritise the commercial performance. Inevitably, this sometimes comes at the cost of safety. Unless, that is, the financial value of optimised human performance in wind is brought to the fore.

So let's get one thing straight. In an industry obsessed with optimal performance and marginal gains, companies cannot overlook their most important assets: their people.

## Being their best

It is natural for occupational health and safety programmes to focus on ensuring that employees tick the right boxes, to meet basic standards and comply with rules. But it is an approach that does not empower individuals to solve problems for themselves. It doesn't give them support, guidance or opportunity to learn from their peers

There is another way.

In this report, we put forward a philosophy that represents a huge evolutionary leap for performance optimisation in wind. The Covid-19 pandemic has driven once-in-a-generation changes in learning – more than we ever thought possible at the start of 2020 – and the wind industry has a duty to respond to this changing demand.

This is an approach that values human ingenuity as much as artificial intelligence. It is an approach that understands how the decisions people make every day on wind farms drive the long-term financial successes and failures of those assets.

What's more, we have seen that the industry is attracted by the benefits on offer. Our platform testing and in-depth interviews show that our approach resonates with skills specialists, and can help companies in the wind industry to cope with key challenges they face now and in future. This is an industry that has cut costs fast – but needs to realise the huge value of training and retaining skilled and motivated staff.

Wind is entering another transformational decade. But the approach to learning that got us here won't get us where we need to be by 2030.

It's time to make an evolutionary jump.

If this resonated with you,  
contact us at [info@armsa.co.uk](mailto:info@armsa.co.uk)





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Research conducted independently by

