SHORELINE

WHITE PAPER

How Developers Can Reduce Construction Delays at Offshore Wind Farms

SHORELINE.NO | INFO@SHORELINE.NO

Offshore wind developers, OEMs and contractors face many risks in the construction phase of projects that can cause costly delays when not properly addressed through the project life cycle. These issues are worsened when companies rely on outdated construction management systems, but new digital tools are giving the sector hope.

On time and on budget. These are the most beautiful words in the vocabulary of any company developing or building a major infrastructure project. Any delay can have huge financial impacts, and easily avoidable delays do reputational damage too.

But construction delays are an ever-present risk at offshore wind farms.

For example, British utility SSE Renewables announced in its third-quarter results in February 2024 that commissioning of its 1.2GW Dogger Bank A wind farm was being delayed by one year, until 2025, due to issues including poor weather. Dogger Bank A is set to be part of the huge 3.6GW Dogger Bank complex off the UK's east coast.

This project is not alone.

The Global Wind Energy Council, in its 'Global Offshore Wind Report' in August 2023, said supply chain bottlenecks would delay work on offshore wind farms "in every region of the world except China" from the mid-2020s.

Companies work hard to mitigate supply chain issues in the design and development stages of projects, but they cannot predict every construction challenge.

In this white paper, we discuss the main reasons that projects are delayed in their construction phase; explore why current digital construction management tools are often outdated and can exacerbate delays; and look at how companies can get their projects back on track with tools that improve project planning through their life cycle.

This is why discussion about the maturity of the supply chain at the Global Offshore Wind conference in the UK on 18th and 19th June is vital. The process of building an offshore wind farm has come so far in the last decade, but there is much more to be done to ensure that advanced wind turbines are matched by smart construction tools.

Common construction delays at offshore wind farms

No two projects are exactly the same, but the issues that can delay them during their construction are similar. The increased headline capacities of offshore wind projects also means that the costs of those delays can be far greater now than ten years ago.

In early offshore wind projects, developers secured feed-in tariffs from governments. These subsidies were priced at levels that accounted for the fact that projects would be hit by unexpected delays, but were intended to help establish the industry.

Nowadays, the picture is different. Rather than pure subsidies, developers will often gain financial support for projects through revenue stabilisation mechanisms such as Contracts for Difference, or by signing power purchase agreements with private off-takers. This means developers tend to be working with slimmer profit margins than they were in the past, which are passed through the supply chain, while also working on more complex sites. Delays can be the difference between profit and loss.

One major cause of delays is bad weather and the impact this has on construction schedules, which are often under pressure due to shortages of vessels and workers.

The rapid expansion of offshore wind means that there is often little margin for error with supplies of turbines, vessels, raw materials, and other supporting infrastructure. As well as weather, construction schedules can also be delayed by accidents that do damage to turbines, foundations and cables -- and can cause worker fatalities too.

We have seen that even high-profile projects in the most developed offshore wind markets can be affected, and the risks are multiplied as developers and contractors start building offshore wind farms in new parts of the world.

For example, seabed conditions off the coast of Taiwan have slowed the growth of offshore wind in that market, while the presence of intense typhoons also causes major issues with weather windows.

Such difficulties can be exacerbated when developers and contractors are working with new technologies, such as floating foundations, or trying to take into account changes such as the need for port space to build foundations or fix faulty turbines.

In short, there are so many variables that affect the process of smoothly building an offshore wind farm that developers and contractors are wise to plan as far ahead, and in as much depth, as possible. This helps companies to build projects smoothly and foster collaboration between the many players building an offshore wind farm.

But businesses too often lack the construction management tools to make those ambitions a reality.

> One major cause of delays is bad weather and the impact this has on construction schedules, which are often under pressure due to shortages of vessels and workers.

Outdated approaches to construction management hinder developers

When a delay happens during construction of an offshore wind farm, there are two priorities for the developers, contractors and OEMs.

First, they want to quickly understand the reason for a delay and remove the issue as quickly as possible; and second, they want to get projects back on track so that they can mitigate knock-on effects of those delays and the financial consequences that they can bring. This usually involves working closely with multiple parties.

One major challenge for the developers and contractors dealing with these delays is that they are using digital tools ill-suited to effective construction management.

Simon Rasmus Jacobsen, senior consultant and partner at Heron Energy specialising in delivery of offshore wind construction projects, said many companies still rely on simple word processing documents or spreadsheets to plan and communicate about projects. He said this includes handling work orders and daily progress reports.

Jacobsen said this approach is usually inefficient: "I have been working for large developers on various construction project, and most of the reporting has been done using Word and Excel files. That is for reporting back to the organisation, but it's also for snagging, tracking and related to work orders," he said. This can mean a lot of manual work for companies to move data between documents and makes it difficult to visualize the impacts of changes.

He said some developers try to avoid these problems by building their own in-house construction management software, but these can make it hard to respond to delays as they focus on reporting on progress rather than planning for changes. Most of these systems would not include information about historic weather patterns, for example, that help give developers the cost certainty they need to take smart decisions.

"It definitely makes it more difficult when it is handled with Excel sheets or smaller systems. You want to see knock-on effects of making changes in the construction phase, and then go back and make a new construction plan," he said.

This highlights the need for a new mentality to how projects are managed during the construction phase, as well as the digital tools to make it happen. The focus cannot simply be on tracking progress and ticking off the milestones met.

Rather, developers and contractors must recognize that offshore wind construction projects are highly dynamic and, in an era of slim profit margins, it makes sense to keep projects under close review throughout construction. Companies often need to refine the design of projects throughout construction, drawing on information from a range of partners. Smart digital systems can provide that control and transparency.

Jacobsen said construction of offshore wind projects definitely goes smoother when companies can all use the same system as this supports closer working: "It definitely creates the most value if most of the parties involved in a project use the same tool, because they can share as much information as they want both between themselves and in the wider project team," he said.

Developers and contractors need tools that treat construction management as more than a tick-box exercise, and empower them to keep refining project designs through the construction phase. Design doesn't stop when the developer takes a decision to build a project -- and advances in digital systems can give the support they need.

"It definitely makes it more difficult when it is handled with Excel sheets or smaller systems. You want to see knock-on effects of making changes in the construction phase, and then go back and make a new construction plan"

Simon Rasmus Jacobsen,
senior consultant
at Heron Energy

Using A.I. and the cloud to support ongoing project simulations

Companies working on offshore wind construction projects need to embrace digital innovation if they are to deliver their projects efficiently and profitably. The growth of artificial intelligence, cloud computing and machine learning are helping them do so.

In GWEC's 'Global Offshore Wind Report', it highlighted how rapid digital innovation could improve the process of designing and building offshore wind farms. It said it saw potential to improve efficiency with advances in artificial intelligence, automation and robotics, but also warned that these changes could mean disruptions to the way that projects and their workforces are planned.

For example, the organization argued that using 'digital twins' to predict maintenance needs at operational offshore wind farms could boost profitability, and this would be further enhanced by generative artificial intelligence and machine learning.

Such 'digital twins' can also be helpful during construction too. Some developers are using cloud-based platforms to create digital simulations of their projects using new parameters within minutes, whereas this could previously have taken days or weeks. This reduces risks, enables smooth project delivery, and keeps projects on track by empowering developers, OEMs and contractors to react fast to construction delays.

Michael Bjerrum, Chief Commercial Officer at Shoreline Wind, said such simulations were initially used in early design and tendering, where companies are focusing on building strong business cases and submitting competitive tender bids. But he added that they are proving to be highly valuable throughout the construction phase as well.

"Developers constantly see different potential delays during construction," he said.

"They see changing weather conditions, potential delay in component deliveries, and then perhaps a key installation vessel arrives later than planned too."

He said using a simulation and modelling tool through construction could empower companies to constantly update schedules of projects taking into consideration all of these factors: "These are complex projects with so many moving parts, so it's really helpful to be able to continuously simulate project progress and expected completion of the various phases," he said.

As well as keeping project teams informed, such simulations can also support project managers to report their decisions to their senior managers.

Heron's Jacobsen said that platforms that shared these simulations with the different companies in the offshore wind construction process could aid collaboration.

Such platforms can enable different companies to input data about their own parts of a project in a secure way that protects their sensitive commercial data.

He said: "Some of the issues we have seen in the construction phase relate to resources, planning, training, certificates, and so on. It helps to have a platform where you have all that knowledge and can share it with other shareholders, as that has been an issue when data is captured in old Excel files and you can't say with confidence that it's all up to date."

Developers, OEMs and contractors know the importance of collaboration as they all seek to deliver projects on time and on budget with slim profit margins, but this must also prompt deep thinking about how they invest in construction management tools. New approaches can help companies to foresee delays and predict their financial impacts, while also taking steps to mitigate those delays or avoid them all together.

"These are complex projects with so many moving parts, so it's really helpful to be able to continuously simulate project progress and expected completion of the various phases"

Michael Bjerrum,
Chief Commercial Officer at Shoreline Wind

Conclusion

Delays are an occupational hazard for the companies that deliver large infrastructure projects, and offshore wind is no exception.

Some of these delays – whether caused by weather, accidents or vessel problems – are unavoidable, and there will never be a digital system that keeps every offshore project perfectly on track. However, there are tools that developers can use to react fast and reduce the knock-on effects, and financial impacts, of these delays.

There are three points to take from this white paper:

1. **The risks posed by delays are getting bigger.**

   GWEC has forecast that 380GW of offshore wind farms will be built globally between 2023 and 2032. That is going to exacerbate supply chain bottlenecks and lead to project delays in most countries.

2. **Too many developers try to tackle construction delays by relying on outdated digital approaches.**

   These systems often don't give developers the abilities they need to track changing variables; to foster collaboration with partners; and quickly produce simulations to make smart decisions during construction.

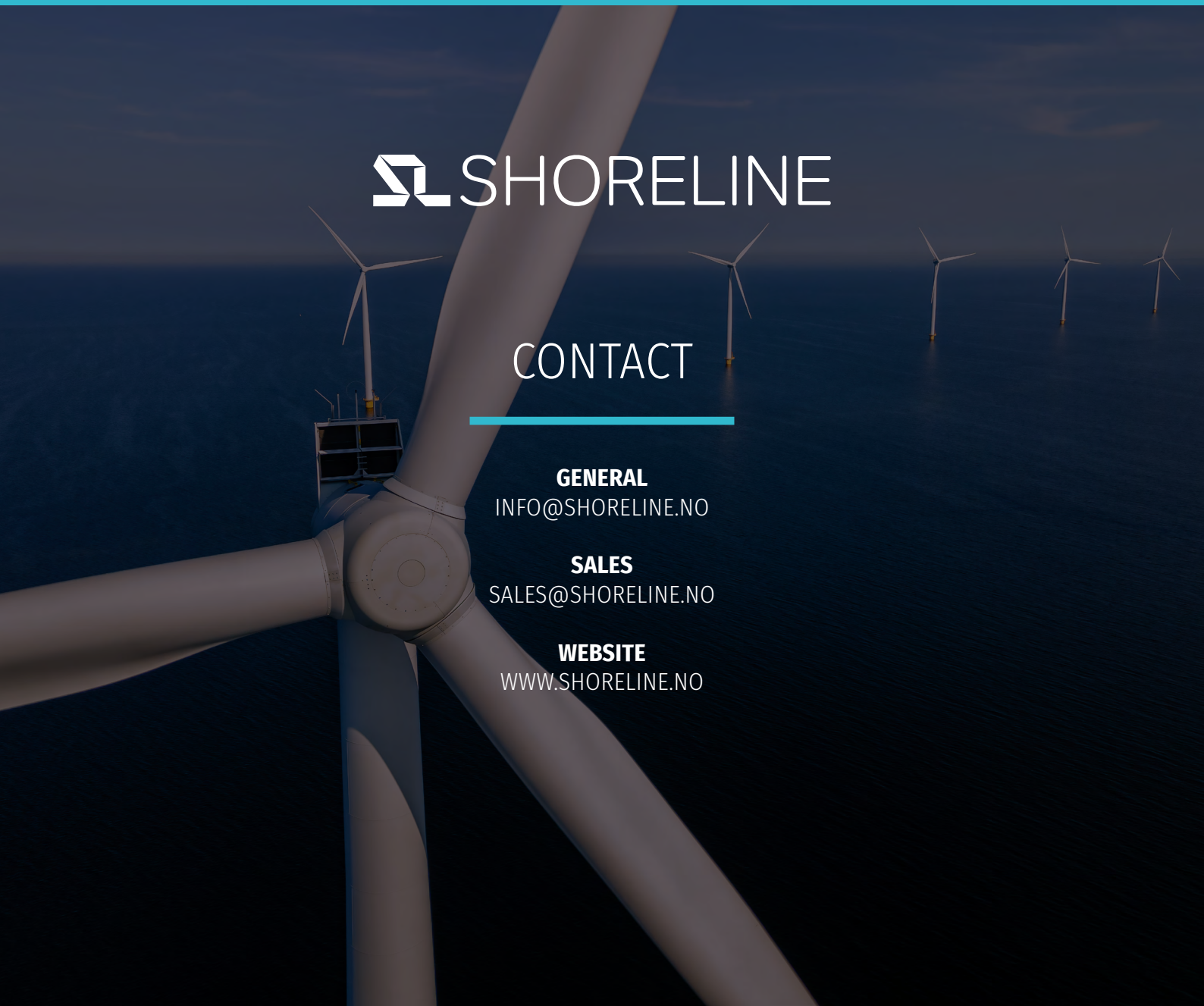
3. **New digital tools are available.**

   Artificial intelligence and machine learning can transform this sector, by providing developers the control and transparency they need at offshore wind construction projects. But few developers are currently taking advantage. This will undermine efforts to boost the maturity of the whole industry.

   Digital solutions already exist that can help developers to reduce delays and keep projects on track. In a competitive market, this is wisdom few can afford to ignore.

Would you like to talk about the risks explored in this report? Or find out more about how our industry standard digital optimisation tools for wind farm planning, CMMS and resource management can help with your projects?

If so, please contact the team
www.shoreline.no/contact-us



SHORELINE

CONTACT

GENERAL
INFO@SHORELINE.NO

SALES
SALES@SHORELINE.NO

WEBSITE
WWW.SHORELINE.NO