



Making Marginal Gains in Offshore Projects:

How Weather Data Helps You Improve Performance

What are marginal gains?

Marginal gains are the philosophy of looking for many small, incremental improvements to create a significant improvement when they all come together. It first found traction in Olympic cycling, when Sir Dave Brailsford took over the British cycling team in 2002. At the time, the team had only won a single gold medal in 76 years. Fast forward to the present and the team has an excellent record of success, which has been attributed to the marginal gains approach. Everything from training schedules, bike setups, and sleep routines were optimized, with the combined impact allowing the British cycling team to dominate track events at the last three Olympic games.

But the approach isn't limited to sport. In an interview with Harvard Business Review, Sir Dave Brailsford said: "there are ample opportunities in the corporate realm to apply the marginal gains approach."



Why The Margins Matter In Offshore

When a cable laying company saw one of their weather forecasts showed that a southerly wind, traveling at five knots, was due to shift to a strong northerly wind, they had a tough decision to make: trust the forecast and cut the cable that was already in the water or take the risk and continue work.

The stakes were high. None of their other weather forecasts showed the wind shift. But if unfavorable weather conditions hit and the cable is in the water, it can snap. This scenario can add up to 15 days to a project, as the crew would have to find the cable and re-do the survey before continuing work - not ideal when timings on projects are already tight! Plus if the one forecast was right, it also meant conditions would be unsafe to continue work.

However, if the forecast was wrong and they cut the cable, they would have to spend in the region of €4million to connect the cable again - all for nothing.

The decision was made. The cable was cut. Fortunately, the forecast was right. So why did the company trust this one forecast over their other weather sources? It all comes down to confidence that the one forecast is accurate and reliable in the margins.

Marginal gains rely on accurate weather forecasts

The weather is an unpredictable factor. It means that if you can forecast it successfully, you have yourself a competitive advantage - especially in the margins.

Extreme weather is extreme. If there's a hurricane, it's evident that you can't work. Likewise, when conditions are flat and calm, you probably don't even need to look at the forecast to know you can work. But when it's borderline, and it's a tough go/no-go call, accurate forecasts are the difference between making the right decision or getting it wrong.

If you take any offshore project, anywhere in the world, you will have to go through more or less the same steps: tender, planning, start-up, execution, and review. We're going to take you through how the weather impacts on each stage, showing how the gains add up across the whole project. Then we'll take you through why the time for action is now and back this up with the four business benefits accurate weather forecasts bring. In short, marginal gains help to improve the profitability of a project, to ensure the safety of the crew, and to protect assets from damage. Let's show you how.



Weather At Each Phase - Applying Marginal Weather Throughout An Offshore Project

It's perhaps obvious that the offshore companies require some form of weather data during project execution. But using it just at this stage misses the real value that can be unlocked when it is used at every step. In this chapter, we're going to walk you through how you can use weather data throughout an offshore project.

Tendering

Use weather data to establish when projects can take place

Regardless of the location, there are certain weather conditions where vessels cannot operate. Bidding companies will analyze their requirements based on Alpha Factors, such a maximum wave height, wind speed, and wind direction and put all of this information in the MetOcean database. Based on the outputs, they'll establish when in the year they can do the work. This information determines the limitation of the job. They'll submit their tender with this information included.

Where companies choose not to use a professional weather service and rely on free online weather data, previous experience or anecdotal data, it can lead them to miscalculate the weather risk: a potentially expensive mistake.

For example, say the bidding company assumes, based on their data, that during a 50-day project they won't be able to work for 30% of the time. This assumption is all well and good; it allows for 15 days downtime.

However, if they miscalculate the weather risk and downtime is more than 15 days, they still have to pay for the vessel, the crew, the materials and fuel on the days they cannot work. Almost immediately, the profit on that project is wiped out. This situation can be linked back to the fact they decided not to spend a little bit of extra money getting that accurate weather data.

Investing in weather data while tendering will help you price competitively, by giving you confidence in the downtime that you can reasonably expect during a project. It reduces the risk of unplanned downtime and helps to maximize efficiency and profitability. If they then win the tender, then the whole process of preparing for the job begins in earnest.

Planning

Analyze the design, location, and structure of your offshore operations, and above all minimize the associated risks

Planning is all about ensuring the right vessels, equipment, and crew are lined up for the project. Every consideration, from establishing how to get people back and forth during the project, down to which vessel to use, needs scoping out.

A crucial part of this is recognizing the restrictions of the job and finding answers to the following questions:

- What are our limitations?
- What are the safety thresholds for all the vessels?
- What are the conditions where we have to stop work?
- What contingencies do we need to have in place?

Understanding the likely weather conditions will impact on the answer to all these questions. During the planning stage, weather experts help offshore companies to analyze the expected conditions, so that they can make the most efficient use of crew and other assets during the project.

Start-up

Plan safe and reliable offshore operations, with accurate weather data.

The planning has been done; we're into the operational stages of the project. For the offshore company, this means mobilizing teams and starting work. For the weather company, it is a shift from providing data for analysis and planning and moving to active forecasting.

It's a two-way communication. The offshore company briefs what they're trying to achieve; for example, they need a 72-hour weather window to complete a job from start to finish.

The weather company can then make a recommendation based on the weather data. Often this is an active role, joining daily briefing calls with the logistics, operations, and project teams. It ensures that, after issuing the forecast, the weather experts can explain it in more detail and share their confidence in the forecast. The decision of whether to work or not will still lie with the offshore company, but the weather company will help them identify when to work and when to stop based on conditions.

Execution

Access to the most reliable weather data to ensure optimized processes at every stage of your operations

After identifying the weather window, they're mobilized, now they're actually doing the work. That 72-hour clock has started ticking. Now it's about continuous monitoring of the weather, querying any discrepancies, monitoring confidence in the forecast, and establishing if it's marginal or continuous. Accurate weather data, which enables operations in the margins, can help uncover weather windows.

It's at this stage that companies need confidence in the weather data. If one forecast shows that they have a 72-hour weather window, but other data sources show it will only be 60 hours, you need to know who to trust.

If you decide you're not confident that you have 72 hours, you believe it will only be 60 hours; then you lose that three-day window. You now have to wait for the next weather window, which could end up being weeks away.

These are tough decisions to make. Sometimes the weather window isn't there; but something it is, you need to have trust in the data to keep projects on track. A lot of it is marginal, but it's also where you can make real gains during your project. The execution phase can run concurrently with a start-up phase for the next part of the overall project.

Review

Evaluating performance and lessons to be learned in Execution

At the end of every offshore project, there is a review stage to evaluate the weather forecasting accuracy. It's about establishing and analyzing the performance of the forecasted weather compared to the actual weather. Key questions to answer at this stage include:

- What impact did the weather forecast have on the project?
- Could the company make more go decisions, rather than no go decision based on the forecast?
- What lessons can be learned?

Not every weather company offers a post-project analysis service, but it is an essential bridge to closing the loop and maintaining trust. Planning and executing projects is complex. Knowing the likely conditions at each project phase puts you in the best position to ensure projects run on time and budget.



Why the Time is Now

Whether you're working on a wind farm construction, an oil rig, or dredging navigation channels, it's no surprise that the weather impacts your work. This has always been the case for offshore companies. As we explored in the previous chapter, it not just about execution, weather impacts on every phase of a project.

So the question is, why now? What changes are happening that mean weather data, especially in the margins, is important. We've identified four trends that answer this question.

Oceans are becoming more stormy

Recent research published in Science has revealed that the world's oceans are becoming more stormy. Over the last 30 years, increases in average wave height and wind speeds have been observed.

In the Southern Ocean, for example, average wind speeds have increased by 8% or 1.5 meters per second, and average wave heights have increased by 5% or 30cm. While these increases might not sound massive, if the trend is sustained over time, it means that the weather would become more extreme and put offshore structures at risk in the future.

Take away: Weather is becoming more, not less likely to impact on Offshore operations.

Efficiency and cost savings remain on the agenda

Since the oil and gas downturn in 2014, efficiency has been a top priority. Pressures from the subsequent fall in oil prices have driven cost savings through the industry. Procurement teams have been charged with making everything as cost-effective as possible. It means that often the cheapest suppliers win. In the context of weather data, this can mean that accuracy and reliability are sacrificed.

In the last few years, there has been a move towards building alliances and collaboration between companies. Projects are initiated with a set pot on money for all the work. If the project finishes early, the companies still get all the money. If they finish late, the pot is still the same size, and they effectively lose money by having to self-fund overrunning work. This approach has encouraged better collaboration and reliance on data to ensure projects don't overrun.

Take away: Cutting on weather data means you don't have all the information to make the close calls. It's penny-wise and pound-poor.



Digitization and technology advances

There has been a growing focus on digitization in offshore, with a World Economic Forum report estimates that digitization could create \$1.6 trillion worth of value for the oil and gas industry. As well, it is the top priority for R&D investment in 2019 for offshore companies. Digitization will also help support collaboration between companies, by streamlining information sharing.

Specifically, with regards to weather data, digitization will mean APIs can be used to enable access to forecasts using in house technology and systems. This will help create a complete view and will help to integrate forecasts into the decision-making process.

Take away: Weather data helps communication and decision-making, as part of any drive towards digitization.

Managing personal reputation

When you have to make a million dollar decision to work or not work, based on the weather, you need confidence that the data you're using is accurate. When conditions are marginal, people want to utilize as many sources of information as possible because, if they make the wrong call, it reflects poorly on them.

The false alarm means they increased the cost of the project because they don't work when they actually could have worked; it also impacts on their reputation.

Take away: Accurate weather forecasts give you more confidence in your decisions. What do these trends really mean? The offshore industry is trying to balance changing weather conditions, cost-savings, and efficiency - all while maintaining their reputation and embracing digitization. Accurate weather forecasts can help and, in the next chapter, we'll show you the benefits!



The Four Benefits of Accurate Weather Data

Smart companies are utilizing weather data to inform decisions at the margins. They're doing this because they understand the impact weather has throughout every phase of a project, and also because they recognize the four business benefits that embedding accurate weather data can have for them.

1. Avoid unnecessary weather-related downtime

What's the risk: In all aspects of offshore, there are specific safety thresholds. For all the different tasks, with different vessels, there are different thresholds. For example, if you're laying a cable from the northern Netherlands towards Denmark, your vessel has a wave limit of one meter. Above this threshold, you cannot work, so you would have to stop operations, and return to shore.

How weather can help: The thresholds are precise, with clear cutoffs. If you're using a basic weather product, then deciding whether to stop or to continue to work is harder because you can't be confident in the accuracy of the forecast. As a result, you have to allow for a higher tolerance in the margins, leading to more days where you cannot work. Professional weather services go through a complex modeling exercise, with different sources of data aggregated and then verified by experts. It creates one source of truth for the clients that can then be used to assess the conditions with more confidence.

2. Avoid scheduling changes due to weather

What's the risk: Projects are broken down into chunks of work, typically based around the time needed to complete a section of work. If they need 72-hours to get the job done, from start to finish, you need to know that you have a 72-hour weather window to complete everything. After mobilization, if the weather data is telling the team that the weather window is now actually only 60 hours, then you lose that window and have to reschedule the work.

How weather can help: Accurate weather data, which enables operations in the margins, can help uncover weather windows. In situations where the weather window is tight, the accurate data can reveal that weather close to the threshold is the right side of the margin. This allows the work to continue while maintaining safety throughout. The impact here is potentially huge. Not only can scheduling changes mean you lose the initial 3-day weather window, but it can also be weeks before conditions allow for the next suitable weather window.

3. Prevent damage to equipment and environment

What's the risk: It's no surprise that in bad weather, assets can get severely damaged, which has an impact on long term profitability. As well, accidents risk causing environmental damage.

How weather can help: The offshore industry is acutely aware of the dangers relating to offshore operations. Complete weather data enables you to avoid mistakes. It provides visibility on changing conditions, typically with an inbuilt threshold alarm, leading to improved safety at sea and reduced risk of damage to equipment.

4. Prevent accidents and ensure safety

What's the risk: Across all phases, safety in offshore is paramount, and all work adheres to the highest safety standards. Adverse weather is a risk and, more importantly, the crew can get injured or even killed. But get the calls to stop work wrong, and one of two things will happen. Either, crews stay on site, see that conditions don't break the safety thresholds and subsequently lose confidence

in the forecast. Or, they take action, move away from the site and discover the forecast is wrong, so they've increased the cost of the project by stopping work when they could have continued.

How weather can help: In extreme weather, it's obvious you cannot work. The conditions are too dangerous. But when conditions are deteriorating, at what point do you evacuate a rig when say a hurricane is approaching? It's a difficult decision because stopping too early adds cost to the project and finishing too late is a safety risk. Confidence in your weather forecast helps you make the right call at the right time.

Forecast accuracy, and trust in this accuracy are vital for decision makers on offshore projects. The more accurate the weather forecast is, the more confident people feel at making the tough calls, such as moving away from the site and stopping work when needed. It's only with accuracy that companies can realize the four benefits.



Localizing Forecasts - One Size Doesn't Fit All

The type of service a weather expert can provide is equal wherever you are in the world. It doesn't matter whether it is in the Gulf of Mexico, the North Sea or near Australia. But, as you can imagine, the types of weather around the world is different. This means that similar projects have different requirements depending on location.

For an operation to install an oil rig in the North Sea, we would advise them to use twice daily weather forecast during the start-up stage. When you move to project execution, we increase to four times a day. We'd also advise them to use current data for the sea surface current, spectral data for the vessel motion and use our ability to warn them in cases of extreme weather.

If this same operation were in West Africa, the daily forecast would stay the same. But, we'd also advise them to use the current data for below the sea level because the output of big rivers can have a significant impact on the current flow below the surface in this area. We'd also advise them to use squall forecasting, as you can have an almost clear sky and calm seas and two hours later it's completely dark, and the winds will pick up to 45 knots plus in this part of the world.

Bring the same installation to the Gulf of Mexico, all of a sudden there is a loop current on the sea level, which has an impact on boats. It changes direction within 5-6 hours, and the stream flow is very fast,

which can make the vessel bounce against the installation, which you want to avoid. Same fixed location forecast, twice a day then increasing to four times a day. Then, in the season, there is also the hurricane risk in GoM, which needs monitoring.

Conclusion

We've shown the importance of forecasting at every stage of an offshore project and explored the advantages that you can gain by using an accurate forecast in the margins. It helps you address the main concerns and pressures that come with working offshore: managing costs, keeping projects on track, and ensuring the crew and assets are safe. It may sometimes seem like it's only a few hours gained here and there, but over the whole project these add up to real savings.

These marginal gains come from the interaction with the weather forecast and the weather experts. Working collaboratively and leaning on meteorological expertise can unlock insight that isn't apparent from basic weather services. And that's what it's really about; seeking out those extra nuggets of savings to ensure profitability. We've come to learn, through our offshore clients, that weather data can be an effective driver for cost-savings. To support your projects and ensure they're successful, it's critical that your team understands how accurate weather data can help you to optimize operations, by increasing the days you work on a project and decreasing project costs.