BEST PRACTICE GUIDE

# HOW TO CHOOSE AN OFFSHORE WIND TRANSPORT & INSTALLATION PROVIDER

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# INTRODUCTION

It's still relatively early days in the offshore wind industry. And even though the industry is maturing quickly, there is much to be done before standards and processes are sufficiently aligned. In such an environment, best practice thinking must be encouraged. Lessons learned from one project need to be taken to the next in order to address crucial issues such as reducing installation costs, making installation processes more reliable, and continually improving safety standards.

Installation of turbines and foundations is a crucial part of the value chain. Because there is significant risk and uncertainty, it is important that utilities and project owners know what to look for when choosing an installation partner. The right contractor is the key to meeting project goals and delivering on time and on budget.

There is more to the installation phase than just erecting a turbine at sea. Significant cost reductions and project efficiencies can be realised by working with a partner that has specialist know-how and a proven track record in all phases of the installation process. This includes:

- **transporting** equipment from land to the offshore site
- **installing** wind turbines and foundations according to local conditions and specifications
- **servicing** wind turbines after commissioning

Active in the offshore wind industry since its beginnings, A2SEA has built up a vast amount of experience and know-how within each step of the offshore wind turbine and foundation installation process. We bring this expertise to all of our projects, but we also want to share our knowledge in the hopes of advancing our industry and making offshore wind energy more affordable.

With our series of Best Practice Guides, we intend to document our learnings to help decision makers in the offshore wind industry become better prepared and informed about crucial elements of the value chain. This Best Practice Guide focuses on what to look for when choosing an offshore wind installation and transport provider. In particular, we will look at the assets and competencies a provider should have in six key areas:

- Vessels
- Crew
- Services
- Track record
- Planning skills
- Management skills

We hope you find our recommendations useful as you consider your future offshore wind installation projects.

**Hans Schneider,** COO, A2SEA A/S

# VESSELS

Due to variations in the sea environment, turbine type and foundation conditions, vessel requirements change according to the job. Selecting the right equipment and the appropriate vessels manned by a highly skilled crew leads to faster execution, greater installation capacity and more available working days at sea.

## What to consider when choosing a vessel provider for your project:

### 1 Selecting a reliable partner

For installation and maintenance projects that are delivered on time and on budget, choose a partner that owns and operates its own fleet of specially designed vessels. The partner should know how to prioritise vessel maintenance and implement systems that guarantee 24/7 availability. This ensures full flexibility and capacity, as well as the ability to handle any turbine or seabed conditions.

### 2 A forward-thinking collaboration

Staying on top of new technologies and trends within the wind industry goes hand in hand with new investments in larger, more adaptable vessels. Look for a partner with an advanced, robust fleet who is continuously upgrading its capacity and capabilities.

### 3 Specialist vessels

You should never have to make do with repurposed vessels from other industries, such as Oil and Gas, which were not designed with wind turbine installation in mind. Your provider should have dedicated, specialist vessels that can handle everything from jacket and tripod foundations to suction bucket foundation design. These high-capacity vessels should also support the powerful, heavy cranes necessary for lifting the huge steel tubes in monopile foundations.

### 4 Capabilities for any condition

It's important to commission vessels specifically designed for offshore work. The provider should have a range of vessels robust enough to operate in a wide range of weather and sea conditions – from mounting turbines in shallow waters to servicing a wind farm further offshore in deep water.

### 5 Port logistics and know-how

For successful offshore wind turbine installation and servicing, look for a vessels partner that understands harbour design and can cover the logistics of getting all necessary materials from land to sea. The loading process is complex, and not all ports can accommodate the size of installation ships and machinery. You need a partner that has the right vessels and the ability to work in different ports.

### 6 Flexible, convenient site access

Fast and easy access to your offshore site is vital. Find out whether your provider can supply crew boats for transporting personnel, spare parts and other goods back and forth from the harbour to your offshore sites throughout the installation and operation phases.

**Ulla Bjørndal Møller,** Head of Fleet, A2SEA A/S

**READY FOR ANY CHALLENGE**

Installing a foundation or wind turbine is not nearly as straightforward as it may seem. Each wind farm site has its own particular challenges. The tide alone can vary from zero to eight meters, and the current from nothing to five knots. The seabed can either be so soft that there is penetration up to 30 meters or so hard that there is no penetration at all. And the wind can change within minutes. It's essential that vessels be able to adapt safely to any environmental conditions that a site is exposed to.

# CREW

The right vessels and equipment are a great start, but no offshore wind installation or maintenance project will ever be a success without the right crew on board. Your provider should employ a fast-thinking, experienced crew that puts safety first and has all the appropriate processes in place.

### What to consider when choosing a crew for your project:

**1 A stable, dedicated team**

To handle the complexity and unpredictability of offshore wind installation projects, you need a fixed team. But because the competition for skilled workers is fierce, the supply is shrinking. Installers should therefore maintain their own experienced staff who are trained to work together as a team. Hiring temporary crews for your vessels or your project staff just won't cut it.

**2 Offshore wind specialists**

The specialist skills and knowledge required for offshore wind cannot be learned overnight. Your crew should have extensive experience within grid connection, foundation installation and lifting. They should be able to design and install the deck spread and sea-fastening to ensure monopiles and transition pieces are securely stowed on board during transfer. Look for a crew that can also interpret seabed conditions, particularly during penetration.

**3 Industry leaders**

Your contractor should have expert knowledge in various turbine configurations and have experience with all turbine manufacturers. Look for a forward-thinking supplier that is setting industry standards. New foundation designs are being developed and wind farms are moving to deeper waters, so you need a partner who is on top of the latest trends and technologies.

**4 Safety first**

Proactive risk management is a prerequisite for accident prevention and minimising overall project risks. This requires a professionally-managed crew that is on top of safety standards and procedures. Care and precision are critical when lifting large, heavy structures, so look for a dedicated team of lifting supervisors that can meet all key safety criteria. The right team on board and an effective HSEQ policy in place will ensure minimum downtime and maximum profitability for your project.

**5 Problem solvers**

Unexpected challenges are a part of every job. Your provider's crew should be a team of problem solvers with the right 'can do' attitude to tackle whatever unforeseen issues might arise.

**6 Common values**

A flexible, responsible crew that prioritises teamwork will ensure all parties engage in an open dialogue. With a common set of values, everyone is fully committed to making the project a success.

**Marianne Stavid Olsen,** Crew Manager, A2SEA A/S

**A TEAM OF EXPERTS**

"Along with ship crews, you need a provider that also supplies engineers, project managers, site managers and lifting supervisors. A team of offshore experts will be able to stay on top of potential safety issues and they'll also be able to document the entire installation operation, which will ease the detailed work involved in servicing specific components such as gearboxes, generators and main shafts. And because servicing components requires different skillsets than running a full turbine installation, it's also important to have specialists who are dedicated to Operations and Maintenance from the outset."

# SERVICES

Offshore wind installation projects are vast in scope. From transport logistics on land to the technical skills and equipment necessary for installing foundations and erecting turbines, you need a contractor that takes an integrated approach – and offers the full range of services.

## What to consider when choosing a provider for your project:

### 1 A holistic approach

Detailed knowledge of maritime procedures and conditions is just as important as turbine installation expertise. But because they are often seen as separate processes, transport and installation are frequently handled by different providers. To ensure flexibility and efficiency, choose a partner that takes a comprehensive approach to installation and transport. Providers that are dedicated to offshore wind are typically best equipped to coordinate vessel, logistics and installation activities.

### 2 Maintenance planning

Life at sea is rough. Even the best turbine parts and technologies cannot withstand the wear and tear of the elements forever, and components such as mainshafts, gear boxes, transformers and generators will all need to be replaced down the line. Look for a provider that can incorporate maintenance in the early stages of project planning. Advanced planning – even during the installation stage – for operations and maintenance will save you time and money in the long run.

### 3 Turbine and foundation expertise

To keep downtime to a minimum, your operations and maintenance partner should be able to service all wind turbine configurations and foundations. Look for a provider with experience in servicing a wide range of foundation designs as well as different turbine sizes and brands.

### 4 Consider multi-contracting

An installation provider needs to have the experience and flexibility to deal with different types of contracts. In addition to typical EPIC contracts, the provider should also offer multi-contract projects that comprise overall contracts for each of the following phases: foundation installation, turbine installation, and cable installation.

### 5 The right level of service

No two offshore wind sites are the same. The provider must be able to scale its offering to the specific requirements and demands of the wind farm. In particular, the provider should supply service vessels that match the site and turbines. And if you need an entire service team along with your vessel, the provider should be able to deliver one.

### 6 Feasibility assessments

All offshore positions need to be assessed to ensure a smooth-running project. The installation provider should be able to perform detailed assessments of the metocean, wind and seabed data. Make sure your provider has the necessary competencies and track record in analysing data and mapping trends.

**Thomas Sandberg,** Project Manager, Service & Logistics, A2SEA A/S

**PLANNING FOR MAINTENANCE**

"Turbines don't run forever, and it's just a matter of when – not if – components will fail. And when they do fail, you don't want to wait weeks to get the information about the installed turbine or foundation, or the seabed or site data. Planning is also important when it comes to Operations and Maintenance. Wind farm owners tend not to pay as much attention to future service requirements as to current installation needs. But they will be better prepared to repair or replace components quickly with minimal disruption to turbine operations if they plan for it at the installation stage."

# TRACK RECORD

Experience is key. Without specialist knowledge and skills, the risks of significant delays, additional costs and contract disputes are high. A provider with a solid track record in onshore wind or within Oil and Gas is unlikely to be the best choice for an offshore wind installation.

## What to consider when evaluating a provider's track record:

### 1 Is the installation provider dedicated to offshore wind?

An expert offshore provider knows the realities of working in a harsh, unpredictable marine environment, and this shared background makes it easier to take into account contractual obligations when setting realistic, workable expectations. Look for a provider that consistently delivers projects on time and on budget and that also has the capabilities and know-how to tackle offshore projects.

### 2 How many turbines and foundations has the provider installed?

It takes hundreds of turbine and foundation installations to gain the necessary in-house expertise to be a reliable, trustworthy provider. The provider should have worked with turbines of all sizes and from all the main manufacturers, including but not limited to Siemens, Vestas and RePower. And the provider should have installation experience with different types of foundations.

### 3 Has health and safety always been a strong focus area?

Evaluate the number and nature of accident incidents. You need a provider that takes the necessary precautions and has the right procedures in place to minimise the risk of accident or damage. The provider should conform to industry standards at the very minimum and employ highly trained and qualified staff.

### 4 How healthy are the company's finances and investments?

A solid credit rating and a proven ability to deliver healthy operating profits are the two criteria to look for when determining a company's fiscal situation. Dig a little deeper to find out if the provider is regularly or sufficiently investing in new equipment, and how much investment there has been in research and development.

### 5 How well does the provider know your region?

Legislation and regulations vary from country to country, so look for a provider that has experience dealing with your region's authorities. Local experience ensures a smoother filing process, and it also means that the provider will be familiar with the layout of your harbours, your local climate and environment, and the condition of the seabed in your area.

**Martin Huss,** Chief Sales Office, A2SEA A/S

**ONE ADMIRAL AT SEA**

As we look towards the future, the use of new technologies to reduce costs is a major opportunity – and challenge – facing the offshore wind industry. This involves risk and investment. You have to be confident that the people you work with know how to handle the risk and take care of the investments – and that they know how to deal with the offshore conditions. They need to know how to take responsibility and demonstrate leadership – as you would expect from an admiral. This only comes after years of experience on the job at sea.

# PLANNING SKILLS

The offshore wind industry has experienced an influx of suppliers from other segments, such as Oil and Gas and onshore wind, looking to cash in on new opportunities. However, to plan an entire offshore wind project, you need a partner with specialist know-how and experience – and a proven track record within offshore wind.

## What to consider when planning your offshore wind installation project:

### 1 Expert planning support

There are risks in every project, but the more planning skills your provider has, the easier it will be to avoid and overcome problems. A provider experienced in marine co-ordination services should be able to help you plan your port and load-out setup in advance. Partnering with an offshore wind expert not only ensures you get the right contract in place, but also that your project will conform to all local legislation.

### 2 Less is more: Using resources efficiently

Project owners often hire large teams of people when preparing to install a new wind farm. They believe a surplus of people and vessels acts as a safety net. Instead, it often results in resource overloading and leads to project inefficiencies, delays and high costs – all significant barriers to a project's success. A qualified offshore provider knows that achieving the best result at your budget is a matter accurate resource planning.

### 3 The right project organisation

You can get your project off to a good start by assessing the capabilities of your own organisation. Do you have a team of permanent employees or are they contracted? The composition of your project team will determine the level of external assistance you will require. An experienced provider will have the organisational understanding and practical knowledge to help you determine the best project approach for your organisation. The provider should also have the flexibility to adapt to your specific project and your organisation's competencies.

### 4 Timing is everything

Sufficient planning time is a must, but many project owners begin planning too early in the wind turbine installation process. Starting 18 months ahead, for example, can increase total project costs, lead to inefficiencies and hinder effective preparation. Oftentimes a planning period of about nine months is sufficient for a large wind farm as it will allow ample time to carry out all the necessary assessments and planning requirements.

### 5 Dare to decide – before you begin

It's important to settle some key elements early in the planning phase. How will the turbines be picked up? What feeder services are available at the marshalling ports? There may be changes along the way, but making decisions reduces the risk of larger transport distances, which could hamper your ability to deliver according to plan. An experienced installation provider should have the know-how to assist you in making prudent choices.

**Hans Peter Johannsen,** Head of Engineering, A2SEA A/S

**THE IMPORTANCE OF DOCUMENTATION**

"There is plenty of heavy lifting involved in the installation of an offshore wind turbine, but installers can't escape heavy paperwork either. It is essential to obtain the necessary approvals from third parties, such as marine warranty surveyors, who are highly influential to the outcome. And there's documentation involved in the various feasibility assessments that are necessary to execute an efficient project. The right partner will ensure that all approvals and marine warrantees are handled properly right from the start – which is crucial in order to avoid nasty surprises."

# MANAGEMENT SKILLS

Once the planning phase is over and your project is underway, adaptability and decisiveness are the keys to success. You need a provider who can demonstrate strong management capabilities throughout the entire project organisation. The provider should supply you with timely, accurate information, and be able to make quick decisions and changes to the plan in response to new developments or unexpected conditions.

## Consider the following when looking for a project management provider:

### 1 Making it work – no matter what

Almost all offshore wind installation projects run into unexpected situations and adverse conditions. The project management team must therefore have the ability and the flexibility to adapt as the project progresses, and be willing to work together to get back on track on mutually agreeable terms. If necessary, the provider should have the means to draw upon other teams to supplement or even replace the current project team.

### 2 According to plan

To ensure your project is delivered on time and on budget, look for an offshore wind installation provider that follows solid, proven project management processes. The provider should keep detailed documentation of all processes and events during the installation and maintenance phases in order to gain knowledge and a better understanding of your site, your staff and your equipment.

### 3 Teamwork and marine coordination

Proactive, hands-on team management helps keep staff motivated and focused. The installation provider should be able to collaborate with turbine manufacturers as well as manage teams across all the various parties involved in your project. And if your installation site has multiple offshore contractors working simultaneously, the installation provider will need to supply first-rate marine co-ordination services.

### 4 All–round project facilitation and quality control

It's important to find an offshore wind installation provider that can facilitate the approval processes with marine surveyors and third parties, such as insurance companies. In addition to ensuring the project meets all documentation requirements, the provider should also have a dedicated HSE management team and be able to provide 24/7 site management. Look for a provider that manages projects according to proven QA models – with proven processes in place that ensure consistently high quality.

**Hans Schneider,** COO, A2SEA A/S

**A WILLINGNESS TO LEAD**

"Always look for a provider that is willing to take responsibility and make decisions. At A2SEA, we have experienced times where our team could solve a particular challenge – but the solution was at odds with the project owner's plans. This is where skilled project managers are essential. They must know how to make honest judgments and be able to communicate the decisions.

An experienced offshore wind provider will be able to strike that necessary balance between following the project owner's requirements and showing strong leadership. The provider has the experience and know-how to get the job done right; that's why project owners outsource to the experts. But in order to make the project a success, everyone needs to be flexible – and be willing to work together."

# BEST PRACTICE GUIDE EVALUATOR TOOL

**Evaluate your potential supplier against the following criteria.** Score each parameter from 1 to 5. A score of 1 indicates the company is much weaker than most competitors. 5 indicates a market-leading position. The total maximum score is 150. Complete one evaluation for each potential supplier, then you can compare your scores.

**Name of potential provider:**

| VESSELS | | CREW | | SERVICES | | TRACK RECORD | | PLANNING | | MANAGEMENT | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EVALUATION CRITERIA | SCORE | EVALUATION CRITERIA | SCORE | EVALUATION CRITERIA | SCORE | EVALUATION CRITERIA | SCORE | EVALUATION CRITERIA | SCORE | EVALUATION CRITERIA | SCORE |
| Knows how to own and operate fleet of specialist vessels | | Has specialist offshore wind skills, knowledge and expertise | | Takes a comprehensive approach to installation and transport | | Consistently completes offshore wind projects on time and on budget | | Offers specific marine co-ordination services | | Follows documented, proven project management processes | |
| Continuously upgrades vessel capacity and capabilities | | Works together as a team | | Incorporates maintenance early in project planning | | Installed turbines of all sizes from all major manufacturers | | Knows how to accurately plan resources | | Collaborates with turbine manufacturers | |
| Operates own crew boats | | Knows every possible turbine configuration and all turbine manufacturers | | Maintains different foundations and turbines | | Installed many different foundations types | | Knows how to put together the right project team | | Can manage teams across all parties involved | |
| Operates in different weather and sea conditions | | Meets all safety standards and procedures | | Works with different types of contracts | | Has documented procedures for minimising accident and damage risk | | Knows the optimal time to begin planning | | Facilitates approval processes with marine surveyors and third parties | |
| Understands harbour design and logistics | | Shares the same professional values as your organisation | | Scales service level to specific requirements | | Has strong credit rating and financial performance | | Can confidently make decisions to increase the chances of success | | Has a dedicated HSEQ management team | |
| SUBTOTAL ▸ | | SUBTOTAL ▸ | | SUBTOTAL ▸ | | SUBTOTAL ▸ | | SUBTOTAL ▸ | | SUBTOTAL ▸ | |
| | | | | | | | | | | GRAND TOTAL ▸ (maximum score = 150) | |
| **General comments:** | | | | | | | | | | | |
| **Overall ranking:** | | | | | | | | | | | |

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