Developers of offshore wind farms face a number of risks, as do the banks and equity funds that invest in them. Clean Energy Pipeline interviewed Raya Peterson, Principal Engineer at SgurrEnergy, to understand how these risks are changing and what strategies can be adopted to mitigate them. We also discuss emerging financing considerations as project finance structures become more attractive.

**What are the most important risks that developers, equity investors and banks need to consider when evaluating investments in offshore wind farms?**

Each project is unique and hence needs to be evaluated with respect to its specific risks. However, some general recommendations can be given.

As offshore wind farms are large, capital-intensive infrastructure projects with long implementation timeframes, a key area for scrutiny is the expertise of the project team and the involved participants. In our experience, the success of a project is directly linked to the track record of those involved and the team’s ability to draw from past knowledge and make adequately informed decisions during project development and execution. Where experience is limited, appropriate measures such as external checks and peer reviews should be implemented.

Contractors with limited experience generally require a higher degree of monitoring by the project team, which needs to be considered.

The supply chain continues to be an area of focus across this industry. Currently there are only a handful of experienced contractors available for each work package. The competition is even less when looking at the wind turbine supply package. It is therefore critical to evaluate how the specific project fits into the contractor’s overall planning in order to gain assurance that they can deliver on time and are not overcommitted.

The supply and construction schedule should also be analysed in detail in order to understand both the critical path and the float in the schedule. It is recommended that the schedule allows for enough float such that smaller disruptions do not immediately cause significant knock-on effects throughout the project.
Finally, the contingency level for the project should be appropriate to the project specific risk profile. Having access to appropriate contingency is critical, as it allows the project team to react to changes, which will always happen during the project execution. Probabilistic quantitative cost risk assessment combined with project stress testing and integrated cost schedule risk analysis are considered best practice to make sufficiently educated decisions about the required contingency amount.

Offshore wind farms are increasingly being built further out at sea and in deeper waters. They are also using larger turbines and foundations. What new risks does this create for developers? How can these risks be managed / mitigated?

SgurrEnergy has acted as lender’s technical advisor on several offshore projects in German waters, all of which are approaching construction completion. Due to the coastal protection zones, these German projects are typically located much further offshore than projects in other countries, giving us unique insight into the challenges of increasingly deep water offshore projects.

The first step in mitigating this risk is to develop a detailed understanding with regards to weather conditions on site. By conducting detailed analysis using site specific weather data; appropriate weather windows, required working times and workability limits for the selected marine spread can be identified and mitigated. Projects need to have in-house schedule analysis capabilities and either the tools or external support to conduct such analysis. The derived information is crucial to be able to make educated decisions about the installation strategy, vessel selection, installation start dates and required float between the different activities. This information can be of significant monetary value during contract negotiations, specifically when evaluating the option to transfer weather risk to the contractor.

Finally, SgurrEnergy recommends using the derived insight to conduct probabilistic quantitative schedule risk analysis in order to evaluate the probability of achieving the scheduled completion date.

How can SgurrEnergy assist investors evaluate the technical, contractual and financial aspects of offshore wind projects? What solutions does SgurrEnergy offer lenders and equity investors after financial close?

SgurrEnergy has been mandated as lender’s technical advisor for more than 18 offshore wind projects (>5GW), of which ten have already reached financial close and a number have been constructed successfully. This track record is approximately 60% (in terms of capacity) of the offshore wind projects that have been financed with debt capital, a large market share that highlights our leading position in the sector. Furthermore our team has conducted diverse technical and commercial advisory assignments for more than 25 additional offshore wind farms located worldwide.

A key issue for offshore projects located further offshore is that the project is being constructed in a much harsher environment, particularly with respect to wave and wind conditions. While higher wind speeds are favourable from an energy production perspective, they can present a significant challenge during installation.

This includes projects with wind turbines of all major manufacturers including the Siemens SWT-6.0-154, Senvion 6M, Alstom Haliade 150-6MW and Adwen AD5-116. We’ve
been involved in projects using all types of foundation technology including tripods and jackets and, most recently, extra-large monopiles with diameters of more than 7.5m.

This considerable and diverse knowledge of each aspect of offshore wind projects means we draw from a level of experience that is unrivalled in the industry and allows us to offer investors unique advisory services. Our services are tailor-made and depend on the specifics of the transaction and needs of our clients. For example, we can undertake full due diligence of all technical and commercial aspects of the project, advise on industry best practice, construction methods, contract terms and conditions, risk quantification and mitigation measures. Furthermore we regularly conduct independent schedule analysis, peer reviews as well as probabilistic quantitative cost risk assessment and contingency sizing.

Following financial close, SgurrEnergy typically follows implementation and construction closely and monitors construction progress for the investors. Such assignments may include preparation of construction monitoring reports, construction progress verification, site visits or risk and reserve reviews. For lenders we typically also provide monthly cost verification including drawdown certification and technical advice on an as needed basis.

**Utilities increasingly seem to be raising project finance for their offshore wind farms. How do they need to alter the structure of projects to make them attractive to equity investors and banks?**

The appetite for risk differs greatly between lenders and equity investors. Therefore, the strategy to finance the project will directly influence its structure and needs to be defined at an early stage of the project development. In past transactions it has proven to be beneficial to involve credible technical and legal advisors early to ensure that the lender’s requirements are reflected and the project is sufficiently de-risked to reach financial close within target timescales. This is particularly relevant for project developers who are not familiar with project financing of offshore wind projects.

In the past utilities generally implemented their projects under multi-contracting structures. Lenders tend to prefer more consolidated contracting structures and all construction contracts need to be finalised to achieve financial close. Typically this also includes a requirement to have the main construction vessels secured.

Lenders expect that the construction and operating contracts are in line with recent market standards for project financed transactions and any deviation from this will need to be justified. Based on our experience there are a number of elements where the lender’s requirements are more conservative than what we typically see accepted by utilities on non-project finance transactions.

One final and very important aspect of project finance is that it requires a high degree of transparency of the project. The external involvement of advisors across the project life cycle is not something that utilities are accustomed to, but a change to practice that will prove necessary when seeking debt for their projects.

SgurrEnergy has worked in this industry for many years. To what extent have costs come down? Where do you believe there is greater potential for further cost reductions?

Investment costs have yet to come down. When looking at the development of investment costs over the past ten years it becomes clear that they have increased since the first projects were constructed and only in the past few years have started to level off.

However, we’ve seen some recent projects that are now going into construction which have lowered the costs significantly. This indicates that costs may start to come down in the near future if framework conditions are favourable for offshore wind and allow for continued rollout of projects.

Areas where we see good potential for cost reduction include standardisation of individual elements such as the substation, utilisation of larger wind turbines, economics of scale in production, greater competition amongst the contractors and increasing experience of all involved parties.

SgurrEnergy has undergone sustained growth, maturing into a globally respected, multi-disciplinary renewable energy consultancy with a reputation for engineering and technical excellence, professionalism, integrity and responsiveness. Operating from our network of offices around the world, our global team of over 230 engineers and consultants has extensive international experience and an impressive track record – having assessed more than 160GW of renewable energy projects in over 90 countries, spread across six continents. In addition, our Galion lidar is transforming how wind data is collected, offering a unique, all-sky scanning capability and up to 4km range.