

Due diligence for financing of PV assets

Project finance | Minimising risk to lenders is vital in ensuring the solar industry continues to have access to adequate sources of finance. Simon Turner and Paola Piazzolla outline the key ingredients for the technical due diligence needed to give peace of mind to investors



Credit: OST Energy

Financing renewable energy projects has been key to the successful growth of the industry. In 2015 approximately US\$286 billion was invested [1], a new record high. In total 118GW of new wind and solar PV installed capacity was added in the same year and renewables (excluding hydro) made up 54% of all newly installed generating capacity, the first year renewables has beaten thermal. With the size of projects and portfolios now being financed and the constant search for lower costs of finance, it has become increasingly important to ensure that appropriate diligence is undertaken before making investment decisions.

OST Energy has worked on over 30GW of solar and wind projects globally. We have advised numerous international development institutions and commercial banks on the risk of financing renewable energy projects in the role of Lenders' Engineer, working on over 50% of utility-scale UK solar projects and 40% of all utility-scale African solar projects, and have forged a reputation for providing advice synonymous with a positive financial return, even on the most complex transactions. Understanding, quantifying and mitigating technical risk through the due diligence process is critical

to the financing process.

Below is a high-level summary of the process undertaken during due diligence. The general process is similar both for financing of new-build projects and refinancing of operational assets, however some risk allocations will be different depending on the stage of the project at which the analysis is undertaken.

Process outline

The general process undertaken to support lenders and investors in the identification and mitigation of renewable energy project risks can be summarised below:

Technical due diligence for financing PV projects is becoming increasingly important as solar finds its way into new markets and environments

- Risk identification
- Risk assessment
- Risk mitigation

All renewable energy projects have to deal with a certain amount of risk, since they are unique undertakings based on assumptions about the future, affected by many factors and subject to the influence of multiple stakeholders. Controlling the project risks has a positive effect on the control of project costs, timeliness, quality, and performance.

The scope of work for a Lenders' Engineer covers any aspect of the project with a technical input, including review of permitting, grid connection, construction and operation contracts, power purchase agreement (PPA), project participants, site conditions, lease, yield, design, construction schedule and financial model. The output is to provide the lenders and other stakeholders with an overview of the technical risks and how to mitigate them in order to reduce the risk profile of the project. Technical risk mitigation needs to involve all the advisors, not just technical. Early engagement of all the legal and financial advisors is key to ensuring a timely transaction.

The approach to due diligence is based upon a methodical risk analysis, accounting for mitigating controls and residual risk.

Figure 1. Approach to due diligence

				Probability				
		Capex	Revenue	Very unlikely	Unlikely	50/50	Likely	Certain
Impact	Reputation	Time	<0.1%	<1%				
	Slight	Days						
	Project	Weeks	0.1 - 0.9%	1-2%				
	Local	Months	1 - 2.4%	2-5%				
	National	Years	2.5 - 4.9%	5-10%				
International	Permanent	>5%	>10%					

Major and residual risks

There is a different approach to mitigating major risks and residual risks. Major risks are those that are more likely to have a big impact on the debt terms from a lender's perspective and are mitigated through the implementation of a risk response strategy. For the major risks, the Lenders' Engineer evaluates occurrence probability and impact severity to quantify the risk exposure of the project. Residual risks are generally mitigated through contractual arrangements and contingency values that are included in the financial model.

In the risk response strategy a qualitative scale is used to evaluate probability and impact. Probability scale is defined by using a 1 to 5 range that classifies the probability of occurrence as very low, low, medium, high and very high. We also use a "five value" range to define impact as a percentage on revenues and capex. Time impact and reputational impact are also considered in our analysis.

The lowest scale points for probability and impact are set to a level of risk exposure which is regarded as negligible. Higher scale points define risks that lead to significant consequences on the project.

Additionally, we identify whoever is best able to manage the risk at the lower cost as 'risk owner'.

Dealing with risk

The level of the overall risk exposure changes over time throughout the project, as a result of actions taken regarding the project or due to other external events. Some risks are relevant only during specific phases of the projects, such as construction and delay risks for new-built plants that are no longer relevant during a due diligence process for refinancing of operational assets. Similarly, should longer term operational yield data be available the uncertainty associated with performance modelling will be reduced with a refinancing compared to a new build.

Risks can be mitigated, transferred, avoided, or accepted. Lenders are risk-acceptance adverse and the only risk they accept in a non-recourse financed renewable energy project is the resource risk (even so a P90 or even P99 downside to yield is investigated). All the other risks have to be managed and allocated to the other parties involved in the transaction. Technical risks can be mitigated in three areas:

- Technical
- Financial
- Legal

Technical due diligence in practice

OST has worked on hundreds of lenders' due diligence exercises across the world advising on project risks. Our main areas of expertise are ground-mounted and rooftop solar and wind. We have selected a few case studies, related to the refinancing of the assets, where we acted as Lenders' Engineer and helped the client to mitigate any issues which could have had a detrimental effect on project value, in order to help ensure lasting financial viability for the buy-and-hold nature of the investment.

OST carried out a technical due diligence on a floating PV plant in the South of England. We identified a number of technical risks, chief amongst them being the structural element underpinning the entire project, namely; the anchoring system. The anchoring system plays an integral role by ensuring the floating platform on which the PV modules are placed remains fixed in position and withstands the effects of wave and wind action. We carried out a structural analysis of the anchoring system using our in-house civil and structural engineering experts. We recommended European and international standards to which we expected the system to be designed, and identified tests to increase confidence in the chosen system. We also analysed the installation methodology of the anchoring system and commented on H&S risks. OST successfully guided the development team through the planning stages of the design and construction of the floating plant and its anchoring system. The project is now fully operational and was the first of its kind to secure European Bank financing.

OST has conducted the technical due diligence of an existing operational portfolio of under 50kWp rooftop and ground-mounted sites in the UK. Inverter warranties were not available at the time of our review so we had to assume that the components were out of warranty. To mitigate this issue, we needed to size a suitable MRA in conjunction with the review of the O&M contracts of the project. At the end of the process, the portfolio was accepted by the lender.

Although the Lenders' Engineer will co-ordinate the mitigation of technical risk, each advisor must input into each area.

Technical mitigation includes any design or operational changes to the original design. This could be related to planning, grid connection or to the plant design itself. These risks are normally highlighted to the EPC/O&M contractor and discussions held to try and resolve potential areas of concern.

The Lenders' Engineer should review the technical inputs to the financial model. Financial mitigations are related to these inputs and assumptions and include irradiation studies, yield studies, availability of the plant, degradation, capex, opex, MRA and downside sensitivities. The lender determines the financial requirements of the debt. The Lenders' Engineer should work with the financial advisor to maintain the project financial model within these parameters whilst maintaining an appropriate technical risk profile.

The Lenders' Engineer should also review all the project contracts from a technical perspective. These include the EPC and O&M contracts, PPA, land lease, manufacturers' warranties and other technical agreements. These documents are reviewed in

conjunction with a legal review. Any technical risks are highlighted and negotiated with the relevant counterparty. If this is not achievable the risk will have to be mitigated in one of the other areas. Insurance is also included in the legal mitigation area, although usually only relied upon as a last resort or in the case of factors outside of the stakeholders' control, for example force majeure events.

In some cases a combination of two or even three mitigation measures is required. For example underperformance of the projects is normally mitigated through the EPC contract by means of liquidated damages; a legal mitigation in terms of obligations under the EPC contract that is calculated based on the required coverage of lost revenues from the financial model.

Moving forward

The sector is set to grow over the next years and decades, and we believe that Lenders' Engineering will cover an increasingly important role in the future as new types of money enter the market and projects become increasingly complex as renewable penetration increases, storage becomes a commonplace addition, networks become more strained and new business models enter the marketplace. There is a shortage of available projects in mature markets such as Western Europe at the moment so new opportunities are being sought out. Newer markets and applications represent a challenge for all parties involved in the transaction as they tend to have a higher risk profile, therefore a specific risk analysis conducted by a reputable and experienced Lenders' Engineer will help the lenders to mitigate those risks effectively. ■

Authors

Simon Turner holds a first class MEng (Hons) degree in mechanical engineering and is a member of the Institute of Mechanical Engineers. He has extensive experience across a wide range of renewable technologies, specialising in solar PV. Simon co-founded OST Energy in June 2008 and, in the role of Lenders' Technical Advisor, he has evaluated the technical and commercial risk of purchasing numerous solar PV plants.



Paola Piazzolla holds a BSc in engineering physics and a Master's in engineering, contracting and project management from the Politecnico di Milano, Italy. She is a Technical Advisor with experience in supporting lenders and investors in the identification and mitigation of project risks associated with utility-scale and portfolio renewable energy projects. Paola joined OST Energy in April 2015.



References

- [1] Global trends in renewable energy investment 2016, Frankfurt School-UNEP Centre/BNEF