PO.362

Enhanced Business Case Certainty in Emerging Markets

James Munro (1), Aaron Daniels (1), Poul Hansen (2), Christopher Osbourne (3)
Modern Energy Management (1), JLT (2), Watson, Farley & Williams (3)

Abstract

As a consultancy firm specializing in Project Management of Renewable Energy projects in emerging markets, Modern Energy Management (MEM) have observed a number of European investors and developers coming to regions, such as SE Asia and S. America, and deploy European methodologies to develop, construct and operate wind farm projects. This approach has led to numerous risks being underestimated, or even ignored, and has led to inappropriate mitigation, which reduces business case certainty with Lenders.

To avoid the increased cost of debt, and the increase the creditworthiness of a project in an emerging market, MEM teamed up with the insurance broker JLT, and the specialist legal firm Watson, Farley & Williams (WFW), and performed a detailed study into the processes and work flow for the development, construction and operations of a wind farm project in emerging markets. The aim of this exercise was to identify key milestones when insurance and legal advisors can be brought in to help the technical and commercial project management team identify and mitigate risks through a mixture of insurance, contractual terms and technical measures. When employed on wind farm projects in emerging markets, this approach has received significant backing from Lenders and Developers; resulting in increased business case certainty and credit enhancement.

Objectives

The primary aims of this work is to:

- Increase awareness of the early milestones that legal advisors and insurance brokers can be brought into a project to assist with credit enhancement and increasing the business case certainty of a project in an emerging market.
- Encourage more European investment in developing countries.
- Show delegates that employing a standard 'European approach' is risky due to the low level of wind farm knowledge in country, and the immature and sometimes contradictory regulatory and legal framework.
- Provide an 'industry recognized standardized approach' to wind farm development in emerging markets that can be deployed to ensure risks are identified at the earliest possible opportunity, and mitigated through a mixture of insurance, contractual terms and technical measures.

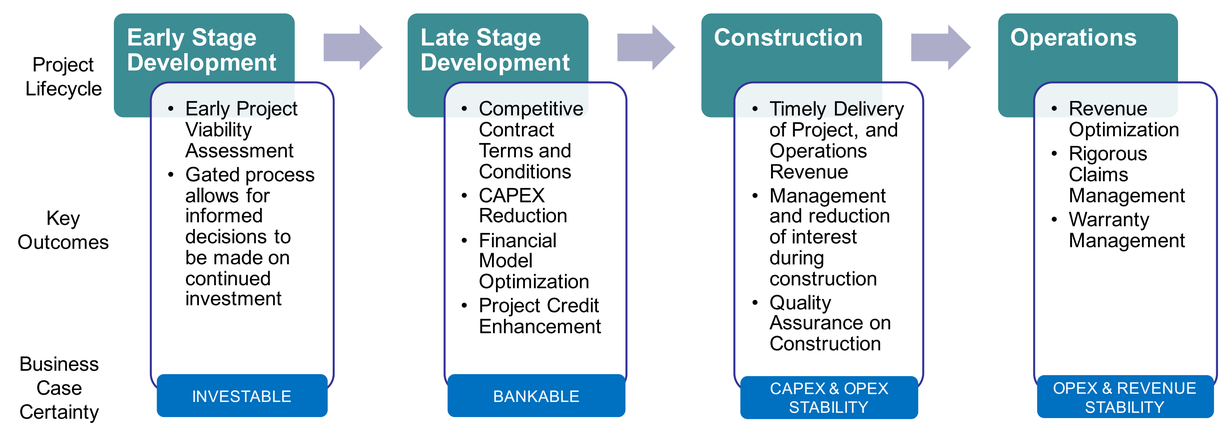
Methods

A wind farm project in an emerging market was mapped out into PMI 4 phases of Project Development (Early and Late Stage Development, Construction and Operations); this was defined as the 'Level 1 Diagram'. Each of the 4 stages was then broken down to show the work breakdown structure (WBS) within each phase; termed the 'Level 2 Diagram'. Finally, the work packages within the Level 2 Diagrams were then further broken down to 'Level 3 Diagrams'. A discussion was held about each respective company's experience on previous projects, and how the interaction between MEM, WFW and JLT can work together in the identification of risks at the earliest possible stage, and execute suitable mitigation strategies. Once the framework had been established, MEM engaged a third party consultant to devise a Financial Model, and apply scenarios to show the effectiveness of the new methodology.

Results

IGV Methodology

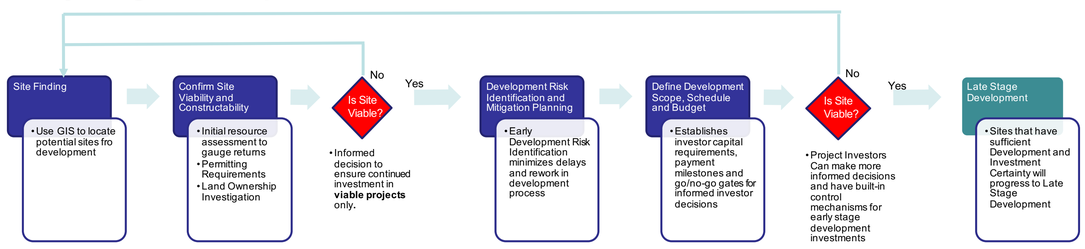
IGV Project Lifecycle



LEVEL 1

The wind farm project lifecycle was divided into the 4 stages of project development defined by PMI; Early Stage Development, Late Stage Development, Construction and Operations. The business case certainty of each phase were defined as **INVESTABLE, BANKABLE, CAPEX AND OPEX STABILITY and OPEX AND REVENUE STABILITY** respectively.

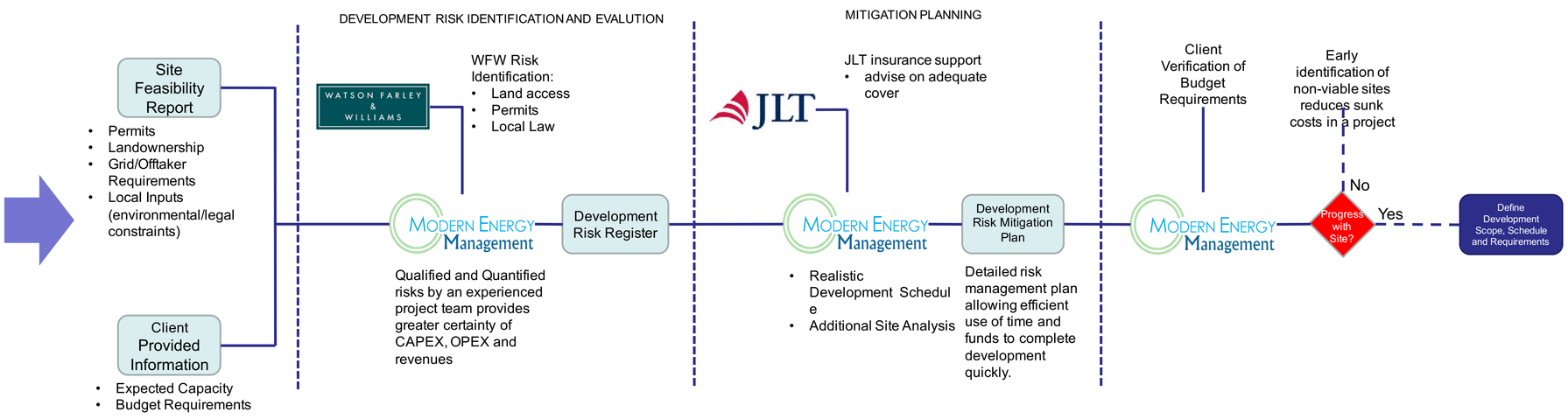
Early Stage Development



LEVEL 2

The processes that are involved in the **Early Stage Development** have been used an example. This is a gated process flow that covers the progression from Confirming Site Viability and Constructability, Development Risk Identification and Mitigation Planning and Define Development Scope, Schedule and Budget. Each is a Gated Process, giving time to make an informed decision as to how and whether to continue with project development.

Development risk Identification and Mitigation Planning



LEVEL 3

MEM as the project and commercial management team, leads the work flow in example of the **Development Risk Identification and Mitigation Planning.** It shows the early involvement of the legal partner, WFW, advising on the risks associated with land access, permits and local law. The specialist insurance broker, JLT, assists with advising on possible mitigation strategies using appropriate insurance cover.

Financial Analysis and Valuation

The table below shows 11 construction-related problems that were modelled and the impact on the typical Asian 50 MW wind project. Two Case Studies were also created based on actual project examples that MEM have encountered. To value the impact of these problems, we analyzed EIRR, NPV (at a 10% cost of equity) and nominal cash flow. The table shows the reduction from Base Case results for these metrics caused by each problem.

		Problems During Construction Phase		Cost and Production Implications		Financial Impact EIRR (%)	NPV ($M)	Nom. CF ($M)
Construction Phase	1	Wind delay during construction	▪ Main crane charge ▪ Standby labor cost ▪ Equipment transportation cost	▪ $0.33M / month ▪ $0.05M / month ▪ $0.02M / month	3mo	-1.2%	-2.7	-2.8
					6mo	-2.2%	-5.3	-5.6
					9mo	-3.2%	-7.8	-8.4
	2	EPC contractor delay due to owner's risks	▪ Labor carrying cost ▪ Storage and maintenance ▪ Bond renewal fee and insurance	▪ $0.10M / month ▪ $2.00M one time cost (at 4th and 7th month) ▪ $0.50M one time cost (at 7th month)	3mo	-1.6%	-3.6	-3.7
					6mo	-3.1%	-7.4	-7.8
					9mo	-3.71%	-9.2	-9.8
	3	Capex increase	▪ Increase in capex	▪ 10% increase in capex		-3.8%	-9.0	-8.1
Operation Phase	4	Improper allocation of WTG unavailability		▪ 3% decrease in WTG availability		-1.1%	-3.0	-7.6
	5	Incorrect adjustment of blades during construction		▪ 2% reduction in energy yield		-0.7%	-1.9	-4.9
	6	Construction quality defects and/or improper maintenance during operations		▪ 20% increase in opex		-0.6%	-1.6	-3.6
	7	Construction quality defects		▪ 15% decrease in energy yield in the first 2 years of operation		-1.3%	-3.1	-4.7
	8	O&M team not adequately prepared		▪ 5% decrease in energy yield in the first 2 years of operation		-0.4%	-1.0	-1.6
	9	Manufacturing, construction quality defects and/or deferred maintenance		▪ Project life from 20 to 15 years (debt repaid accordingly)		-4.7%	-12.2	-42.7
	10	Replacement of gearboxes at early year of operation due to serial defects ▪ Gearbox, crane, transportation, and labor costs ▪ WTG downtime for repair		Replace 50% gearboxes at year two ▪ Gearboxes $6M, crane $1.5M, transport $0.6M, labor $0.25M ▪ 15% decrease in energy yield in year two		-2.3%	-5.5	-8.4
	11	Delay of commercial operation date increases debt Interest During Construction (IDC) and equity dividend timing		▪ 3-9 months delay	3mo	-0.7%	-1.7	-1.8
					6mo	-1.4%	-3.3	-3.6
					9mo	-2.0%	-4.9	-5.4

Case Study 1
BOP defects affect availability
Construction defects in civil and electrical works result in loss of wind turbine availability in first 2 years of operations (loss of grid during repair). EPC warranty guarantees repair only. Civil and electrical works issues are exclusions in wind turbine availability warranty. This results in 10% reduction of wind turbine availability in years 1 and 2.

EIRR	NPV	Nom. CF
-0.8%	$ -1.9M	$ -3.0M

Case Study 2
Layout constructability issues
The developer's preliminary design fails to account for permit restrictions and setback requirements which were discovered during construction. This results in a 3 months delay in construction and 10% CAPEX cost overrun to change design of civil and electrical works plus a 2% reduction in energy yield due to the change in wind turbine layout.

EIRR	NPV	Nom. CF
-4.8%	$ -12.5M	$ -14.9M

eigen
www.eigenventures.com

Conclusions

Through this investigation, MEM, JLT and WFW developed their own standardized approach to wind farm development in emerging markets; the **Investment Grade Verification (IGV).** It is often the case with European projects that due to the developed nature of the industry, insurance and legal reviews are introduced at the end of Financial Close. Employing such a strategy in emerging markets is very risky due to the various unknowns when embarking on such a venture. Involving a team of specialist project managers, insurers and legal advisors at the most appropriate times, identifies risks earlier, without significant additional cost to the developer. This early identification of risks and issues gives more time to the insurance broker, lawyers and technical and commercial project managers to investigate appropriate insurance cover, technical solutions and contractual terms that will mitigate the uncommon and unusual risks associated with emerging markets.

Wind EUROPE SUMMIT 2016 27-29 SEPTEMBER HAMBURG
windeurope.org/summit2016
#windeuropesummit2016
Download the poster