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Shams 1 Solar Power Project, UAE

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12/03/2012

The 100MW, US$765 million Shams 1 Solar Power Project in Abu Dhabi is the first large-scale renewables project to be built in the Middle East. The project is also one of the largest thermal solar power plants in the world, utilising 768 parabolic trough collectors. The facility is also the first to be project financed in the UAE. Construction on the solar power plant began in Q3 2010, and it is due to come online in August this year.

The project is found close to the city of Madinat Zayad, about 120km south west of Abu Dhabi. It occupies a 2.5km site that is set to grow with the Shams 2 and Shams 3 projects already in the pipeline.

Background

Abu Dhabi government investment vehicle Masdar initiated and developed the project, setting up the SPV Sham Power Company. Masdar retains a 60 per cent stake in the project. The remaining 40 per cent of the project is owned by Total Abengoa Solar Emirates Investment Company, a 50/50 joint venture between Spain's Abengoa and French company Total.

Abengoa, through its subsidiary Abengoa Solar, brought prior experience (including operations and maintenance) with concentrating solar power plants that were similar to the technology used on the Shams project.

Total was chosen for its development experience in power generation and its knowledge of Abu Dhabi, where it has been running operations for several decades. The operator under the O&M Agreement is also a subsidiary of Total and Abengoa.

The EPC contractor is an entity formed by Abener and Teyma. The two are both subsidiaries of Abengoa. Abener and Teyma are contractors (for solar field and civil works respectively) and have worked as EPC contractors for similar concentrating solar power projects.

Financial structure

Financial close for the project with a valuation of US$765 million was reached on 3 March 2011. The debt was structured as follows:

- Senior Debt (Base Tranche): US$578 million
- Senior Debt (Standby Tranche): US$34 million
- Equity (Base Tranche): US$144.5 million
- Equity (Standby Tranche): US$8.5 million

The lenders for the project are:

- BNP Paribas
- Bank of Tokyo-Mitsubishi
- KfW
- Mizuho
- Natixis
- National Bank of Abu Dhabi
- SMBC
- Société Générale
- WestLB
- Union National Bank

The project has a debt to equity ratio of 80:20. The final maturity date for the long-term debt is 18 June 2032, in a 22 year, fully amortised financing deal. The transaction was oversubscribed, with US$900 million of commitments received after the US$634 million commitment letter for senior debt was released. In the end, only US$578 million of debt was actually required.

The 25 year PPA is with the Abu Dhabi Water & Electric Company, which is a wholly-owned by the Abu Dhabi government. The senior debt has a tail of five years from the maturity date to the expiry date of the power purchase agreement (PPA).

The Abu Dhabi National Oil Company, again, a government utility, will supply gas to the project under a 25 year agreement. As noted further on in this case study, the project utilises gas as part of its technology. It remains to be seen what impact this will have on the plant's carbon output.

BNP Paribas acted as financial advisor and Linklaters provided legal support for Total and Abengoa. Allen & Overy advised Masdar before the project JV company was formed, and then acted for the project company up to financial close.

Putting it all together

The technology used for the project is solar parabolic trough (solar PT, or thermal solar). The technology has been has been operating successfully for more than 20 years at a number of other countries, including the SEGS plants in the Mojave Desert in California and in a number of new projects located in Nevada in the US, Spain, Algeria, Morocco and Egypt.

It works by converting solar irradiation into heat, by using mirrors combined with absorber tubes. The heat generated by the focused light energy is used to generate steam, which is then supplied to a conventional steam turbine power generation system. At Shams, the solar steam produced is further heated by a dual fuel booster heater (running on gas or backup fuel) in order to increase the efficiency of the plant.

Conclusion

The Shams 1 Solar Power Project is a prime example of how to successfully introduce and finance a new technology into a country heretofore reliant on oil and gas. It has a strong project finance pedigree, with investment won from a number of key international investors which should give confidence to banks when considering future green energy transactions in the region.

The project has achieved a number of firsts for the renewables industry in the Middle East, and will hopefully set a precedent for further investment in clean technology in the region in the years to come. The project, as part of the future Shams 1, 2 and 3 plants will be key to ensuring that the UAE's commitment to produce 7 per cent of its energy from renewable sources by 2020 is met.