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POWER & ENERGY CONSULTANTS

(A Division of Goldline Power Solutions Limited)

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To,
MMTC Limited
Core-1 "SCOPE COMPLEX"
7, Institutional Area, Lodhi Road,
New Delhi – 110003

Date: 7th December 2006

Kind Attn: Mr. H. S. Mann

Sub: Revision in financial calculation due to change in location for 15 MW wind power plant in Karnataka.

Background:
As directed by the Invest Committee of Directors in their 170th meeting held on the 16th of November 2006, a team of three officials including one of our consultant visited the alternate site(Gajendragarh, District Gadag) proposed by Vestas RRB for your 15 MW wind power project from 20th November to 25th November 2006. In the course of the visit a meeting was held with some of the other wind farm owners and it was given to understand that the actual generation is 15-20% less than the generation promised by the suppliers. Since generation forms one of the most important parameters of financial calculations, the IRR for the project is likely to change large extent. Thus, in the following report we would like to submit the revised financial calculations for your wind power project.

Analysis:

The change in the location of the project activity leads to a significant change in the generation of the project activity. Thus, the financials have been reworked by altering the parameter of generation only. The parameters used to reach to this figure have been listed below. The detailed calculations have been attached as annex I to the report.

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Parameter	UNIT	Pawan Shakti 600
Price / WTG		
Cost of Land	Rs in Lacs	11.4
Cost of WTG	Rs in Lacs	240.85
Erection & Commissioning Charge	Rs in Lacs	23.75
Infrastructure Charges	Rs in Lacs	0
Processing Fees	Rs in Lacs	0
Preliminary & Preoperative cost	Rs in Lacs	1
Total Cost Per WTG	Rs in Lacs	276
Total Project Cost	**Rs in Lacs**	**6900**
Cost per MW	Rs in Lacs	460.00
Gross Generation (per machine)	LacUnits	15
Total Losses	**%**	**19.0%**
Machine Non Availability	%	5%
Grid Non Availability	%	5%
Transmission	%	5%
Auxiliary Consumption	%	1.0%
Uncertainties Viz: Modelling Error, Instrumentation Error etc	%	3%
Net Generation	LUnits	12.15
Annual Costs		
O & M (Price)	Rs in Lacs	3
Escalation	%	5.0%
Free O & M (yr.)	Yrs	2
General Insurance	%	0.17%
Machine Break Down Insurance	%	0.00%
Administrative charges	Rs. In lacs	33.60
Inflation	%	5.00%
Tariff		
Tariff (i)	Rs.	3.40
Tariff Escalation	Rs.	0.00
Tariff (ii) after 10 yrs	Rs.	3.40

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the resultant Internal Rate of Return (IRR) to the project was calculated to be 13.77%. To determine viability of the project, the rate of return as calculated from above needs to be compared with the minimum rate of return expected from a project i.e. the hurdle rate.

The hurdle rates are extremely important for any project appraisal. These rates can be considered as the cut-off rates, which decide the viability of the projects. Our project is a wind power project activity, therefore, a hurdle rate that is specific to the renewable energy sector is considered to be ideal.

Since this is the first venture of MMTC of wind power project, we cannot take reference of any previous project for a value of the benchmark. Therefore, new and appropriate benchmarks were sought. Three different values have been considered as the hurdle rates for the project activity.

1) **Return on Equity of 16%** - The Karnataka Electricity Regulatory Commission (KERC) in its tariff order of 18th January 2005 considers a Return on Equity of 16% for calculating the tariff. Since the same tariff order will be applicable to our project, our project is expected to yield a minimum return of 16%. Thus, 16% can be easily considered as suitable benchmark for the project. Three factors make this value a favourable benchmark:
   - Provided by the Government of Karnataka; a reliable source
   - Used for renewable energy sector specifically
   - Widely used in appraisal of projects

2) **Cost of Equity (CRISIL Report)** – In April 2000, the CRISIL Advisory Service (CAS), on behalf of the Central Electricity Regulatory Commission (CERC) calculated the cost of equity for the central sector utilities with the help of the CAPM method. The resultant cost of equity was calculated to be 19.2%. Though the value was not accepted by the CERC for various reasons, the value serves as a good example of the cost of equity for the central government power sector companies. MMTC also being a central government undertaking, the value of 19.2% can be considered to be a suitable benchmark. However, the value of 19.2% has been calculated based on the data available in the years prior to 2000 and represents the cost of equity of the entire power sector and not specific to renewable energy sector.

3) **Cost of Equity (Calculated)** – The third way of finding out the benchmark is to calculate the cost of equity based on current market values. Such an exercise will

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allso help us to verify the credibility of the above-mentioned options. The Cost of Equity will represent the real opportunity cost of investing into this project. We use the same method as used by the CRISIL to determine the cost of equity. However, we have not considered values from the CRISIL's study as the report was published in the year 2000. Since this is a market-based approach, values are likely to change very quickly. Therefore, we carried out the calculation of cost of equity with the most recent values available to us.

As in the report, the Capital Asset Pricing Model (CAPM) has been used to find out the Cost of Equity. The CAPM has been based on the portfolio theory of finance. It involves the determination of the following values:

- Risk free rate in the country
- Market risk premium for private investors
- Risk factor in a particular sector calculated as the co-efficient of volatility of returns to the stocks of a particular company with respect to the market returns (Beta).

Parameter	Value	Comments
Risk free rate	7.34%	Based on the weighted average yield of the long term Government of India(GOI) securities for the year 2005-06
Market risk premium	8.58%	Based on the paper published by IIM Ahmadabad. The database for the value spans from 1991-2005
Beta	1.11	Co-efficient of the volatility of the stocks of BF Utilities, the only listed company involved solely in wind power generation, with respect to overall market returns.

With the help of the above-mentioned assumptions, the Cost of Equity has been calculated to be 16.88%. Detailed calculation of the same has been provided as an annex II to the report.

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Out of the three values of benchmarks available, we recommend the use of ROE as stated by the KERC in its tariff order for non-conventional energy sources as the most appropriate benchmark for your project. Apart from the reasons stated above in point no. 1, the 16% ROE is the most conservative value of all. Moreover, very little difference exists between the Cost of equity calculated through market data and ROE set by the government, underlining the fact that the value of 16% is an appropriate one. M/S MMTC Limited being a Public Sector company, it is advisable to go for a more established and widely used value of 16% as determined by the Karnataka government in its tariff order.

Assuming that the hurdle rate for the project is considered to be 16%, it is clear that the returns to the project are far below the hurdle rate and that the project is not a viable one. Even if the generation to the project is increased by 10%, the returns do not reach the benchmark.

CDM benefits

The low returns to the project can be levered through the inclusion of CDM benefits as an inflow for the project activity as discussed with some of the project developers during our tour. It was found that when an inflow of Rs. 0.29 /unit was put in the financial analysis, the IRR improved to 15.24% from 13.77%. The detailed financial calculation has been attached as annex III in the report. CDM benefits indeed help in improving the chances of the project to be viable.

Thus, keeping the above analysis into consideration, we strongly recommend to initiate the process of obtaining CDM benefits for your wind power project.

(B.K. Thakur)

for Power & Energy Consultant