Mr. Clifford Mahlung
Chair, CDM Executive Board
UNFCCC

Response to the request for review for the CDM project activity "SSL Wind Power Project" (Ref. no.: 3433)

2010-11-30

Dear Mr. Mahlung,

The DOE TÜV Rheinland Japan Ltd. was informed on 2nd November 2010 that the CDM project "SSL Wind Power Project" (Ref. no. 3433.), is under "Request for Review" because three requests for review have been received from members of the board.

All of these requests for review contain the same three issues. We would like to provide our response to the issue raised on the following pages.

In summary, we understand the issues raised in the "Request for Review" and regret if the previous Validation Report did not reflect and describe the validation results in sufficient detail. However, we hope that the input by the project participants and this explanation will find acceptance among the members of the Executive Board.

Yours sincerely

Dr. Manfred Brinkmann
CDM Program Manager
TÜV Rheinland Japan Ltd.

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Issue 1 raised:

The DOE is requested to provide further details on the validation of the parameters used in the determination of the benchmark of 14.65% and the calculation of the benchmark. In doing so, please refer to VVM ver. 1.1 paragraph 111.

TÜV Rheinland's response:

Para 9(a) of Annex 40 EB 55 has been opted by the DOE and necessary revisions to the project design document (PDD) and validation report (VR) as deemed necessary have been implemented by the PP and DOE, respectively.

In context to the review comment raised and referring to paragraph of 111 of VVM ver 1.1 and paragraph 12 of Annex 58 of EB 51, the PP was requisitioned to compute the WACC for the project activity. WACC for the project activity forms part of the revised Investment Analysis worksheet.

The validation confirms that both financial indicator and the revised benchmark (based on WACC) are in conformity with the Additionality Tool and paragraph 12 of Annex 58 of EB 51. The detailed validation of WACC calculation is summarized below:

Validation of WACC:

WACC computation involves estimation of three parameters, namely, (a) debt equity ratio, (b) cost of debt and (c) cost of equity, which are standard in the market (conformity to Additionality Tool). Since financial indicator has been computed on post-tax basis (which is *appropriate for the project type and decision making context* as the project is funded more than 70% by debt), the benchmark should also be on post-tax basis.

a) Debt equity ratio: In computing the post-tax WACC, debt equity ratio has been assumed at 70:30, which is the gearing applicable to infrastructure projects in India and is also recommended by Maharashtra Electricity Regulatory Commission (MERC)[1].

b) Cost of debt: The then prevailing commercial lending rate as represented by PLR (10.50 %)[2] has been considered as the cost of debt. The applicable tax rate (11.22 %)[3] has been considered in arriving at the post tax cost of debt. Hence the cost of debt works out as 9.32%.

c) Cost of equity: Expected return on equity has been arrived at based on the CAPM. Cost of equity is worked as summation of risk free rate and market risk premium.

Risk free return (R_f) is an investment that delivers the same return, no matter what the scenario, should be uncorrelated with risky investments with returns that vary across scenarios. Therefore, both academics and practitioners have long used government security rates as risk free rates as they are

[1] The debt-equity ratio taken by the PP for the WACC calculation is the one which was considered at the time of project conceptualization, this is validated against the letter of PP's financial consultant Shah and Kirtane on the project financial arrangement dated 13/02/2006. Since for all the parameters (used for WACC calculation) the period used in the calculation viz cost of debt, risk free rate, market risk premium and beta is at the time of project conceptualization, consideration of this debt-equity ratio is deemed to be appropriate. Moreover this is also inline with Maharashtra Electricity Regulatory Commission Order, dated November 24, 2003 (paragraph 3.3.4, p. 93).

[2] Weekly Statistical Supplement February 10, 2006, the latest document available at the time of decision making. The data can be accessed at http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/68724.pdf. Mid rate has been taken into account as cost of debt. This represents the commercial lending rate.

[3] As per section 115 JB of Income tax act 1961

devoid of default risk[4]. Since the benchmark is computed for the project activity, whose operating life is estimated at 20 years and for the reasons explained vide foot note below, YTM of G-Sec with a maturity of 20 years has been chosen as proxy for risk free return (*Rf*). Yield to Maturity (YTM) of Government Securities[5] during the decision making period has been selected to represent the Government bond rate. Average YTM of the last four months of G-sec with a residual maturity of 20 years has been used as the proxy for Government bond rate[6]. This data has been sourced from Reserve Bank of India Bulletin. The latest Bulletin available at the time investment decision (17/02/2006) was December, 2005[7]. Based on the above methodology, Government bond rate works out to 7.46%.

Suitable market risk premium: Risk premium has been computed as the difference between the market return and risk free return. While the YTM has been used as a proxy for Risk free return (R_f), return on BSE 500[8] has been used as proxy for Market return (R_m). The suitable risk premium to reflect the project type consists of computation of two variables, viz., (i) market risk premium and (ii) risk profile of the project type - the product of which yields suitable risk premium reflecting the project type

Market risk premium: The market risk premium or simply risk premium, as measured and applied in practice, is the premium over and above the risk-free rate of return that investors expect to earn on a *well-diversified portfolio of equities*. Therefore, market risk premium calculation involves computation of risk free return and return on a well diversified portfolio.

In calculating market risk premium, it is usual to use a widely diversified stock market index as a proxy for the market portfolio. BSE-500 Index, which represents the return on 500 stocks listed in the BSE and 90.15%[9] of market capitalisation, has been chosen as the proxy for market return (Rm).

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[4] "What is the risk free rate? A Search for the Basic Building Block" – *Aswath Damodaran*, please see http://pages.stern.nyu.edu/~adamodar/pdfiles/papers/riskfreerate.pdf (p.2 & 4)

[5] YTM is nothing but the internal rate of return earned by an investor who buys the bond today (either in the auction or in the secondary market) assuming that the bond is held until maturity. In India, Government securities are issued by the Reserve Bank of India through Multiple price (American/French) Auction or Uniform price (Dutch) Auction. Hence, the purchase price is different from face value of the security. This is all the more true in the case of secondary market purchase. Therefore the return (interest and principle on redemption) earned on the security should be linked to purchase price, which the YTM is.

[6] The selection of the tenure of the G-Sec. depends on the time period for which the investment is expected to be/being made. Since the benchmark is computed for the project activity, whose operating life is estimated at 20 years, the appropriate duration G-Sec should be 20 years. The interest rate risk associated with holding a fixed interest security increases with the time remaining to maturity. Therefore, use a long term bond rate in excess of 20 years would result in *over-compensating* the investors for an interest rate risk, which they do not bear. On the other hand, choosing a shorter period would result in building in the reinvestment risk. Hence, YTM of G-Sec with a maturity of 20 years has been chosen. To eliminate the volatility in the YTM, the last four months average has been chosen as suggested by CRISIL Advisory Services in their report on "Cost of Capital for Central Sector Utilities" (please see http://www.cercind.gov.in/rep1304.pdf p. 29).

[7] RBI Bulletin, Dec, 2005 issue provides data on YTM upto October 2005. The average YTM of G-Sec for the last four months (July-October 2005) works out to 7.46% .Validation Team observed that even if January 2006 issue the average YTM for the last four months (August – October 2005) does not change and remains at 7.46% only. The relevant data can be accessed at http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/67766.pdf for December 2005 issue and http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/68273.pdf for January 2006 issue. RBI bulletin is the publication of the central bank of the country

[8] BSE 500 which consists of 500 stocks and account for more than 80% of market capitalization.

[9] In India, number of stock market indices – BSE 30, BSE 100, BSE 400, S&P CNX 500, Nifty, etc. – are available. Often the choice is between a widely diversified portfolio and one that is only made up of the largest or most frequently traded companies, i.e., between 'breadth' and 'depth'. While BSE-500 Index represents 90.15% of market capitalization, BSE Sensex account for only 40.49% market capitalization. This information can be accessed at http://www.bseindia.com/mktlive/indiceshighlights.asp. Other indices represent market capitalization between these two extremes. Hence, though BSE Sensex is the oldest index, it lacks *breadth*, which is one of the pre requisites and principles on which CAPM rests. In this context it may be observed that authors on financial management books invariably use indices representing widely diversified portfolio over older index. James C. Van Horne, for example, states, "As the market portfolio is a somewhat unwieldy thing with which to work, most people use a surrogate such as Standard & Poor's 500 stock index. Broader indexes include New York Stock Exchange Index of all stocks listed on that exchange and Wilshire 5000 Index, which covers 5000 stocks and includes exchanges other than NYSE as well as the over-the-counter market", *James C. Van Horne*, Financial Management and Policy (Sixth Edition) (p.55). See also *Aswath Damodaran*, Corporate Finance, Theory and Practice (Second edition) (Pp.194-200). The authors do not use DJIA, which though very old, consists of only 30 stocks. On the use of DJIA, as Damodaran states, "Using an index with a long history, such as the Dow 30, seems like an obvious solution, but returns on the Dow may not be a good reflection of overall returns on stocks". Please see Equity Risk Premiums (ERP) – Detminants, Estimation and Implications, *Aswath Damodaran* (September 2008), p.22.

Market return has been computed based on the data from February 1, 1999 (since introduction of the index) to December 31, 2005 (one month before the decision making period)[10]. Market return works out to 21.29%. The market risk premium, therefore, works out to 13.83% (21.29%-7.46%).

Guidance 15 of Annex 58, EB 51states, "It is not considered reasonable to apply the rate general stock market returns as a risk premium for project activities that face a different risk profile than an investment in such indices. The required rate of return for any project activity will necessarily reflect the underlying risk profile of this project". Hence, it is necessary to ascertain the required rate of return reflecting the underlying risk profile of the projects activity.

Project risk profile: It is customary to measure the risk profile of the project through beta (β). Since there is only one wind energy company listed and traded in the stock exchange as on the date of decision making, all power generating companies which have a trading data for at least three years as on the cut off date (December 2005) have been selected and the beta of all these companies have been computed[11]. There were in all six listed and traded (in the stock exchange) engaged in power generation, viz., Reliance Infrastructure Ltd., Tata Power Company Ltd., CESC Ltd., Gujarat Industrial Power Corporation Ltd., BF Utilities Ltd. and Neyveli Lignite Corporation Ltd. The beta of these companies was computed by regressing the stock return on BSE-500 index. The gearing and tax rate of respective companies[12] have been used to unlever the beta using Hamada equation[13], which is the accepted method. Data relating to market return and stock return of all companies have been sourced from BSE India website[14].

Required/expected rate of return on equity has been computed by relevering the beta using the debt equity ratio and the tax rate, which are *standard in the market* (conformity to Additionality Tool) so that the expected/required return *reflect the risks associated with the project type or activity* (conformity to VVM)[15].

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http://pages.stern.nyu.edu/~adamodar/pdfiles/papers/ERPfull.pdf

[10] Aswath Damodaran states, "The most common approach to estimating the risk premium is to base it on historical data. In the arbitrage pricing model and multifactor models, the raw data on which the premium are based are historical data on asses prices *over very long time periods*. In the CAPM, the premium is estimated by looking at the difference between average returns on stocks and average returns on risk-less securities over an extended period of history." [Corporate Finance, Theory and Practice; *Aswath Damodaran,* (second edition) (p.190)]. Accordingly, the market return (geometric return) has been computed based on the BSE-500 index from the introduction of the index till December 2005.

[11] Aswath Damodaran states, "Risk and return models are silent on how long a time period one needs to use to estimate betas. Services use periods ranging from two years to five years for beta estimates, with varying results. In choosing a time period for beta estimation, it is worth noting the trade off involved. By going back further in time, we get the advantage of having more observations in the regression, but this could be offset by the fact that the firm itself might have changed its characteristics, in terms of business mix and leverage, over that period. Our objective is not to estimate the best beta we can over the last period but to obtain the best beta we can for the future". *Aswath Damodaran*, Estimating risk parameters (p.9). The article can be accessed at http://pages.stern.nyu.edu/~adamodar/pdfiles/papers/beta.pdf. Based on the example given in the article, it was observed that the beta is the lowest for 3 year period at1.04 followed by 1.13 for 5 year period, 1.09 for 7 year period and 1.18 for 10 year period. Since the beta (risk) as computed for 3 year period is the lowest, validation team accepted beta computed based on 3 year data. Lower the beta, (more conservative (lower) the benchmark would be

[12] The gearing and tax rate have been sourced from www.moneycontrol.com, CNBC TV18 official website

[13] Please see http://www.worldlingo.com/ma/enwiki/en/Hamada's_Equation

[14] While stock index data can be accessed from http://www.bseindia.com/stockinfo/indices.aspx, data relating to stock returns of each stock can be accessed from http://www.bseindia.com/stockinfo/stockprc.aspx

[15] The firm's expected return is simply a weighted average of the expected returns for the debt and equity securities, i.e., Ko = [D/(D+E))Ki +(E/D+E))Ke]; where D is the market value of debt; E is the market value of equity; Ki is the cost of debt and Ke is the expected return on equity. Rearranging the equation and cancelling out, we obtain, Ke = Ko+(D/E)(Ko-Ki). The equation reveals that the expected return on the equity increases in proportion to increase in the debt/equity ratio. It is a common knowledge that the systematic risk of the overall firm is simply a weighted average of the betas of the individual securities of the firm. In other words β_{firm} = (D/(D+E))β_{debt} + (E/(D+E)β_{equity}]. Rearranging the equation as above, we get β_{equity} = β_{firm}+(D/E)(β_{firm}-β_{debt}). Thus an increase in the debt/equity ratio increases not only the expected return of a stock but also its beta. With perfect capital markets, both increase proportionately, so that they offset each other with respect to their effect on share price. The increase in return is just sufficient to offset the additional return required by investors for the increment in beta [*James C. Van Horne*, Financial Management and Policy p.252-3].

Based on the above theory, beta has been relevered using the debt equity ratio and tax rate applicable to a wind power project. In India, wind power projects are invariably set up by existing companies to gain tax shield and hence the applicable tax rate is the regular tax rate. The leverage applicable to wind power project is 70:30. Based on the above, beta for each of the companies in the firm and for the firm as a whole has been computed and the lowest beta of all has been selected (which is the most

The lowest re-levered beta has been chosen to compute the risk premium to reflect the risk of the project type. This works out to 1.31. As stated above, risk premium of the project type is nothing but a product of risk profile of the project i.e. beta and the market risk premium, i.e., 13.83 which works out as 18.17%.

Required return on equity is:

Risk free return + Market risk premium for the project type

=7.46 + 18.17
=25.63%

WACC = 0.70*9.32% + 0.3*25.63% = 14.21%.

Based on the above computations (details of which are given in the worksheet), the expected/ required return (WACC) works out to 14.21%, which is less than the benchmark selected by the PP in the web-hosted PDD, (16.17%). The raw data, sources and calculations have been given in the worksheet, which was verified (with the source) and validated by the Validation team. The calculations have been checked with respect to the principle adopted as well as arithmetical accuracy and found to be correct. Since the benchmark conforms to the Additionality Tool, the data, the methodology adopted and the calculations are correct, Validation team concludes that the benchmark conforms to paragraph 110 (c) of VVM also.

The project remains additional even with the revised benchmark.

conservative assumption).

Issue 2 raised:

The DOE is requested to further substantiate how it validated the suitability of the total investment costs, in particular, to further justify the difference from MERC recommendation of INR 40 million/ MW, in line with VVM ver.1.1 paragraph 110.

TÜV Rheinland's response:

Para 9(a) of Annex 40 EB 55 has been opted by the DOE and necessary revisions to the project design document (PDD) and validation report (VR) as deemed necessary have been implemented by the PP and DOE, respectively.

We submit that input parameters are not based on the feasibility study, hence, validation team relied on quotations/purchase orders (Quotation is enclosed as Annex 1 and Purchase Orders are enclosed as Annex 2) for assessment of input parameters and assumptions; it checked the accounting principles adopted, correctness of computation and raised (and also successfully closed) CARs/CLs wherever there were discrepancies; checked the input parameters with third party and/or publicly available sources and then only accepted the input parameters and assumptions and the resultant financial indicator. The sensitivity analysis is dealt with separately in the question.

Validation of the project cost and acceptance thereof by the validation team was based on cross checking through personal discussions, invoices, certification of the cost by an independent statutory auditor, price indices, and third party or publicly available sources. The following paragraphs explain how the validation team checked each of the 5 sources listed above.

As stated in the FVR, the project cost has been estimated at Rs.767.24 mn., which works out to Rs. 51.15 mn per MW. The order was placed for the windmills in May 2006. This is in contrast to the cost of Rs.40 mn. per MW recommended by MERC way back in November 2003.

A critical review of the MERC Order[16] would reveal that while the cost has been assumed at Rs.50 mn. for projects set up till 31.3.2003, the cost has been considered at Rs.40 mn. for projects set up after 31.3.2003, which is intriguing despite the reasoning given therein.

Validation team has further referred to the CDM pipeline[17] published by UNEP RISO Centre to collect the information (namely project name and CDM ref no. in order to get all relevant information like start date and project cost from the PDD or other documents available on UNFCCC website) of all CDM registered wind power projects in the state of Maharashtra and compiled the following table.

Reference No.	Project activity	Starting Date (as per the PDD: available on UNFCCC website)	Cost (INR) Million/MW
744	Bundled Wind Power Projects in Satara & Supa (Maharashtra in India) managed by Tata Motors Ltd.	14/02/2000	50.35

[16] Please see paragraph 3.3.1, Pp. 92-3 of Maharashtra Electricity Regulatory Commission Order, November 24, 2003. Can be accessed at http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf. The commission's expectation "....that the the technological improvements have brought the costs down and at the same time substantial know how is now available within India, which has resulted in the decrease in the cost of the plant" was misplaced and the cost never registered a southward movement at all.

[17] http://cdmpipeline.org/

967	21 MW Bundled Wind Power Project in Vankuswade, Maharashtra	30/03/2000	46.43
792	"14.65 MW Wind Power Project" in Maharashtra by BF Utilities Ltd.	31/03/2000	62.60
800	4.2 MW Wind power project in Maharashtra, by Bharat Forge Limited	31/12/2001	60.09
1115	75MW wind power project in Maharashtra by Essel Mining Industries Limited	December 2004	50
3516	3.75 MW Bundled Wind Power Project in Maharashtra	09/06/2005	52
1142	Priyata Intercontinental Wind Power Project, India.	26/07/2005	50.32
1540	Generation of electricity from 3.2 MW capacity wind mills by Gujarat JHM at Bhambarwadi, Maharashtra	10/08/2005	48.75
1009	3.7 MW Bundled Wind Power Project at Priyadarshini Polysacks Ltd. Dhulia District Maharashtra	05/09/2005	55.23
1542	Generation of electricity from 9.6 MW capacity wind mills by Sun-n-Sand Hotels Pvt. Ltd. at Bhambarwadi, Maharashtra	10/10/2005	48.44
1145	8.75MW Bundle Wind Power Project in Maharashtra	27/10/2005	49.97
1778	15 MW Wind Energy Project in Maharashtra	27/10/2005	50
3479	Renewable energy project at Maharashtra	30/12/2005	62.30
2543	2.5 MW Bundled Wind Power Project in Maharashtra (India)	09/01/2006	50.39
1550	Generation of electricity from 12.8 MW capacity wind mills by Avinash Bhosale group at Bhambarwadi, Maharashtra	22/03/2006	48.39
2894	12.5 MW Small Scale Grid Connected “Wind Electricity Generation Project” by KRBL Ltd., District Dhule, Maharashtra, India	27/03/2006	49.51
2342	14 MW Wind Power Project in Maharashtra	20/04/ 2006	56.2
2540	10 MW Wind Power Project in Maharashtra by Deepak Fertilizers and Petrochemicals Corporation Limited	07/06/2006	53.35
2819	50.4 MW Tata Wind Farm - in Maharashtra	16/08/2006	49.60
1600	40 MW Grid Connected Wind Power Project	28/12/2006	50.8
1615	Wind power project by GFL in	04/01/2007	70.3

	Gudhepanchgani		
2092	Wind Electricity Generation Project	09/02/2007	62.45
3611	Roaring 40's Wind Farms (Khandke) Private Limited – Phase III	19/04/2007	53.22
3142	Roaring 40's Wind Farms (Khandke) Private Limited	19/04/2007	53.22
3238	Wind power generation by Shree Naman Developers Ltd.	12/06/ 2007	72.58
2710	Generation of electricity from 3.3 MW installed capacity wind mills by Mission Biofuels India Private Limited (MBIPL), in Sangli District, Maharashtra, India	21/11/2007	69.63
2605	100 MW Wind Power Project by RS India Wind Energy Pvt. Ltd. at Matrewadi & Varekrwadi, Satara district in Maharashtra	08/05/2008	63.23

Validation team based on above analysis has reached to a conclusion that the MERC recommended project cost is not reasonable and appropriate to consider and none of the project registered to UNFCCC in the state of Maharashtra has project cost(or considered in the PDD) 40 million/MW. Finally, the validation team also ascertained the reasonableness of the cost of subject project by comparing it with other projects (as listed above) which had applied for CDM registration and have start date in 2005 and 2006 and observed that the cost ranges from Rs.48 mn. to Rs.62. mn./MW as per details given above. In contrast to this, the project cost of candidate project works out to Rs.51.15 mn. (including loan processing charges of Rs.3 mn.)[18] which is deemed to be appropriate.

The PP also submitted the Purchase Orders released to the machinery suppliers, which were verified by the validation team and found that the total value of the order was Rs.767.24 mn.

Validation team also requisitioned a certificate from the Chartered Accountant (CA)[19] evidencing the payment released to the machinery supplier. As per the CA certificate (enclosed as Annex 3), the total investment made in the project was Rs.767.24 mn.

The reasonableness of the cost was also checked based on price indices with Rs.40 mn. recommended by MERC in November 2003. Central Electricity Regulatory Commission (CERC) has recommended a Capital Cost Indexation mechanism for wind energy projects in its *Explanatory Memorandum for Draft Terms and Conditions for Determination of Tariff for Renewable Energy Sources* released in May 2009[20]. The application of the formula requires certain data. The relevant

[18] Excluding the loan processing fee, the cost works out to Rs.50.94 mn./MW

[19] Chartered Accountants are members of the Institute of Chartered Accountants of India, a statutory body established under the Chartered Accountants Act, 1949. Chartered Accountants are independent agencies and their certification is credible evidence.

[20] http://www.cercind.gov.in/2009/May09/Draft-Explanataory-Memorandum_RE-Regulations_R2_15.05.2009.pdf. As per the formula, the capital cost of project in the year 'n' will be (p. 37)

CC(n) = P&M(n)* (1+F1+F2+F3)
P&M(n) = P&M(0) * (1+d(n))
d(n) = [a*{(SI(n-1)/SI(0))– 1} + b*{(EI(n-1)/EI(0)) – 1}]/(a+b)

Where,
CC (n) = Capital Cost for nth year
P&M (n) = Plant and Machinery Cost for nth year
P&M (0) = Plant and Machinery Cost for the base year
d (n) = Capital Cost escalation factor for year (n) of Control Period
SI (n-1) = Average WPI Steel Index prevalent for fiscal year (n-1) of the Control Period
SI (0) = Average WPI Steel Index prevalent for fiscal year (0) at the beginning of the Control Period

data along with the sources are given in the following table:

Parameters	Value	Basis
Plant and machinery cost in the base year (Rs. Mn.)	40.00	MERC tariff order of November 2006 (http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf (see p. 93/176)
Average WPI Steel Index at the fiscal year (n-1) of the Control Period, i.e., 2005 [SI(n-1)]	253.5	Wholesale Price Index of Iron & Steel published by the Office of the Economic Advisor, Govt. of India. Please go to http://eaindustry.nic.in/ → select yearly → select search date → select Iron & Steel
Average WPI Steel Index at the beginning of the Control Period, i.e., 2003 [SI(0)]	168.3	Wholesale Price Index of Iron & Steel published by the Office of the Economic Advisor, Govt. of India Please go to http://eaindustry.nic.in/ → select yearly → select search date → select Iron & Steel
Average WPI Electrical Machinery Index at the fiscal year (n-1) of the Control Period, i.e., 2005 [EI(n-1)]	118.7	Wholesale Price Index of Electrical Machinery published by the Office of the Economic Advisor, Govt. of India. Please go to http://eaindustry.nic.in/ → select yearly → select search date → select Electrical Machinery
Average WPI Electrical Machinery Index at the beginning of the Control Period, i.e., 2003 [EI(0)]	112.1	published by the Office of the Economic Advisor, Govt. of India. Please go to http://eaindustry.nic.in/ → select yearly → select search date → select Electrical Machinery

The year 2003 represents the base year – the year in which MERC released the tariff order and 2005 represents the control period – the previous year to the decision making period (investment decision was taken in February 2006 and hence the period up-to December 2005 has been considered). Applying the above values in the formula,

CC(n) = P&M (n) X (1+0.07+0.08+0.10)
CC(n) = P&M(n) X 1.25
P&M (n) = P&M (0) X [1+d(n)]
P&M (0) = Rs. 32 mn.[21]
[1+d(n)] = [a*{(SI(n-1)/SI(0))– 1} + b*{(EI(n-1)/EI(0)) – 1}]/(a+b)
'a' = 0.6
SI(n-1) = 253.5
SI(0) =168.3
'b' = 0.4
EI(n-1) = 118.7
EI(0) = 112.1
[1+d(n)] = 1 + {0.6 X [(253.5/168.3)-1] + 0.4 X [(118.7/112.1)-1]

EI (n-1) = Average WPI Electrical Machinery Index prevalent for fiscal year (n-1) of the Control period
EI(0) = Average WPI Electrical and Machinery Index prevalent for fiscal year (0) at the beginning of the Control Period
a = Constant to be determined by Commission from time to time, (In default it is 0.6), for weightage to Steel Index
b = Constant to be determined by Commission from time to time, (In default it is 0.4), for weightage to Electrical Machinery Index
F1 = Factor for Land and Civil Works (0.08)
F2 = Factor for Erection and Commissioning (0.07)
F3 = Factor for IDC and Financing Cost (0.10)

The formula treats April 2008-09 as control period. In order to apply the formula to this project activity, January – December 2002 has been treated as control period as the MERC Order was issued in November 2003.

[21] In the case of candidate project plant and machinery cost works out to 82%. Hence, out of rs.40 mn./MW recommended by MERC, 80% has been taken as plant and machinery cost

= 1 + (0.6 X 0.506) + (0.4 X 0.0589)
= 1 + (0.3036 + 0.0235) = 1.3271
P&M(n) = 32 X 1.3271 = 42.4672
CC(n) = 42.4672 X 1.25 = Rs.53.08 mn.

As evident from the above the cost works out to Rs.53.08 mn. as against which the project developer has reckoned the cost at Rs.51.15 mn., which is lower than the price indexed cost.

Thus, based on the personal discussion with the project developer, purchase orders released, Chartered Accountant's certificate, price indexation mechanism and the comparison of cost with other registered projects, which have applied for registration, Validation Team concluded that the project cost is appropriate, correct and reliable.

Financing pattern: Project developer had projected a loan component of Rs.565.2 mn. based on the loan sanction letters, copies of which have been submitted to validation team. This debt component yields a debt equity ratio of 74:26. In India, infrastructure projects are generally entitled to a debt equity ratio of 70:30[22], though depending on the case the ratio can be marginally higher or lower. In this instant case the debt equity ratio is marginally higher than the general norm and to that extent it is conservative since lower loan amount results in lower IRR and the project becomes all the more additional. Since the loan amount is evidenced by the loan sanction letter, the debt equity ratio is only marginally higher than the general norm and guidance 11 of Annex 58, EB 51 states, "where a post-tax benchmark is applied the DOE shall ensure that actual interest payable is taken into account in the calculation of income tax", validation team accepted the loan component and considers the value is correct, valid and appropriate consequently the income tax is correctly calculated.

Two banks – Bank of Maharashtra and Karnataka Bank - have sanctioned the loan. While Bank of Maharashtra has stipulated an interest of 10.25%, Karnataka Bank has stipulated an interest of 10.5%. The then prevailing prime lending rate was 10.25% to 10.75% and hence the interest rate stipulated by the banks are in line with the then prevailing PLR[23]. This is also in conformity with guidance 11 of Annex 58, EB 51[24]. Hence, the validation team considers the input values are correct, appropriate and conservative.

The repayment period, initial moratorium and installments have all been taken based on the loan sanction letter to be compliant with guidance 11, Annex 58, EB 51.

[22] All State Electricity Regulatory Commissions – including MERC - have recommended debt equity ratio of 70:30 for wind energy projects
[23] Weekly Statistical Supplement, Reserve Bank of India. http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/68724.pdf.
[24] Guidance 11of annex 58, EB 51 states, "In cases where a post-tax benchmark is applied the DOE shall ensure that actual interest payable is taken into account in the calculation of income tax"

Issue 3 raised:

The DOE is requested to further substantiate the sensitivity analysis, in particular, the variation in the total investment cost. In doing so, please refer to Guidelines on the Assessment of Investment Analysis ver. 3.0 paragraphs 17 and 18 and VVM ver. 1.1 paragraph 110

TÜV Rheinland's response:

Para 9(a) of Annex 40 EB 55 has been opted by the DOE and necessary revisions to the project design document (PDD) and validation report (VR) as deemed necessary have been implemented by the PP and DOE, respectively.

A cursory glance at the projected profitability statement would reveal that other than generation (which is governed by PLF), there are no input parameters which account for more than 20% of the total project cost or revenue. Since tariff is fixed by the PPA throughout the 20 year period, it is not variable. However, O&M cost, though constitutes less than 20% of project cost /revenue, PP was asked to subject it to sensitivity analysis as the validation team considered O&M cost as important input parameter.

Since the cost as per offer was marginally higher [Rs.768 mn. – Plant and machinery cost of Rs.756 mn., Service Tax of Rs. 9.25 mn. (at 12.24% on 10% of the project cost[25]] and loan processing charges of Rs.2.68 mn. (at 0.5% of the loan assuming a debt equity ratio of 70:30[26])] than the cost based on Purchase Order [Rs.767.24 mn. – plant and machinery cost of Rs.764.21 mn. (including service tax) and loan processing charges of Rs.3.02 mn.], the cost based on Purchase Order was chosen *as a conservative measure*. If offer price had been chosen as the cost of the project, the IRR would have been lower at 13.43% and the project would have been all the more additional. Since the cost is based on PO Project cost is firm and fixed, it is not subject to variation. That the project developer had made the investment as per purchase order is also evidenced by the Chartered Accountant's certificate. However, it was subjected to variation because guidance 17 requires initial investment cost should also be subjected to variation. Therefore, the variation in project cost is hypothetical and any reduction or increase is impossible in as much as the investment considered in the financial indicator calculation represents incurred cost. This has been stated in the FVR.

Guidance 18 of Annex 58, EB 51 requires DOE to assess the reasonableness of the range of variations in the project context and recommends that the sensitivity analysis should at least cover a range of +10% and -10%, unless this is not deemed appropriate in the context of the specific project circumstances.

Investment cost (like other input parameters) has been subjected to 5% variation because it was deemed appropriate in the context of the specific project circumstances, as stated above in para 2. As mentioned earlier, the sensitivity analysis is hypothetical in that the cost is based on Purchase Order and hence it represents firm/incurred cost and therefore is not subject to variation. That the project developer had made the investment as per purchase order is also evidenced by the Chartered Accountant's certificate. Hence, even 5% variation in the project cost is hypothetical, rather unrealistic.

Paragraph 110 of VVM (Ver 1.1) requires DOE to assess the sensitivity analysis to determine under what conditions variations in the result would occur, and the likelihood of these conditions. The

[25] The service tax payable component of project cost roughly constitutes about 10% of the total cost. In the actual project cost , the service tax payable component accounts for 13%.

[26] Loan processing fee (also known as front end fee in some banks) normally ranges from 0.5% to 1% of the loan amount, depending on the quantum and the relationship of the client with the bank. IREDA for example charges 0.5%. Please see http://www.ireda.gov.in/pdf/Wind_Brochure.pdf (p.7)

financial indicator will cross the benchmark if the cost comes down by 1.65%. However, as mentioned earlier, the cost is based on Purchase Order and hence it represents firm cost and therefore is not subject to variation. That the project developer had made the investment as per purchase order is also evidenced by the Chartered Accountant's certificate. Hence, even 5% variation in the project cost is hypothetical.

Enclosure details:

Annexure – 1: Offer letter from Suzlon, dated 12/2/2006

Annexure – 2: All Purchase Orders including evidence for land cost and processing fee.

Annexure – 3: CA certificate pertaining to project cost, dated 10/11/2010

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