

CALCULATION OF BASELINE EMISSION FACTORS AND EMISSION REDUCTIONS OF VANDANA GLOBAL LIMITED

Scenario 1: Baseline calculations using Combined Margin Approach

Year of offer	2002-2003		2003-04		2004-05		2005-06	2006-07	2007-08	2008-09
Installed capacity	BASE YEAR									
Generation Mix										
Sector	mU	%	mU	%	mU	%				
Thermal Coal based(CSEB)	6858.22	61.16	6868.09	63.12	7142.16	60.04				
Thermal Coal based(Central)	2855.93	25.47	2655.73	24.41	2266.40	19.05				
CPP (coal)	410.89	3.66	434.24	3.99	767.05	6.45				
Gas Based (Central)	267.57	2.39	199.18	1.83	182.78	1.54				
Hydro (CSEB+ power from Interstate generating station)	276.48	2.47	298.93	2.75	645.38	5.43				
Nuclear (Central)	290.00	2.59	147.00	1.35	169.15	1.42				
Renewable/CPP Waste heat Power	255.36	2.28	180.03	1.65	211.09	1.77				
Import from EREB (WBPDC,GRIDCO,DVC)		0.00	70.98	0.65	387.40	3.26				
Import from NREB(Delhi Transco Limited)		0.00	27.67	0.25	0.00	0.00				
Import from WREB(GEB)		0.00		0.00	9.43	0.08				
Import from SREB(APTRANSCO)		0.00		0.00	104.18	0.88				
Import from North Eastern REB(Tripura, Assam)		0.00		0.00	9.80	0.08				
Total generation	11214.45	100.00	10881.85	100.00	11894.82	100.00				
Net generation excluding Hydro, Nuclear, CPP & RE plants	10392.61	92.67	10157.24	93.34	10358.39	87.08				
% of generation by coal out of total gen.excl. Hydro, Nuclear, CPP & RE plants	10125.04	97.43	9958.06	98.04	10175.61	98.24				
% of generation by gas out of total gen.excl. Hydro, Nuclear, CPP & RE plants	267.57	2.57	199.18	1.96	182.78	1.76				
Estimation of Baseline Emission Factor (t CO2/MU)										
Simple Operating Margin										
Fuel 1: Coal										
Avg. efficiency of power generation with coal as a fuel, %	36.73		36.58		36.49					
Avg. calorific value of coal used, kcal/kg	4171.000		3820.000		3750.000					
Estimated coal consumption, tons/yr		5683470.667		6129420.544		6395710.072				
Emission factor for Coal (IPCC ,tonne CO2/TJ	96.10		96.100		74.909					
Oxidation factor of coal (IPCC standard value)	0.98		0.980		0.980					
COEF of coal (tonneCO2/ton of coal)		1.642		1.503		1.476				
Fuel 2: Gas										
Avg. efficiency of power generation with gas as a fuel, %	45.00		45.00		45.00					
Avg. calorific value of gas used, kcal/kg	10750		10750		10750					
Estimated gas consumption, tons/yr		47565.99		35408.283		32492.850				
Emission factor for Gas (as per standard IPCC value)	56.10		56.100		56.100					
Oxidation factor of gas (IPCC standard value)	0.995		0.995		0.995					
COEF of gas(tonneCO2/ton of gas)		2.508		2.508		2.508				
EF (OM Simple, excluding imports from other grids), tCO2/MU		909.219		915.996		919.142				
EF (EREB) tCO2/MU	1190.000		1190.000		1180.000					
EF (WREB) tCO2/MU	910.000		910.000		910.000					
EF (SREB) tCO2/MU	770.000		760.000		740.000					
EF (NREB) tCO2/MU	790.000		740.000		730.000					
EF(North Eastern REB) tCO2/MU	380.000		390.000		390.000					
EF (OM Simple), tCO2/MU		909.219		917.418		926.237				
Average Simple OM						917.625				
Built Margin Factor										
Considering 20% of Gross Generation										
Sector										
Thermal Coal based(CSEB)	mU									
Thermal Coal based(Central)	0.000									
CPP (Coal)	591.830									
Gas Based (Central)	767.040									
Hydro (CSEB+ Interstate generating station)	0.000									
Nuclear (Central)	520.340									
Renewable sources	84.575									
WREB	25.140									
SREB	9.430									
EREB	104.180									
North Eastern REB	387.400									
Total generation	9.800									
Net generation excluding Hydro, Nuclear, other grid & RE plants	2499.735									
% of generation by coal out of total gen.excl. Hydro, Nuclear, other grid & RE plants	1358.870									
% of generation by gas out of total gen.excl. Hydro, Nuclear, other grid & RE plants	100.00									
% of generation by gas out of total gen.excl. Hydro, Nuclear, other grid & RE plants	0.000									

Built Margin														
Fuel 1 : Coal														
Avg. efficiency of power generation with coal as a fuel, %					36.58									
Avg. calorific value of coal used in kcal/kg					3750.000									
Estimated coal consumption, tons/yr						852029.608								
Emission factor for Coal (IPCC),tonne CO2/TJ					96.100									
Oxidation factor of coal (IPCC standard value)					0.980									
COEF of coal (tonneCO2/ton of coal)						1.476								
EF (excluding imports from other grids), tCO2/MU					925.401									
EF (EREB) tCO2/MU					1180.000									
EF (WREB) tCO2/MU					910.000									
EF (SREB) tCO2/MU					740.000									
EF (NREB) tCO2/MU					390.000									
EF (tCO2 / MU)					721.728									
Combined Margin Factor (Avg of OM & BM) t CO2 / MU					819.676									
Baseline Emissions Factor (kgCO2 / kWh)						0.820								
Off-Site Project Emission Reductions														
Net no. of units generated exclud aux, millions						25.000		25.000		25.000		25.000		25.000
No. of units replaced in the grid, millions						25.000		25.000		25.000		25.000		25.000
Emission factor considered, kg CO ₂ /kWh						0.820		0.820		0.820		0.820		0.820
Baseline Emissions (in tonnes of CO ₂)						20491.90		20491.90		20491.90		20491.90		20491.90
Carbon emission reductions in a year [in tonnes of CO ₂]						20491.90		20491.90		20491.90		20491.90		20491.90
Commitment period		2002-2012												
No. of years of delivery of CERs		10												
Total number of CERs		204919.022												

