

CALCULATION OF BASELINE EMISSION FACTORS AND EMISSION REDUCTIONS

<u>Year of offer</u>	<u>2002-03</u>		<u>2003-04</u>		<u>2004-05</u>	
<u>Generation Mix</u>					<u>BASE YEAR</u>	
<u>Sector</u>	<u>MU</u>	<u>%</u>	<u>MU</u>	<u>%</u>	<u>MU</u>	<u>%</u>
NTPC - Coal	43571.83	28.19	44515.88	26.54	46132.48	26.72
Delhi - Coal	1455.83	0.94	1164.11	0.69	1617.45	0.94
Haryana - Coal	5867.03	3.80	6849.26	4.08	7192.41	4.17
Punjab - Coal	13576.98	8.79	14118.96	8.42	14390.42	8.33
Rajasthan - Coal	13826.40	8.95	15044.48	8.97	17330.79	10.04
UP - Coal	20426.15	13.22	20638.05	12.30	19788.21	11.46
NTPC - Gas	14939.98	9.67	14874.57	8.87	15414.96	8.93
Delhi - Gas	2035.15	1.32	5159.77	3.08	4091.37	2.37
Haryana - Gas	0.00	0.00	0.00	0.00	0.00	0.00
J&K - Gas	67.36	0.04	15.40	0.01	23.51	0.01
Rajasthan - Gas	218.92	0.14	201.37	0.12	360.70	0.21
NHPC - Hydro	11108.60	7.19	13841.64	8.25	14765.34	8.55
SJVNL - Hydro	5123.25	3.32	6032.81	3.60	6154.13	3.56
BBMB - Hydro	3253.10	2.10	3299.29	1.97	3150.52	1.82
Haryana - Hydro	245.75	0.16	251.73	0.15	251.73	0.15
HP - Hydro	1598.25	1.03	3666.69	2.19	3666.39	2.12
J&K - Hydro	407.09	0.26	851.00	0.51	851.03	0.49
Punjab - Hydro	3525.55	2.28	4420.43	2.64	4420.43	2.56
Rajasthan - Hydro	60.78	0.04	494.07	0.29	494.07	0.29
Uttaranchal - Hydro	3426.31	2.22	3452.96	2.06	3452.96	2.00
UP - Hydro	1391.30	0.90	2063.04	1.23	2063.04	1.19
NPC - Nuclear	8418.42	5.45	6797.49	4.05	7069.64	4.09
Other - Low Cost (Wind, Biomass)						
Total	154544.03	100.00	167753.00	100.00	172681.58	100.00
Total generation excluding Low-cost power generation	115985.63		122581.85		126342.30	
Generation by Coal out of Total Generation excluding Low-cost power generation	98724.22	85.12	102330.74	83.48	106451.76	84.26
Generation by Gas (Naphtha) out of Total Generation excluding Low-cost power generation	17261.41	14.88	20251.11	16.52	19890.54	15.74
Imports from others						
Imports from WREB	131.64	0.09	282.02	0.17	1495.77	0.87
Imports from EREB	1019.53	0.66	2334.76	1.39	3581.79	2.07

Estimation of Baseline Emission Factor (tCO ₂ /MU)						
Simple Operating Margin						
Fuel 1 : Coal						
Avg. Efficiency of power generation with coal as a fuel, %		34.518		35.103		35.103
Avg. Calorific Value of Coal used (kcal/kg)		4171		3820		3820
Estimated Coal consumption (tons/yr)		58971331		65628561		68271527
Emission Factor for Coal-IPCC standard value (tonne CO ₂ /TJ)		96.1		96.1		96.1
Oxidation Factor of Coal-IPCC standard value		0.98		0.98		0.98
COEF of Coal (tonneCO ₂ /ton of coal)		1.642		1.503		1.503
Fuel 2 : Gas						
Avg. Efficiency of power generation with gas as a fuel, %		45		45		45
Avg. Calorific Value of Gas used (kcal/kg)		10750		10750		10750
Estimated Gas consumption (tons/yr)		3068566		3600045		3535947
Emission Factor for Gas- IPCC standard value(tonne CO ₂ /TJ)		73.3		73.3		73.3
Oxidation Factor of Gas-IPCC standard value		0.995		0.995		0.995
COEF of Gas(tonneCO ₂ /ton of gas)		3.277		3.277		3.277
EF (OM Simple, excluding imports from other grids), tCO ₂ /MU		921.33		901.15		904.11
EF (WREB), tCO ₂ /MU		910.00		910.00		906.00
EF (EREB), tCO ₂ /MU		1192.00		1186.00		1178.00
EF (OM Simple), tCO ₂ /MU		923.67		906.48		911.60
Average EF (OM Simple), tCO ₂ /MU		913.92				
Considering 20% of Gross Generation						
Sector	MU	%	MU	%	MU	%
Thermal Coal Based					17821.15	51.37
Thermal Gas Based					5012.57	14.45
Hydro					9240.98	26.64
Nuclear					2619.40	7.55
Wind					0.00	
Total					34694.10	100.00

