CALCULATION OF BASELINE EMISSION FACTORS AND EMISSION REDUCTIONS OF SUBASH KABINI HYDRO POWER PROJECT																												
Scenario 2: Baseline calculations using Modified Combined Margin Approach																												
Year of offer	2001-02		2002-03		2003-04		2004-05		2005-06		2006-07		2007-08		2008-09		2009-10		2010-11		2011-12		2012-13		Apr'2013-May'13	
Generation Mix					BASE YEAR																							
Sector	MU	%	MU	%	MU	%																						
Thermal Coal Based-State	8175,10	29,59	9391,10	33,26	10415,27	36,69																						
Thermal Coal Based-Central	6106,70	22,11	7571,21	26,81	6949,04	24,48																						
IPP-Coal Based	0,00	0,00	0,00	0,00	0,00	0,00																						
IPP-Gas (Naphtha) Based	943,57	3,42	1178,18	4,17	866,37	3,05																						
IPP-Diesel Based	720,13	2,61	418,75	1,48	277,13	0,98																						
VVNL-Diesel Based(State)	745,97	2,70	684,98	2,43	523,78	1,85																						
Hydro-State	9119,70	33,01	7062,54	25,01	7364,49	25,94																						
IPP-Mini Hydel	154,54	0,56	185,55	0,66	158,09	0,56																						
VVNL-Hydro (State)	215,75	0,78	250,23	0,89	191,35	0,67																						
Hydro - TB Dam	29,65	0,11	14,75	0,05	6,91	0,02																						
Nuclear Based-Central	1058,26	3,83	1010,73	3,58	926,72	3,26																						
IPP-Co-Generation	317,38	1,15	330,32	1,17	383,36	1,35																						
IPP-Biomass	25,34	0,09	45,33	0,16	52,98	0,19																						
IPP-Wind	12,09	0,04	94,74	0,34	269,63	0,95																						
Total	27624,18	100,00	28238,41	100,00	28385,12	100,00																						
Total generation excluding Low-cost power generation	16691,47		19244,22		19031,59																							
Generation by Coal out of Total Generation excluding Low-cost power generation	14281,80	85,56	16962,31	88,14	17364,31	91,24																						
Generation by Gas (Naphtha) out of Total Generation excluding Low-cost power generation	943,57	5,65	1178,18	6,12	866,37	4,55																						
Generation by Diesel out of Total Generation eexcluding Low-cost power generation	1466,10	8,78	1103,73	5,74	800,91	4,21																						
Imports from others																												
Imports from NTPC-NVVN, PTCIL & PGCIL	379,92	1,38	487,81	1,73	2337,28	8,23																						
Imports from WREB	57,32	0,21	16,16	0,06	0,00	0,00																						
Imports from SREB	2,52	0,01	12,56	0,04	0,00	0,00																						
Estimation od Baseline Emission Factor (tCO_2/MU)																												
Simple Operating Margin																												
Fuel 1 : Coal																												
Avg. Efficiency of power generation with coal as a fuel, %		35,327		35,450		35,450																						
Avg. Calorific Value of Coal used (kcal/kg)		3877		4171		4171																						
Estimated Coal consumption (tons/yr)		8967585		9865550		10099359																						
Emission Factor for Coal-IPCC standard value (tonne CO2/TJ)		96,1		96,1		96,1																						
Oxidation Factor of Coal-IPCC standard value		0,98		0,98		0,98																						
COEF of Coal (tonneCO2/ton of coal)		1,526		1,642		1,642																						
Fuel 2 : Gas (Naphtha)																												
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)		167739		209445		154015																						
Emission Factor for Gas- IPCC standard value(tonne CO2/TJ)		73,3		73,3		73,3																						
Oxidation Factor of Gas-IPCC standard value		0,995		0,995		0,995																						
COEF of Gas(tonneCO2/ton of gas)		3,277		3,277		3,277																						
Fuel 3 : Diesel																												
Avg. Efficiency of power generation with diesel as a fuel, %		41,707		41,707		41,707																						
Avg. Calorific Value of Diesel used (kcal/kg)		9760		9760		9760																						
Estimated Diesel consumption (tons/yr)		309744		233185		169209																						
Emission Factor for Diesel-IPCC standard value (tonne CO2/TJ)		74,1		74,1		74,1																						
Oxidation Factor of Diesel-IPCC standard value		0,99		0,99		0,99																						
COEF of Diesel (tonneCO2/ton of diesel)		2,992		2,992		2,992																						
EF (OM Simple, excluding imports from other grids), tCO2/MU		908,23		913,47		924,24																						
EF (National Grid), tCO2/MU		872,00		865,00		845,00																						
EF (WREB), tCO2/MU		932,00		910,00		910,00																						
EF (SREB), tCO2/MU		752,00		769,00		757,00																						
EF (OM Simple), tCO2/MU		**907,49**		**912,18**		**915,58**																						

Considering 20% of Gross Generation																										
Sector	**MU**	**%**	**MU**	**%**	**MU**	**%**																				
Thermal Coal Based-State					1504,33	29,37																				
Thermal Coal Based-Central					1859,49	36,30																				
IPP-Coal Based					0,00	0,00																				
IPP-Gas (Naphtha) Based					866,37	16,91																				
IPP-Diesel Based					0,00	0,00																				
VVNL-Diesel Based(State)					0,00	0,00																				
Hydro-State					455,83	8,90																				
IPP-Mini Hydel					68,29	1,33																				
VVNL-Hydro (State)					0,00	0,00																				
Hydro - TB Dam					0,00	0,00																				
Nuclear Based-Central					0,00	0,00																				
IPP-Co-Generation					45,49	0,89																				
IPP-Biomass					52,98	1,03																				
IPP-Wind					269,63	5,26																				
Total					5122,41	100,00																				
Generation by Coal out of Total Generation					3363,82	65,67																				
Generation by Gas out of Total Generation					866,37	16,91																				
Generation by Diesel out of Total Generation					0,00	0,00																				
Imports from others																										
Imports from NTPC-NVVN, PTCIL & PGCIL					1517,62	29,63																				
Imports from WREB					0,00	0,00																				
Imports from SREB					0,00	0,00																				
Built Margin																										
Fuel 1 : Coal																										
Avg. efficiency of power generation with coal as a fuel, %						35,450																				
Avg. calorific value of coal used in UPPCL, kcal/kg						4171																				
Estimated coal consumption, tons/yr						1956451																				
Emission factor for Coal (IPCC),tonne CO2/TJ						96,1																				
Oxidation factor of coal (IPCC standard value)						0,98																				
COEF of coal (tonneCO2/ton of coal)						1,642																				
Fuel 2 : Gas (Naptha)																										
Avg. efficiency of power generation with gas as a fuel, %						45																				
Avg. calorific value of gas used, kcal/kg						10750																				
Estimated gas consumption, tons/yr						154015																				
Emission factor for Gas (as per standard IPCC value)						73,3																				
Oxidation factor of gas (IPCC standard value)						0,995																				
COEF of gas(tonneCO2/ton of gas)						3,277																				
Fuel 3 : Diesel																										
Avg. efficiency of power generation with diesel as a fuel, %						41,707																				
Avg. calorific value of diesel used, kcal/kg						9760																				
Estimated diesel consumption, tons/yr						0																				
Emission factor for Diesel (as per standard IPCC value)						74,1																				
Oxidation factor of Diesel (IPCC standard value)						0,99																				
COEF of diesel tonneCO2/ton of diesel						2,992																				
EF (BM , excluding imports) (tCO2/MU)						**725,50**																				
EF (National Grid), tCO2/MU						845,00																				
EF (WREB), tCO2/MU						910,00																				
EF (SREB), tCO2/MU						757,00																				
EF (BM), tCO2/MU						**752,81**																				
Combined Margin Factor (Avg of OM & BM)						**832,28**																				
Baseline Emissions Factor (tCO2/MU)						**832,28**		**832,28**		**832,28**		**832,28**		**832,28**		**832,28**		**832,28**		**832,28**		**832,28**		**832,28**		**832,28**