

Enclosure-A:Calculation of Emission Reduction Units"

<u>Year</u>	<u>2003-04</u>	
Generation Mix		
Sector	mU	%
Thermal Coal based(State)	13808,13	49,99
Thermal Coal based(Central)	4054,82	14,68
Thermal Coal based(Partneship Project)	314,12	1,14
Thermal Coal based (other)	27,06	0,10
Gas based (State)	221,80	0,80
Gas based (Central)	1645,03	5,96
Gas based (other)	5,64	0,02
Hydro (State)	208,22	0,75
Hydro (Central)	916,47	3,32
Hydro (Partnership Project)	3155,10	11,42
Hydro (other)	374,43	1,36
Nuclear (Central)	2766,95	10,02
Renewable -Wind and Biomass	122,39	0,44
Total	27620,16	100,00
Total generation excluding Nuclear projects, Hydro	20076,60	72,69
% of generation by coal out of total gen.exl. RE, Hydro & Nuclear		90,67
% of generation by gas out of total gen.exl. RE, Hydro & Nuclear		9,33
Baseline Emissions (tCO₂/TJ)		
Operating Margin		
Standard emission factor for coal	96,10000	
Standard emission factor for Gas	56,10000	
Thermal efficiency of coal based power plants (%)	35,26	
Thermal efficiency of gas based power plants (%)	50,00	
Net emission factor for thermal (coal) (tCO ₂ /TJ input)		247,13
Net emission factor for thermal (gas) (tCO ₂ /TJ input)		10,46
Net Operating margin factor (Kg CO₂/kWh)		0,93

Built Margin Factor		
Wind Farm	104,67	
Coal	6559,819191	
Gas	0	
Hydro	601,6574	
Nuclear	0	
Total	7266,146591	
% generation by coal out of total generation		90,27920245
% generation by gas out of total generation		0
Standard emission factor for coal	96,10000	
Standard emission factor for Gas	56,10000	
Thermal efficiency of coal based power plants (%)	35,26	
Thermal efficiency of gas based power plants (%)	50,00	
Net emission factor for thermal (coal) (tCO2/TJ input)		246,05
Net emission factor for thermal (gas) (tCO2/TJ input)		0,00
Net Built margin factor (Kg CO2/kWh)		0,89
Combined Margin Factor (Avg of OM & BM)		0,91
Credit Period	Energy Savings - kWh	Baseline emissions
2000-2001	489052	445,04
2001-2002	1806712	1644,11
2002-2003	7441926	6772,15
2003-2004	7441926	6772,15
2004-2005	7441926	6772,15
2005-2006	7441926	6772,15
2006-2007	7441926	6772,15
2007-2008	7441926	6772,15
2008-2009	7441926	6772,15
2009-2010	7441926	6772,15
Total	61831172,00	56266,37

List of plants supplying power to Rajasthan state grid arranged in descending order of date of commissioning

Total Power Generation				27602,44	Refer to Enclosure A
20% of the existing plants				5520,488	
Plant	Capacity	Commissioning	Annual Generation	Comments	
1 SJVNL (Naptha Jhakri)	1000	mrt-04	466,2774		
2 Chamera-II	300	feb-04	135,38		
3 Kalpataru		sep-03	17,72	Note: Kalpatru plant has been excluded from build margin calculations since the project has been submitted for CDM project Validation. Reference has been taken from ACM0002/Version 01, Sectoral Scope: 1, 3 September 2004, page 8.	
4 Kota TPS-IV	195	jul-03	1402,855191	Refer to Supportive Sheet II	
5 Suratgarh-III	250	jun-03	1718,988	Refer to Supportive Sheet II	
6 Wind Farm	120,9	103.35 MW commissioned between 2002-03; 17.55MW commissioned between 2003-2004	104,67	Refer to Supportive Sheet III	
5 most recent plants			3828,170591		
7 Suratgarh-II	500	mrt-02	3437,976		
20% of the existing plants			7266,146591		
Coal			6559,819191		
Gas			0		
Hydro			601,6574		
Wind			104,67		
Nuclear			0		

Power plants supplying power to Rajasthan grid

2003-04

Generation from State owned plants		Total Capacity (MW)	M kWh	Comments
1	Kota TPS			As per NRLDC 2003-04 report, page 51
	I	220		
	II	420		
	III	210		
	IV	195	6283,81	
2	Suratgarh TPS			
	I	500		
	II	500		
	III	250	7524,32	
3	Ramgarh Gas TPS			
	I	3	0	
	II	35,5	221,8	
	III	75	0	
4	Mahi Bajaj Sagar	140	188,24	
5	Annopgarh	9		
6	Small hydro	14,85	19,98	
7	Wind	--	104,67	
8	Kalpataru	7	17,72	
Purchases from central owned plants				
1	Singrauli TPS	2000	2622,96	As per the CEA, General Review 2005, Table no. 5.6 and 5.7
2	Rihand TPS	1000	918,13	
3	Unchar TPS			
	I	420		
	II	420	513,73	
4	Anta Gas TPS	413	709,43	
5	Auriya Gas TPS	652	456,34	
6	Dadri Gas TPS	817	479,26	
7	Tanakpur hydro	120	50,7	
8	Salal hydro			
	I	345		
	II	345	99,95	
9	Chamera hydro			
	I	540		
	II	300	513,12	
10	Uri	480	252,7	
11	RAPP			
	I	100		
	II	200		
	III	220		
	IV	220	2418,91	
12	NAPP	440	348,04	
Purchases from partnership projects				
1	BBMB	2876,15	2415,1	
2	Chambal Projects			The generation has been taken as per NRLDC 2003-04 report-page 76 and 'firm allocation' is taken as given of page 22 of the same report; Energy Content of G. Sagar : Total energy content at Gandhi Sagar, R. P. Sagar and Jawahar Sagar Power Stations =1480 million kWh.
2.1	Chambal hydro			
	Gandhi Sagar	115		
	Rana Pratap Sagar	172		
	Jawahar Sagar	99	740	
2.2	Satpura TPS	312,5	314,12	Power purchase from Chambal Projects - Projects 1054.12 MU; Total energy given to Rajasthan from Chambal Projects as given in CEA, General Review 2005, Table no. 5.6 has been considered;
Purchases from Other sources				
	SJVNL	1000	374,43	
	NTPC (Eastern region)	4910	5,64	

				As per the CEA, General Review 2005, Table no. 5.6 and 5.7
	WBPDCL		2910	27,06
				27620,16

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Gas based (other)	5,64
Hydro (State)	208,22
Hydro (Central)	916,47
Hydro (Partnership Project)	3155,1
Hydro (other)	374,43
Nuclear (Central)	2766,95
Renewable -Wind and Biomass	122,39
Total	27620,16

All the power plants owned by West Bengal Power Development Corporation (WBPDCL) are based on coal. Hence this energy supplied to Rajasthan by WBPDCL has been taken as coal based energy generation.

NTPC operates both coal and gas based plants in India. Due to non-availability of data this energy supplied to Rajasthan has been taken as gas based energy generation, to be on conservative side.

Power Generation Data used for BM Calculations

	MU	MW		Comments
SJVNL				
SJVNL HPS # 1- # 6	6242	1000		1.Total Program generation April,04-March,05 of SJVNL - 6242 mu; Data Source:CEA, Operation Performance Monitoring Division, Energy generation, programs & Plant Load Factor: an overview; 2. Percentage shares of Rajasthan in SJVNL HPS, Central Sector is 7.47%;
Rajasthan's Share	466,2774			
Chamera II				
Chamera II	1400	300		1.Total Program generation April,04-March,05 of Chamera II - 1400 MU; Data Source:CEA, Operation Performance Monitoring Division, Energy generation, programs & Plant Load Factor: an overview; 2. Percentage shares of Rajasthan in Chamera, Central Sector is 9.67%
Rajasthan's Share	135,38			
Kota TPS				
Apr	562,64	850		1. Kota IV was commissioned in July,03; 2.Power Generation Data Source: Annual Grid Report 2003-2004
May	566,67	850		
June	494,63	850		
July	320,84	850		
Aug	463,73	1045	484597,85	
Sep	538,02	1045	562230,9	
Oct	566,37	1045	591856,65	
Nov	607,8	1045	635151	
Dec	595,79	1045	622600,55	
Jan	682,59	1045	713306,55	
Feb	885,94	1045	925807,3	
Mar	671,67	1045	701895,15	
Monthly Weighted Average	626,48875	8360	5237445,95	
Annual Average Kota TPS	7517,865	1045		
Annual Average Kota IV	1402,85519	195		
Annual Average Kota I,II,III	6115,00981	850		
Suratgarh				
Apr	519,65	1000	519650	1. Suratgarh III was commissioned in June,03;2.Power Generation Data Source: Annual Grid Report 2003-2004;
May	621	1000	621000	
June	507,23	1250	634037,5	
July	383,07	1250	478837,5	
Aug	619,79	1250	774737,5	
Sep	656,5	1250	820625	
Oct	792,82	1250	991025	
Nov	809,2	1250	1011500	
Dec	845,76	1250	1057200	
Jan	888,52	1250	1110650	
Feb	772,65	1250	965812,5	
Mar	886,91	1250	1108637,5	
Monthly Weighted Average	716,245	12500	8953062,5	
Annual Average Suratgarh	8594,94			
Annual Average Suratgarh III	1718,988			
Annual Average Suratgarh II	3437,976			
Annual Average Suratgarh I	3437,976			

Status of Proposal Registered for Wind Power Project in Rajasthan as on 20.9.2004

Date of application submission	Developer	Village	Land Area in hectare	Proposed capacity MW	No. & date of recommendation of land to Collector, Jaisalmer	Status of allotment of land	Commissioning schedule
20.11.2002	Suzlon Energy Ltd.	Baramsar	92,54	10,6	7466-70/ 23.11.02	Allotted	Commissioned
21.12.2002	Suzlon Energy Ltd.	Soda /	62,33	25	i) 8993-96 / 8.1.03	Allotted	Commissioned
24.12.2002	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	Soda/	19	24	11181-86 / 3.3.03	Allotted	Commissioned
21.1.2003	RSMML II Phase Udaipur	Pohara	43.62 Phase-III	10	10100-105 / 13.2.2003	Allotted	5 MW Commissioned
20.2.2003	Enercon India Ltd.	Gorera/	140	25	11176-80 / 3.3.03	Allotted	Commissioned
25.3.2003	Suzlon Energy Ltd	Soda /	52,69	15	3507-3511 / 26.6.03	Allotted	6.25 MW commissioned
26.3.2003	Suzlon Energy Ltd	Phoara	88,8	10	3512-16/ 20.6.03	Allotted	7.50 MW Commissioned
19.5.03	Suzlon Energy Ltd.	Baramsar	49,72	8,75	2719-2723 / 4.6.03	Allotted	5.25 MW commissioned
19.8.2003	Enercon	Soda/	51	10	6630-35 /1.9.03	Allotted	Commissioned
12.1.2004	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	Soda	32	10		Allotted	2.3 MW Commissioned

120,9