

## **Loss of 17.6 billion Units of power generation due to flyash related shut downs in Indian thermal power plants between April 2019 and March 2022**

Between April 2019 and March 2022, coal based thermal power plants in the country faced a loss of power generation of **17625.46 Million Units (MU)** due to ash related issues (calculated at an assumed 80% PLF). 17 units were shut for over a month at a time during these years, some of them being closed repeatedly, and 5 units were shut for more than 100 days at a time.

Flyash is a by-product of coal fired electricity generation. Thermal power plants (TPPs) in India generate millions of tons of ash annually. On some occasions issues related to effective management of flyash have impacted power generation at various thermal power stations. This note presents data pertaining to loss in power generation due to flyash related problems in the country. It is informed by data from the Central Electricity Authority's Daily Generation Reports (DGR) between January 2019 and April 2022.

### **Loss of power generation between April 2019 and March 2022**

The CEA lists the reasons for closure of units due to flyash management issues in the DGRs either as 'Ash Handling System Problem' or 'Ash Handling System Not Ready.' Over three years, the closure of thermal power plants due to ash related issues in country has led to a loss in power generation of 17625.46 MU (calculated at 80% PLF). 17 units have been shut for over a month at a time during these years, some of them being closed repeatedly, with five units being shut for more than 100 days at a time. The tables below give plant and unit wise details for the three years. Key highlights for each year are listed after the tables.



Image 1: Flyash slurry in ash pond of Tenughat TPS, Jharkhand/Photo Credit: Sehr Raheja

Table 1: April 2019 - March 2020

S.No.	Plant Name	Unit	Capacity (MW)	Outage From	Outage To	No. of Days of Closure in the Year	Loss in power generation assuming 80% PLF (MU)
1	AKALTARA TPS	3	600	8-Nov-19	21-Dec-19	42.68	491.73
2	AMARAVATI TPS	3	270	24-Apr-19	27-Apr-19	2.55	13.23
3	AMARAVATI TPS	1	270	21-Aug-19	24-Aug-19	2.64	13.67
4	BALCO TPS	2	300	15-Feb-20	29-Feb-20	14.03	80.83
5	BALCO TPS	1	300	12-Nov-19	17-Nov-19	5.16	29.72
6	BARAUNI TPS	6	105	8-Feb-20	14-Feb-20	6.48	13.06
7	BHUSAWAL TPS	5	500	7-Jun-19	9-Jun-19	1.75	16.75
8	BOKARO `B` TPS	3	210	26-Apr-19	29-May-19	32.31	130.29
9	BOKARO TPS `A` EXP	1	500	12-Sep-19	13-Oct-19	31.31	300.59
10	BOKARO TPS `A` EXP	1	500	15-Oct-19	11-Nov-19	26.78	257.09
11	D.P.L. TPS	7	300	4-Feb-20	16-Feb-20	11.01	63.40
12	DHARIWAL TPP	2	300	18-Apr-19	19-Apr-19	0.99	5.70
13	DHARIWAL TPP	1	300	18-Apr-19	19-Apr-19	1.40	8.06
14	FARAKKA STPS	4	500	22-Jun-19	26-Jun-19	4.23	40.58
15	KAMALANGA TPS	3	350	26-Apr-19	28-Apr-19	2.04	13.73
16	KAMALANGA TPS	3	350	26-Jun-19	27-Jun-19	0.36	2.43
17	KAMALANGA TPS	1	350	19-Jan-20	21-Jan-20	2.58	17.33
18	KAMALANGA TPS	3	350	5-Feb-20	6-Feb-20	0.98	6.56
19	KAMALANGA TPS	3	350	9-Feb-20	12-Feb-20	3.41	22.90
20	KAMALANGA TPS	3	350	23-Feb-20	25-Feb-20	2.00	13.45
21	KASAIPALLI TPP	2	135	14-Aug-19	16-Aug-19	1.90	4.92
22	KHAMBARKHERA TPS	1	45	15-Jun-19	25-Jun-19	10.71	9.25
23	KHAMBARKHERA TPS	2	45	15-Jun-19	25-Jun-19	10.54	9.11
24	KODARMA TPP	1	500	25-Oct-19	12-Nov-19	17.27	165.77
25	KODARMA TPP	2	500	31-Oct-19	10-Nov-19	10.03	96.27
26	KOLAGHAT TPS	3	210	24-Nov-19	11-Jun-20	200.04	806.55
27	MAHADEV PRASAD STPP	2	270	9-Feb-20	17-Feb-20	8.16	42.31
28	MARWA TPS	1	500	1-May-19	5-Jun-19	35.53	341.07
29	MARWA TPS	1	500	2-Jul-19	3-Jul-19	1.72	16.56
30	MARWA TPS	2	500	30-Dec-19	4-Jan-20	4.74	45.51
31	MARWA TPS	2	500	9-Jan-20	11-Jul-20	184.25	1768.79
32	MUTHIARA TPP	1	600	26-May-19	30-May-19	4.46	51.42
33	NEYVELI TPS-II	6	210	10-May-19	11-May-19	1.11	4.48
34	NEYVELI NEW TPP	1	500	29-Dec-19	8-Jan-20	10.42	100.01
35	NORTH CHENNAI TPS	3	210	4-Jan-20	10-Jan-20	5.61	22.62
36	NORTH CHENNAI TPS	2	210	4-Mar-20	10-Mar-20	6.07	24.47
37	RAMAGUNDEM - B TPS	1	62.5	16-Dec-19	17-Dec-19	1.35	1.62
38	RAYALASEEMA TPS	6	600	18-Apr-19	26-Apr-19	7.01	80.76
39	RAYALASEEMA TPS	6	600	15-Jun-19	25-Jun-19	10.32	118.85
40	RAYALASEEMA TPS	4	210	20-Aug-19	26-Aug-19	5.50	22.16
41	SAGARDIGHI TPS	4	500	27-May-19	23-Jun-19	26.66	255.93
42	SAGARDIGHI TPS	4	500	8-Sep-19	19-Sep-19	11.59	111.24
43	SASAN UMTTP	6	660	7-Jul-19	9-Jul-19	1.82	23.02
44	SGPL TPP	1	660	23-May-19	24-May-19	0.61	7.68
45	SGPL TPP	1	660	11-Jan-20	11-Jan-20	0.38	4.86
46	TALCHER STPS	2	500	30-Apr-19	4-May-19	3.79	36.41
47	TALCHER STPS	3	500	27-May-19	29-May-19	1.76	16.85
48	TAMNAR TPP	4	600	1-Apr-19	3-Apr-19	2.00	23.02
49	TAMNAR TPP	3	600	14-Sep-19	15-Sep-19	1.96	22.62
50	TAMNAR TPP	2	600	13-Dec-19	15-Dec-19	2.83	32.62
51	TAMNAR TPP	4	600	9-Jan-20	16-Jan-20	7.11	81.90
52	TUTICORIN TPS	4	210	25-Feb-20	27-Feb-20	1.37	5.54
53	TUTICORIN TPS	1	210	27-Feb-20	3-Mar-20	5.71	23.04
54	UTRAULA TPS	2	45	19-Jul-19	1-Aug-19	12.13	10.48
55	WARDHA WARORA TPP	3	135	22-Feb-20	18-Mar-20	25.39	65.81
						<b>TOTAL</b>	<b>5994.61</b>

**Table 2: April 2020 - March 2021**

S.No.	Plant Name	Unit	Capacity (MW)	Outage From	Outage To	No. of Days of Closure in the Year	Loss in power generation assuming 80% PLF (MU)
1	AKALTARA TPS	2	600	20-Dec-20	25-Dec-20	4.66	53.72
2	BALCO TPS	1	300	16-Aug-20	18-Aug-20	2.23	12.83
3	BALCO TPS	2	300	16-Nov-20	19-Nov-20	3.52	20.27
4	BALCO TPS	1	300	24-Nov-20	27-Nov-20	3.08	17.76
5	BALCO TPS	1	300	21-Dec-20	25-Dec-20	3.10	17.85
6	BOKARO 'B' TPS	3	210	11-Sep-19	10-Jul-20	302.86	1221.13
7	D.P.L. TPS	8	250	20-Sep-20	22-Oct-20	32.07	153.94
8	D.P.L. TPS	8	250	24-Oct-20	25-Nov-20	31.66	151.99
9	D.P.L. TPS	7	300	29-Oct-20	30-Oct-20	1.00	5.76
10	GOINDWAL SAHIB TPP	2	270	28-Sep-20	30-Sep-20	2.32	12.01
11	GOINDWAL SAHIB TPP	1	270	31-Jan-21	1-Mar-21	28.53	147.90
12	IB VALLEY TPS	3	660	27-Aug-20	3-Sep-20	6.44	81.61
13	IB VALLEY TPS	4	660	7-Mar-21	8-Mar-21	0.97	12.36
14	KAHALGAON TPS	4	210	6-Aug-20	15-Aug-20	8.91	35.92
15	KAHALGAON TPS	4	210	7-Nov-20	2-Feb-21	87.15	351.37
16	KAHALGAON TPS	5	500	7-Nov-20	24-Nov-20	16.47	158.09
17	KAHALGAON TPS	6	500	6-Aug-20	23-Aug-20	16.67	160.06
18	KAHALGAON TPS	6	500	4-Oct-20	14-Oct-20	9.31	89.40
19	KAHALGAON TPS	7	500	10-Aug-20	17-Aug-20	6.80	65.25
20	KAHALGAON TPS	7	500	7-Nov-20	13-Nov-20	6.41	61.52
21	KAHALGAON TPS	3	210	6-Aug-20	3-Sep-20	27.96	112.75
22	KAHALGAON TPS	3	210	7-Nov-20	29-Dec-20	52.60	212.09
23	KAMALANGA TPS	2	350	24-Sep-20	25-Sep-20	1.00	6.70
24	KAMALANGA TPS	2	350	17-Nov-20	17-Nov-20	0.17	1.12
25	KAMALANGA TPS	2	350	12-Mar-21	13-Mar-21	1.83	12.27
26	KAMALANGA TPS	1	350	30-Sep-20	1-Oct-20	1.00	6.70
27	KAMALANGA TPS	1	350	10-Nov-20	16-Nov-20	5.38	36.12
28	KAMALANGA TPS	1	350	12-Jan-21	13-Jan-21	0.44	2.96
29	KOLAGHAT TPS	3	210	13-Jun-20	27-Feb-21	258.36	1041.73
30	KORBA-III	1	120	17-Jun-20	20-Jun-20	3.02	6.95
31	KORBA-III	2	120	17-Jun-20	19-Jun-20	2.66	6.13
32	KUTCH LIG. TPS	3	75	15-Jul-20	17-Jul-20	1.77	2.55
33	KUTCH LIG. TPS	3	75	1-Dec-20	3-Dec-20	1.95	2.82
34	KUTCH LIG. TPS	3	75	29-Jan-21	30-Jan-21	1.57	2.27
35	MAHADEV PRASAD STPP	1	270	27-Oct-20	11-Dec-20	45.51	235.94
36	MAHADEV PRASAD STPP	2	270	12-Jan-21	3-Feb-21	22.33	115.77
37	MARWA TPS	1	500	14-Oct-20	16-Oct-20	2.32	22.32
38	MARWA TPS	2	500	13-Oct-20	9-Nov-20	26.51	254.51
39	MARWA TPS	2	500	7-Dec-20	9-Dec-20	2.56	24.61
40	NEYVELI NEW TPP	1	500	22-Jun-20	25-Jun-20	3.17	30.39
41	NORTH CHENNAI TPS	4	600	12-Mar-21	8-Apr-21	26.78	308.50
42	SGPL TPP	1	660	21-Nov-20	26-Nov-20	4.37	55.33
43	TUTICORIN TPS	2	210	12-Nov-20	13-Nov-20	0.86	3.48
44	VINDHYACHAL STPS	6	210	7-Dec-20	9-Dec-20	1.74	7.01
45	WANAKBORI TPS	8	800	14-Jan-21	15-Jan-21	0.36	5.59
						<b>TOTAL</b>	<b>5347.32</b>

**Table 3: April 2021 - March 2022**

S.No.	Plant Name	Unit	Capacity (MW)	Outage From	Outage To	No. of Days of Closure in the Year	Loss in power generation assuming 80% PLF (MU)
1	AKALTARA TPS	2	600	30-Jan-22	3-Feb-22	4.16	47.90
2	AMRAVATI TPS	1	270	20-Apr-21	23-Apr-21	2.96	15.34
3	AMRAVATI TPS	5	270	2-Jun-21	5-Jun-21	2.78	14.42
4	AMRAVATI TPS	5	270	23-Sep-21	27-Sep-21	3.97	20.58
5	AMRAVATI TPS	5	270	3-Mar-22	5-Mar-22	2.00	10.37
6	AMRAVATI TPS	3	270	9-Jul-21	10-Jul-21	1.26	6.53
7	AMRAVATI TPS	4	270	13-Nov-21	15-Nov-21	1.70	8.80
8	AMRAVATI TPS	4	270	31-May-22	2-Jun-22	1.95	10.10
9	BALCO TPS	2	300	16-May-21	17-May-21	1.31	7.54
10	BALCO TPS	2	300	25-May-21	27-May-21	1.91	11.01
11	BANDAKHAR TPP	1	300	2-Feb-22	7-Feb-22	5.09	29.32
12	BANDAKHAR TPP	1	300	4-Mar-22	7-Mar-22	2.35	13.54
13	BARADARHA TPS	1	600	2-May-21	4-May-21	1.69	19.46
14	BARADARHA TPS	2	600	3-Sep-21	3-Sep-21	0.91	10.52
15	BARADARHA TPS	2	600	14-Oct-21	15-Oct-21	1.46	16.85
16	BHUSAWAL TPS	5	500	3-Mar-22	15-Mar-22	12.22	117.30
17	BHUSAWAL TPS	5	500	18-Mar-22	20-Mar-22	1.96	18.79
18	BOKARO TPS `A` EXP	1	500	5-Jan-22	12-Jan-22	7.00	67.25
19	DERANG TPP	1	600	14-May-21	18-May-21	4.56	52.57
20	DERANG TPP	1	600	24-Aug-21	28-Aug-21	4.02	46.30
21	DERANG TPP	2	600	16-Dec-21	19-Dec-21	2.81	32.38
22	DURGAPUR STEEL TPS	1	500	17-Mar-22	21-Mar-22	4.08	39.19
23	GMR WARORA TPS	2	300	24-Apr-21	20-May-21	25.78	148.50
24	GMR WARORA TPS	1	300	25-Jan-22	29-Jan-22	3.70	21.28
25	IB VALLEY TPS	3	660	6-Jun-21	9-Jun-21	3.08	38.98
26	KAMALANGA TPS	1	350	11-Jul-21	11-Jul-21	0.31	2.10
27	KAMALANGA TPS	1	350	17-Jul-21	18-Jul-21	0.33	2.25
28	KAMALANGA TPS	1	350	7-Oct-21	11-Oct-21	3.38	22.74
29	KAMALANGA TPS	3	350	24-Aug-21	25-Aug-21	0.42	2.81
30	KAMALANGA TPS	3	350	2-Sep-21	5-Sep-21	3.05	20.47
31	KAMALANGA TPS	2	350	10-Mar-22	15-Mar-22	5.02	33.73
32	KASAIPALLI TPP	2	135	15-Aug-21	15-Aug-21	0.40	1.04
33	KUNDARKI TPS	1	45	11-Jul-21	12-Jul-21	1.60	1.39
34	KUTCH LIG. TPS	3	75	16-May-21	19-May-21	2.97	4.28
35	KUTCH LIG. TPS	3	75	5-Oct-21	6-Oct-21	1.35	1.94
36	KUTCH LIG. TPS	3	75	16-Dec-21	18-Dec-21	1.90	2.73
37	KUTCH LIG. TPS	3	75	5-Jan-22	8-Jan-22	2.91	4.19
38	MARWA TPS	2	500	29-May-21	5-Jun-21	6.92	66.42
39	MARWA TPS	2	500	1-Jul-21	14-Jul-21	12.65	121.41
40	MARWA TPS	1	500	19-Jul-21	4-Aug-21	16.28	156.26
41	NEYVELI NEW TPP	1	500	22-Jun-21	23-Jun-21	1.43	13.77
42	NORTH CHENNAI TPS	5	600	19-Apr-21	19-Jun-21	61.82	712.17
43	NORTH CHENNAI TPS	5	600	25-Jun-21	21-Jul-21	26.14	301.15
44	NORTH CHENNAI TPS	5	600	28-Aug-21	10-Sep-21	13.06	150.48
45	NORTH CHENNAI TPS	4	600	22-Apr-21	4-Jun-21	43.69	503.29
46	OP JINDAL TPS	2	250	23-Jul-21	28-Jul-21	4.03	19.33
47	PAINAMPURAM TPP	2	660	2-Sep-21	6-Sep-21	3.32	42.02
48	RAICHUR TPS	8	250	4-Oct-21	26-Oct-21	22.01	105.66
49	RAICHUR TPS	2	210	18-Oct-21	2-Nov-21	15.17	61.17
50	RAICHUR TPS	2	210	29-Dec-21	6-Jan-22	7.19	28.97
51	RAYALASEEMA TPS	6	600	29-Aug-21	1-Sep-21	2.98	34.29
52	RIHAND STPS	5	500	15-Jan-22	18-Jan-22	3.00	28.80
53	SURATGARH TPS	3	250	17-Dec-21	17-Dec-21	0.17	0.83
54	TALCHER (OLD) TPS	6	110	15-Feb-21	19-Feb-21	3.30	6.97
55	TAMNAR TPP	4	600	30-Dec-20	17-Aug-21	229.49	2643.71
56	TUTICORIN TPS	5	210	1-Jan-22	3-Jan-22	1.80	7.25
57	UCHPINDA TPP	4	360	26-Apr-21	30-Apr-21	4.32	29.83
58	UCHPINDA TPP	1	360	13-Aug-21	15-Sep-21	32.64	225.60
59	UNCHAHAH TPS	6	500	14-Apr-21	17-Apr-21	2.83	27.21
60	UNCHAHAH TPS	6	500	24-Mar-22	26-Mar-22	1.10	10.53
61	WANAKBORI TPS	5	210	3-Mar-22	6-Mar-22	2.76	11.11
62	WANAKBORI TPS	5	210	7-Mar-22	8-Mar-22	0.36	0.15
63	YERMARUS TPP	2	800	15-Feb-22	18-Feb-22	3.30	50.67
						<b>TOTAL</b>	<b>6283.53</b>

Notes on the tables:

1. In some cases, the power plant units have remained shut for periods longer than shown in the table here. However, the reason for closure given in the DGR has changed from ash related issues to others, such as coal shortage, annual maintenance, furnace clinker formation etc. In such cases, the duration of closure of the units has been calculated only based on the period when the reason for closure has been given as 'ash handling system problem' or 'ash handling system not ready.'
2. In some cases, there is a discrepancy in the DGR data. In addition to reason for closure of a particular unit, the DGRs also provide the date of outage, expected date of resumed operations, and actual date of resumed operations. The dates of closure due to ash related problems, and dates of resumed operations vary within some of the DGRs itself. We have taken the date of outage as that given in that DGR which lists the plant as back in operation.
3. Data for April and May 2020 is Not Available, i.e., DGRs not uploaded on CEA online portal

### **Key Highlights from data for three years**

#### **Loss of power generation from April 2019 to March 2020**

- A total of 55 units of 31 thermal power plants faced loss in power generation due to ash related reasons for the year April '19 – March '20
- Of these, 19 units were shut for 10 days or more at a time, and 6 of these were shut for more than a month at a time
- Total loss in power generation due to closure of all these units between April 2019 and March 2020 was 5994.61 MU (at 80% PLF)
- Unit 3 (210 MW) of Kolaghat TPS in West Bengal was shut for 200 days, and unit 2 (500 MW) of Marwa TPS in Chhattisgarh for 184 days
- Unit 1 of the Bokaro TPS 'A' Expansion, with a capacity of 500 MW, is listed as shut in the DGR due to 'Ash Handling System Problem' from 12<sup>th</sup> September 2019 to 13<sup>th</sup> October 2019, and again from 15<sup>th</sup> October 2019 to 11<sup>th</sup> November 2019. The ash pond of this power plant breached on 12<sup>th</sup> September 2019, flooding three nearby villages with ash slurry

#### **Loss of power generation from April 2020 to March 2021**

- A total of 45 units of 19 thermal power plants faced loss in power generation due to ash related problems between April '20 and March '21
- Of these, 14 units were shut for two weeks or more at a time, and 7 of these were shut for more than a month at a time
- Total loss in power generation due to closure of all these units between April 2020 and March 2021 was 5347.32 MU (at 80% PLF)
- Unit 3 (210 MW) of Bokaro 'B' TPS in Jharkhand was shut for 303 days, and Unit 3 (210 MW) of Kolaghat TPS in West Bengal was shut for 258 days

- Four units of Kahalgaon TPS in Bihar were reported as shut due to 'Ash Handling System Problem' on 7<sup>th</sup> November 2020. All four units resumed electricity generation on different dates. Units 3 and 4 of 210 MW each were shut for 52 days and 87 days respectively. On 7<sup>th</sup> November 2020, the embankment of the ash dyke of Kahalgaon TPS collapsed, damaging up to 80 Ha of agricultural land in the vicinity

### **Loss of power generation from April 2021 to March 2022**

- A total of 63 units of 31 thermal power plants faced loss in generation due to ash related problems between April '21 and March '22
- Of these, 12 units were shut for 12 days or more at a time, and four were shut for over a month at a time
- Total loss in power generation due to closure of these units between April 21' and March '22 was 6283.53 MU (at 80% PLF)
- Unit 4 (600 MW) of Tamnar TPP in Chhattisgarh was shut for 229 days

### **DGR data does not always reflect state of on-ground ash related accidents**

The ash pond breaches of Bokaro TPS (September 2019) and Kahalgaon TPS (November 2020) are listed as part of the highlights above because, on the dates of their occurrence, the respective DGRs also showed these plants as closed due to 'ash handling system problems.' However, it is to be noted that this may not always be the case. Anecdotal evidence and media reports suggest that plants are not always shut down in the event of ash related accidents (such as pond breaches, pipeline leaks, deliberate discharge of ash slurry), and so, not all ash related accidents are reflected in the DGRs.

For instance, the ash pond of MAHAGENCO's Koradi Thermal Power Station in Maharashtra breached on 16<sup>th</sup> July 2022. At least three villages were flooded by ash slurry. The ash even mixed with the water of the Kanhan and Kolar rivers. The DGRs of 15<sup>th</sup> – 20<sup>th</sup> July 2022 however, do not make note of any unit shut downs due to ash issues (or any other reasons). Only one unit of the plant is reported as shut since 4<sup>th</sup> July due to 'overhauling works.' Similarly, there was a large scale flyash slurry leak from MAHAGENCO's Khaparkheda Thermal Power Station ash pond in Maharashtra on 6<sup>th</sup> and 7<sup>th</sup> July 2022. There is no reflection of this in DGRs from 4<sup>th</sup> to 8<sup>th</sup> July 2022. Instances when the ash slurry pipelines of some thermal power plants have burst and leaked slurry into surroundings also do not always entail a unit shut down, and do not reflect in the DGRs.

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