

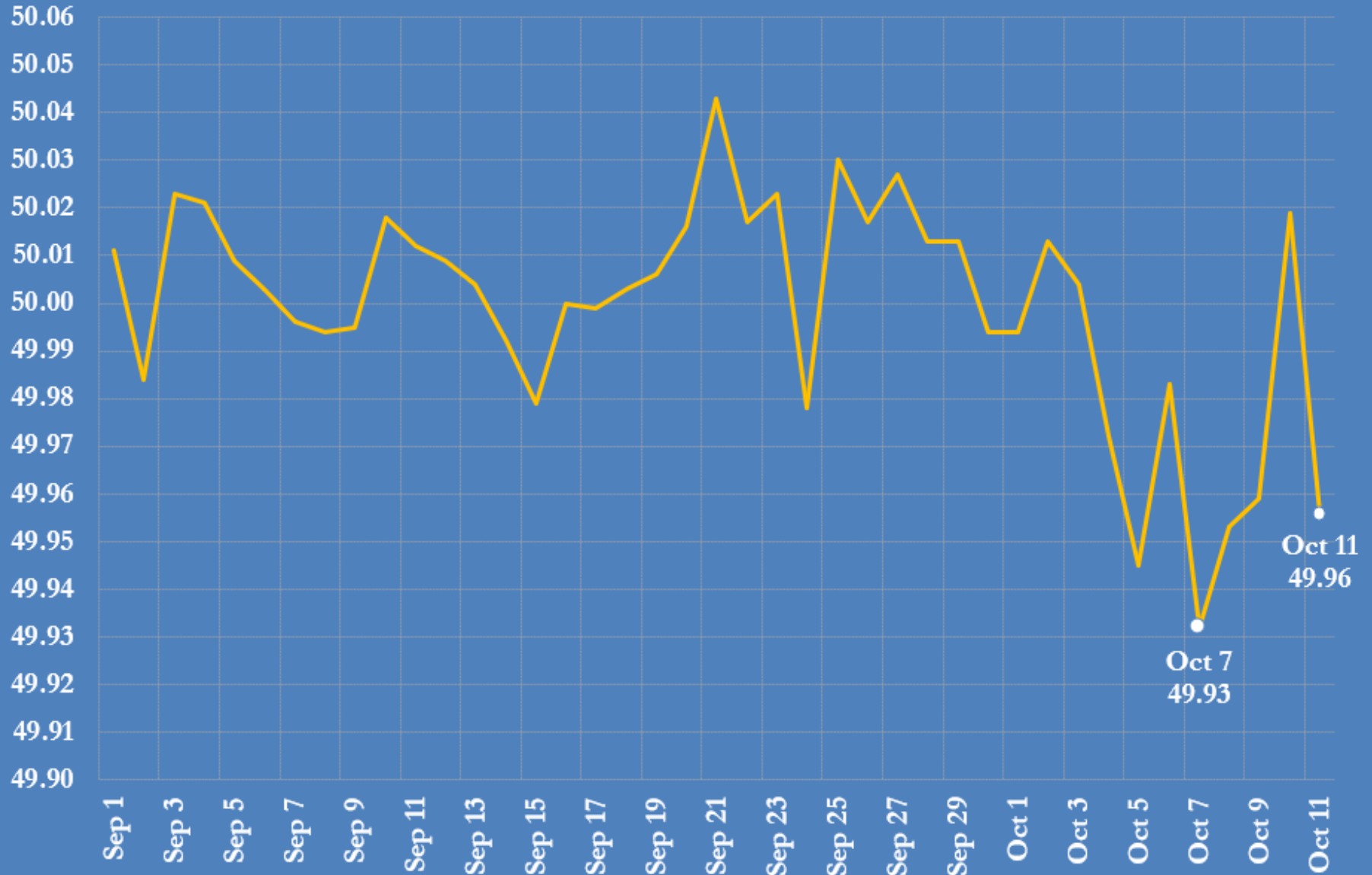
India power generation and coal shortages

Selected indicators

JOHN KEMP
REUTERS
12 Oct 2021

India power grid frequency, Sep-Oct 2021

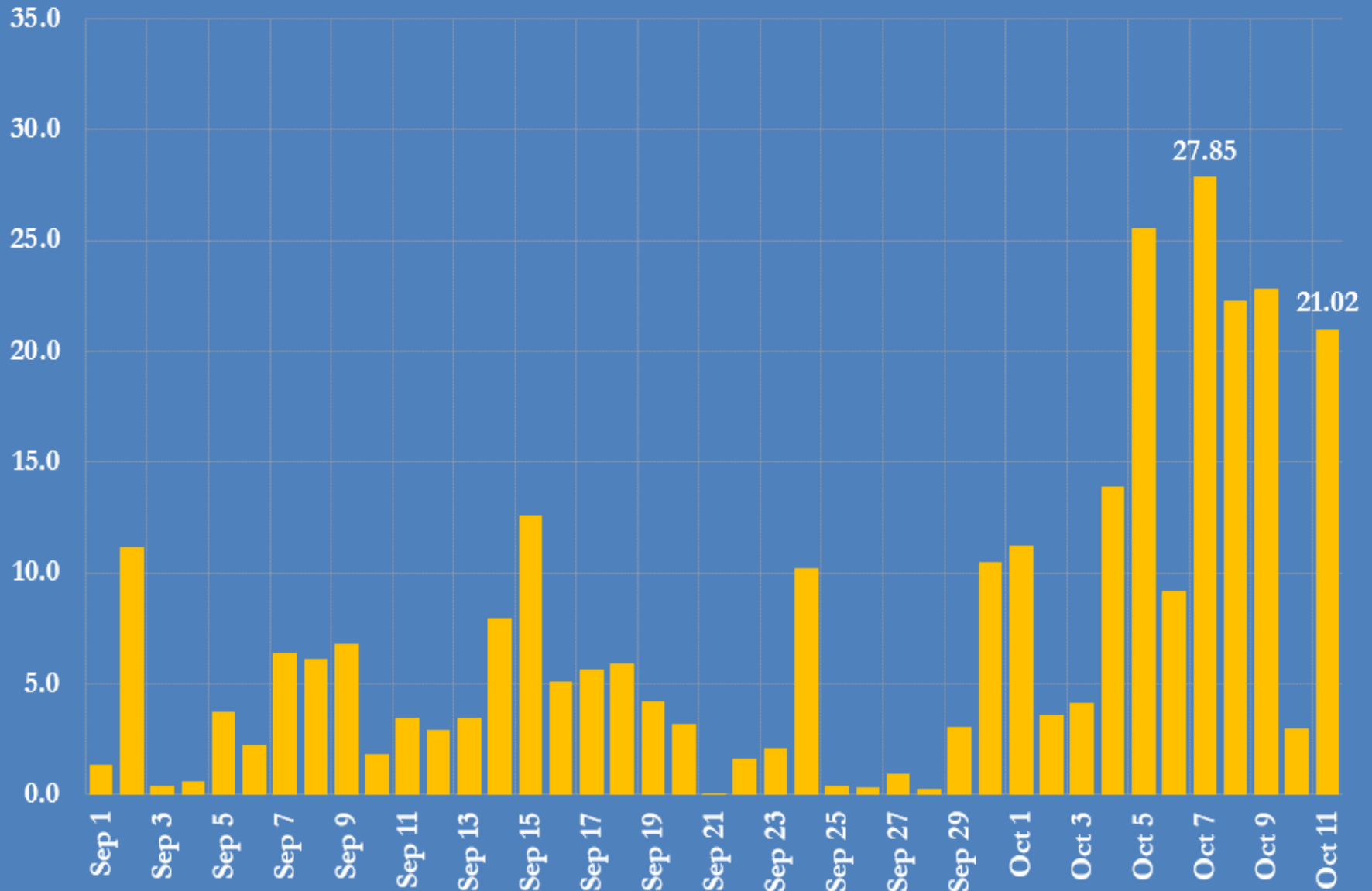
daily average, cycles per second (Hz)



Source: National Load Despatch Centre, Power System Operation Corporation of India
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India power grid frequency, Sep-Oct 2021

daily, percent of day spent below minimum target of 49.9 Hz



Source: National Load Despatch Centre, Power System Operation Corporation of India
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India power grid frequency profile for Sep 27 (Monday)

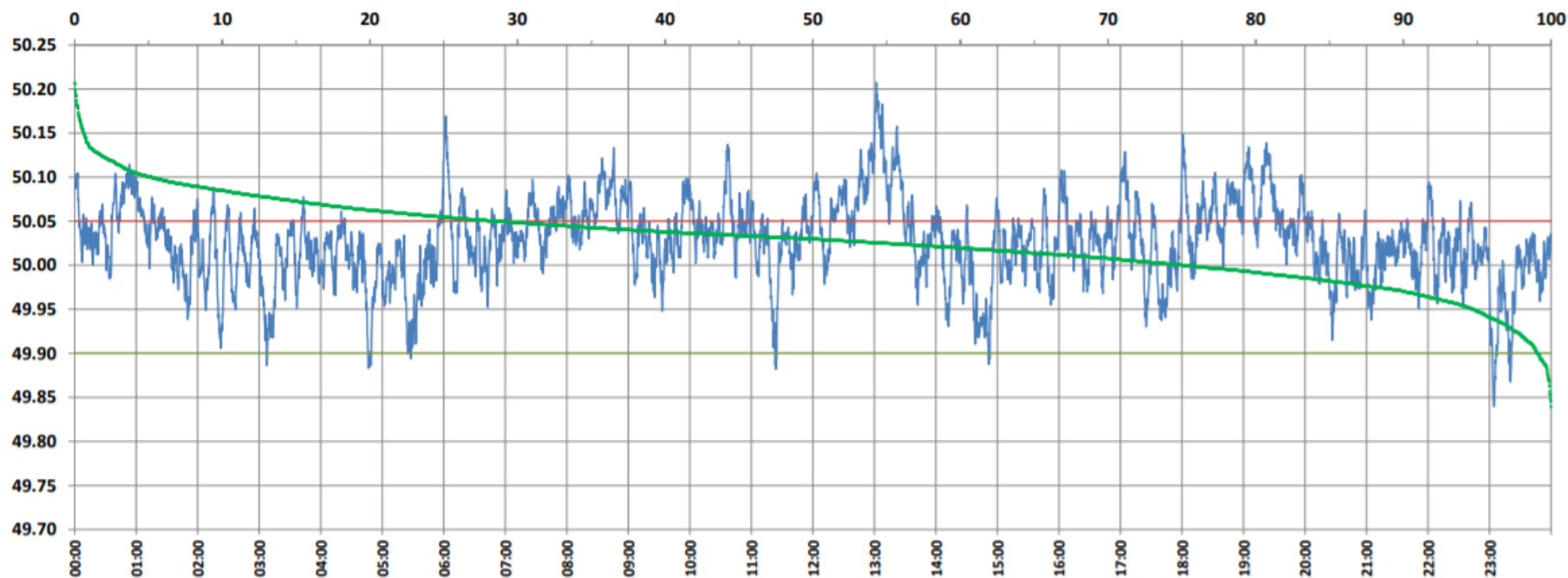
Normal conditions on the grid with generation and load well balanced

POWER SYSTEM OPERATION CORPORATION LIMITED

NATIONAL LOAD DESPATCH CENTRE, NEW DELHI



Frequency profile for 27-Sep-2021 (Monday)



<49.7	<49.90	<49.97	49.7-49.8	49.8-49.9	49.9-50.0	50.0-50.1	50.1-50.2	49.90-50.05	49.7-50.2	49.97-50.03	50.05-50.1	>50	>50.03	>50.05	>50.2	<49.95	49.95-50.05	49.90-49.95
0.00	0.93	9.93	0.00	0.93	24.03	69.84	5.19	70.46	99.98	40.36	23.40	75.05	49.71	28.61	0.02	5.28	66.11	4.35

Average Frequency : 50.027

Frequency Variation Index : 0.0289

Standard Deviation : 0.0463

Mileage: 45.6

FDI: 29.5

India power grid frequency profile for Oct 7 (Thursday)

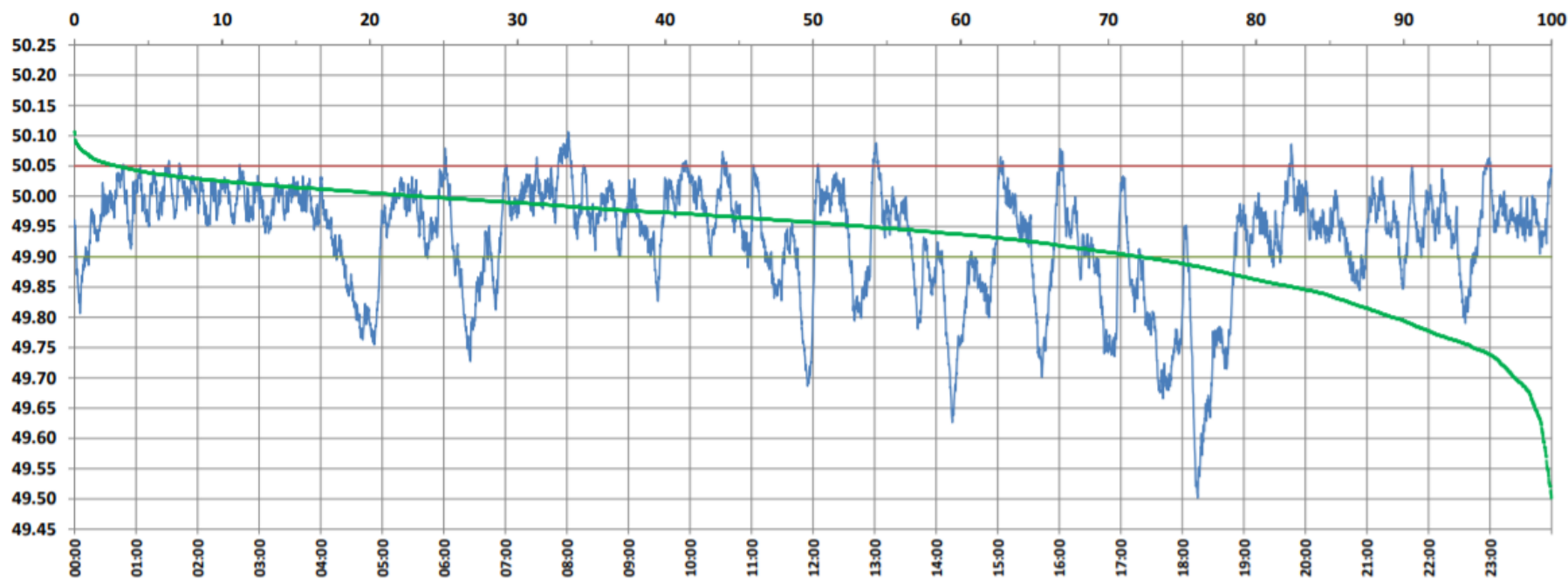
Worst day of power crisis so far – severe, persistent under-frequency excursions

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NATIONAL LOAD DESPATCH CENTRE, NEW DELHI



Frequency profile for 07-Oct-2021 (Thursday)



<49.7	<49.90	<49.97	49.7-49.8	49.8-49.9	49.9-50.0	50.0-50.1	50.1-50.2	49.90-50.05	49.7-50.2	49.97-50.03	50.05-50.1	>50	>50.03	>50.05	>50.2	<49.95	49.95-50.05	49.90-49.95
2.49	27.85	57.85	8.31	17.05	48.88	23.24	0.03	69.29	97.51	34.27	2.82	23.28	7.88	2.86	0.00	46.44	50.71	18.59

Average Frequency : 49.932

Frequency Variation Index : 0.1321

Standard Deviation : 0.0926

Mileage: 47.0

FDI: 30.7

India power grid frequency profile for Oct 11 (Monday)

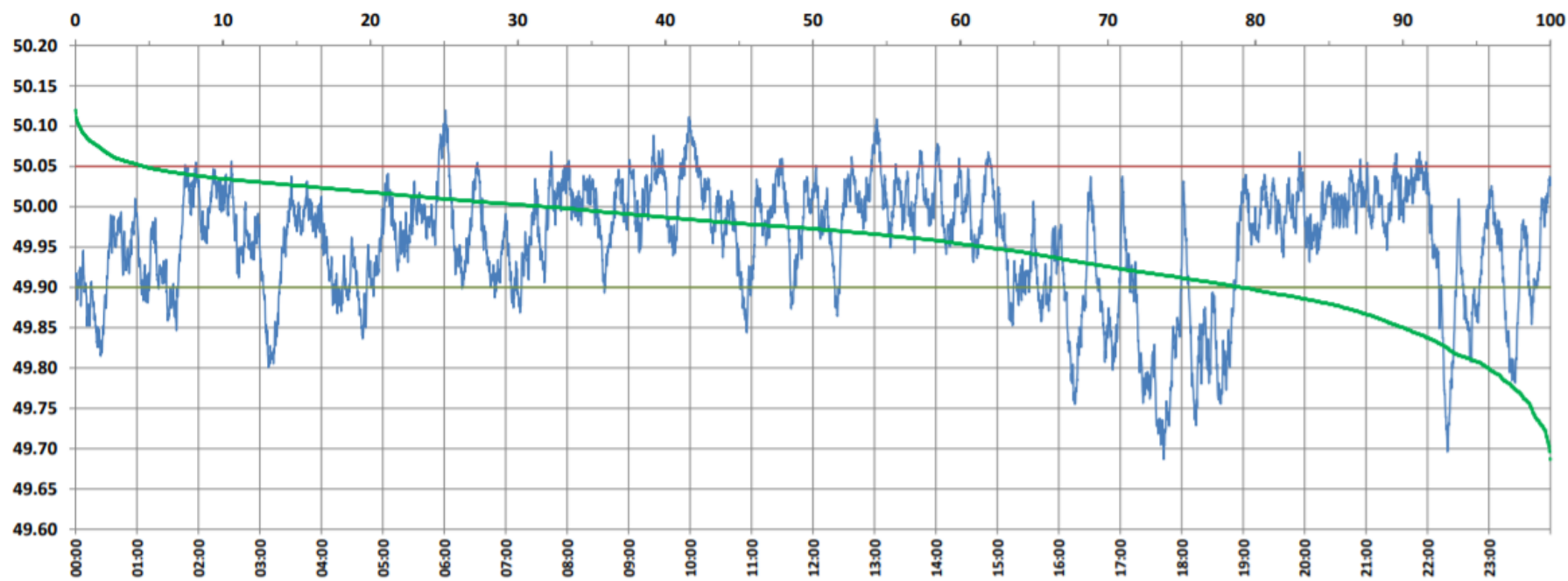
Persistent under-frequency from around 1500 hours

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NATIONAL LOAD DESPATCH CENTRE, NEW DELHI



Frequency profile for 11-Oct-2021 (Monday)



<49.7	<49.90	<49.97	49.7-49.8	49.8-49.9	49.9-50.0	50.0-50.1	50.1-50.2	49.90-50.05	49.7-50.2	49.97-50.03	50.05-50.1	>50	>50.03	>50.05	>50.2	<49.95	49.95-50.05	49.90-49.95
0.07	21.02	48.16	4.12	16.83	47.08	31.64	0.25	74.36	99.93	39.00	4.36	31.90	12.84	4.62	0.00	38.36	57.03	17.34

Average Frequency : 49.956

Frequency Variation Index : 0.0743

Standard Deviation : 0.0740

Mileage: 45.7

FDI: 25.6

India actual power generation versus plan

million kWh

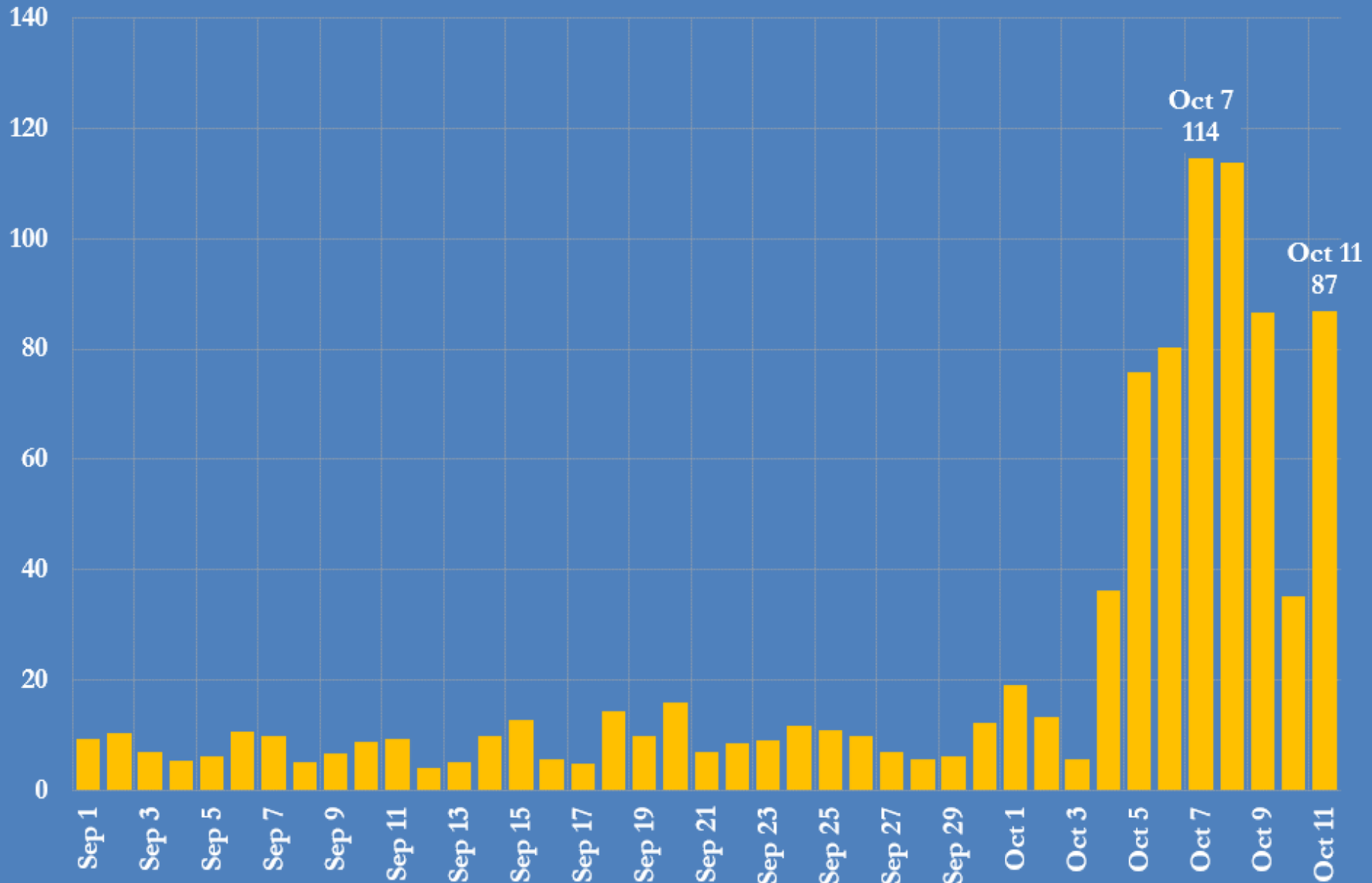
	April 1 - August 31		April 1 - October 10		Incremental deviation from Aug 31 to Oct 10
	Deviation	Percent	Deviation	Percent	
Northern Region	-10,225	-6.7	-10,200	-5.3	25
Thermal	-7,273	-6.9	-8,797	-6.6	-1,524
Nuclear	442	10.1	697	12.9	255
Hydro	-3,394	-7.7	-2,100	-3.9	1,294
Western Region	-2,826	-1.4	-12,944	-4.9	-10,118
Thermal	-2,463	-1.3	-11,442	-4.6	-8,979
Nuclear	-776	-13.3	-1,009	-13.6	-232
Hydro	414	7.3	-493	-6.0	-907
Southern Region	-5,614	-5.1	-7,450	-5.3	-1,836
Thermal	-8,261	-9.1	-11,380	-9.9	-3,119
Nuclear	17	0.2	200	1.9	183
Hydro	2,630	22.3	3,730	23.0	1,100
Eastern Region	8,236	9.2	9,785	8.6	1,550
Thermal	8,387	10.6	9,683	9.7	1,296
Hydro	-151	-1.4	102	0.7	254
North Eastern Region	-495	-5.5	-355	-3.1	141
Thermal	-76	-1.5	193	2.9	269
Hydro	-419	-11.3	-548	-11.2	-129
All India	-11,576	-2.0	-21,471	-2.9	-9,895
Thermal	-9,686	-2.0	-21,743	-3.6	-12,057
Nuclear	-317	-1.8	-112	-0.5	206
Hydro	-920	-1.2	692	0.7	1,612

Source: India National Power Portal

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India electricity shortage, Sep-Oct 2021

daily, million kilowatt-hours

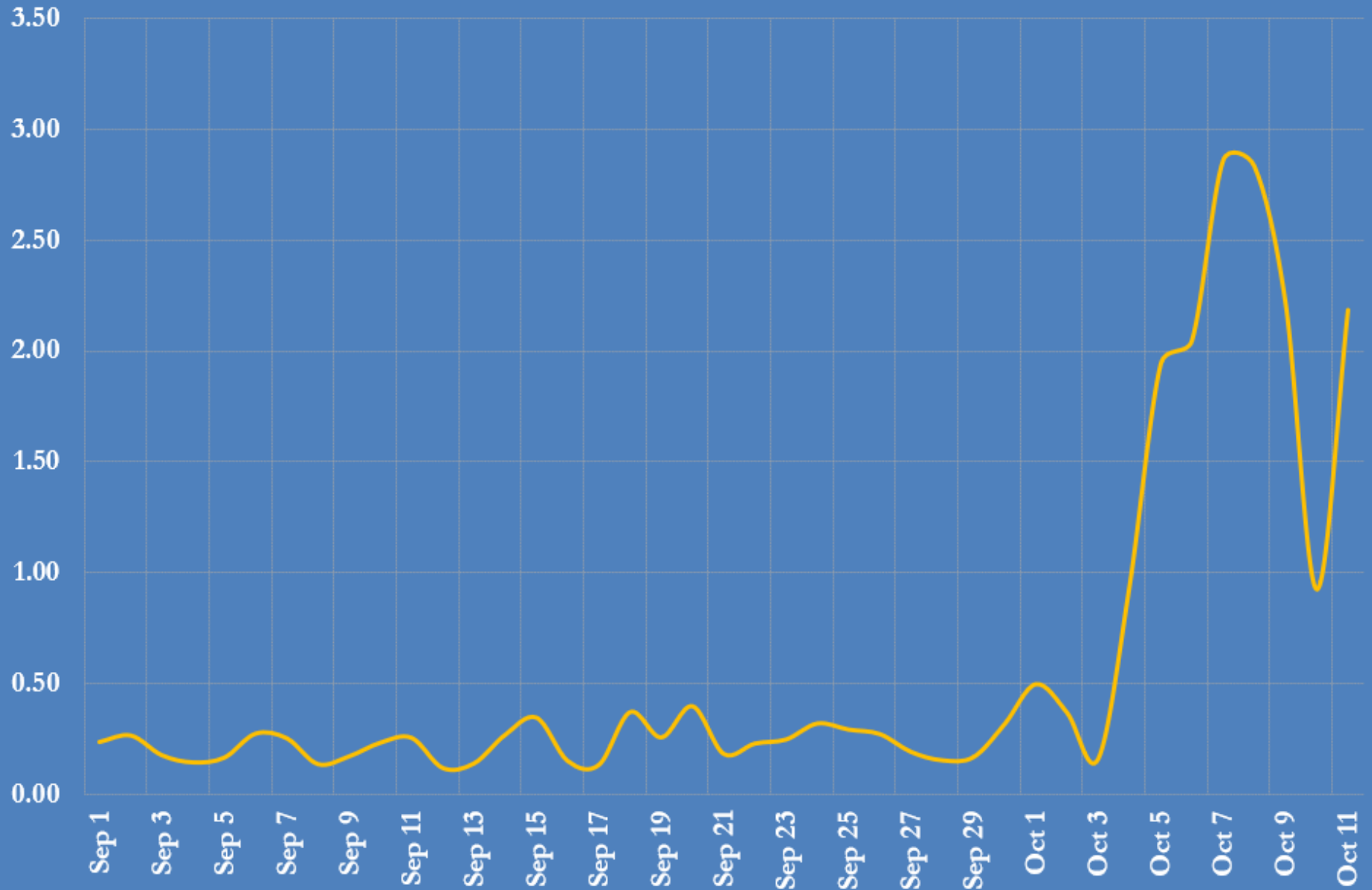


Source: National Load Despatch Centre, Power System Operation Corporation

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India unmet electricity demand, Sep-Oct 2021

daily, percent of total demand

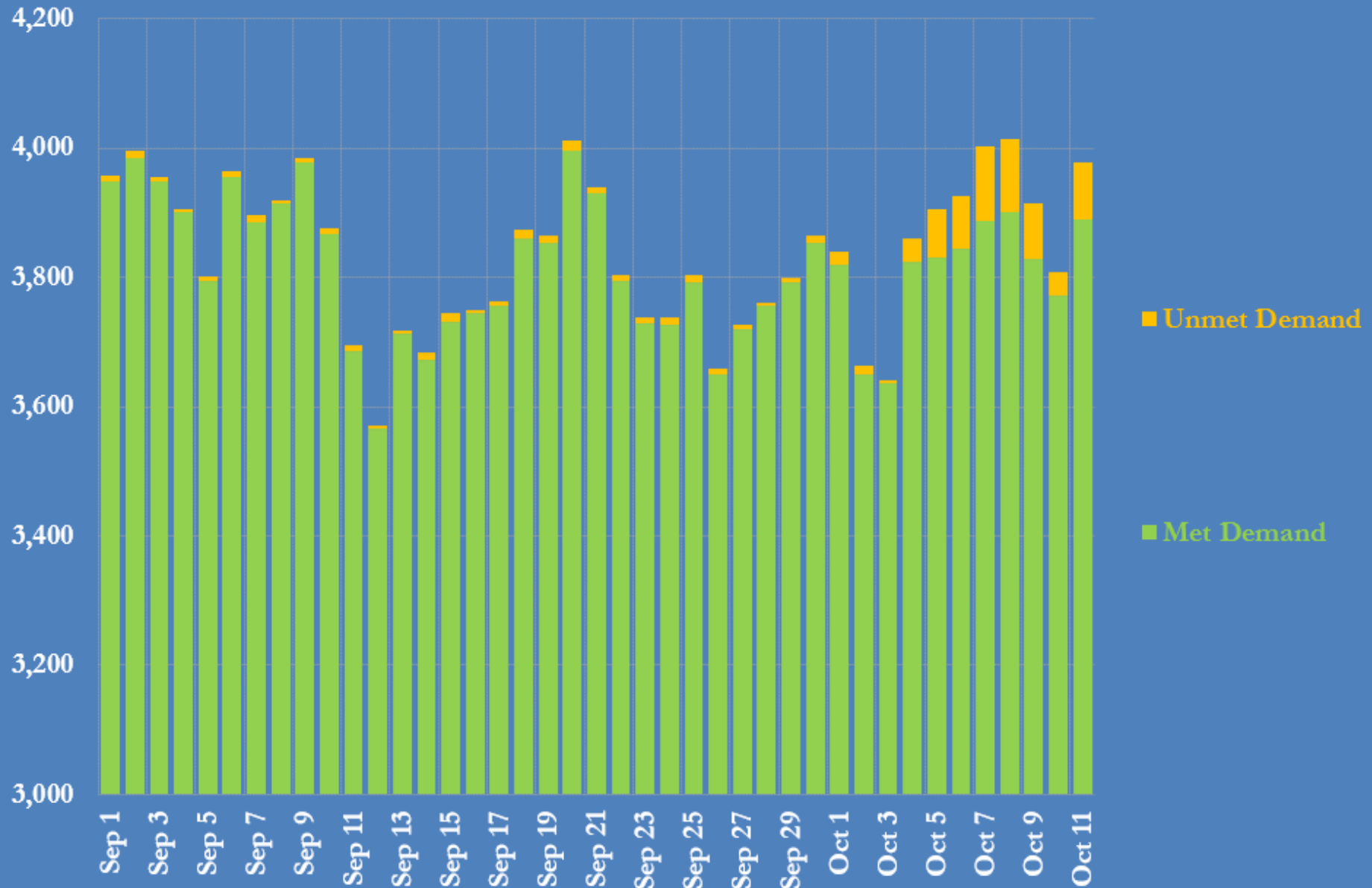


Source: National Load Despatch Centre, Power System Operation Corporation

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India electricity met and unmet demand, Sep-Oct 2021

daily, million kilowatt-hours, note broken axis

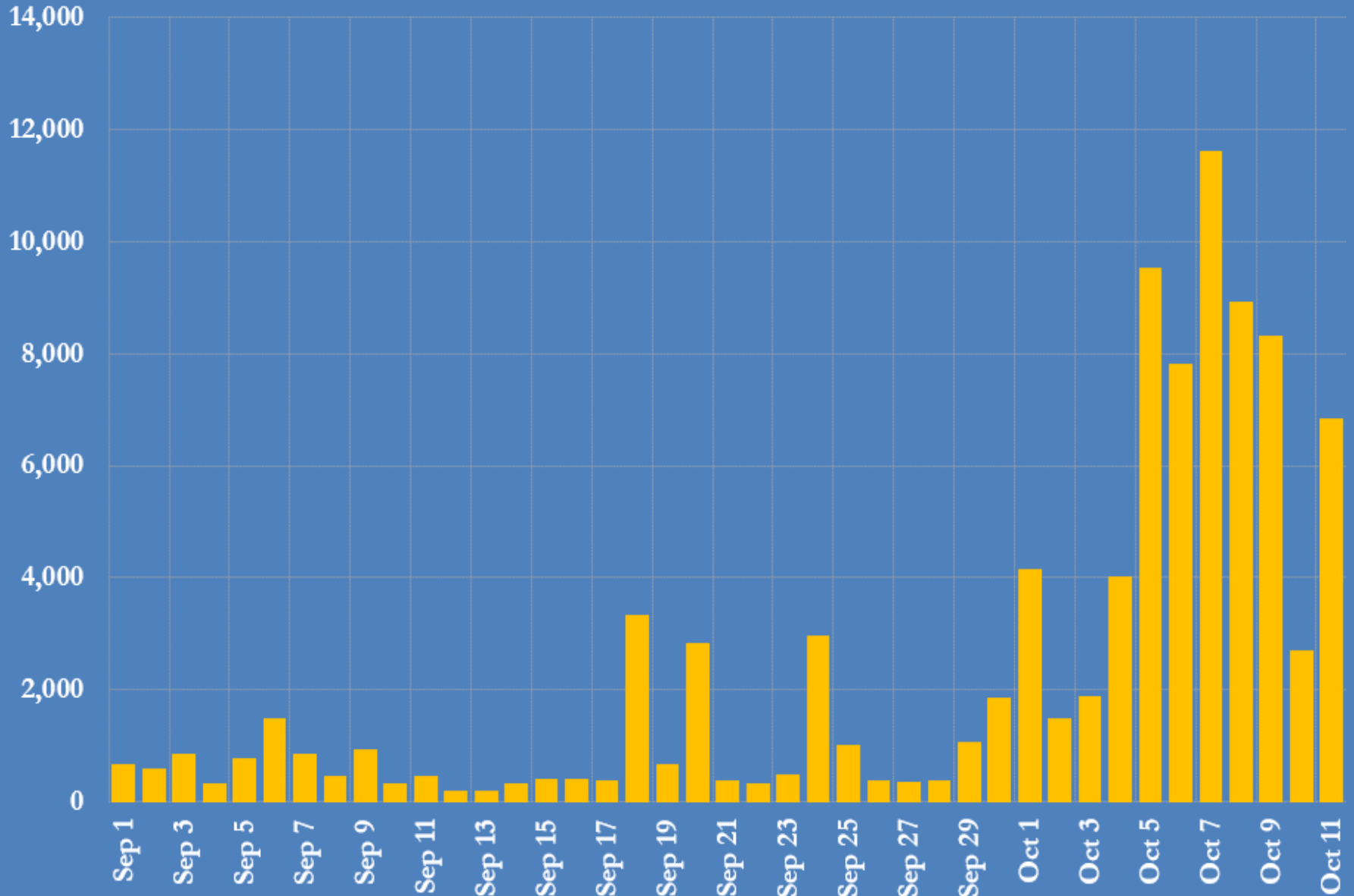


Source: National Load Despatch Centre, Power System Operation Corporation

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India electricity shortage, Sep-Oct 2021

daily, peak power shortage MW

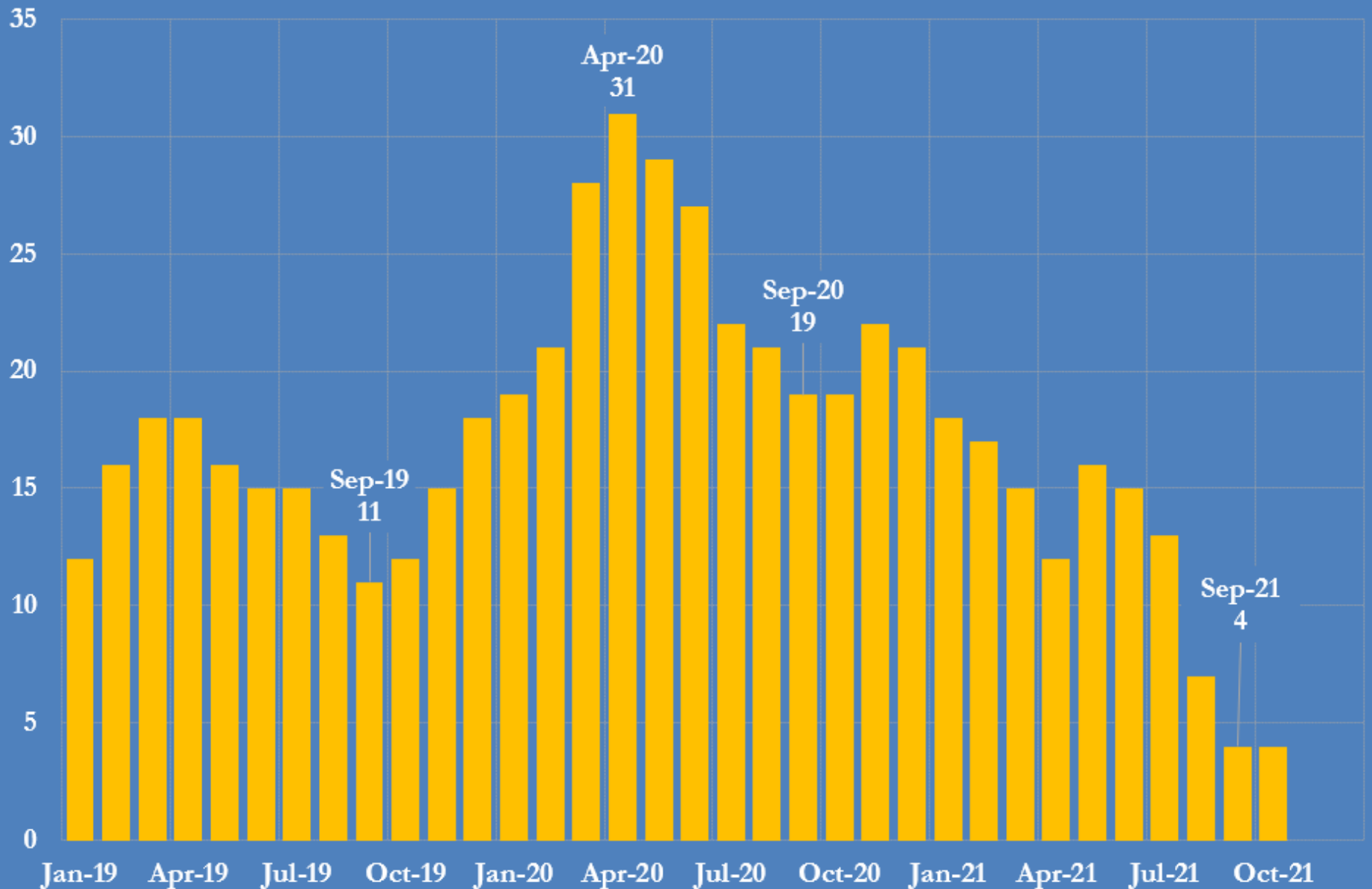


Source: National Load Despatch Centre, Power System Operation Corporation

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India coal stocks at power plants, 2019-2021

month-end, stocks in days of consumption



Source: India Central Electricity Authority / National Power Portal

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