

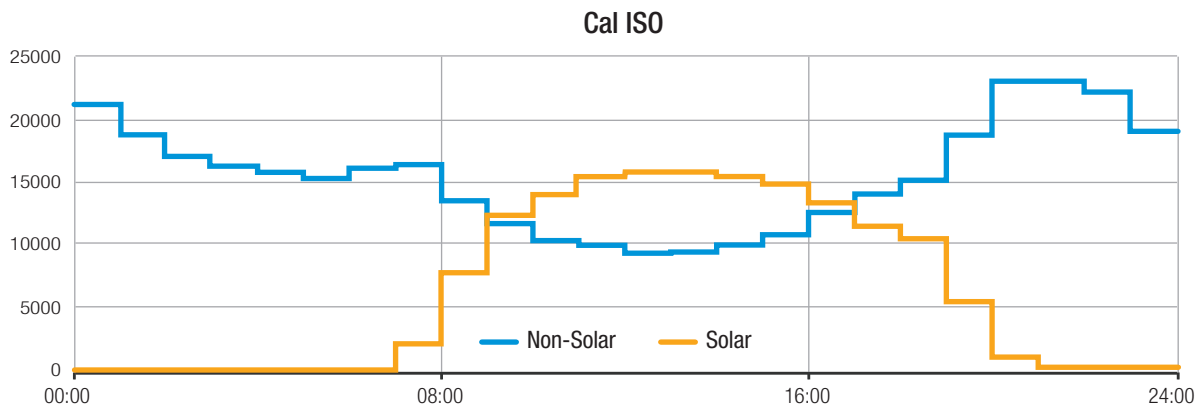
A Day in the Life of the Grid

Cal ISO, PJM, ERCOT

The regional power grids are changing rapidly and facing unprecedented challenges. Here's a look at one day, a month ago, the fifteenth of May, a Wednesday, illustrating interesting dynamics in three regions, those of the California ISO, PJM in the mid-Atlantic, and ERCOT in Texas.

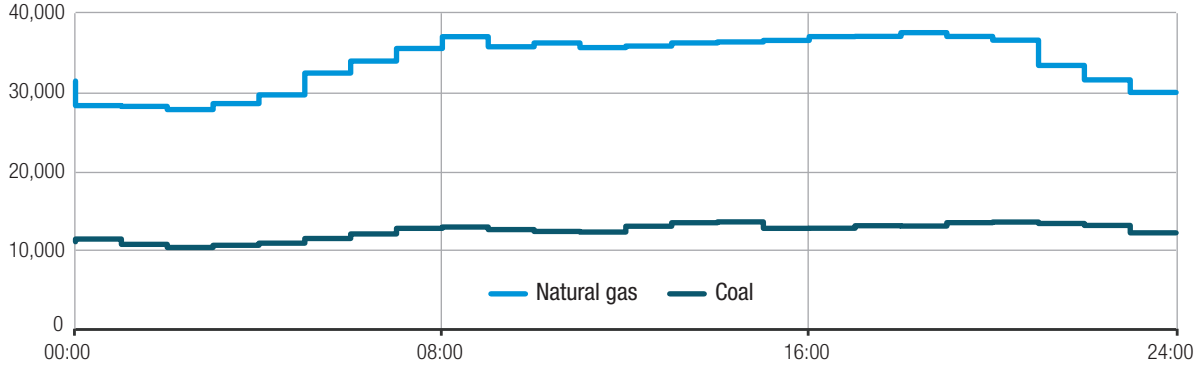
Cal ISO, as is shown here, regularly encounters a swift decline in solar generation in the late afternoon necessitating a swift rise in a

mix of non-solar generation to compensate. PJM, as is shown here, depends quite heavily on natural gas generation far more than coal generation, a reversal of the situation not long ago. ERCOT, as is shown here, experiences that same swift decline in solar generation in the late afternoon, precipitating a dramatic increase in natural gas generation especially to compensate.



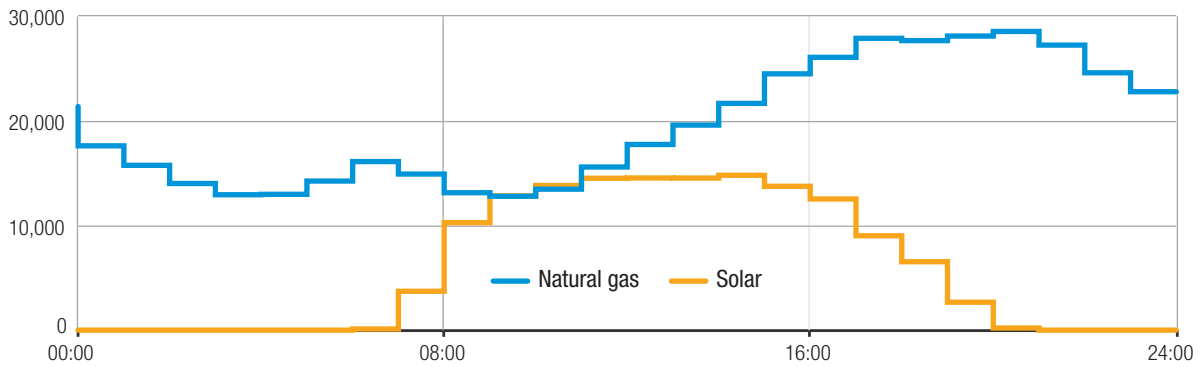
Hour ending	Total (MWh)	Solar (MWh)	Non-Solar (MWh)	Hour ending	Total (MWh)	Solar (MWh)	Non-Solar (MWh)	Hour ending	Total (MWh)	Solar (MWh)	Non-Solar (MWh)
12 a.m.	21,620	160	21,460	8 a.m.	18,955	2,266	16,689	4 p.m.	26,101	15,019	11,082
1 a.m.	19,173	169	19,004	9 a.m.	21,800	7,986	13,814	5 p.m.	26,225	13,507	12,718
2 a.m.	17,380	168	17,212	10 a.m.	24,460	12,606	11,854	6 p.m.	25,861	11,606	14,255
3 a.m.	16,679	172	16,507	11 a.m.	24,783	14,308	10,475	7 p.m.	25,911	10,526	15,385
4 a.m.	16,202	174	16,028	12 p.m.	25,718	15,598	10,120	8 p.m.	24,722	5,636	19,086
5 a.m.	15,923	170	15,753	1 p.m.	25,447	15,985	9,462	9 p.m.	24,442	1,070	23,372
6 a.m.	15,651	167	15,484	2 p.m.	25,135	15,589	9,546	10 p.m.	23,735	377	23,358
7 a.m.	16,423	185	16,238	3 p.m.	25,530	15,529	10,001	11 p.m.	22,744	382	22,362
								12 a.m.	19,767	382	19,385

PJM



Hour ending	Natural Gas (MWh)	Coal (MWh)	Ratio Gas to Coal	Hour ending	Natural Gas (MWh)	Coal (MWh)	Ratio Gas to Coal	Hour ending	Natural Gas (MWh)	Coal (MWh)	Ratio Gas to Coal
12 a.m.	31,402	11,030	2.85	8 a.m.	35,530	12,727	2.79	4 p.m.	36,552	12,727	2.87
1 a.m.	28,287	11,371	2.49	9 a.m.	37,025	12,894	2.87	5 p.m.	37,035	12,740	2.91
2 a.m.	28,188	10,698	2.63	10 a.m.	35,747	12,570	2.84	6 p.m.	37,064	13,059	2.84
3 a.m.	27,785	10,302	2.7	11 a.m.	36,229	12,335	2.94	7 p.m.	37,535	13,018	2.88
4 a.m.	28,542	10,579	2.7	12 p.m.	35,642	12,257	2.91	8 p.m.	37,055	13,447	2.76
5 a.m.	29,644	10,848	2.73	1 p.m.	35,836	12,995	2.76	9 p.m.	36,582	13,525	2.7
6 a.m.	32,412	11,440	2.83	2 p.m.	36,234	13,439	2.7	10 p.m.	33,379	13,344	2.5
7 a.m.	33,932	12,017	2.82	3 p.m.	36,359	13,546	2.68	11 p.m.	31,550	13,097	2.41
								12 a.m.	29,959	12,158	2.46

ERCOT



Hour ending	Solar (MWh)	Natural Gas (MWh)	Ratio Solar to Gas	Hour ending	Solar (MWh)	Natural Gas (MWh)	Ratio Solar to Gas	Hour ending	Solar (MWh)	Natural Gas (MWh)	Ratio Solar to Gas
12 a.m.	0	21382	0	8 a.m.	3716	14920	0.25	4 p.m.	13751	24500	0.56
1 a.m.	0	17618	0	9 a.m.	10270	13136	0.78	5 p.m.	12539	26076	0.48
2 a.m.	0	15753	0	10 a.m.	12839	12799	1	6 p.m.	9021	27897	0.32
3 a.m.	0	14016	0	11 a.m.	13827	13475	1.03	7 p.m.	6537	27674	0.24
4 a.m.	0	12942	0	12 p.m.	14518	15592	0.93	8 p.m.	2667	28111	0.09
5 a.m.	0	12984	0	1 p.m.	14544	17748	0.82	9 p.m.	204	28552	0.01
6 a.m.	0	14251	0	2 p.m.	14538	19601	0.74	10 p.m.	0	27247	0
7 a.m.	108	16113	0.01	3 p.m.	14801	21673	0.68	11 p.m.	0	24599	0
								12 a.m.	0	22792	0