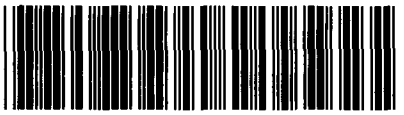

Control Number: 50277

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SOAH DOCKET NO. 473-20-2278

DOCKET NO. 50277

APPLICATION OF EL PASO	**§**	
ELECTRIC COMPANY TO AMEND	**§**	
ITS CERTIFICATE OF	**§**	**BEFORE THE**
CONVENIENCE AND NECESSITY	**§**	**PUBLIC UTILITY COMMISSION**
FOR AND ADDITIONAL	**§**	**OF TEXAS**
GENERATING UNIT AT THE	**§**	
NEWMAN GENERATING STATION	**§**	

WORKPAPERS

OF

SCOTT NORWOOD

ON BEHALF OF

THE CITY OF EL PASO

MAY 6, 2020

102

TABLE 1

Plant Construction Cost	$141.2
Plant AFUDC	$16.4
Transmission Interconnection	$6.2
Total Project Cost	$163.8
Cost/kW at 228 MW	$718.4

El Paso Electric Company
Loads & Resources 2019-2028
CEP Revised with Deferred Retirements, 35 to 60 MW Short-term Purchase and 4-Year Delay of Newman

TABLE 2

			SOLAR SOL/BATT	BATTERY ST Purchase	ST Purchase	ST Purchase	ST Purchase	CC 320	125 SOLAR RECIP	
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
1 0 GENERATION RESOURCES										
1 1 RIO GRANDE	278	278	278	278	278	278	278	232	232	232
1 2 NEWMAN	736	736	736	736	736	736	736	262	262	262
1 3 COPPER	63	63	63	63	63	63	63	63	63	63
1 4 MONTANA	352	352	352	352	352	352	352	352	352	352
1 5 PALO VERDE	633	633	633	633	633	633	633	633	633	633
1 6 RENEWABLES	6	6	6	6	6	6	6	6	6	6
1 7 STORAGE	0	0	0	50	50	50	50	50	50	50
1 8 POSSIBLE EMERGING TECHNOLOGY EXPANSION[1]	0	0	0	0	0	40	40	40	40	40
1 9 NEW BUILD (local)	0	0	0	0	0	0	0	546	596	596
1 0 TOTAL GENERATION RESOURCES [2]	**2,068**	**2,068**	**2,068**	**2,118**	**2,118**	**2,158**	**2,158**	**2,184**	**2,234**	**2,234**
2 0 RESOURCE PURCHASES										
2 1 RENEWABLE PURCHASE (SunEdison & NRG)	29	29	28	28	28	28	27	27	27	27
2 2 RENEWABLE PURCHASE (Hatch)	3	3	3	3	3	3	3	3	3	3
2 3 RENEWABLE PURCHASE (Macho Springs)	34	34	34	34	34	34	33	33	33	33
2 4 RENEWABLE PURCHASE (Juwi)	7	7	7	7	7	7	7	7	7	7
2 5 NEW RENEWABLE/ BATTERY PURCHASE	0	0	100	100	100	100	100	100	131	131
2 6 RESOURCE PURCHASE	80	110	35	35	35	35	60	70	20	70
2 0 TOTAL RESOURCE PURCHASES [4]	**153**	**183**	**207**	**207**	**206**	**206**	**231**	**240**	**221**	**271**
3 0 TOTAL NET RESOURCES (1 0 + 2 0)	**2,221**	**2,251**	**2,275**	**2,325**	**2,324**	**2,364**	**2,389**	**2,424**	**2,455**	**2,505**
4 0 SYSTEM DEMAND										
4 1 NATIVE SYSTEM DEMAND	**2,009**	**2,044**	**2,073**	**2,104**	**2,128**	**2,166**	**2,200**	**2,237**	**2,269**	**2,315**
4 2 DISTRIBUTED GENERATION[5]	-3	-4	-6	-7	-9	-10	-10	-10	-10	-10
4 3 ENERGY EFFICIENCY	-12	-18	-24	-30	-36	-41	-47	-53	-59	-65
4 4 LINE LOSSES	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
4 5 INTERRUPTIBLE SALES	-59	-59	-59	-59	-59	-59	-59	-59	-59	-59
5 0 TOTAL SYSTEM DEMAND (4 1-(4 2+4 3+4 4+4 5)) [6]	**1,928**	**1,956**	**1,978**	**2,001**	**2,018**	**2,048**	**2,077**	**2,108**	**2,134**	**2,174**
6 0 MARGIN OVER TOTAL DEMAND (3 0 - 5 0)	**293**	**294**	**297**	**324**	**307**	**316**	**312**	**316**	**321**	**331**
PLANNING RESERVE, % W/O Newman 6	**15 2%**	**15 0%**	**15 0%**	**16 2%**	**15 2%**	**15.4%**	**15 0%**			
7 0 PLANNING RESERVE 15% OF TOTAL SYSTEM DEMAND	**289**	**293**	**297**	**300**	**303**	**307**	**312**	**316**	**320**	**326**
8 0 MARGIN OVER RESERVE (6 0 - 7 0)	**4**	**1**	**1**	**24**	**4**	**8**	**0**	**0**	**1**	**5**

Generation Additions
100 MW Solar (25 MW at Peak) in 2022
Solar/Batt Combo (100/50 MW) in 2022
(75 MW at Peak)
Stand-alone Battery (50 MW) in 2023
Newman 6 GT5 (226 MW) in 2023
Drop_In 1x1 CC (320 MW Total) in 2027
125 MW Solar (31 MW at Peak) in 2028
Recip Engines (50 MW) in 2028

Unit Retirements
Rio Grande 6 (45MW)[3]
Rio Grande 7 (46MW) - December 2022
Newman 1 (76MW) - December 2022
Newman 2 (76MW) - December 2022
Newman 3 (95MW) - December 2026
Newman 4 CC (227MW) - December 2026
Copper (63MW) - December 2030
Rio Grande 8 (144MW) - December 2033

Renewable Purchases
SunEdison, NRG, Macho Springs, Juwi, and Hatch sc
purchases reflect 70% availability at Peak

Company Owned Renewables
Renewable Resources shown in line item 1 6 consists
of EPE Community Solar, Holloman Solar, EPCC,
Stanton, Wrangler, Rio Grande & Newman Carpor
and Van Horn

Resource Purchase
This purchase is supported by firm transmission
through (i) simultaneous buy/sell with

Freeport McMoRan (formerly Phelps Dodge),
(ii) Four Corners switchyard after Four Corners
retired, and (iii) SPS via the Eddy Tie

1 Emerging technologies may include customer or other distributed resources as well as additional community solar
2 Generation unit retirements are consistent with the 2018 IRP
3 Rio Grande 6 is classified as inactive reserve
4 Purchases based on existing and estimated future purchases including renewable purchases The recently passed NM Energy Transition Act is pending Commission rulemaking Future resource additions for NM RPS may modify this L&R
5 Forecasted Distributed Generation incremental growth is denoted in line 4 2 These values are in addition to the existing 45 MW online at the end of 2018 DG resources added through 2025 reflect 18 9% availability at peak
6 System Demand based on 2019 Long-term Forecast dated April 9, 2019
Includes state-required targets for Energy Efficiency
Interruptible load reflects current contracts
7 Long-term resource needs will be evaluated based on system needs and are subject to change
8 The resource expansions in 2022 & 2023 are a result of the 2017-2018 RFP process
9 The resource expansions in 2027 & 2028 are subject to RFP results and may be in combination with renewables and/or others resources
10 Additional small renewable projects being pursued and if implemented, will reduce the capacity need in future years
11 EPE is exploring additional renewable resources to satisfy RPS requirements and if acquired those resources may impact the L&R as well as planned additions

TABLE 3

Average Equivalent Availability during summer peak months (May - Sept) (%)

Plant/Unit	2015	2016	2017	2018	2019	Average
Rio Grande 6	100.0%	99.7%	98.9%	98.6%		99.3%
Rio Grande 7	99.0%	97.4%	96.7%	96.1%	95.7%	97.0%
Newman Unit 1	88.0%	100.0%	38.5%	84.0%	99.4%	82.0%
Newman Unit 2	95.8%	96.8%	85.9%	37.6%	97.5%	82.7%

Source: EPE's response to CEP 1-16(e).

Rio Grande 6	100.0	99.7	98.9	98.6	-	99.3
Rio Grande 7	99.0	97.4	96.7	96.1	95.7	97.0
Rio Grande 8	92.9	89.0	99.3	82.1	98.9	92.4
Rio Grande 9	95.7	43.3	96.8	95.0	89.6	84.1
Newman Unit 1	88.0	100.0	38.5	84.0	99.4	82.0
Newman Unit 2	95.8	96.8	85.9	37.6	97.5	82.7

EXHIBIT SN-6

2015-2019 EPE Historical Peak Demands (MW)

	Annual Peak Hour	100th Highest Peak Hour	MW Difference Peak vs 100th Highest Hour
2015	1,794	1,635	159
2016	1,892	1,704	188
2017	1,935	1,683	252
2018	1,929	1,767	162
2019	1,977	1,798	179
			188

Data Source is EPE's response to CEP 1-6.

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2015 to December 31, 2015
Hours are in MST

Line No.	Date	Hour	Native Peak
1	8/6/15	16:00	1,794
2	6/22/15	16:00	1,787
3	8/6/15	15:00	1,783
4	6/22/15	15:00	1,778
5	8/6/15	17:00	1,768
6	8/18/15	15:00	1,765
7	6/22/15	17:00	1,763
8	8/18/15	14:00	1,761
9	8/7/15	15:00	1,757
10	8/7/15	16:00	1,752
11	8/5/15	16:00	1,740
12	8/6/15	14:00	1,737
13	8/14/15	16:00	1,737
14	8/18/15	16:00	1,735
15	8/5/15	15:00	1,733
16	6/22/15	14:00	1,730
17	8/14/15	15:00	1,730
18	7/28/15	16:00	1,718
19	8/13/15	16:00	1,717
20	8/14/15	17:00	1,716
21	8/14/15	14:00	1,714
22	8/19/15	16:00	1,714
23	8/21/15	15:00	1,714
24	6/22/15	18:00	1,712
25	8/5/15	17:00	1,711
26	8/21/15	16:00	1,710
27	8/7/15	14:00	1,709
28	8/13/15	15:00	1,706
29	8/17/15	15:00	1,706
30	7/28/15	15:00	1,704
31	8/17/15	16:00	1,704
32	8/19/15	15:00	1,704
33	8/20/15	16:00	1,704
34	8/6/15	18:00	1,703
35	8/18/15	13:00	1,703
36	8/7/15	17:00	1,699
37	7/28/15	17:00	1,695
38	8/5/15	14:00	1,695
39	7/27/15	15:00	1,690
40	8/10/15	16:00	1,690
41	6/18/15	16:00	1,688
42	7/21/15	15:00	1,687
43	8/4/15	16:00	1,687

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2015 to December 31, 2015
Hours are in MST

Line No.	Date	Hour	Native Peak
44	8/20/15	15:00	1,686
45	7/13/15	16:00	1,684
46	8/6/15	13:00	1,683
47	8/13/15	17:00	1,681
48	8/19/15	17:00	1,680
49	7/2/15	16:00	1,678
50	8/21/15	14:00	1,677
51	8/10/15	15:00	1,676
52	7/20/15	16:00	1,675
53	7/24/15	16:00	1,675
54	7/27/15	14:00	1,674
55	7/28/15	14:00	1,674
56	8/13/15	14:00	1,673
57	8/20/15	17:00	1,673
58	7/13/15	15:00	1,672
59	8/4/15	15:00	1,672
60	8/17/15	17:00	1,672
61	7/20/15	15:00	1,670
62	8/10/15	17:00	1,669
63	9/1/15	16:00	1,669
64	8/28/15	16:00	1,668
65	7/2/15	15:00	1,667
66	8/28/15	15:00	1,667
67	8/14/15	13:00	1,666
68	6/22/15	13:00	1,665
69	8/17/15	14:00	1,665
70	9/2/15	15:00	1,664
71	7/24/15	17:00	1,663
72	6/18/15	15:00	1,662
73	7/24/15	15:00	1,662
74	8/4/15	17:00	1,662
75	7/21/15	16:00	1,661
76	7/27/15	16:00	1,660
77	8/21/15	17:00	1,660
78	9/1/15	15:00	1,660
79	7/13/15	17:00	1,659
80	8/19/15	14:00	1,659
81	8/5/15	18:00	1,658
82	9/2/15	16:00	1,656
83	8/14/15	18:00	1,655
84	8/31/15	16:00	1,654
85	8/7/15	13:00	1,648
86	7/2/15	17:00	1,645

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2015 to December 31, 2015
Hours are in MST

Line No.	Date	Hour	Native Peak
87	8/7/15	18:00	1,644
88	7/13/15	14:00	1,641
89	8/18/15	17:00	1,641
90	8/20/15	14:00	1,640
91	9/8/15	15:00	1,640
92	9/8/15	16:00	1,640
93	6/17/15	16:00	1,639
94	6/22/15	19:00	1,638
95	7/20/15	17:00	1,638
96	8/31/15	15:00	1,638
97	9/16/15	16:00	1,638
98	7/27/15	13:00	1,637
99	7/21/15	14:00	1,635
100	8/25/15	15:00	1,635

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2016 to December 31, 2016
Hours are in MST

Line No.	Date	Hour	Native Peak
1	7/14/16	16:00	1,892
2	7/14/16	15:00	1,887
3	6/23/16	16:00	1,871
4	7/14/16	17:00	1,870
5	6/23/16	15:00	1,865
6	7/13/16	16:00	1,856
7	7/14/16	14:00	1,851
8	7/13/16	15:00	1,842
9	7/13/16	17:00	1,842
10	6/22/16	16:00	1,839
11	6/22/16	15:00	1,834
12	7/22/16	16:00	1,833
13	6/22/16	17:00	1,831
14	7/21/16	15:00	1,828
15	6/23/16	17:00	1,827
16	7/12/16	16:00	1,824
17	7/15/16	16:00	1,823
18	6/22/16	14:00	1,816
19	7/21/16	16:00	1,815
20	7/22/16	15:00	1,811
21	7/12/16	17:00	1,807
22	7/12/16	15:00	1,803
23	7/15/16	15:00	1,802
24	6/23/16	14:00	1,801
25	7/13/16	18:00	1,801
26	7/14/16	18:00	1,800
27	7/15/16	17:00	1,797
28	7/11/16	16:00	1,793
29	7/11/16	15:00	1,791
30	7/22/16	17:00	1,790
31	7/21/16	14:00	1,789
32	7/20/16	16:00	1,788
33	7/13/16	14:00	1,787
34	8/8/16	16:00	1,786
35	8/8/16	15:00	1,785
36	7/6/16	16:00	1,780
37	7/18/16	15:00	1,777
38	7/20/16	15:00	1,776
39	7/26/16	15:00	1,775
40	7/22/16	14:00	1,773
41	7/25/16	16:00	1,773
42	7/18/16	16:00	1,772
43	7/21/16	17:00	1,772

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2016 to December 31, 2016
Hours are in MST

Line No.	Date	Hour	Native Peak
44	7/26/16	16:00	1,772
45	7/6/16	15:00	1,768
46	7/25/16	15:00	1,768
47	6/23/16	18:00	1,766
48	7/11/16	17:00	1,766
49	7/12/16	14:00	1,765
50	7/12/16	18:00	1,765
51	7/14/16	13:00	1,765
52	7/15/16	14:00	1,760
53	6/22/16	18:00	1,757
54	6/24/16	16:00	1,757
55	7/21/16	18:00	1,756
56	7/6/16	17:00	1,754
57	7/20/16	17:00	1,752
58	7/26/16	14:00	1,748
59	7/14/16	19:00	1,747
60	7/19/16	14:00	1,745
61	7/11/16	14:00	1,744
62	7/25/16	17:00	1,744
63	7/19/16	15:00	1,743
64	7/20/16	14:00	1,741
65	7/28/16	16:00	1,741
66	6/24/16	15:00	1,740
67	7/7/16	16:00	1,740
68	7/18/16	17:00	1,740
69	8/8/16	14:00	1,738
70	7/21/16	13:00	1,737
71	7/18/16	14:00	1,736
72	7/8/16	16:00	1,733
73	7/22/16	18:00	1,732
74	7/25/16	14:00	1,732
75	6/22/16	13:00	1,731
76	7/13/16	13:00	1,729
77	7/23/16	16:00	1,728
78	7/28/16	15:00	1,728
79	7/7/16	15:00	1,727
80	7/13/16	19:00	1,726
81	7/24/16	17:00	1,725
82	7/12/16	13:00	1,724
83	7/7/16	17:00	1,721
84	8/12/16	15:00	1,721
85	8/5/16	16:00	1,720
86	7/11/16	18:00	1,719

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2016 to December 31, 2016
Hours are in MST

Line No.	Date	Hour	Native Peak
87	7/8/16	17:00	1,718
88	7/24/16	16:00	1,718
89	6/23/16	13:00	1,717
90	8/12/16	14:00	1,714
91	6/24/16	17:00	1,713
92	7/6/16	14:00	1,713
93	8/5/16	15:00	1,712
94	7/23/16	17:00	1,711
95	7/5/16	16:00	1,708
96	8/1/16	15:00	1,708
97	7/8/16	15:00	1,707
98	7/5/16	17:00	1,706
99	7/25/16	18:00	1,705
100	7/22/16	13:00	1,704

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2017 to December 31, 2017
Hours are in MST

Line No.	Date	Hour	Native Peak
1	6/22/17	16:00	1,935
2	6/22/17	17:00	1,918
3	6/22/17	15:00	1,915
4	6/23/17	15:00	1,912
5	6/23/17	16:00	1,905
6	6/23/17	14:00	1,893
7	6/23/17	17:00	1,867
8	6/21/17	16:00	1,856
9	6/22/17	14:00	1,854
10	6/22/17	18:00	1,845
11	6/21/17	15:00	1,832
12	6/21/17	17:00	1,826
13	6/19/17	16:00	1,819
14	6/23/17	13:00	1,815
15	6/20/17	16:00	1,813
16	6/23/17	18:00	1,812
17	6/20/17	17:00	1,811
18	6/21/17	18:00	1,804
19	7/11/17	16:00	1,792
20	6/20/17	15:00	1,791
21	6/21/17	14:00	1,786
22	6/22/17	13:00	1,785
23	7/11/17	17:00	1,779
24	6/19/17	14:00	1,778
25	8/10/17	16:00	1,773
26	6/19/17	15:00	1,770
27	7/11/17	15:00	1,770
28	8/9/17	16:00	1,768
29	6/20/17	14:00	1,763
30	6/20/17	18:00	1,763
31	7/11/17	14:00	1,754
32	8/7/17	16:00	1,750
33	6/29/17	16:00	1,746
34	8/10/17	15:00	1,746
35	6/29/17	15:00	1,743
36	6/22/17	19:00	1,742
37	8/7/17	15:00	1,742
38	7/5/17	15:00	1,740
39	8/9/17	15:00	1,739
40	7/6/17	16:00	1,738
41	7/26/17	15:00	1,738
42	6/15/17	16:00	1,736
43	6/30/17	16:00	1,736

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2017 to December 31, 2017
Hours are in MST

Line No.	Date	Hour	Native Peak
44	7/13/17	16:00	1,735
45	7/12/17	16:00	1,734
46	8/9/17	17:00	1,734
47	8/10/17	14:00	1,733
48	6/15/17	15:00	1,732
49	6/20/17	13:00	1,732
50	6/21/17	13:00	1,732
51	7/13/17	15:00	1,731
52	8/11/17	15:00	1,731
53	7/10/17	16:00	1,730
54	6/19/17	17:00	1,727
55	7/5/17	16:00	1,727
56	7/6/17	15:00	1,727
57	6/23/17	19:00	1,726
58	7/11/17	18:00	1,726
59	6/28/17	16:00	1,723
60	6/23/17	12:00	1,721
61	6/30/17	17:00	1,720
62	7/12/17	15:00	1,719
63	8/7/17	17:00	1,717
64	6/19/17	13:00	1,714
65	6/30/17	15:00	1,714
66	6/16/17	16:00	1,713
67	6/15/17	17:00	1,711
68	8/11/17	14:00	1,711
69	7/26/17	14:00	1,709
70	7/10/17	15:00	1,708
71	8/14/17	16:00	1,708
72	6/29/17	14:00	1,707
73	7/6/17	17:00	1,705
74	6/21/17	19:00	1,704
75	6/28/17	15:00	1,704
76	7/3/17	16:00	1,704
77	6/29/17	17:00	1,703
78	7/12/17	17:00	1,699
79	7/10/17	17:00	1,698
80	8/11/17	16:00	1,698
81	6/16/17	17:00	1,696
82	7/13/17	14:00	1,694
83	6/28/17	17:00	1,693
84	7/5/17	14:00	1,693
85	6/22/17	20:00	1,692
86	6/16/17	15:00	1,690

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2017 to December 31, 2017
Hours are in MST

Line No.	Date	Hour	Native Peak
87	8/22/17	16:00	1,690
88	8/14/17	15:00	1,688
89	8/9/17	14:00	1,687
90	6/30/17	18:00	1,686
91	7/6/17	14:00	1,686
92	8/7/17	14:00	1,686
93	8/23/17	15:00	1,686
94	6/22/17	12:00	1,685
95	9/13/17	16:00	1,685
96	8/10/17	13:00	1,684
97	6/14/17	16:00	1,683
98	7/3/17	15:00	1,683
99	7/13/17	17:00	1,683
100	8/10/17	17:00	1,683

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2018 to December 31, 2018
Hours are in MST

Line No.	Date	Hour	Native Peak
1	7/23/18	16:00	1,929
2	7/25/18	16:00	1,924
3	7/23/18	15:00	1,922
4	6/26/18	16:00	1,921
5	6/26/18	15:00	1,909
6	7/25/18	17:00	1,906
7	6/27/18	16:00	1,904
8	7/23/18	14:00	1,903
9	7/23/18	17:00	1,896
10	7/25/18	15:00	1,891
11	6/27/18	17:00	1,889
12	6/26/18	17:00	1,885
13	6/27/18	15:00	1,870
14	8/2/18	16:00	1,864
15	6/27/18	18:00	1,853
16	7/19/18	15:00	1,851
17	6/26/18	14:00	1,847
18	7/23/18	13:00	1,846
19	8/2/18	15:00	1,846
20	6/22/18	16:00	1,845
21	7/25/18	18:00	1,845
22	6/22/18	17:00	1,843
23	7/25/18	14:00	1,841
24	7/23/18	18:00	1,840
25	7/24/18	16:00	1,839
26	6/22/18	15:00	1,838
27	8/2/18	17:00	1,836
28	6/27/18	14:00	1,833
29	7/19/18	14:00	1,833
30	7/30/18	15:00	1,833
31	8/8/18	16:00	1,828
32	8/9/18	16:00	1,828
33	8/6/18	16:00	1,827
34	8/29/18	16:00	1,827
35	7/30/18	14:00	1,826
36	7/24/18	17:00	1,825
37	7/30/18	16:00	1,825
38	8/3/18	16:00	1,825
39	6/26/18	18:00	1,821
40	7/19/18	16:00	1,821
41	8/7/18	16:00	1,821
42	7/20/18	16:00	1,819
43	8/7/18	17:00	1,814

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2018 to December 31, 2018
Hours are in MST

Line No.	Date	Hour	Native Peak
44	7/20/18	15:00	1,813
45	6/12/18	16:00	1,812
46	6/21/18	16:00	1,811
47	8/30/18	16:00	1,811
48	8/3/18	15:00	1,810
49	8/8/18	15:00	1,810
50	8/9/18	15:00	1,810
51	7/24/18	15:00	1,808
52	6/20/18	16:00	1,806
53	7/20/18	17:00	1,804
54	8/6/18	15:00	1,804
55	6/28/18	15:00	1,803
56	6/28/18	16:00	1,803
57	8/29/18	17:00	1,803
58	6/25/18	16:00	1,802
59	7/26/18	15:00	1,801
60	6/12/18	17:00	1,799
61	6/22/18	14:00	1,798
62	6/25/18	17:00	1,797
63	6/22/18	18:00	1,796
64	8/7/18	15:00	1,796
65	8/29/18	15:00	1,796
66	6/21/18	17:00	1,794
67	6/19/18	16:00	1,793
68	6/26/18	13:00	1,791
69	8/6/18	17:00	1,791
70	8/30/18	17:00	1,790
71	7/26/18	14:00	1,789
72	8/2/18	14:00	1,789
73	6/20/18	17:00	1,787
74	6/21/18	15:00	1,786
75	7/18/18	16:00	1,786
76	8/1/18	16:00	1,786
77	8/30/18	15:00	1,785
78	6/12/18	15:00	1,784
79	7/19/18	17:00	1,784
80	6/7/18	16:00	1,779
81	6/20/18	15:00	1,779
82	8/8/18	17:00	1,779
83	8/9/18	17:00	1,779
84	7/20/18	14:00	1,777
85	7/26/18	16:00	1,776
86	8/3/18	17:00	1,776

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2018 to December 31, 2018
Hours are in MST

Line No.	Date	Hour	Native Peak
87	8/16/18	16:00	1,776
88	6/28/18	17:00	1,775
89	7/25/18	13:00	1,775
90	8/2/18	18:00	1,775
91	6/8/18	16:00	1,774
92	8/1/18	15:00	1,774
93	6/25/18	15:00	1,773
94	7/22/18	17:00	1,773
95	8/20/18	16:00	1,771
96	8/31/18	16:00	1,771
97	6/19/18	17:00	1,770
98	6/28/18	14:00	1,770
99	7/20/18	18:00	1,768
100	8/14/18	16:00	1,767

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2019 to December 31, 2019
Hours are in MST

Line No.	Date	Hour	Native Peak
1	8/27/19	16:00	1,977
2	8/26/19	17:00	1,969
3	8/27/19	17:00	1,955
4	8/7/19	15:00	1,952
5	8/26/19	15:00	1,950
6	8/7/19	16:00	1,945
7	8/21/19	16:00	1,942
8	8/27/19	15:00	1,942
9	8/21/19	15:00	1,923
10	8/5/19	16:00	1,919
11	8/2/19	16:00	1,918
12	8/26/19	18:00	1,915
13	8/20/19	15:00	1,911
14	8/7/19	14:00	1,909
15	8/20/19	16:00	1,907
16	8/2/19	15:00	1,901
17	8/5/19	15:00	1,899
18	8/5/19	17:00	1,898
19	8/6/19	16:00	1,886
20	7/16/19	16:00	1,885
21	8/2/19	17:00	1,884
22	8/26/19	14:00	1,884
23	7/15/19	16:00	1,880
24	8/1/19	16:00	1,878
25	8/27/19	14:00	1,878
26	8/21/19	17:00	1,876
27	7/18/19	16:00	1,872
28	8/1/19	15:00	1,871
29	8/27/19	18:00	1,871
30	8/19/19	16:00	1,866
31	7/15/19	17:00	1,865
32	7/17/19	16:00	1,859
33	7/31/19	16:00	1,859
34	8/8/19	16:00	1,859
35	8/5/19	18:00	1,857
36	8/9/19	16:00	1,857
37	8/19/19	17:00	1,857
38	6/27/19	16:00	1,856
39	7/18/19	17:00	1,856
40	7/10/19	16:00	1,855
41	8/14/19	16:00	1,854
42	7/10/19	15:00	1,853

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2019 to December 31, 2019
Hours are in MST

Line No.	Date	Hour	Native Peak
43	7/16/19	17:00	1,853
44	8/6/19	17:00	1,852
45	8/16/19	16:00	1,851
46	7/15/19	15:00	1,850
47	8/20/19	14:00	1,850
48	8/21/19	14:00	1,850
49	8/29/19	16:00	1,850
50	8/7/19	17:00	1,848
51	8/2/19	14:00	1,847
52	8/28/19	16:00	1,847
53	7/31/19	15:00	1,846
54	7/17/19	17:00	1,843
55	8/9/19	17:00	1,843
56	8/29/19	15:00	1,843
57	8/1/19	17:00	1,842
58	7/18/19	15:00	1,840
59	8/9/19	15:00	1,840
60	8/14/19	15:00	1,839
61	8/20/19	17:00	1,839
62	6/27/19	17:00	1,838
63	7/16/19	15:00	1,838
64	7/31/19	17:00	1,838
65	8/5/19	14:00	1,837
66	8/7/19	13:00	1,837
67	8/19/19	15:00	1,837
68	8/14/19	17:00	1,836
69	8/12/19	16:00	1,835
70	7/17/19	15:00	1,834
71	8/8/19	17:00	1,834
72	7/19/19	16:00	1,830
73	8/16/19	17:00	1,827
74	7/21/19	16:00	1,826
75	8/28/19	17:00	1,826
76	7/15/19	18:00	1,824
77	8/2/19	18:00	1,822
78	7/10/19	14:00	1,821
79	7/10/19	17:00	1,821
80	8/22/19	16:00	1,821
81	8/28/19	15:00	1,820
82	8/1/19	14:00	1,819
83	8/8/19	15:00	1,819
84	7/1/19	16:00	1,816
85	8/6/19	15:00	1,815

El Paso Electric Company
60-Minute Load Profile Data
For the period of January 1, 2019 to December 31, 2019
Hours are in MST

Line No.	Date	Hour	Native Peak
86	8/29/19	17:00	1,814
87	8/26/19	19:00	1,812
88	6/27/19	15:00	1,811
89	8/12/19	17:00	1,811
90	7/19/19	17:00	1,810
91	8/12/19	15:00	1,809
92	8/13/19	16:00	1,809
93	8/15/19	16:00	1,809
94	8/13/19	15:00	1,806
95	8/23/19	15:00	1,801
96	8/6/19	18:00	1,800
97	8/8/19	18:00	1,800
98	8/3/19	17:00	1,799
99	7/26/19	16:00	1,798

2,000

1,950

1,900

1,850

1,800

1,750

1,700

2,000

1,950

1,900

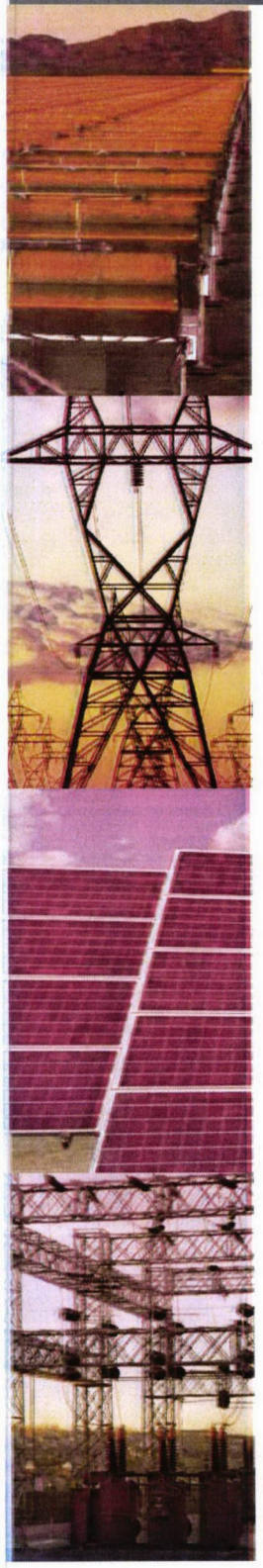
2,000

1,950

1,900

1

Solar Energy and Capacity Value



Solar Energy Can Provide Valuable Capacity to Utilities and Power System Operators

Solar photovoltaic (PV) systems and concentrating solar power (CSP) systems without integrated thermal energy storage (TES) are variable, renewable energy resources with output that depends on the time of day, season, and weather patterns. These resources are unlike traditional dispatchable generators that can be controlled to respond to variations in demand. An important benefit of all generators is capacity value—their ability to reliably meet demand. Generator outages—caused by mechanical failures, planned maintenance, or lack of real-time generating resources (especially for renewables)—may leave a power system with insufficient capacity to meet load. Because variable energy sources are not as controllable as conventional power plants, analysis is needed to evaluate their capacity-related benefits, which are not always readily apparent.

Calculating Capacity Value

The capacity value of a renewable generator is calculated by one of several methods. Detailed reliability-based metrics are widely accepted by utilities and system planners. These methods use statistical approaches to determine the ability of a generation resource to maintain a reliable system and meet demand. An alternative approach is to use approximation techniques, such as examining the output of a renewable generator during periods of highest risk of not meeting load. These are typically hours of high demand—often late afternoons in summer, when the demand for air-conditioning places utility systems under greatest stress. Examining solar output during these periods can provide insight into the potential of different solar generators to add reliable capacity.

Coincidence of Solar Energy With Electricity Demand Patterns

Although detailed analysis is needed to quantify solar capacity value, examining patterns of electricity demand and solar generation can provide some indication of the ability of solar energy to contribute to meeting peak demand. Figure 1 shows the demand for electricity on a hot summer day in Colorado in 2006. It also shows simulated solar output for a scenario in which solar satisfies 1% of total demand and the corresponding solar generation during that time. In this figure, net load is the normal load minus the contribution from wind and solar, or the load that needs to be met with conventional generators. Both PV systems (and CSP systems without storage) provide significant generation during the hours of peak demand (typically 4 to 6 p.m.) and provide capacity value to the system. In the western United States, the capacity value of PV plants can be in the range of 50% to 80% of their alternating current (AC) rating, with the higher values representing systems that use active tracking to orient the PV modules toward the sun. The capacity value of CSP plants without storage can be similar to that of PV plants. This means that a 100-MW (AC rated) solar plant can potentially provide the same level of reliability as a 50-MW to 80-MW conventional plant, depending on type and location.

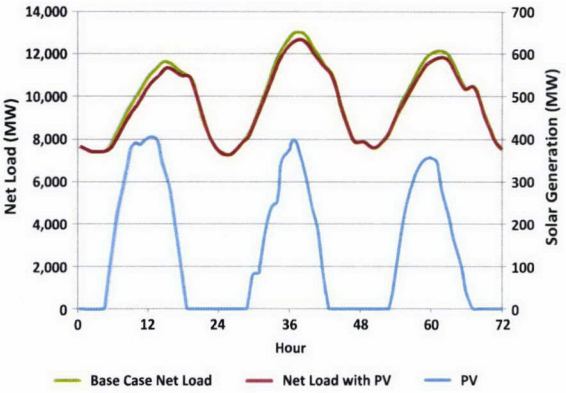


Figure 1. Coincidence of solar energy with peak demand

Impact of Solar at High Penetrations

The capacity value of solar generation is dependent on the coincidence of sunlight with demand patterns. A challenge occurs when increased solar generation on the grid

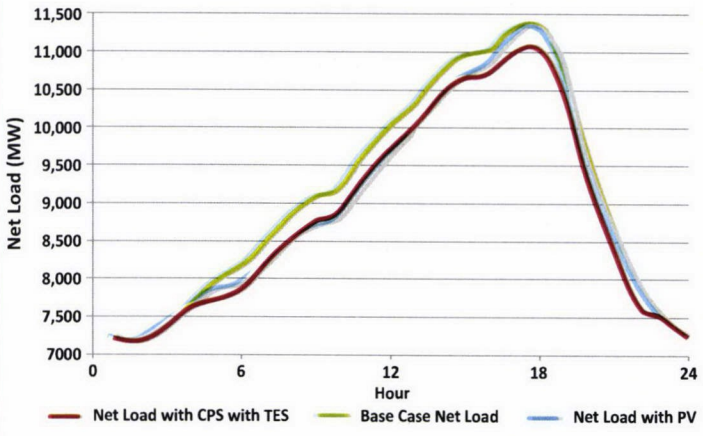


Figure 2. Changes in solar capacity value at high penetration

actually changes the net load patterns. As solar is added to the grid, it reduces the net demand for electricity in the middle part of the day and shifts the time of greatest need to the evening. This is illustrated in Figure 2, which demonstrates the change in demand that results when solar provides 10% of the system demand for electricity. It shows the new net demand for energy, which peaks at 7 p.m., at a time when PV generation has dropped significantly and no longer provides significant capacity value. At high penetrations of solar, new techniques will be needed to maintain high capacity values for solar generation technologies. One approach is to deploy TES in CSP plants. These plants can shift generation to the evening and continue to provide reliable capacity to utilities and system operators. Figure 2 demonstrates how CSP with TES can be dispatched to provide energy during peak demand periods in the evening and provide high capacity value.

Associated Publications

S. H. Madaeni, R. Sioshansi, and P. Denholm. (2012). *Comparison of Capacity Value Methods for Photovoltaics in the Western United States.* NREL/TP-6A20-54704. Golden, CO: National Renewable Energy Laboratory. Accessed January 2013: www.nrel.gov/docs/fy12osti/54704.pdf.

S. H. Madaeni, R. Sioshansi, and P. Denholm. (2011). *Capacity Value of Concentrating Solar Power Plants.* NREL/TP-6A20-51253. Golden, CO: National Renewable Energy Laboratory. Accessed January 2013: www.nrel.gov/docs/fy11osti/51253.pdf.

More Information

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Defining Capacity-Related Terms

Capacity generally refers to the maximum output (generation) of a power plant. Capacity is typically measured in a kilowatt (kW), megawatt (MW), or gigawatt (GW) rating. Rated capacity may also be referred to as "nameplate capacity" or "peak capacity." This may be further distinguished as the "net capacity" of the plant after plant parasitic loads have been considered, which are subtracted from "gross capacity."

Capacity from PV systems may be measured by either their AC or DC capacity. PV modules produce direct current (DC) voltage. This DC electricity is converted into alternating current (AC). As a result, PV power plants have both a DC rating (corresponding to the output of the modules) and an AC rating, which is always lower than the DC rating because of losses associated with converting DC to AC. AC rating better corresponds to traditional power plant ratings. CSP plants are rated by their net AC capacity in the same manner as conventional power plants.

Capacity factor is a measure of how much energy is produced by a plant compared with its maximum output. It is measured as a percentage, generally by dividing the total energy produced during some period of time by the amount of energy the plant would have produced if it ran at full output during that time.

Capacity value refers to the contribution of a power plant to reliably meet demand. The capacity value (or capacity credit) is measured either in terms of physical capacity (kW, MW, or GW) or the fraction of its nameplate capacity (%). Thus, a plant with a nameplate capacity of 150 MW could have a capacity value of 75 MW or 50%. Solar plants can be designed and operated to increase their capacity value or energy output.

See our website at energy.analysis@nrel.gov/.

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