

Sample Output

June 7, 2019

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[1]: import renewable
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[2]: renewable.getWikiTables()
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electricity_production_from_renewable_sources/Table0
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electricity_production_from_renewable_sources/Table3
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Plot_Data/WikiTables/Plot_Data/WikiTables/Solar_power_in_New_Mexico/Table1
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Plot_Data/WikiTables/Plot_Data/WikiTables/Solar_power_in_Hawaii/Table3

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```
[3]: renewable.get_data_generation_1999_2019()
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```

[3]:   Year      Coal      Oil      Gas Subtotal_fossil Nuclear   Hydro  \
0   2018   1,146.39   24.57  1,480.20      2,651.17   807.08  291.72
2   2017   1,205.84   21.39  1,308.89      2,536.12   804.95  300.33
4   2016   1,239.15   24.20  1,391.11      2,654.47   805.69  267.81
6   2015   1,352.40   28.25  1,346.60      2,727.25   797.18  249.08
8   2014   1,581.71   30.23  1,138.63      2,750.57   797.17  259.37
9   2013   1,581.12   27.16  1,137.69      2,745.97   789.02  268.57
10  2012   1,514.04   23.19  1,237.79      2,775.02   769.33  276.24
11  2011   1,733.4    30.2   1,025.3      2,788.9    790.2   319.4
12  2010   1,847.3    37.1    999.0      2,883.4    807.0   260.2

```

14	2009	1,755.9	38.9	931.6	2,726.5	798.9	273.4
15	2008	1,985.8	46.2	894.7	2,926.7	806.2	254.8
16	2007	2,016.5	65.7	910.0	2,992.2	806.4	247.5
17	2000	1,966	111	615	2,692	754	260
19	1999	1,881	118	571	2,570	728	319.5

	Geothermal	Solar	Wind	Wood	Bio_other	Subtotal_renewable	Misc \
0	16.73	66.60	274.95	41.41	21.35	712.77	51.26
2	15.93	53.29	254.30	41.15	21.61	686.61	62.90
4	15.83	36.05	226.99	40.95	21.81	609.45	67.49
6	15.92	24.89	190.72	41.93	21.70	544.24	75.61
8	15.88	17.69	181.655	42.34	21.65	538.58	60.50
9	15.78	9.04	167.84	40	20.83	522.07	55.64
10	15.56	4.33	140.82	37.8	19.82	494.57	56.1
11	15.3	1.82	120.2	37.4	19.2	513.32	46
12	15.2	1.21	94.7	37.2	18.9	427.4	33.3
14	15.0	0.89	73.9	36.1	18.4	417.7	41.4
15	14.8	0.86	55.4	37.3	17.7	380.9	38.3
16	14.6	0.61	34.5	39.0	16.5	352.7	36.6
17	14	0.49	5.6	37.6	23	318.7	38.6
19	14.8	0.50	4.5	37	22.6	392.8	55

	Total
0	4,222.28
2	4,090.58
4	4,137.10
6	4,144.27
8	4,146.2
9	4,112.7
10	4095
11	4138.4
12	4,151.0
14	3,984.4
15	4,152.2
16	4,188.0
17	3,836
19	3,723.8

```
[4]: renewable.get_data_hydro_2004_2018()
```

[4]:	Year	Summer Capacity	Electricity Generation	Capacity Factor \	
	0	2018	79.89	291.72	0.417
	1	2017	79.79	300.05	0.430
	2	2016	79.91	267.81	0.383
	3	2015	79.66	249.08	0.357
	4	2014	79.24	258.75	0.373
	5	2013	79.22	268.57	0.387
	6	2012	78.7	276.24	0.401

7	2011	78.65	319.36	0.464
8	2010	78.83	260.2	0.377
9	2009	78.52	273.45	0.398
10	2008	77.93	254.83	0.373
11	2007	77.89	247.51	0.363
12	2006	77.82	289.25	0.424
13	2005	77.54	270.32	0.398
14	2004	77.64	268.42	0.395

	Year Growth Capacity	Year Growth Produced	Portion of Renewable \
0	0.12%	-2.7%	40.9%
1	-0.2%	12%	43.7%
2	0.3%	7.50%	43.9%
3	0.56%	-4.0%	45.77%
4	0.05%	-3.66%	47.93%
5	0.64%	-2.78%	51.44%
6	0.06%	-13.50%	55.85%
7	-0.23%	22.74%	62.21%
8	0.39%	-4.85%	60.88%
9	0.76%	7.31%	65.47%
10	0.05%	2.96%	66.90%
11	0.09%	-14.43%	70.18%
12	0.36%	7.00%	74.97%
13	-0.13%	0.71%	75.57%
14	-1.33%	-2.68%	76.36%

	Portion of Total
0	7.0%
1	7.44%
2	6.57%
3	6.11%
4	6.32%
5	6.61%
6	6.82%
7	7.79%
8	6.31%
9	6.92%
10	6.19%
11	5.95%
12	7.12%
13	6.67%
14	6.76%

```
[5]: renewable.get_data_hydro_production()
```

	Rank	Rank w/o Hydropower	state with Hydro	w/o Hydro	\
0			United States	17.1	9.6
1	1	2	Vermont	99.6	41.3

2	2	10	Idaho	81.6	21.9
3	3	21	Washington	80.0	8.2
4	4	16	Oregon	76.3	13.6
5	5	1	Maine	75.9	46.1
6	6	6	South Dakota	73.1	30.2
7	7	8	California	47.2	26.5
8	8	23	Montana	45.1	7.8
9	9	3	Iowa	38.8	37.2
10	10	4	Kansas	36.2	36.1
11	11	5	Oklahoma	36.1	32.3
12	12	35	Alaska	33.3	3.45
13	13	7	North Dakota	31.8	26.9
14	14	31	New York	27.8	5.0
15	15	9	Minnesota	24.9	22.8
16	16	11	Nevada	24.8	20.1
17	17	12	Colorado	23.4	19.6
18	18	18	New Hampshire	19.9	12.5
19	19	15	Nebraska	19.3	14.9
20	20	13	New Mexico	17.7	16.9
21	21	14	Texas	16.0	15.6
22	22	17	Hawaii	14.2	13.5
23	23	30	Arizona	11.8	5.3
24	24	20	Utah	11.6	9.4
25	25	19	Wyoming	11.6	9.4
26	26	49	Tennessee	11.2	1.42
27	27	22	Massachusetts	10.5	7.8
28	28	26	North Carolina	10.3	6.6
29	29	34	Maryland	9.8	4.07
30	30	32	Wisconsin	9.3	4.90
31	31	42	Alabama	9.2	2.57
32	32	44	Arkansas	8.8	2.45
33	33	25	Michigan	8.3	6.9
34	34	29	Georgia	7.9	5.5
35	35	24	Rhode Island	7.2	7.2
36	36	50	Kentucky	6.9	0.67
37	37	27	Illinois	6.6	6.5
38	38	33	Virginia	6.4	4.72
39	39	28	Indiana	6.0	5.5
40	40	36	South Carolina	5.9	2.99
41	41	46	West Virginia	4.60	2.19
42	42	37	Pennsylvania	4.35	2.99
43	43	43	Missouri	4.24	2.57
44	44	38	Louisiana	4.15	2.88
45	45	40	Connecticut	3.46	2.70
46	46	39	New Jersey	2.89	2.85
47	47	41	Mississippi	2.60	2.60
48	48	45	Florida	2.53	2.44

49	49	47	Ohio	2.48	2.02
50	50	48	Delaware	1.68	1.68

	with Hydro(GWH)	w/o Hydro(GWH)	Total electricity
0	687,290	387,245	4,014,804
1	2,069	858	2,077
2	12,989	3,480	15,926
3	92,342	9,517	115,474
4	44,623	7,980	58,516
5	8,492	5,163	11,192
6	7,651	3,156	10,464
7	97,298	54,606	206,107
8	12,753	2,192	28,269
9	21,933	21,018	56,478
10	18,590	18,561	51,366
11	27,598	24,737	76,545
12	1,987	206	5,971
13	13,029	10,993	40,931
14	35,505	6,440	127,880
15	14,885	13,628	59,701
16	9,414	7,621	37,967
17	12,686	10,668	54,318
18	3,483	2,195	17,494
19	6,945	5,351	35,937
20	5,933	5,683	33,566
21	72,345	70,759	452,235
22	1,399	1,332	9,848
23	12,536	5,564	105,833
24	4,263	3,444	36,732
25	5,434	4,398	46,826
26	8,725	1,111	78,103
27	3,291	2,466	31,456
28	13,398	8,682	130,689
29	3,352	1,389	34,132
30	6,040	3,195	65,247
31	12,782	3,580	139,194
32	5,470	1,519	62,109
33	9,344	7,732	112,367
34	10,194	7,054	128,979
35	378	376	5,244
36	4,948	483	72,116
37	11,976	11,847	181,911
38	6,027	4,410	93,500
39	6,001	5,533	100,492
40	5,497	2,793	93,467
41	3,376	1,607	73,410
42	8,705	5,981	200,201

43	3,552	2,152	83,801
44	4,027	2,796	96,978
45	1,180	920	34,108
46	2,153	2,127	74,541
47	1,573	1,573	60,574
48	6,006	5,811	237,821
49	2,954	2,401	118,974
50	129	129	7,662

```
[6]: renewable.get_data_hydro_potential()
```

```
[6]: New Jersey Rhode Island Massachusetts Connecticut Maryland New York \
0      549          59          1197          922          814          6711

      Delaware Florida Ohio Pennsylvania ... Utah Nebraska Nevada Idaho \
0      31      682 3046          8368 ... 3528          3142          846 18758

      New Mexico South Dakota North Dakota Montana Wyoming Alaska
0      1363          1047          347      14547      4445      23676

[1 rows x 50 columns]
```

```
[7]: renewable.scrape_wind_data_from_wiki()
```

Saved wind wiki data to Plot_Data/wind_wiki.csv

```
[7]:          2015    2014    2013    2012    2011    2010    2009    2008    2007 \
State
Alaska      158.2  153.6  145.3  37.39  12.45  12.61  7.027  0.068  1.012
Arizona     445.5  472.5  449.8  531.6  255.6  134.9  29.54    0      0
California  12228  13776  12822  9754   7752   6079   5840   5385  5585
Colorado     7441   7351   7204   5969   5200   3452   3164   3221  1292
Connecticut    0      0      0      0      0      0      0      0      0
Delaware     4.923  4.705  4.458  3.638  4.825  2.556    0      0      0
Hawaii      601.3  585.3  503.3  378.2  340.8  261.1  251.4   240  238.2
Idaho        2457   2778   2460   1891   1307  440.7  313.4  207.5  172.3
Illinois     10733  10077   9625   7727   6213   4454   2820   2337  664.4
Indiana       4516   3495   3481   3210   3285   2934   1403  238.4    0
Iowa         17878  16295  15568  14032  10709   9170   7421   4084  2757
Kansas       10927  10844   9433   5195   3720   3405   2863   1759  1153
Maine         1273   1095   1048  886.9  706.6  499.2  298.6  131.6  99.07
Maryland     433.5  323.5  321.7  321.7  270.7   1.494    0      0      0
Massachusetts 220.1    224  204.9  89.67  61.38  22.07   5.956  3.672    0
Michigan      4778   3875   2800   1132  456.5  360.3  300.2  141.2  2.723
Minnesota     9797   9060   8259   7615   6726   4792   5053   4355  2639
Missouri      1034   1131   1167   1245   1178  925.5  499.4  203.3    0
Montana       1962   1966   1755   1262   1265  930.2  820.9  593.1  495.8
Nebraska      3154   2736   1802   1284   1051  421.6  382.6  214.2  216.8
Nevada       309.7  300.1  250.5  128.8    0      0      0      0      0
```

New Hampshire	419.2	416.8	389.2	208.7	66.09	75.69	62.48	10.32	0
New Jersey	22.14	11.9	10.88	11.57	10.52	12.65	20.92	20.89	20.41
New Mexico	2067	2263	2193	2226	2104	1832	1547	1643	1393
New York	3956	3971	3539	2680	2828	2596	2266	1251	833.5
North Carolina	0	0	0	0	0	0	0	0	0
North Dakota	6530	6349	5519	5275	5236	4096	2998	1693	620.8
Ohio	1206	1152	1146	985.5	198.4	12.58	14.11	15.08	14.75
Oklahoma	14018	11862	11162	8158	5605	3808	2698	2358	1849
Oregon	6675	7580	7456	6343	4775	3920	3470	2575	1247
Pennsylvania	3352	3584	3352	2129	1794	1854	1075	729.4	470
Rhode Island	14.77	7.025	2.59	1.38	2.912	3.124	0	0	0
South Dakota	2481	2916	2688	2915	2668	1372	421	145.1	150
Tennessee	45.84	51.14	46.74	47.49	53.14	40.57	51.75	50.12	49.94
Texas	44959	39371	35874	32214	30548	26251	20026	16225	9006
Utah	621.4	664.8	539.8	703.9	572.8	447.7	159.5	23.9	0
Vermont	322.7	305.6	236	106.9	33.18	13.89	11.59	10.24	10.51
Washington	7101	7264	7004	6600	6262	4745	3572	3657	2438
West Virginia	1376	1451	1387	1286	1103	939.2	742.4	391.9	167.6
Wisconsin	1641	1609	1558	1558	1188	1088	1052	487.1	109.3
Wyoming	3768	4420	4433	4369	4612	3247	2226	962.5	754.9
Alabama	0	0	0	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0	0
Georgia	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0	0	0	0
Mississippi	0	0	0	0	0	0	0	0	0
Virginia	0	0	0	0	0	0	0	0	0

	2006	2005
State		
Alaska	0.788	0.589
Arizona	0	0
California	4883	4262
Colorado	865.5	776.2
Connecticut	0	0
Delaware	0	0
Hawaii	79.674	6.632
Idaho	169.6	0
Illinois	254.6	141.15
Indiana	0	0
Iowa	2318	1647
Kansas	991.9	425.8
Maine	0	0
Maryland	0	0
Massachusetts	0	0

Michigan	2.212	1.848
Minnesota	2055	1582
Missouri	0	0
Montana	436	0
Nebraska	261.2	96.61
Nevada	0	0
New Hampshire	0	0
New Jersey	15.99	0
New Mexico	1255	794.6
New York	655.4	103
North Carolina	0	0
North Dakota	369.5	220.3
Ohio	14.4	13.27
Oklahoma	1712	847.8
Oregon	931.2	734.3
Pennsylvania	361.1	284.2
Rhode Island	0	0
South Dakota	149	158.1
Tennessee	54.6	3.339
Texas	6671	4237
Utah	0	0
Vermont	10.69	11.49
Washington	1038	498.5
West Virginia	173.8	153.9
Wisconsin	101.4	92.54
Wyoming	759.1	717.3
Alabama	0	0
Arkansas	0	0
Florida	0	0
Georgia	0	0
Kentucky	0	0
Louisiana	0	0
South Carolina	0	0
Mississippi	0	0
Virginia	0	0

```
[8]: renewable.scrapeEIA()
```

```
C:\Users\swapn\Documents\ECE 143\project\Upload_dir\git\renewable.py:354:
UserWarning: No parser was explicitly specified, so I'm using the best available
HTML parser for this system ("lxml"). This usually isn't a problem, but if you
run this code on another system, or in a different virtual environment, it may
use a different parser and behave differently.
```

The code that caused this warning is on line 354 of the file
C:\Users\swapn\Documents\ECE 143\project\Upload_dir\git\renewable.py. To get rid
of this warning, pass the additional argument 'features="lxml"' to the
BeautifulSoup constructor.

```
soup = Soup(driver.page_source)
C:\Users\swapn\Documents\ECE 143\project\Upload_dir\git\renewable.py:401:
UserWarning: No parser was explicitly specified, so I'm using the best available
HTML parser for this system ("lxml"). This usually isn't a problem, but if you
run this code on another system, or in a different virtual environment, it may
use a different parser and behave differently.
```

The code that caused this warning is on line 401 of the file
C:\Users\swapn\Documents\ECE 143\project\Upload_dir\git\renewable.py. To get rid
of this warning, pass the additional argument 'features="lxml"' to the
BeautifulSoup constructor.

```
soup = Soup(html)

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Plot_Data/eiadata/10.05/renewable197401-197412.txt
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Saving data for 199101 to 199112 to path
Plot_Data/eiadata/10.05/renewable199101-199112.txt
Saving data for 199201 to 199212 to path
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Saving data for 200001 to 200012 to path
Plot_Data/eiadata/10.05/renewable200001-200012.txt
Saving data for 200101 to 200112 to path
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 Saving to Plot_Data/eiadata/10.06/Jan-Feb 2019.csv
 Successfully saved to Plot_Data/eiadata/10.06/Jan-Feb 2019.csv!

[9]: `renewable.MakeCSPDataForSolar()`

Extracting file: nsrdb_v3_0_1_1998_2016_dni.zip to Potential/Solar
 Done

Dataset Shapefile Found: nsrdb_v3_0_1_1998_2016_dni.shp. Projection is: {'init':
 'epsg:4326'}

Extracting file: states_21basic.zip to Potential/States/

```

Done
Dataset Shapefile Found: states.shp. Projection is: {'init': 'epsg:4269'}
Reading data from CSV Files...
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2001_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2002_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2003_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2004_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2005_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2006_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2007_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2008_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2009_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2010_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2011_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2012_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2013_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2014_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2015_dni.csv
Potential/Solar/NSRDB-YearWise/nsrdb_v3_0_1_2016_dni.csv
Merging Data with Original Reference File...
Done merging original reference with 2001 data.
Done merging original reference with 2002 data.
Done merging original reference with 2003 data.
Done merging original reference with 2004 data.
Done merging original reference with 2005 data.
Done merging original reference with 2006 data.
Done merging original reference with 2007 data.
Done merging original reference with 2008 data.
Done merging original reference with 2009 data.
Done merging original reference with 2010 data.
Done merging original reference with 2011 data.
Done merging original reference with 2012 data.
Done merging original reference with 2013 data.
Done merging original reference with 2014 data.
Done merging original reference with 2015 data.
Done merging original reference with 2016 data.
Done with merging all!
Merging GeoPandas Data for DNI with State Boundaries...
Merged Final Data Successfully...
Converting Table CRS to meters (3395 EPSG)...
Modified CRS is: {'init': 'epsg:3395'}
Calculating Net Area for CSP Calculations...
Calculating for Year: 2001 in state: AZ
Calculating for Year: 2002 in state: AZ
Calculating for Year: 2003 in state: AZ
Calculating for Year: 2004 in state: AZ
Calculating for Year: 2005 in state: AZ
Calculating for Year: 2006 in state: AZ

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Calculating for Year: 2007 in state: AZ
Calculating for Year: 2008 in state: AZ
Calculating for Year: 2009 in state: AZ
Calculating for Year: 2010 in state: AZ
Calculating for Year: 2011 in state: AZ
Calculating for Year: 2012 in state: AZ
Calculating for Year: 2013 in state: AZ
Calculating for Year: 2014 in state: AZ
Calculating for Year: 2015 in state: AZ
Calculating for Year: 2016 in state: AZ
Calculating for Year: 2001 in state: CA
Calculating for Year: 2002 in state: CA
Calculating for Year: 2003 in state: CA
Calculating for Year: 2004 in state: CA
Calculating for Year: 2005 in state: CA
Calculating for Year: 2006 in state: CA
Calculating for Year: 2007 in state: CA
Calculating for Year: 2008 in state: CA
Calculating for Year: 2009 in state: CA
Calculating for Year: 2010 in state: CA
Calculating for Year: 2011 in state: CA
Calculating for Year: 2012 in state: CA
Calculating for Year: 2013 in state: CA
Calculating for Year: 2014 in state: CA
Calculating for Year: 2015 in state: CA
Calculating for Year: 2016 in state: CA
Calculating for Year: 2001 in state: NV
Calculating for Year: 2002 in state: NV
Calculating for Year: 2003 in state: NV
Calculating for Year: 2004 in state: NV
Calculating for Year: 2005 in state: NV
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Calculating for Year: 2011 in state: NV
Calculating for Year: 2012 in state: NV
Calculating for Year: 2013 in state: NV
Calculating for Year: 2014 in state: NV
Calculating for Year: 2015 in state: NV
Calculating for Year: 2016 in state: NV
Calculating for Year: 2001 in state: CO
Calculating for Year: 2002 in state: CO
Calculating for Year: 2003 in state: CO
Calculating for Year: 2004 in state: CO
Calculating for Year: 2005 in state: CO
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Calculating for Year: 2007 in state: CO
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Calculating for Year: 2015 in state: CO
Calculating for Year: 2016 in state: CO
Calculating for Year: 2001 in state: NM
Calculating for Year: 2002 in state: NM
Calculating for Year: 2003 in state: NM
Calculating for Year: 2004 in state: NM
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Calculating for Year: 2011 in state: NM
Calculating for Year: 2012 in state: NM
Calculating for Year: 2013 in state: NM
Calculating for Year: 2014 in state: NM
Calculating for Year: 2015 in state: NM
Calculating for Year: 2016 in state: NM
Calculating for Year: 2001 in state: TX
Calculating for Year: 2002 in state: TX
Calculating for Year: 2003 in state: TX
Calculating for Year: 2004 in state: TX
Calculating for Year: 2005 in state: TX
Calculating for Year: 2006 in state: TX
Calculating for Year: 2007 in state: TX
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Calculating for Year: 2012 in state: TX
Calculating for Year: 2013 in state: TX
Calculating for Year: 2014 in state: TX
Calculating for Year: 2015 in state: TX
Calculating for Year: 2016 in state: TX
Calculating for Year: 2001 in state: GA
Calculating for Year: 2002 in state: GA
Calculating for Year: 2003 in state: GA
Calculating for Year: 2004 in state: GA
Calculating for Year: 2005 in state: GA
Calculating for Year: 2006 in state: GA

Calculating for Year: 2007 in state: GA
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Calculating for Year: 2010 in state: GA
Calculating for Year: 2011 in state: GA
Calculating for Year: 2012 in state: GA
Calculating for Year: 2013 in state: GA
Calculating for Year: 2014 in state: GA
Calculating for Year: 2015 in state: GA
Calculating for Year: 2016 in state: GA
Calculating for Year: 2001 in state: TN
Calculating for Year: 2002 in state: TN
Calculating for Year: 2003 in state: TN
Calculating for Year: 2004 in state: TN
Calculating for Year: 2005 in state: TN
Calculating for Year: 2006 in state: TN
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Calculating for Year: 2016 in state: TN
Calculating for Year: 2001 in state: NC
Calculating for Year: 2002 in state: NC
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Calculating for Year: 2011 in state: NC
Calculating for Year: 2012 in state: NC
Calculating for Year: 2013 in state: NC
Calculating for Year: 2014 in state: NC
Calculating for Year: 2015 in state: NC
Calculating for Year: 2016 in state: NC
Calculating for Year: 2001 in state: FL
Calculating for Year: 2002 in state: FL
Calculating for Year: 2003 in state: FL
Calculating for Year: 2004 in state: FL
Calculating for Year: 2005 in state: FL
Calculating for Year: 2006 in state: FL

Calculating for Year: 2007 in state: FL
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Calculating for Year: 2011 in state: FL
Calculating for Year: 2012 in state: FL
Calculating for Year: 2013 in state: FL
Calculating for Year: 2014 in state: FL
Calculating for Year: 2015 in state: FL
Calculating for Year: 2016 in state: FL
Calculating for Year: 2001 in state: DE
Calculating for Year: 2002 in state: DE
Calculating for Year: 2003 in state: DE
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Saving merged area data for Direct Normal Irradiance dataset...
Saving Maximum Potential to Potential/Solar/ ...
Now calculating for actual energy production!
Saving Actual Energy Production to Potential/Solar/ ...
Calculating and Saving Percentage of Potential Achieved...
Successfully calculated and saved all metrics in Potential/Solar ...

```
[10]: renewable.CalcWindPotential()
```

```
Extracting file: uswtdbSHP.zip to Potential/Wind
Done
Wind Energy Database ShapeFile...
Shape of the dataframe: (59338, 25)
Projection of dataframe: {'init': 'epsg:4269'}
US States Database ShapeFile...
Shape of the dataframe: (51, 6)
Projection of dataframe: {'init': 'epsg:4269'}
Successfully saved all data. Output files are at
'Potential/Wind/Wind_Potential_AllStates.csv',
'Potential/Wind/Wind_ActualEne_AllStates.csv' and
'Potential/Wind/Wind_Percent_AllStates.csv'
```