WeatherPower: Year in Review

Introduction
Renewable energy from solar panels and wind turbines is growing in importance in the United States. These sources provide electricity without producing greenhouse gasses and other air pollutants. Renewable energy projects create jobs in the U.S., and the revenues from wind and solar add to local economies.

Climate Central launched WeatherPower in 2018 to report how solar and wind energy are growing across the U.S. The current WeatherPower system came online in late 2020. It uses NOAA/National Weather Service forecast data and information on renewable installed capacity to estimate how much wind and solar power will be generated on a given day at the state, media market, county, or congressional district level (see Box A). For more about the difference between capacity and generation, see Box B.

In this report, we use the data from WeatherPower to look at patterns of solar and wind energy generation over 2021. We compare wind and solar generation between states across the country and highlight when each state produced the most electricity from the wind and sun.

Renewable energy is a key strategy for reducing the carbon pollution that is altering the climate. The U.S. has committed to reducing net carbon pollution to zero by 2050 in order to do its share in meeting the goals of the Paris Climate Agreement. In order to track progress toward this goal, we reference the solar and wind energy produced in 2021 to the levels needed by 2030 to ensure that we are on a path to meeting the 2050 goal.

Box A: What is WeatherPower?
The idea behind WeatherPower is to forecast daily solar and wind generation at a local scale. First, WeatherPower gathers capacity data from a number of sources. For large-scale utility solar and wind plants, data are taken from the U.S. Energy Information Agency. For rooftop solar generation, data are taken from the Solar Energy Industry Agency, the Lawrence Berkeley National Laboratory “Tracking the Sun” report, and Google's Project Sunroof. From these, a location and a capacity are recorded for each solar and wind installation across the U.S. It takes about two months for new capacity to be incorporated into the WeatherPower system. At present, our system only works for the continental U.S.

Second, WeatherPower uses two National Oceanic and Atmospheric Administration databases to get historical and forecast weather data. Combining the capacity and weather data, WeatherPower produces daily
National View
In 2021, we estimate that the U.S. had the potential to generate a total of 606,000 GWh of electricity from wind and solar installations. Wind power was the bigger source, producing 444,000 GWh (73% of the total). Solar produced the remaining 162,000 GWh (27%). Note that our numbers may be slightly different from other sources due to differences in methodology. For example, our forecasts can not account for facilities that are offline for maintenance or other reasons.

Solar energy generation peaks in the summer (Figure 1, yellow line) when days are long and the sun's rays strike the U.S. more directly. The national solar peak of 619 GWh occurred on June 12, 2021. Wind energy generation is highest during the spring and fall (Figure 1, blue line). The national wind peak of 1,750 GWh occurred on December 12, 2021.

Box B: Capacity vs. Generation
Capacity (sometimes referred to as installed capacity) and generation (sometimes referred to as electricity production or production) are important terms in energy discussions. Broadly, capacity is a measure of the maximum rate at which electricity can be generated. Capacity is reported in watts (W). Generation is the amount of energy actually produced over a period of time. Generation is reported in watt-hours (Wh). Because we are working with large numbers, we will typically use megawatt-hours (MWh) or even gigawatt-hours (GWh). One MWh equals 1 million Wh. One GWh equals 1 billion Wh or 1,000 MWh.

For example, if a solar farm is rated at 2 MW, that farm could produce 2 MWh of electricity in an hour on a very sunny day.

The average American household consumes 10.7 MWh of electricity each year.
Because the U.S. has more wind capacity, the national total (Figure 1, black line) strongly resembles the wind power time series. However, the national peak of 2,170 GWh on April 5, 2021 occurs six months before the peak in wind power generation due to the additional solar energy in April compared with December.

State-by-State Comparisons
In order to see how wind and solar energy production is distributed across the country, we first look at raw generation numbers for wind and solar. This helps us identify which states generated the most wind and solar energy. However, this isn’t always the most useful metric. Renewable energy (especially wind) requires a lot of space, so we might expect large states like California and Texas to produce more electricity from the sun and the wind. To account for state area, we also look at generation per square mile. The electricity generated by solar and wind installations is used by homes and businesses, so ideally there would be more renewable electricity produced in states with a lot of people. To account for state population, we also look at generation per person.
Wind

Texas generated 114,000 GWh from wind power in 2021, about a quarter of total wind generation in the U.S., and almost three times more than second place Iowa (Figure 2). Oklahoma, Kansas, and California round out the top five (Table 1). For detailed numbers on individual states’ generation, see Tables 2 and 3 at the end of this report.

Wind and solar generation require land for turbines and panels. Texas and California are big states, so their large area helps explain their top rankings in raw renewable generation. We divided each state’s renewable electricity generation by its geographic area. This tells us how much states are generating given their available land area.

Wind farms require a large amount of land away from houses and other developed areas. Larger states therefore still tend to outperform smaller states even when normalized by area (Figure 2). Iowa and Oklahoma, however, generate more wind electricity per square mile than Texas. Illinois also moves into the top five (Table 1).

Finally, in order to represent how much renewable electricity states produce compared to the amount of electricity they consume, we divided the generation by the population of each state (Figure 2). It is worth noting that this is only an approximation.

Table 1. Rankings of the top 10 states for raw wind and solar generation in 2021, as well as wind and solar generation normalized by state area, and population.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Wind Generation</th>
<th>Solar Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Raw generation</td>
<td>Generation per square mile</td>
</tr>
<tr>
<td>1</td>
<td>TX</td>
<td>IA</td>
</tr>
<tr>
<td>2</td>
<td>IA</td>
<td>OK</td>
</tr>
<tr>
<td>3</td>
<td>OK</td>
<td>TX</td>
</tr>
<tr>
<td>4</td>
<td>KS</td>
<td>IL</td>
</tr>
<tr>
<td>5</td>
<td>CA</td>
<td>KS</td>
</tr>
<tr>
<td>6</td>
<td>IL</td>
<td>ND</td>
</tr>
<tr>
<td>7</td>
<td>CO</td>
<td>IN</td>
</tr>
<tr>
<td>8</td>
<td>ND</td>
<td>MN</td>
</tr>
<tr>
<td>9</td>
<td>MN</td>
<td>CA</td>
</tr>
<tr>
<td>10</td>
<td>NM</td>
<td>CO</td>
</tr>
</tbody>
</table>
based on the population, and not on the actual electricity consumption.

In this view of wind, Texas’ rank drops dramatically from first for raw generation and third for generation per area, to ninth for generation per capita. Meanwhile, Kansas and Iowa were the most consistent of the top 10, staying in the top five across the board (Table 1). Meanwhile, North Dakota, South Dakota, and Wyoming (all among the lowest populated states in the country) climb into the top five.

**Solar**

California generated a WeatherPower-estimated 55,000 GWh of solar electricity in 2021, more than a third of the total U.S. solar generation, and 3.2 times more solar than the second place, Texas (Figure 3). Florida, Arizona, and North Carolina, rounded out the top five (Table 1).

Although Washington, D.C. generated 140 GWh of solar in 2021 (just 0.25% of California’s generation), it has just 0.04% of California’s land area, and led the way for solar generation normalized by land area (Figure 3 and Table 1). Washington, D.C. generated 2,200 MWh per square mile in 2021, compared with 354 MWh per square mile for California. 2,200 MWh is enough electricity to power about 200 average American homes for a year. New Jersey led the way for the rest of the country, generating 626 MWh of solar per square mile. Other northeastern states including Massachusetts and Connecticut also
produced a lot of solar energy per square mile. While California dropped from the top spot, it still stayed in the top five.

Normalizing by population underscores just how impressive California’s solar generation is: despite being the most populous state with 39.5 million inhabitants, it still managed to generate the third most solar energy per capita in 2021 (Table 1). California is the only state that ranked in the top five for solar generation across all three metrics: raw generation, generation normalized by area, and generation per capita (Table 1). As the most densely populated state, New Jersey drops out of the top ten, while Arizona, North Carolina, Utah, and Nevada close out the top five.

**Tracking National Renewable Energy Goals**

The amount of wind and solar electricity produced in the U.S. is growing each year, but is it growing fast enough to meet the nation’s ambitious targets? The Net Zero America Project (NZA) identified five pathways by which the U.S. could transform its energy system to get to net zero emissions by 2050. In one scenario, NZA estimated that solar and wind energy generation would need to rise to 2.2 million GWh per year by 2030. This is 1.6 million GWh more than was produced in 2021, or 3.6 times the 2021 total.

According to the U.S. Energy Information Administration, U.S. solar generation...
increased by 25,000 GWh between 2020 and 2021 and wind generation increased by 84,000 GWh (109,000 GWh combined). In order to stay on the pathway to net zero outlined by NZA, we would need to add an average of 213,000 GWh per year, or nearly double the recent increase. Increases in solar and wind generation are accelerating, however, and both sources increased 28% in 2021. In order to meet the 2030 target and stay on the path toward net zero emissions in 2050, generation would need to increase 18.3% year over year to meet the goal. This suggests that the NZA goal for 2030 may be in reach if recent rates of acceleration are maintained.

State-by-State Views
Using the county-by-county estimates from WeatherPower, we can look at how individual states’ generation varies across the state. Below, we show county-by-county solar and wind generation across California, where five out of the top 10 2021 renewable energy-generating counties in the U.S. were located.

Figure 4. WeatherPower-estimated wind (left) and solar (right) generation for California for 2021 (Million MWh)

Kern County, Calif., one the nation’s most important counties for renewable energy generation, shows up clearly in both the wind and solar map (Figure 4). Kern County houses the Alta Wind Energy Center, the largest wind farm in the U.S., and the second largest in the world. It also contains the Solar Star Farm, the largest solar farm in the U.S. The WeatherPower tool estimates that Kern County generated almost 24 million MWh of combined wind and solar energy in 2021. This is more than twice as much as the next highest county, Nolan County, Tex. (which generated 7.7 million MWh).
Next, we look at county-by-county wind and solar generation for Texas (Figure 5). Here, two counties stood out: Nolan County for wind, and Pecos County for solar. Nolan county is home to the Roscoe Wind farm, a 785 MW installation. Pecos County, meanwhile, contains two of the top five largest solar farms in Texas: Roserock and Buckthorn Solar Farms, both coming in at just over 200 MW.

**Figure 5.** WeatherPower-estimated wind (left) and solar (right) generation for Texas for 2021 (Million MWh)

Tables 2 and 3 at the end of this report show the 2021 solar and wind generation for each state, as well as their national rankings for raw generation and normalized generation. States with solar or wind generation smaller than 1 GWh are removed from those respective tables. The tables also list the day when each state produced the most renewable energy and highlights the state’s top solar and wind power-producing counties.

**Conclusion**
Renewable energy is a growing part of electricity generation in the U.S. Climate Central’s WeatherPower tool allows us to estimate local solar and wind generation so that we can assess how different parts of the country are helping achieve the national energy goal of net zero emissions by 2050. There is opportunity for growth in every state, and every community can help contribute to reaching this goal. Who will lead the way for next year? Stay tuned for our 2022 report!
<table>
<thead>
<tr>
<th>State</th>
<th>Production (GWh)</th>
<th>Raw Generation Rank</th>
<th>Normalized by Area Rank</th>
<th>Normalized by Population Rank</th>
<th>Maximum Date</th>
<th>Top County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>471.3409</td>
<td>29</td>
<td>34</td>
<td>33</td>
<td>2021-09-02</td>
<td>Chambers</td>
</tr>
<tr>
<td>Arkansas</td>
<td>496.0723</td>
<td>28</td>
<td>33</td>
<td>28</td>
<td>2021-06-22</td>
<td>Chicot</td>
</tr>
<tr>
<td>Arizona</td>
<td>10771.1</td>
<td>4</td>
<td>11</td>
<td>2</td>
<td>2021-06-11</td>
<td>Maricopa</td>
</tr>
<tr>
<td>California</td>
<td>55219.94</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2021-06-10</td>
<td>Kern</td>
</tr>
<tr>
<td>Colorado</td>
<td>2737.288</td>
<td>13</td>
<td>20</td>
<td>13</td>
<td>2021-06-11</td>
<td>El Paso</td>
</tr>
<tr>
<td>Connecticut</td>
<td>1055.314</td>
<td>21</td>
<td>5</td>
<td>20</td>
<td>2021-06-17</td>
<td>Hartford</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>140.0153</td>
<td>40</td>
<td>1</td>
<td>25</td>
<td>2021-06-17</td>
<td>District of Columbia</td>
</tr>
<tr>
<td>Delaware</td>
<td>211.1852</td>
<td>38</td>
<td>10</td>
<td>23</td>
<td>2021-06-17</td>
<td>Kent</td>
</tr>
<tr>
<td>Florida</td>
<td>11430.72</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>2021-05-24</td>
<td>Hillsborough</td>
</tr>
<tr>
<td>Georgia</td>
<td>4169.87</td>
<td>9</td>
<td>13</td>
<td>16</td>
<td>2021-05-07</td>
<td>Taylor</td>
</tr>
<tr>
<td>Iowa</td>
<td>660.366</td>
<td>25</td>
<td>28</td>
<td>24</td>
<td>2021-06-13</td>
<td>Polk</td>
</tr>
<tr>
<td>Idaho</td>
<td>745.6929</td>
<td>24</td>
<td>35</td>
<td>15</td>
<td>2021-07-09</td>
<td>Ada</td>
</tr>
<tr>
<td>Illinois</td>
<td>946.3746</td>
<td>22</td>
<td>25</td>
<td>35</td>
<td>2021-07-03</td>
<td>Perry</td>
</tr>
<tr>
<td>Indiana</td>
<td>1295.74</td>
<td>19</td>
<td>19</td>
<td>26</td>
<td>2021-06-17</td>
<td>Marion</td>
</tr>
<tr>
<td>Kansas</td>
<td>111.6229</td>
<td>42</td>
<td>43</td>
<td>42</td>
<td>2021-06-13</td>
<td>Stanton</td>
</tr>
<tr>
<td>Kentucky</td>
<td>77.6625</td>
<td>44</td>
<td>41</td>
<td>45</td>
<td>2021-06-23</td>
<td>Mercer</td>
</tr>
<tr>
<td>Louisiana</td>
<td>220.7681</td>
<td>36</td>
<td>38</td>
<td>40</td>
<td>2021-06-17</td>
<td>Orleans</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>3974.496</td>
<td>10</td>
<td>3</td>
<td>9</td>
<td>2021-06-17</td>
<td>Worcester</td>
</tr>
<tr>
<td>Maryland</td>
<td>1744.458</td>
<td>17</td>
<td>8</td>
<td>21</td>
<td>2021-06-17</td>
<td>Prince George's</td>
</tr>
<tr>
<td>Maine</td>
<td>326.0472</td>
<td>34</td>
<td>31</td>
<td>22</td>
<td>2021-06-24</td>
<td>Cumberland</td>
</tr>
<tr>
<td>Michigan</td>
<td>591.3295</td>
<td>26</td>
<td>32</td>
<td>39</td>
<td>2021-06-16</td>
<td>Lapeer</td>
</tr>
<tr>
<td>Minnesota</td>
<td>1964.496</td>
<td>15</td>
<td>22</td>
<td>19</td>
<td>2021-06-12</td>
<td>Chisago</td>
</tr>
<tr>
<td>Missouri</td>
<td>385.1169</td>
<td>32</td>
<td>37</td>
<td>38</td>
<td>2021-06-13</td>
<td>Jackson</td>
</tr>
<tr>
<td>Mississippi</td>
<td>372.8631</td>
<td>33</td>
<td>36</td>
<td>30</td>
<td>2021-04-12</td>
<td>Lamar</td>
</tr>
<tr>
<td>Montana</td>
<td>137.6633</td>
<td>41</td>
<td>45</td>
<td>29</td>
<td>2021-06-17</td>
<td>Yellowstone</td>
</tr>
<tr>
<td>North Carolina</td>
<td>10578.13</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>2021-07-03</td>
<td>Edgecombe</td>
</tr>
<tr>
<td>North Dakota</td>
<td>1.274374</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>2021-06-12</td>
<td>Cass</td>
</tr>
<tr>
<td>Nebraska</td>
<td>76.56485</td>
<td>45</td>
<td>44</td>
<td>41</td>
<td>2021-06-12</td>
<td>Douglas</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>156.3231</td>
<td>39</td>
<td>24</td>
<td>31</td>
<td>2021-06-17</td>
<td>Rockingham</td>
</tr>
<tr>
<td>New Jersey</td>
<td>4605.581</td>
<td>7</td>
<td>2</td>
<td>12</td>
<td>2021-06-17</td>
<td>Middlesex</td>
</tr>
<tr>
<td>New Mexico</td>
<td>1950.663</td>
<td>16</td>
<td>27</td>
<td>6</td>
<td>2021-06-11</td>
<td>Bernalillo</td>
</tr>
<tr>
<td>Nevada</td>
<td>7872.072</td>
<td>6</td>
<td>15</td>
<td>1</td>
<td>2021-06-10</td>
<td>Clark</td>
</tr>
<tr>
<td>New York</td>
<td>3388.986</td>
<td>12</td>
<td>14</td>
<td>27</td>
<td>2021-06-17</td>
<td>Suffolk</td>
</tr>
<tr>
<td>Ohio</td>
<td>1067.937</td>
<td>20</td>
<td>21</td>
<td>34</td>
<td>2021-07-05</td>
<td>Hardin</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>102.5192</td>
<td>43</td>
<td>42</td>
<td>44</td>
<td>2021-06-22</td>
<td>Caddo</td>
</tr>
<tr>
<td>Oregon</td>
<td>1607.872</td>
<td>18</td>
<td>26</td>
<td>17</td>
<td>2021-06-17</td>
<td>Crook</td>
</tr>
<tr>
<td>State</td>
<td>Production (GWh)</td>
<td>Raw Generation Rank</td>
<td>Normalized by Area Rank</td>
<td>Normalized by Population Rank</td>
<td>Maximum Date</td>
<td>Top County</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------</td>
<td>---------------------</td>
<td>-------------------------</td>
<td>-------------------------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>935.4813</td>
<td>23</td>
<td>23</td>
<td>36</td>
<td>2021-06-17</td>
<td>Lancaster</td>
</tr>
<tr>
<td>South Carolina</td>
<td>2381.225</td>
<td>14</td>
<td>12</td>
<td>14</td>
<td>2021-06-17</td>
<td>Orangeburg</td>
</tr>
<tr>
<td>South Dakota</td>
<td>2.679074</td>
<td>47</td>
<td>47</td>
<td>47</td>
<td>2021-06-21</td>
<td>Hughes</td>
</tr>
<tr>
<td>Tennessee</td>
<td>468.0025</td>
<td>30</td>
<td>29</td>
<td>37</td>
<td>2021-06-23</td>
<td>Shelby</td>
</tr>
<tr>
<td>Texas</td>
<td>17268.24</td>
<td>2</td>
<td>16</td>
<td>8</td>
<td>2021-08-07</td>
<td>Pecos</td>
</tr>
<tr>
<td>Utah</td>
<td>3589.449</td>
<td>11</td>
<td>18</td>
<td>4</td>
<td>2021-06-11</td>
<td>Iron</td>
</tr>
<tr>
<td>Virginia</td>
<td>4445.8</td>
<td>8</td>
<td>9</td>
<td>11</td>
<td>2021-08-02</td>
<td>Spotsylvania</td>
</tr>
<tr>
<td>Vermont</td>
<td>439.6051</td>
<td>31</td>
<td>17</td>
<td>7</td>
<td>2021-06-17</td>
<td>Chittenden</td>
</tr>
<tr>
<td>Washington</td>
<td>263.3626</td>
<td>35</td>
<td>39</td>
<td>43</td>
<td>2021-06-17</td>
<td>King</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>585.0595</td>
<td>27</td>
<td>30</td>
<td>32</td>
<td>2021-09-01</td>
<td>Manitowoc</td>
</tr>
<tr>
<td>West Virginia</td>
<td>14.52957</td>
<td>46</td>
<td>46</td>
<td>46</td>
<td>2021-06-16</td>
<td>Kanawha</td>
</tr>
<tr>
<td>Wyoming</td>
<td>213.4046</td>
<td>37</td>
<td>40</td>
<td>18</td>
<td>2021-06-11</td>
<td>Sweetwater</td>
</tr>
</tbody>
</table>

Table 3. State-by-state summary of wind generation for 2021

<table>
<thead>
<tr>
<th>State</th>
<th>Production (GWh)</th>
<th>Raw Generation Rank</th>
<th>Normalized by Area Rank</th>
<th>Normalized by Population Rank</th>
<th>Maximum Date</th>
<th>Top County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>1612.193</td>
<td>27</td>
<td>31</td>
<td>29</td>
<td>2021-12-14</td>
<td>Mohave</td>
</tr>
<tr>
<td>California</td>
<td>27129.99</td>
<td>5</td>
<td>9</td>
<td>22</td>
<td>2021-03-13</td>
<td>Kern</td>
</tr>
<tr>
<td>Colorado</td>
<td>18032.83</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>2021-10-27</td>
<td>Lincoln</td>
</tr>
<tr>
<td>Connecticut</td>
<td>14.11783</td>
<td>37</td>
<td>36</td>
<td>37</td>
<td>2021-01-24</td>
<td>Litchfield</td>
</tr>
<tr>
<td>Delaware</td>
<td>5.797576</td>
<td>38</td>
<td>35</td>
<td>36</td>
<td>2021-04-30</td>
<td>Sussex</td>
</tr>
<tr>
<td>Iowa</td>
<td>40337.62</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2021-03-29</td>
<td>Adair</td>
</tr>
<tr>
<td>Idaho</td>
<td>2899.265</td>
<td>22</td>
<td>29</td>
<td>15</td>
<td>2021-11-16</td>
<td>Bonneville</td>
</tr>
<tr>
<td>Illinois</td>
<td>19645.27</td>
<td>6</td>
<td>4</td>
<td>16</td>
<td>2021-12-15</td>
<td>McLean</td>
</tr>
<tr>
<td>Indiana</td>
<td>8457.305</td>
<td>16</td>
<td>7</td>
<td>19</td>
<td>2021-12-15</td>
<td>Benton</td>
</tr>
<tr>
<td>Kansas</td>
<td>28884.6</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>2021-12-10</td>
<td>Ford</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>286.336</td>
<td>34</td>
<td>27</td>
<td>33</td>
<td>2021-03-02</td>
<td>Berkshire</td>
</tr>
<tr>
<td>Maryland</td>
<td>578.2855</td>
<td>29</td>
<td>24</td>
<td>32</td>
<td>2021-01-22</td>
<td>Garrett</td>
</tr>
<tr>
<td>Maine</td>
<td>2636.481</td>
<td>23</td>
<td>22</td>
<td>14</td>
<td>2021-02-02</td>
<td>Somerset</td>
</tr>
<tr>
<td>Michigan</td>
<td>8008.948</td>
<td>18</td>
<td>14</td>
<td>21</td>
<td>2021-12-16</td>
<td>Huron</td>
</tr>
<tr>
<td>Minnesota</td>
<td>16829.16</td>
<td>9</td>
<td>8</td>
<td>12</td>
<td>2021-11-17</td>
<td>Lincoln</td>
</tr>
<tr>
<td>Missouri</td>
<td>7783.15</td>
<td>19</td>
<td>18</td>
<td>18</td>
<td>2021-04-26</td>
<td>Atchison</td>
</tr>
<tr>
<td>Montana</td>
<td>3312.186</td>
<td>21</td>
<td>30</td>
<td>11</td>
<td>2021-12-21</td>
<td>Toole</td>
</tr>
<tr>
<td>North Carolina</td>
<td>403.2324</td>
<td>32</td>
<td>33</td>
<td>34</td>
<td>2021-11-07</td>
<td>Perquimans</td>
</tr>
<tr>
<td>North Dakota</td>
<td>17556.05</td>
<td>8</td>
<td>6</td>
<td>1</td>
<td>2021-02-04</td>
<td>Morton</td>
</tr>
<tr>
<td>State</td>
<td>Production (GWh)</td>
<td>Raw Generation Rank</td>
<td>Normalized by Area Rank</td>
<td>Normalized by Population Rank</td>
<td>Maximum Date</td>
<td>Top County</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>---------------------</td>
<td>-------------------------</td>
<td>------------------------------</td>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>Nebraska</td>
<td>9858.358</td>
<td>15</td>
<td>15</td>
<td>8</td>
<td>2021-12-05</td>
<td>Antelope</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>472.9632</td>
<td>30</td>
<td>25</td>
<td>27</td>
<td>2021-12-17</td>
<td>Coos</td>
</tr>
<tr>
<td>New Jersey</td>
<td>20.42145</td>
<td>36</td>
<td>37</td>
<td>38</td>
<td>2021-02-01</td>
<td>Atlantic</td>
</tr>
<tr>
<td>New Mexico</td>
<td>12052.92</td>
<td>10</td>
<td>20</td>
<td>7</td>
<td>2021-12-10</td>
<td>Roosevelt</td>
</tr>
<tr>
<td>Nevada</td>
<td>412.2441</td>
<td>31</td>
<td>34</td>
<td>31</td>
<td>2021-01-27</td>
<td>White Pine</td>
</tr>
<tr>
<td>New York</td>
<td>8124.225</td>
<td>17</td>
<td>11</td>
<td>24</td>
<td>2021-12-12</td>
<td>Wyoming</td>
</tr>
<tr>
<td>Ohio</td>
<td>2542.129</td>
<td>24</td>
<td>23</td>
<td>30</td>
<td>2021-12-16</td>
<td>Paulding</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>38367.23</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>2021-12-24</td>
<td>Garfield</td>
</tr>
<tr>
<td>Oregon</td>
<td>10588.31</td>
<td>14</td>
<td>19</td>
<td>13</td>
<td>2021-02-05</td>
<td>Gilliam</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>5342.682</td>
<td>20</td>
<td>16</td>
<td>25</td>
<td>2021-04-30</td>
<td>Somerset</td>
</tr>
<tr>
<td>South Dakota</td>
<td>11193.08</td>
<td>12</td>
<td>13</td>
<td>4</td>
<td>2021-11-17</td>
<td>Deuel</td>
</tr>
<tr>
<td>Tennessee</td>
<td>62.95369</td>
<td>35</td>
<td>38</td>
<td>35</td>
<td>2021-12-24</td>
<td>Anderson</td>
</tr>
<tr>
<td>Texas</td>
<td>113514.8</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td>2021-12-15</td>
<td>Nolan</td>
</tr>
<tr>
<td>Utah</td>
<td>1116.468</td>
<td>28</td>
<td>32</td>
<td>26</td>
<td>2021-12-12</td>
<td>Beaver</td>
</tr>
<tr>
<td>Vermont</td>
<td>372.1256</td>
<td>33</td>
<td>26</td>
<td>23</td>
<td>2021-11-27</td>
<td>Orleans</td>
</tr>
<tr>
<td>Washington</td>
<td>10619.69</td>
<td>13</td>
<td>12</td>
<td>17</td>
<td>2021-11-14</td>
<td>Klickitat</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>1981.644</td>
<td>26</td>
<td>28</td>
<td>28</td>
<td>2021-03-10</td>
<td>Fond du Lac</td>
</tr>
<tr>
<td>West Virginia</td>
<td>2106.746</td>
<td>25</td>
<td>21</td>
<td>20</td>
<td>2021-12-25</td>
<td>Grant</td>
</tr>
<tr>
<td>Wyoming</td>
<td>11442.34</td>
<td>11</td>
<td>17</td>
<td>2</td>
<td>2021-12-23</td>
<td>Converse</td>
</tr>
</tbody>
</table>