Electric Utility Performance

A STATE-BY-STATE DATA REVIEW

SECOND EDITION

PRODUCED BY THE
CITIZENS UTILITY BOARD (CUB)
OF ILLINOIS

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DATA SOURCES

This report presents data in the context of three key benchmarks of utility performance and customer satisfaction: affordability, reliability and environmental responsibility. The data come from these main sources:

- **The Energy Information Administration (EIA).** The statistical arm of the U.S. Department of Energy, the EIA is tasked with aggregating and disseminating information about the American energy industry, and trends in energy uses, sources, reliability, and efficiency.
- **The U.S. Census Bureau's American Community Survey.**
- **The Environmental Protection Agency (EPA).**

These are all publicly available sources, but the data they collect are not always communicated in ways that are accessible and meaningful to most people. The report authors hope these comparative rankings help engaged citizens compare the performance and characteristics of their state's utilities to other states across the country.

While the majority of the figures in this report are for 2020, some are from 2021. There is a time lag in reporting on the part of the utilities. Each metric—affordability, reliability and environmental responsibility—includes two tables, one that ranks the states alphabetically and one that ranks them from best to worst. In all figures, the states are ranked from best to worst.

GLOSSARY

TERMS AND ABBREVIATIONS

- **ACS:** American Community Survey
- **CAIDI:** Customer Average Interruption Duration Index
- **CO2:** Carbon Dioxide
- **EIA:** Energy Information Administration
- **EPA:** Environmental Protection Agency
- **IEEE:** Institute of Electrical and Electronics Engineers
- **MED:** Major Event Days
- **NOx:** Nitrogen Oxides of Multiple Types
- **RPS:** Renewable Portfolio Standard
- **SAIDI:** System Average Interruption Duration Index
- **SAIFI:** System Average Interruption Frequency Index
- **SEDS:** State Energy Data System
- **SO2:** Sulfur Dioxide

UNITS OF MEASUREMENT

- **GWh/Gigawatt-hour:** one million kilowatt-hours
- **kWh/Kilowatt-hour:** a unit of electricity measurement typical on U.S. electric bills, the average American household uses about 11,000 kWh per year.
- **Metric Ton:** one million grams or 2,204.6 pounds
- **MMBTU:** one million British thermal units, equivalent to 293.07 kWh
- **MWh/Megawatt-hour:** one thousand kilowatt-hours
- **TWh/Terawatt-hour:** one billion kilowatt-hours

Introduction

This publication marks the second edition of what aims to be an enduring trademark of the Citizens Utility Board as we annually revisit and compare the performance of the nation's utilities according to three common standards of consumer value: affordability, reliability, and environmental responsibility.

The report is intended to help state officials, consumer advocates and the public at large ascertain the performance of their utilities, identify areas where those results might be flagging, and consider the remedies necessary to maximize benefits for consumers.

As this analysis is based largely on data accrued in 2020, it must come accompanied by a now-familiar caveat: The coronavirus pandemic that erupted in 2020 disrupted the economy and the culture to a degree with few historical precedents. The subsequent contraction in total national employment coincided with the exodus of much of the remaining labor force from traditional office space to a work-from-home environment. Many conventional leisure activities also ground to a halt due to moratoriums on indoor dining, attendance at sports and cultural events, and other common forms of entertainment.

All of this, of course, had profound implications on energy consumption in 2020, as pursuits that traditionally occurred outside the home—such as work, school, and shopping—were suddenly fixtures on the domestic scene for many Americans. We don't purport to know exactly how those tectonic shifts reverberate in the data from 2020, or in the resulting rankings on utility performance, but it's fair to conclude they left their imprint in ways that are unlikely to be duplicated any time soon.

Meanwhile, the year 2020 also saw jarring weather events that convulsed different areas of the country—a trend we fear will continue to challenge our energy systems as climate change continues to accelerate and escalate.

While our effort to chart utility performance remains in its infancy, this second edition of the report card does permit us to show year-over-year comparisons in the results within each of the three categories we measure, as well as the cumulative state-by-state rankings. This year we documented some dramatic fluctuations in rankings, particularly in the reliability and affordability categories. Further study is needed to determine whether the causes are temporal and related to the unique environment of the pandemic, or structural and symptomatic of issues that could become chronic without intervention.

Also for the first time, this year we looked at utilities' energy efficiency investments. Energy efficiency measures are instrumental to lowering consumer bills and curbing the emissions that pollute the air and exacerbate climate change. The cost savings garnered from these programs were reflected in our calculations on affordability, while their corresponding pollution-reduction benefits informed the rankings on environmental performance.

KEY OBSERVATIONS

Some key observations about the data include:

- Many states that depended on fuel oil and natural gas tended to rank lower in affordability than those that gravitate toward carbon-free sources. This trend was particularly evident among northeastern and southern states, and it illustrates the financial value that could be unleashed for consumers by curbing vulnerability to high gas prices. Replacing aging and retired gas furnaces with high-efficiency heat pumps at scale, could yield dramatic benefits in this regard.
- Reliability rankings appeared prone to significantly more volatile year-over-year changes than those measuring affordability or environmental performance. It would be rash and potentially misleading to infer any sort of pattern from data that spans only a two-year cycle; yet the seismic shifts in how states fared on reliability between 2019 and 2020 do raise questions that should attract further inquiry.
- Outside the confines of this study, **other research** has shown that adequate investments in so-called "firm" carbon-free energy—generation sources that are always available to produce energy at full capacity, including nuclear, hydropower and geothermal—are important complements to renewables in the quest to decarbonize the electricity sector while maximizing affordability.[1] That fact may account for favorable affordability rankings in states with robust commitments to nuclear power, such as Illinois, or hydropower, which is prevalent in the American West.

The data captured in this report reside at the heart of one of the most formidable public policy imperatives of our time: delivering affordable, reliable power in a digital economy that is ever-more dependent on electricity, while trying to preserve the integrity of a natural environment ever-more embattled by the way we generate and use that electricity. We believe it is incumbent on advocates to monitor this data and put it into a national perspective.

The function of this report is to start conversations, not end them. These rankings are measurements, not full explanations. In that vein, this report provides a snapshot of the utility landscape as it existed in 2020. The next step is to unearth the root causes.

CUB hopes this report will be an impetus to the entire community of policymakers, consumer advocates, regulators and researchers to build on this data with more critical context.

1 Sepulveda, Nestor A., Jenkins, Jesse D., de Sisternes, Fernando J., and Lester, Richard K. "The Role of Firm Low-Carbon Electricity Resources in Deep Decarbonization of Power Generation." Joule, Volume 2, Issue 11, 21 November 2018, Pages 2403-2420. https://www.sciencedirect.com/science/article/pii/S2542435118303866

TABLE 1: STATE RANKINGS ON OVERALL UTILITY PERFORMANCE (ALPHABETICAL)

State	Ranking (Best to Worst)	Affordability Average	Reliability Average	Environmental Average	Average Rank
Alabama	45	37.7	39.5	23.3	33.5
Alaska	50	42.2	38.3	34.0	38.2
Arizona	7	29.8	4.0	19.8	17.9
Arkansas	38	18.0	42.7	29.3	30.0
California	22	32.8	21.8	17.3	24.0
Colorado	6	13.2	14.0	24.7	17.3
Connecticut	42	47.0	27.2	21.6	31.9
Delaware	29	30.3	21.7	33.1	28.4
District of Columbia	3	13.0	5.5	31.0	16.5
Florida	25	30.0	13.2	33.8	25.7
Georgia	44	35.3	34.0	30.0	33.1
Hawaii	40	43.8	16.0	32.8	30.9
Idaho	17	12.8	35.7	18.3	22.3
Illinois	5	16.7	14.8	19.3	16.9
Indiana	43	31.0	27.3	39.9	32.7
Iowa	20	22.2	29.7	19.2	23.7
Kansas	12	28.8	11.5	19.4	19.9
Kentucky	35	20.0	25.3	42.2	29.2
Louisiana	47	18.0	47.0	37.7	34.2
Maine	39	29.0	44.7	18.8	30.8
Maryland	16	33.7	10.8	22.0	22.2
Massachusetts	48	42.3	34.0	28.1	34.8
Michigan	46	33.0	37.5	30.3	33.6
Minnesota	8	20.3	12.8	21.2	18.1
Mississippi	49	28.3	44.5	35.1	36.0
Missouri	24	22.2	16.3	37.7	25.4
Montana	15	14.5	29.2	22.6	22.1
Nebraska	10	16.5	10.2	29.9	18.9
Nevada	2	19.7	4.3	22.2	15.4
New Hampshire	36	38.2	33.3	16.3	29.3
New Jersey	23	26.2	27.7	21.3	25.1
New Mexico	13	17.3	21.5	23.7	20.8
New York	19	32.7	22.5	13.8	23.0
North Carolina	26	21.5	35.3	23.8	26.9
North Dakota	11	20.3	10.2	28.9	19.8
Ohio	37	21.3	29.0	37.7	29.3
Oklahoma	28	21.0	43.0	19.2	27.7
Oregon	9	15.0	26.8	13.7	18.5
Pennsylvania	31	33.7	26.0	27.1	28.9
Rhode Island	41	41.8	24.8	26.2	31.0
South Carolina	27	33.7	27.8	20.6	27.4
South Dakota	4	27.8	9.2	13.3	16.8
Tennessee	32	28.8	35.8	22.7	29.1
Texas	33	25.5	34.0	28.0	29.2
Utah	18	4.7	28.2	34.1	22.3
Vermont	33	38.0	34.5	15.0	29.2
Virginia	30	23.7	33.3	29.2	28.7
Washington	1	8.7	26.3	10.4	15.1
West Virginia	51	30.8	45.3	42.3	39.5
Wisconsin	14	19.7	13.7	32.6	22.0
Wyoming	21	13.2	24.2	34.1	23.8

TABLE 2: STATE RANKINGS ON OVERALL UTILITY PERFORMANCE (BEST-TO-WORST)

Ranking (Best to Worst)	State	Change from Previous Year	Affordability Average	Reliability Average	Environmental Average	Average Rank
1	Washington	1	8.7	26.3	10.4	15.1
2	Nevada	-1	19.7	4.3	22.2	15.4
3	District of Columbia	9	13.0	5.5	31.0	16.5
4	South Dakota	13	27.8	9.2	13.3	16.8
5	Illinois	0	16.7	14.8	19.3	16.9
6	Colorado	5	13.2	14.0	24.7	17.3
7	Arizona	1	29.8	4.0	19.8	17.9
8	Minnesota	1	20.3	12.8	21.2	18.1
9	Oregon	-5	15.0	26.8	13.7	18.5
10	Nebraska	-4	16.5	10.2	29.9	18.9
11	North Dakota	-4	20.3	10.2	28.9	19.8
12	Kansas	7	28.8	11.5	19.4	19.9
13	New Mexico	3	17.3	21.5	23.7	20.8
14	Wisconsin	13	19.7	13.7	32.6	22.0
15	Montana	-1	14.5	29.2	22.6	22.1
16	Maryland	9	33.7	10.8	22.0	22.2
17	Idaho	-14	12.8	35.7	18.3	22.3
18	Utah	-8	4.7	28.2	34.1	22.3
19	New York	-4	32.7	22.5	13.8	23.0
20	Iowa	-7	22.2	29.7	19.2	23.7
21	Wyoming	1	13.2	24.2	34.1	23.8
22	California	2	32.8	21.8	17.3	24.0
23	New Jersey	-3	26.2	27.7	21.3	25.1
24	Missouri	13	22.2	16.3	37.7	25.4
25	Florida	-7	30.0	13.2	33.8	25.7
26	North Carolina	5	21.5	35.3	23.8	26.9
27	South Carolina	1	33.7	27.8	20.6	27.4
28	Oklahoma	-5	21.0	43.0	19.2	27.7
29	Delaware	-8	30.3	21.7	33.1	28.4
30	Virginia	11	23.7	33.3	29.2	28.7
31	Pennsylvania	3	33.7	26.0	27.1	28.9
32	Tennessee	-6	28.8	35.8	22.7	29.1
33	Texas	-4	25.5	34.0	28.0	29.2
33	Vermont	0	38.0	34.5	15.0	29.2
35	Kentucky	5	20.0	25.3	42.2	29.2
36	New Hampshire	0	38.2	33.3	16.3	29.3
37	Ohio	8	21.3	29.0	37.7	29.3
38	Arkansas	1	18.0	42.7	29.3	30.0
39	Maine	3	29.0	44.7	18.8	30.8
40	Hawaii	9	43.8	16.0	32.8	30.9
41	Rhode Island	-6	41.8	24.8	26.2	31.0
42	Connecticut	1	47.0	27.2	21.6	31.9
43	Indiana	5	31.0	27.3	39.9	32.7
44	Georgia	-12	35.3	34.0	30.0	33.1
45	Alabama	-15	37.7	39.5	23.3	33.5
46	Michigan	0	33.0	37.5	30.3	33.6
47	Louisiana	-3	18.0	47.0	37.7	34.2
48	Massachusetts	-10	42.3	34.0	28.1	34.8
49	Mississippi	-2	28.3	44.5	35.1	36.0
50	Alaska	0	42.2	38.3	34.0	38.2
51	West Virginia	0	30.8	45.3	42.3	39.5

Affordability Metrics

Electricity bills often have multiple components, including fixed monthly fees, per kilowatt-hour (kWh) rates and even "demand" charges based on the customer's peak rate of power usage in the billing month or previous year. The way utilities assign costs to customers varies by company, customer class (residential and commercial, for example) and state. Despite those differences, each kWh is identical—so dividing the total bill by kilowatt-hours used is generally the best way to compare the impact of utility costs on customers.

The Energy Information Administration (EIA) collects monthly data from each utility in the nation on the amounts of electricity sold and revenue from electricity by customer class. Customer classes include residential, commercial, industrial and transportation, with almost all electricity delivered in most states going to the first three classes. EIA makes the data available through its **Electricity Data Browser**.

The affordability of electricity is a nuanced calculation—climate and the availability of alternative heating fuels, for example, can affect the amount of electricity a household consumes. Therefore, this section offers a number of metrics to give readers a comprehensive view of affordability:

- Average Monthly Cost of Electric Bills.
- Average Annual Cost of Household Energy Expenditures (electricity and non-electricity).
- Average Annual Household Electricity Costs as a Percentage of Median Income.
- Average Annual Residential Electricity Expenditures.
- Average Annual Electricity Cost Per Kilowatt-Hour for Residential Customers.
- Average Annual Electricity Cost Per Kilowatt-Hour for All Customers (residential, commercial, industrial).
- Cost per Kilowatt-Hour of Energy Efficiency Savings in the Residential Sector.

As you see in Figure 7, the Affordability section for the first time includes a metric on energy efficiency. (An efficiency metric has also been added to the Environmental section.) This is a sign of the times, as electric utilities across the nation—reacting to economic pressures and state and federal legislation—work to reduce carbon emissions and shutter their oldest, dirtiest and least-efficient power plants, as well as respond to increases in load resulting from electrification of transportation and buildings. Efficiency should be a key component of this process, as utilities not only look to build new clean supply, but also control the demand side of the equation.

Utilities in all states offer some residential efficiency programs, since a kilowatt-hour of unused electricity is the same as, and often cheaper than, the production of an additional kilowatt-hour of clean generation. These programs come in different forms, but typical programs help consumers weatherize their homes (improve insulation and air sealing) and either provide or subsidize the replacement of older light bulbs and appliances. However, not all energy efficiency programs are equal, and not all utilities use them to their full potential.

To get at the differences in program efficiency and deployment, this report uses data from the utilities' **Form 861 filings to the EIA** to measure "Cost per Kilowatt Hour of Energy Efficiency Savings." This is an attempt to measure the efficiency of efficiency programs—how well utilities are spending their money on energy efficiency and what states are getting the biggest savings relative to their spending.

The prices of electricity and heating fuels comprise just a segment of the overall energy affordability picture. For example, whereas households in warmer climates may consume more electricity on an annual basis to run air conditioning units than households in colder climates, those same households will not spend as much on natural gas, propane or other heating fuels during the winter. High costs in Alaska and Hawaii are due simply to these states' isolation relative to the U.S. mainland's comparatively interconnected grid and access to energy resources. Energy expenditures are measured by the EIA in the **State Energy Data System (SEDS) database**.

TABLE 3: AFFORDABILITY RANKINGS (ALPHABETICAL)

State	Average Household Energy Expenditures	Total Household Electricity Costs as a Percentage of Income	Electricity Cost per Kilowatt Hour For All Customers	Electricity Cost per Kilowatt Hour for Residential Customers	Electricity Expenditures	Cost per Kilowatt Hour of Energy Efficiency Savings
Alabama	36	50	27	29	49	35
Alaska	50	25	50	48	38	42
Arizona	28	40	33	23	47	8
Arkansas	10	43	11	10	20	14
California	32	15	49	49	30	22
Colorado	5	3	35	30	3	3
Connecticut	51	39	47	46	50	49
Delaware	31	26	31	24	31	39
District of Columbia	2	2	39	30	4	1
Florida	9	45	34	17	41	34
Georgia	38	44	32	25	42	31
Hawaii	39	38	51	51	51	33
Idaho	6	11	1	2	6	51
Illinois	19	5	26	34	5	11
Indiana	35	34	28	36	34	19
Iowa	27	19	14	26	15	32
Kansas	33	18	29	28	25	40
Kentucky	13	41	13	15	29	9
Louisiana	8	46	7	6	28	13
Maine	44	14	41	41	8	26
Maryland	42	8	38	32	37	45
Massachusetts	47	17	48	50	45	47
Michigan	40	29	40	42	19	28
Minnesota	25	7	37	35	12	6
Mississippi	20	51	19	16	40	24
Missouri	24	35	23	12	27	12
Montana	21	28	18	9	9	2
Nebraska	15	16	10	5	17	36
Nevada	17	33	5	13	21	29
New Hampshire	46	10	45	45	33	50
New Jersey	41	6	42	40	18	10
New Mexico	1	27	21	37	2	16
New York	45	21	43	44	22	21
North Carolina	12	37	17	13	32	18
North Dakota	18	31	4	4	24	41
Ohio	30	32	20	27	14	5
Oklahoma	11	42	8	22	16	27
Oregon	7	9	12	11	13	38
Pennsylvania	43	23	24	38	26	48
Rhode Island	49	22	46	47	43	44
South Carolina	29	47	25	33	48	20
South Dakota	26	30	30	21	35	25
Tennessee	14	48	22	7	39	43
Texas	22	36	16	18	46	15
Utah	3	1	3	3	1	17
Vermont	48	24	44	43	23	46
Virginia	37	20	15	19	44	7
Washington	4	4	6	1	7	30
West Virginia	34	49	9	20	36	37
Wisconsin	16	12	36	39	11	4
Wyoming	23	13	2	8	10	23

TABLE 4: AFFORDABILITY RANKINGS (BEST-TO-WORST)

Rank Based on Average Performance	State	Rank Change from 2021 Report	Average Household Energy Expenditures	Total Household Electricity Costs as a Percentage of Income	Electricity Cost per Kilowatt Hour For All Customers	Electricity Cost per Kilowatt Hour for Residential Customers	Electricity Expenditures	Cost per Kilowatt Hour of Energy Efficiency Savings
1	Utah	0	3	1	3	3	1	17
2	Washington	0	4	4	6	1	7	30
3	Idaho	0	6	11	1	2	6	51
4	District of Columbia	9	2	2	39	30	4	1
5	Colorado	0	5	3	35	30	3	3
5	Wyoming	1	23	13	2	8	10	23
7	Montana	6	21	28	18	9	9	2
8	Oregon	-4	7	9	12	11	13	38
9	Nebraska	-1	15	16	10	5	17	36
10	Illinois	2	19	5	26	34	5	11
11	New Mexico	-2	1	27	21	37	2	16
12	Arkansas	-2	10	43	11	10	20	14
12	Louisiana	3	8	46	7	6	28	13
14	Nevada	-7	17	33	5	13	21	29
14	Wisconsin	4	16	12	36	39	11	4
16	Kentucky	1	13	41	13	15	29	9
17	Minnesota	1	25	7	37	35	12	6
17	North Dakota	-1	18	31	4	4	24	41
19	Oklahoma	-8	11	42	8	22	16	27
20	Ohio	1	30	32	20	27	14	5
21	North Carolina	2	12	37	17	13	32	18
22	Iowa	2	27	19	14	26	15	32
22	Missouri	-2	24	35	23	12	27	12
24	Virginia	14	37	20	15	19	44	7
25	Texas	1	22	36	16	18	46	15
26	New Jersey	3	41	6	42	40	18	10
27	South Dakota	5	26	30	30	21	35	25
28	Mississippi	5	20	51	19	16	40	24
29	Kansas	-2	33	18	29	28	25	40
29	Tennessee	1	14	48	22	7	39	43
31	Maine	10	44	14	41	41	8	26
32	Arizona	-2	28	40	33	23	47	8
33	Florida	-5	9	45	34	17	41	34
34	Delaware	1	31	26	31	24	31	39
35	West Virginia	-10	34	49	9	20	36	37
36	Indiana	0	35	34	28	36	34	19
37	New York	3	45	21	43	44	22	21
38	California	-16	32	15	49	49	30	22
39	Michigan	-5	40	29	40	42	19	28
40	Maryland	2	42	8	38	32	37	45
40	Pennsylvania	-1	43	23	24	38	26	48
40	South Carolina	3	29	47	25	33	48	20
43	Georgia	0	38	44	32	25	42	31
44	Alabama	3	36	50	27	29	49	35
45	Vermont	-9	48	24	44	43	23	46
46	New Hampshire	-1	46	10	45	45	33	50
47	Rhode Island	1	49	22	46	47	43	44
48	Alaska	1	50	25	50	48	38	42
49	Massachusetts	-3	47	17	48	50	45	47
50	Hawaii	0	39	38	51	51	51	33
51	Connecticut	-1	51	39	47	46	50	49

FIGURE 1: 2020 AVERAGE MONTHLY COST OF ELECTRICITY

State	Yearly Residential Electricity Sales per Customer in Kilowatt Hours	Residential Electricity Price per Kilowatt Hour	Average Residential Monthly Electricity Bill
Utah	9,226	$0.104	$80
New Mexico	8,039	$0.129	$87
Colorado	8,533	$0.124	$88
District of Columbia	8,445	$0.126	$89
Illinois	8,647	$0.130	$94
Idaho	11,464	$0.099	$95
Washington	11,634	$0.099	$96
Maine	6,836	$0.168	$96
Montana	10,299	$0.112	$96
Wyoming	10,434	$0.111	$97
Wisconsin	8,331	$0.143	$99
Minnesota	9,306	$0.132	$102
Oregon	10,995	$0.112	$102
Ohio	10,479	$0.123	$107
Iowa	10,380	$0.125	$108
Oklahoma	12,938	$0.101	$109
Nebraska	12,158	$0.108	$109
New Jersey	8,201	$0.160	$110
Michigan	8,107	$0.163	$110
Arkansas	12,720	$0.104	$110
Nevada	11,677	$0.113	$110
New York	7,219	$0.184	$110
Vermont	6,806	$0.195	$111
North Dakota	13,024	$0.104	$113
Kansas	10,598	$0.129	$114
Pennsylvania	10,152	$0.136	$115
Missouri	12,333	$0.112	$115
Louisiana	14,407	$0.097	$116
Kentucky	12,878	$0.109	$117
California	6,862	$0.204	$117
Delaware	11,184	$0.126	$117
North Carolina	12,490	$0.114	$118
New Hampshire	7,564	$0.190	$120
Indiana	11,259	$0.128	$120
South Dakota	12,441	$0.117	$122
West Virginia	12,614	$0.118	$124
Maryland	11,488	$0.130	$125
Alaska	6,627	$0.226	$125
U.S. Average	10,715	$0.137	$125
Tennessee	14,020	$0.108	$126
Mississippi	13,756	$0.112	$128
Florida	13,698	$0.113	$129
Georgia	12,974	$0.120	$130
Rhode Island	7,129	$0.220	$131
Virginia	13,143	$0.120	$132
Massachusetts	7,221	$0.220	$132
Texas	13,583	$0.117	$133
Arizona	13,364	$0.123	$137
South Carolina	12,968	$0.128	$138
Alabama	13,737	$0.126	$144
Connecticut	8,535	$0.227	$162
Hawaii	6,446	$0.303	$163

FIGURE 2: 2020 AVERAGE ANNUAL COST OF HOUSEHOLD ENERGY EXPENDITURES

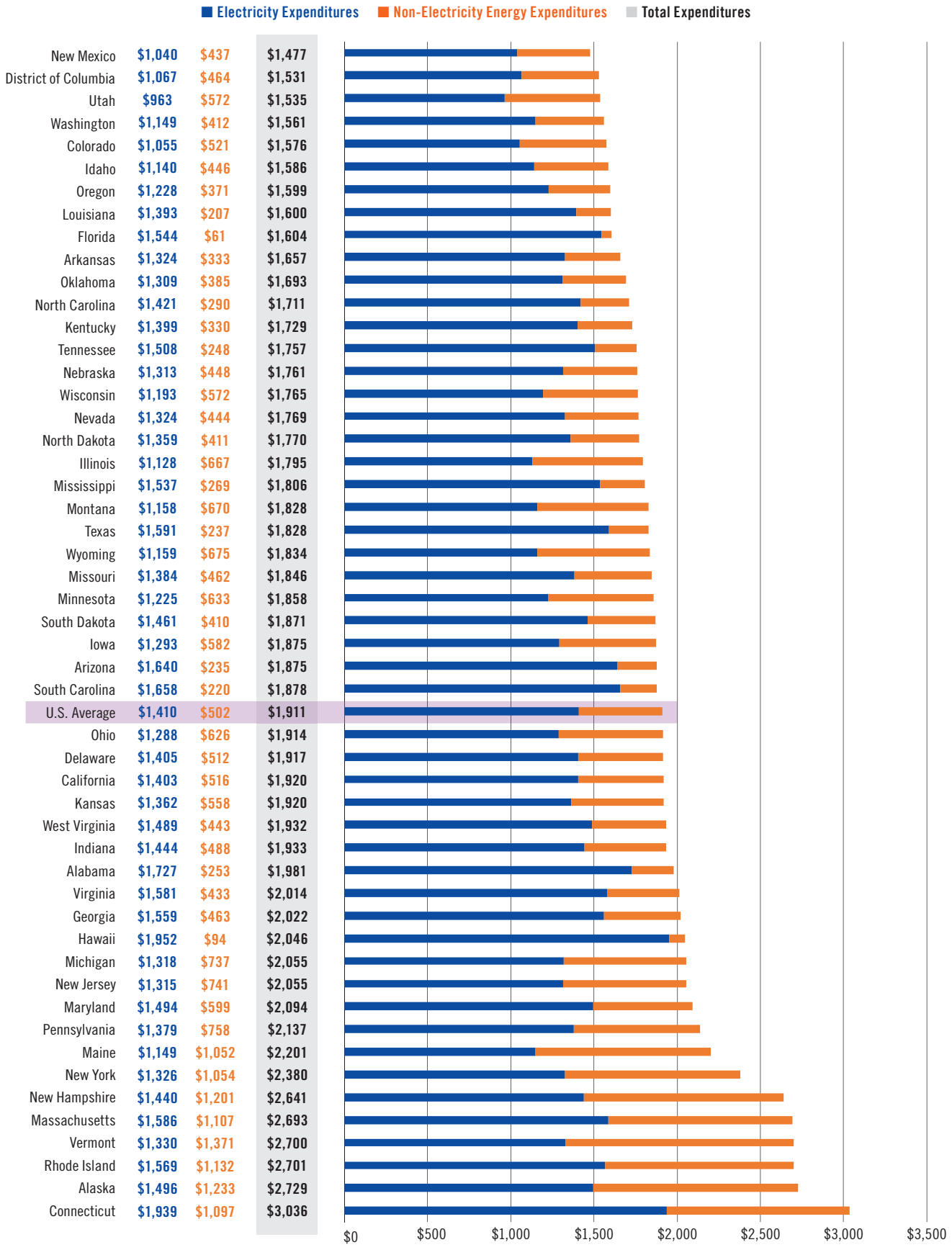


FIGURE 3: 2020 AVERAGE ANNUAL HOUSEHOLD ELECTRICITY COSTS AS A PERCENTAGE OF MEDIAN INCOME

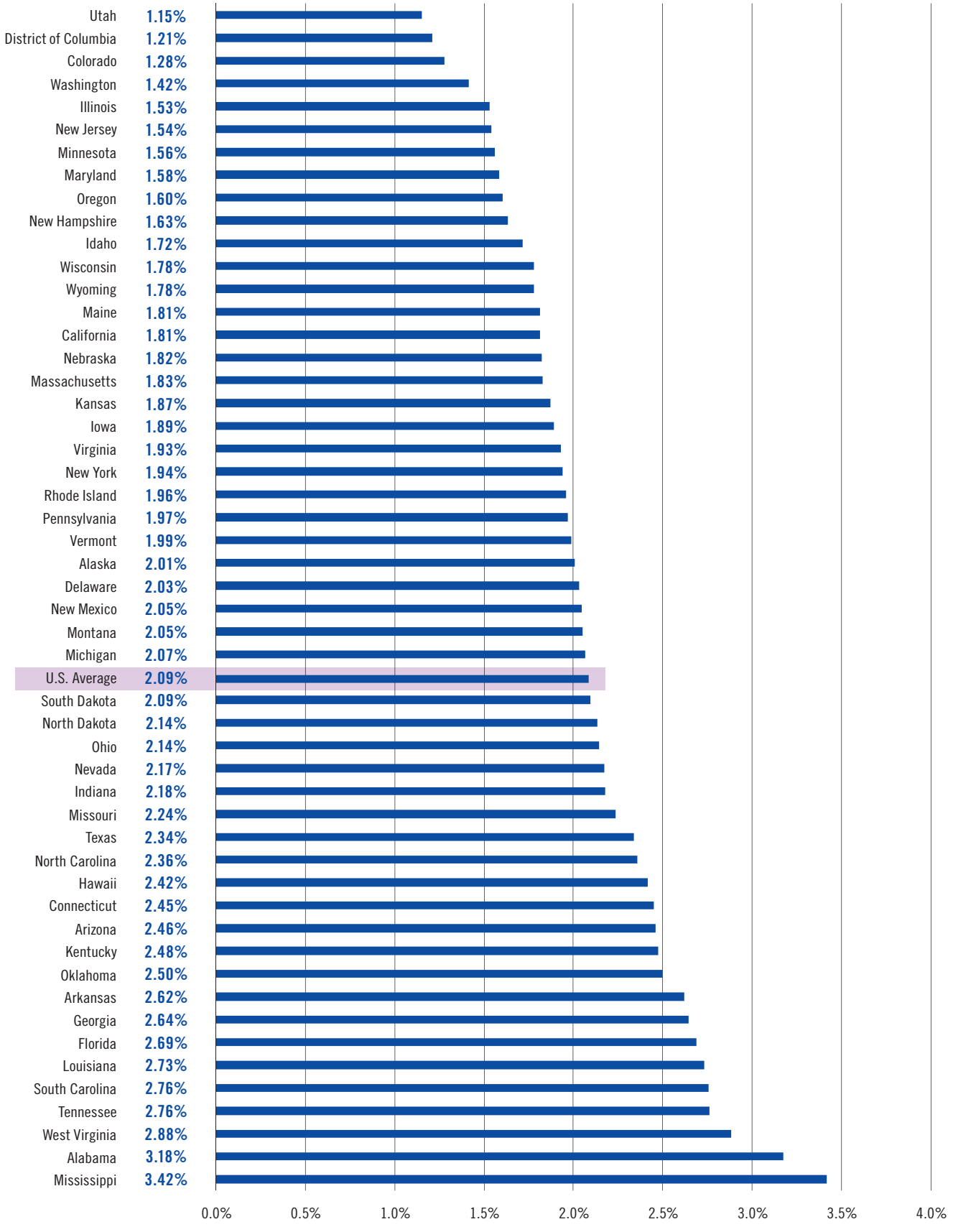


FIGURE 4: 2020 AVERAGE ANNUAL RESIDENTIAL ELECTRICITY EXPENDITURES

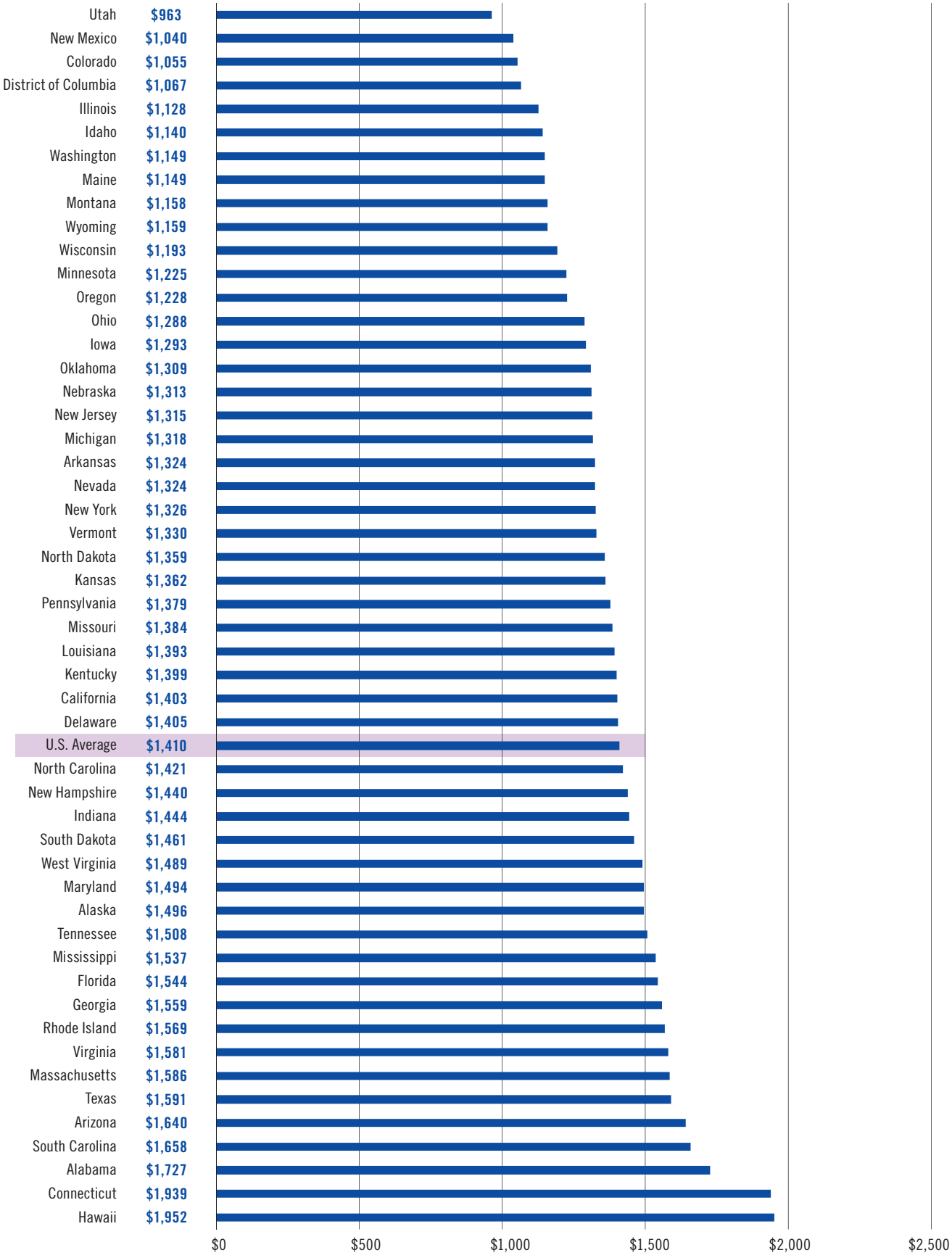


FIGURE 5: 2021 AVERAGE ANNUAL ELECTRICITY COST PER KILOWATT-HOUR FOR RESIDENTIAL CUSTOMERS

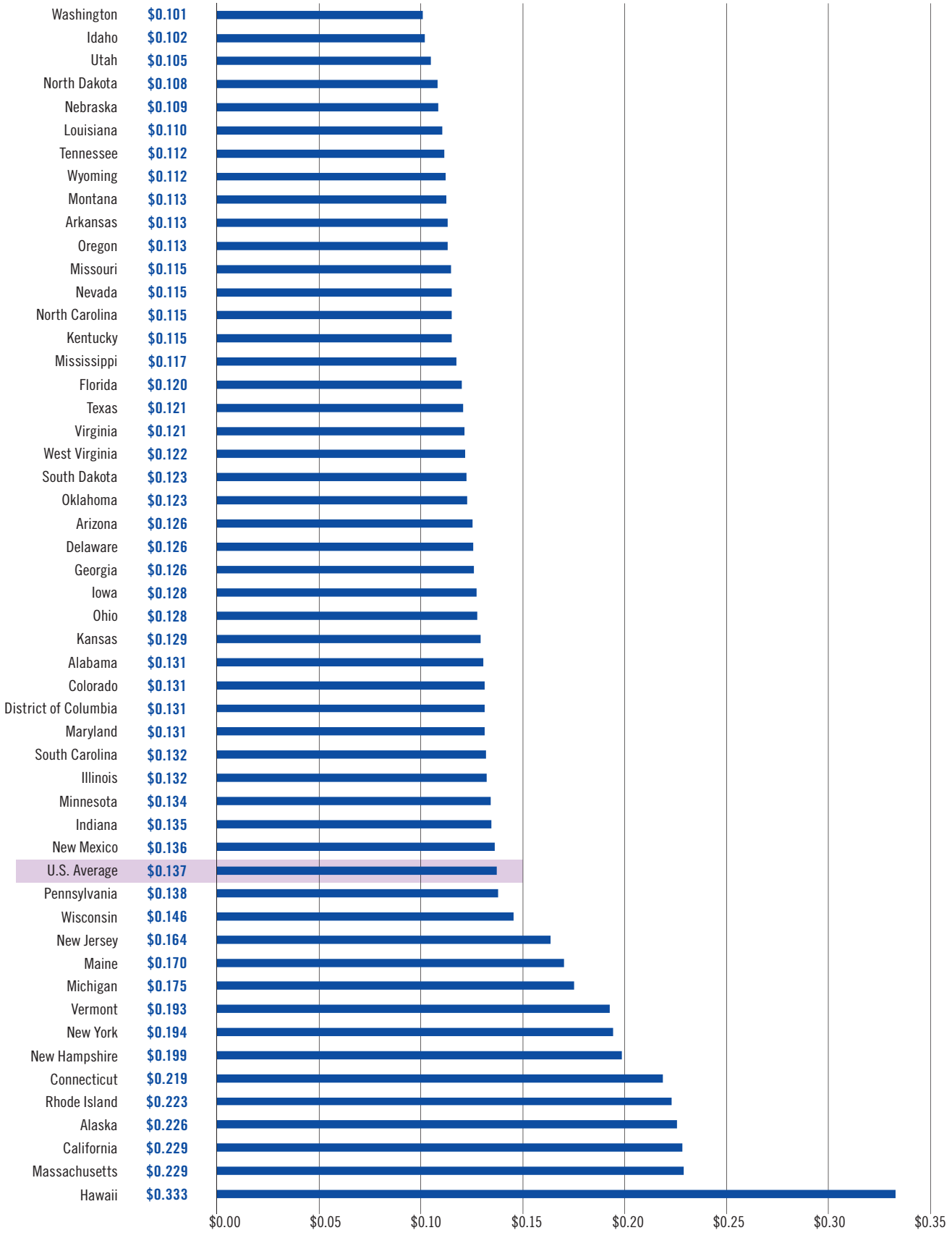


FIGURE 6: 2021 AVERAGE ANNUAL ELECTRICITY COST PER KILOWATT-HOUR FOR ALL CUSTOMERS (RESIDENTIAL, COMMERCIAL, INDUSTRIAL)

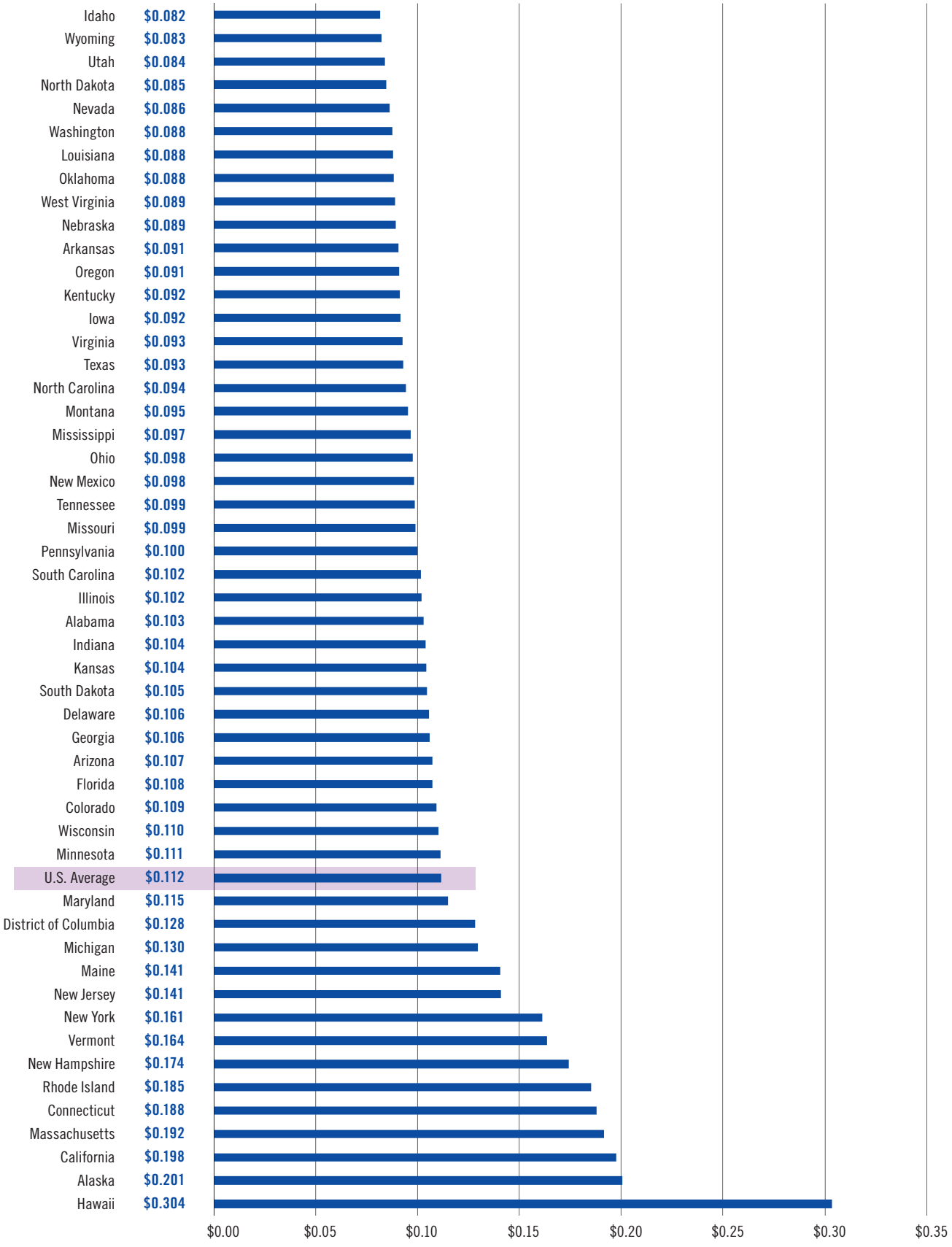
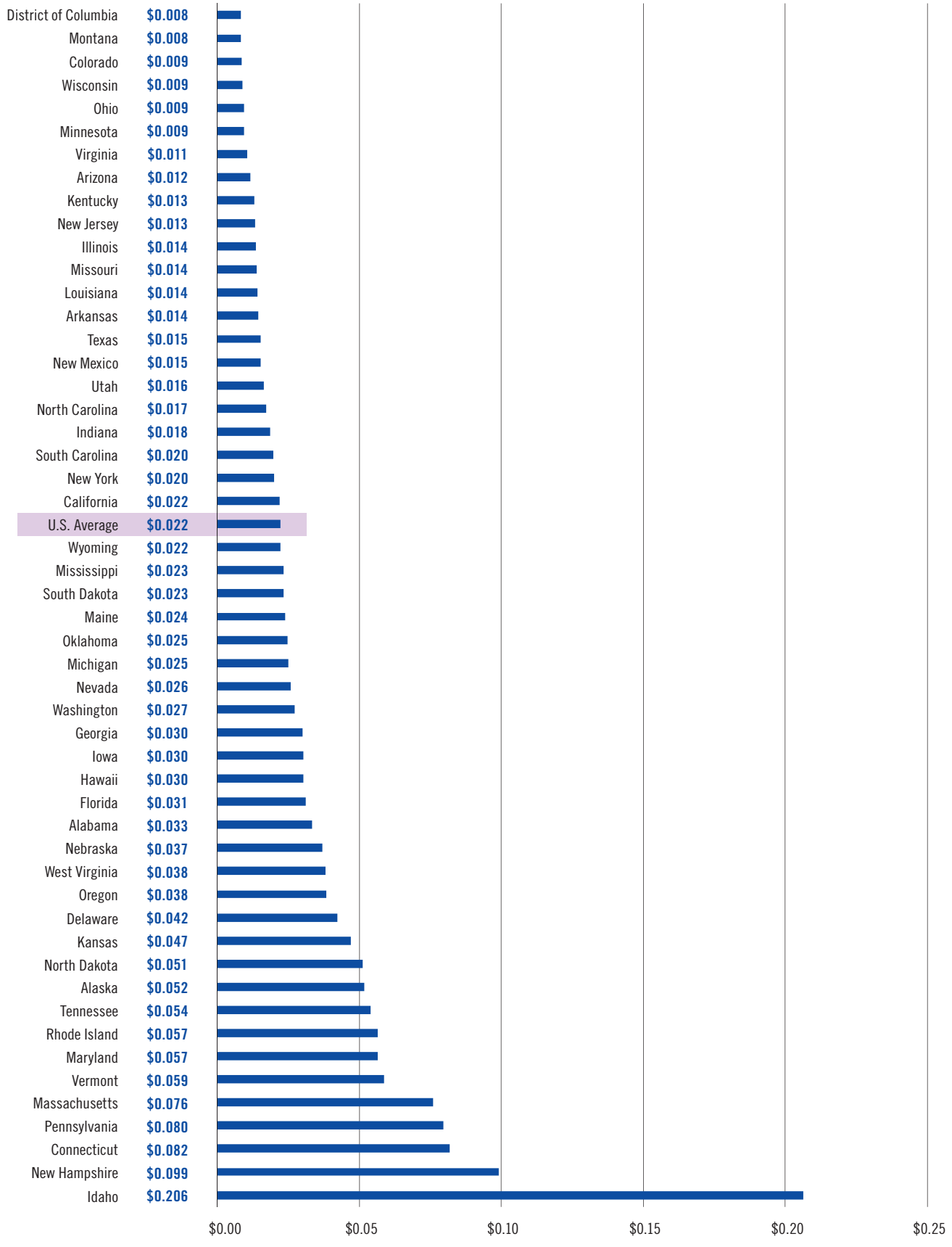


FIGURE 7: 2020 COST PER KILOWATT-HOUR OF ENERGY EFFICIENCY SAVINGS IN THE RESIDENTIAL SECTOR



Utility Reliability and Performance Metrics

Much of the public discussion about electric utility reliability focuses on what regulators and utilities call "Resource Adequacy." This ensures there is sufficient power generation capacity to satisfy each utility's peak customer demand.

However, loss of electricity supply due to generation or transmission problems accounts for only about 1 percent of outage minutes nationally. The power outages that utility customers experience on a regular basis are not caused by insufficient generation or long-distance transmission, but by breakdowns in the electricity delivery system—the power grid. Such disruptions happen for many reasons, including equipment failures, squirrels and other animals that disturb lines and cause a "short," and power lines downed by violent weather that has become more common as climate change worsens.

The electric power industry, led by the Institute of Electrical and Electronics Engineers (IEEE), has created several interrelated metrics measuring reliability.

- System Average Interruption Duration Index (SAIDI): Considered the best overall measure of an electric utility's reliability, SAIDI is the average number of minutes of outages per year per customer.
- Customer Average Interruption Duration Index (CAIDI): The product of the two other reliability metrics, CAIDI measures the average time for the utility to restore power to a customer after an outage starts.
- System Average Interruption Frequency Index (SAIFI): SAIFI measures outages per customer.

These metrics are interrelated. Poor SAIDI scores can be driven by SAIFI or CAIDI, or both.

In collecting these metrics, the EIA considers the impact of Major Event Days (MED). MED are often the result of ice storms, windstorms, wildfires or hurricanes, and can materially affect annual reliability statistics. While reliability metrics that include MED can fluctuate greatly year-to-year, they provide a more accurate representation of the customer experience in a given year than metrics excluding MED. For this reason, reliability data in this report are presented with and without MED.

Therefore, it is worth understanding the statistical classification of MED: IEEE defines it as any day on which more than 10 percent of utility customers are without power. The result of this hard threshold is that sometimes reliability scores without MED may, in fact, be driven by major events. For example, in the case of storm recovery that lasts multiple days, the time toward the beginning of that recovery may be considered MED because more than 10 percent of utility customers are without power. However, the time near the end may not be considered MED because by that point fewer than 10 percent of customers are experiencing the outage—even though all the days of the blackout were caused by the same event.

We computed SAIDI, SAIFI and CAIDI with and without MED by state using an average of the reporting utilities within each state, weighted by the number of customers served by each utility.

Beginning in 2013, the EIA began collecting annual reports of SAIDI, SAIFI and CAIDI from utilities and publishing the data in annual compilations. The information is collected on **form EIA-861** and may be downloaded at the EIA website. The latest available reliability data from the EIA are for calendar year 2020.

TABLE 5: RELIABILITY RANKINGS (ALPHABETICAL)

State	Average Duration of Power Outages		Average Time to Restore Power Per Customer		Average Frequency of Power Outages	
	With Major Event Days (SAIDI)	Without Major Event Days (SAIDI)	With Major Event Days (CAIDI)	Without Major Event Days (CAIDI)	With Major Event Days (SAIFI)	Without Major Event Days (SAIFI)
Alabama	47	33	47	25	47	38
Alaska	19	49	18	48	45	51
Arizona	2	4	1	3	5	9
Arkansas	43	45	41	46	38	43
California	18	23	29	32	15	14
Colorado	12	13	13	23	12	11
Connecticut	49	5	51	16	37	5
Delaware	21	14	27	13	31	24
District of Columbia	1	1	7	22	1	1
Florida	15	8	11	2	18	25
Georgia	38	35	34	14	41	42
Hawaii	9	21	3	8	19	36
Idaho	30	44	22	45	33	40
Illinois	31	3	40	5	6	4
Indiana	22	30	28	37	20	27
Iowa	48	18	49	21	30	12
Kansas	6	19	6	15	7	16
Kentucky	23	31	19	20	25	34
Louisiana	51	47	48	39	50	47
Maine	46	48	43	31	51	49
Maryland	10	11	9	17	8	10
Massachusetts	28	43	33	49	23	28
Michigan	34	42	39	50	28	32
Minnesota	11	15	8	11	14	18
Mississippi	45	46	44	38	49	45
Missouri	14	20	16	24	11	13
Montana	20	36	21	41	27	30
Nebraska	8	6	14	28	3	2
Nevada	3	2	4	12	2	3
New Hampshire	37	29	36	29	36	33
New Jersey	44	17	45	6	32	22
New Mexico	13	27	15	40	13	21
New York	33	10	46	30	10	6
North Carolina	35	37	32	34	35	39
North Dakota	5	12	5	4	9	26
Ohio	24	34	26	33	26	31
Oklahoma	50	38	50	42	43	35
Oregon	27	24	38	47	17	8
Pennsylvania	32	25	31	27	21	20
Rhode Island	39	7	37	1	42	23
South Carolina	29	28	25	19	29	37
South Dakota	4	9	2	7	16	17
Tennessee	41	39	35	10	44	46
Texas	36	40	20	18	46	44
Utah	40	22	42	26	24	15
Vermont	16	50	10	43	40	48
Virginia	26	41	23	35	34	41
Washington	17	32	24	44	22	19
West Virginia	42	51	30	51	48	50
Wisconsin	7	16	12	36	4	7
Wyoming	25	26	17	9	39	29

TABLE 6: RELIABILITY RANKINGS (BEST-TO-WORST)

Rank Based on Average Performance	State	Rank Change from 2021 Report	Average Duration of Power Outages		Average Time to Restore Power Per Customer		Average Frequency of Power Outages	
			With Major Event Days (SAIDI)	Without Major Event Days (SAIDI)	With Major Event Days (CAIDI)	Without Major Event Days (CAIDI)	With Major Event Days (SAIFI)	Without Major Event Days (SAIFI)
1	Arizona	0	2	4	1	3	5	9
2	Nevada	-1	3	2	4	12	2	3
3	District of Columbia	4	1	1	7	22	1	1
4	South Dakota	23	4	9	2	7	16	17
5	Nebraska	-2	8	6	14	28	3	2
5	North Dakota	3	5	12	5	4	9	26
7	Maryland	4	10	11	9	17	8	10
8	Kansas	19	6	19	6	15	7	16
9	Minnesota	1	11	15	8	11	14	18
10	Florida	-5	15	8	11	2	18	25
11	Wisconsin	18	7	16	12	36	4	7
12	Colorado	1	12	13	13	23	12	11
13	Illinois	-8	31	3	40	5	6	4
14	Hawaii	11	9	21	3	8	19	36
15	Missouri	12	14	20	16	24	11	13
16	New Mexico	5	13	27	15	40	13	21
17	Delaware	-14	21	14	27	13	31	24
18	California	18	18	23	29	32	15	14
19	New York	-4	33	10	46	30	10	6
20	Wyoming	-2	25	26	17	9	39	29
21	Rhode Island	-9	39	7	37	1	42	23
22	Kentucky	9	23	31	19	20	25	34
23	Pennsylvania	8	32	25	31	27	21	20
24	Washington	9	17	32	24	44	22	19
25	Oregon	-1	27	24	38	47	17	8
26	Connecticut	9	49	5	51	16	37	5
27	Indiana	11	22	30	28	37	20	27
28	New Jersey	-15	44	17	45	6	32	22
29	South Carolina	5	29	28	25	19	29	37
30	Utah	-15	40	22	42	26	24	15
31	Ohio	9	24	34	26	33	26	31
32	Montana	-14	20	36	21	41	27	30
33	Iowa	-24	48	18	49	21	30	12
34	New Hampshire	9	37	29	36	29	36	33
34	Virginia	9	26	41	23	35	34	41
36	Georgia	-19	38	35	34	14	41	42
36	Massachusetts	-14	28	43	33	49	23	28
36	Texas	-6	36	40	20	18	46	44
39	Vermont	6	16	50	10	43	40	48
40	North Carolina	-1	35	37	32	34	35	39
41	Idaho	-19	30	44	22	45	33	40
42	Tennessee	-5	41	39	35	10	44	46
43	Michigan	3	34	42	39	50	28	32
44	Alaska	-3	19	49	18	48	45	51
45	Alabama	-25	47	33	47	25	47	38
46	Arkansas	2	43	45	41	46	38	43
47	Oklahoma	-5	50	38	50	42	43	35
48	Mississippi	-2	45	46	44	38	49	45
49	Maine	1	46	48	43	31	51	49
50	West Virginia	1	42	51	30	51	48	50
51	Louisiana	-2	51	47	48	39	50	47

FIGURE 8: 2020 AVERAGE DURATION OF POWER OUTAGES PER YEAR PER CUSTOMER, IN MINUTES (SAIDI) WITH MAJOR EVENT DAYS

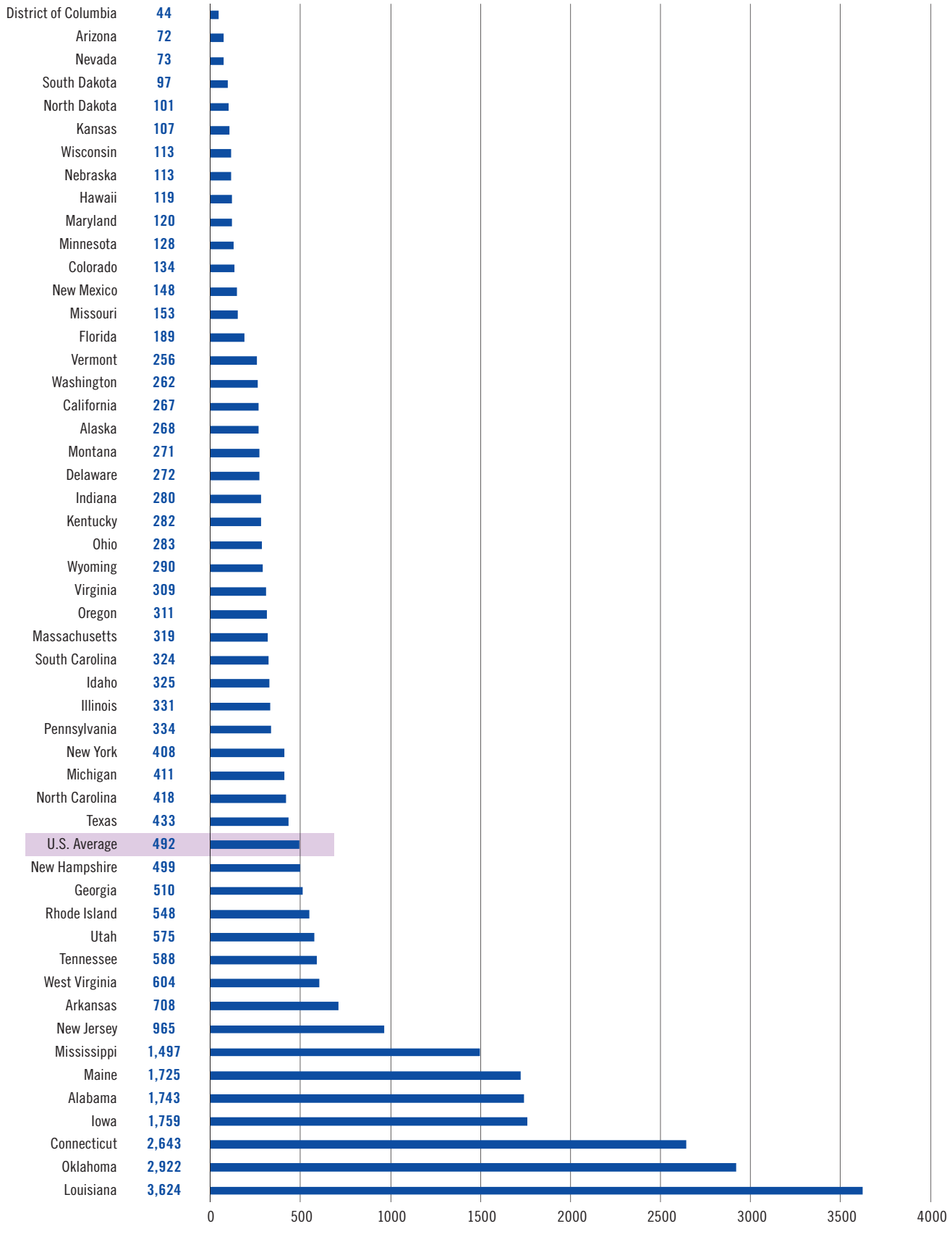


FIGURE 9: 2020 AVERAGE DURATION OF POWER OUTAGES PER YEAR PER CUSTOMER, IN MINUTES (SAIDI)
WITHOUT MAJOR EVENT DAYS

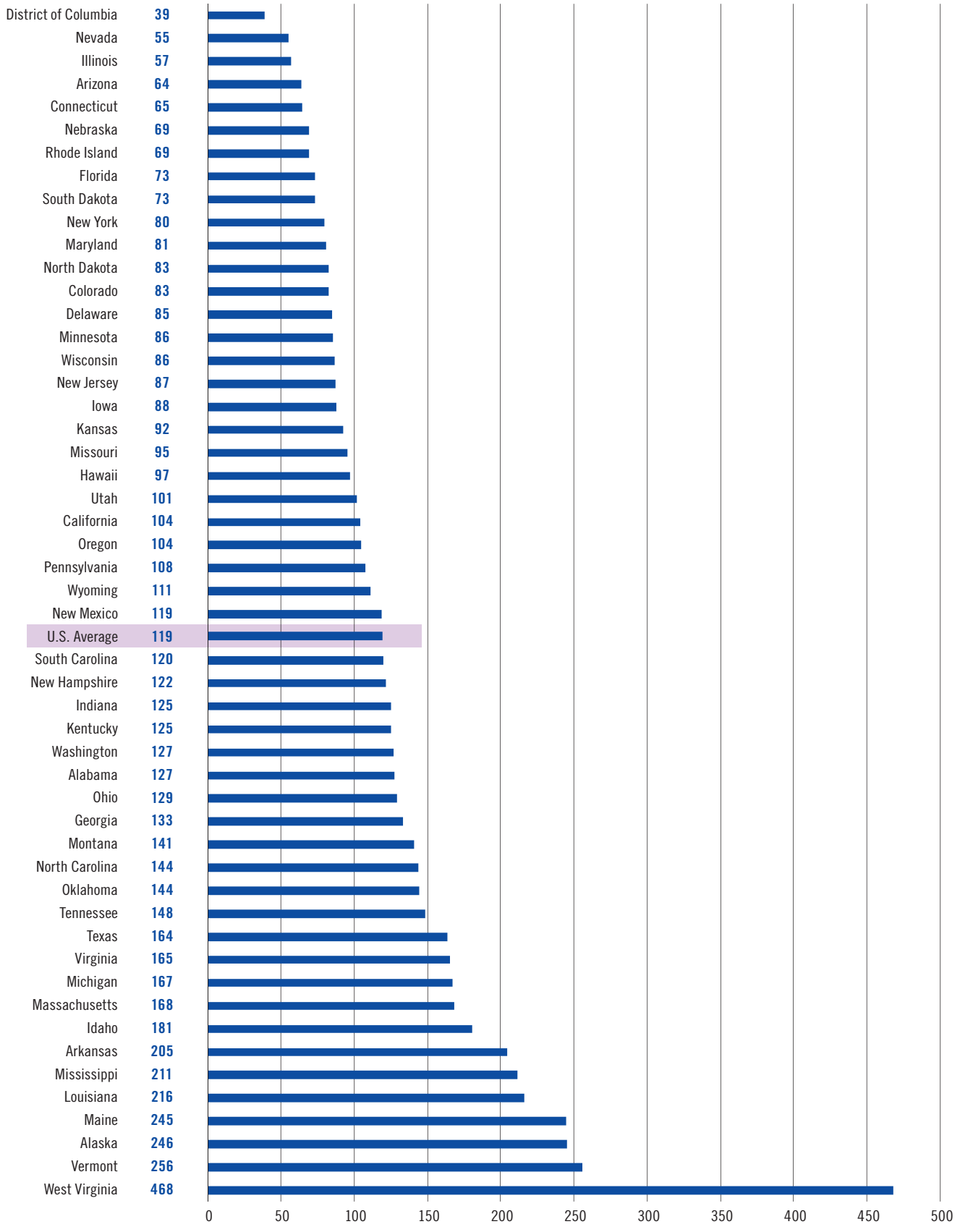


FIGURE 10: 2020 AVERAGE AMOUNT OF TIME TO RESTORE POWER PER CUSTOMER, IN MINUTES (CAIDI) WITH MAJOR EVENT DAYS

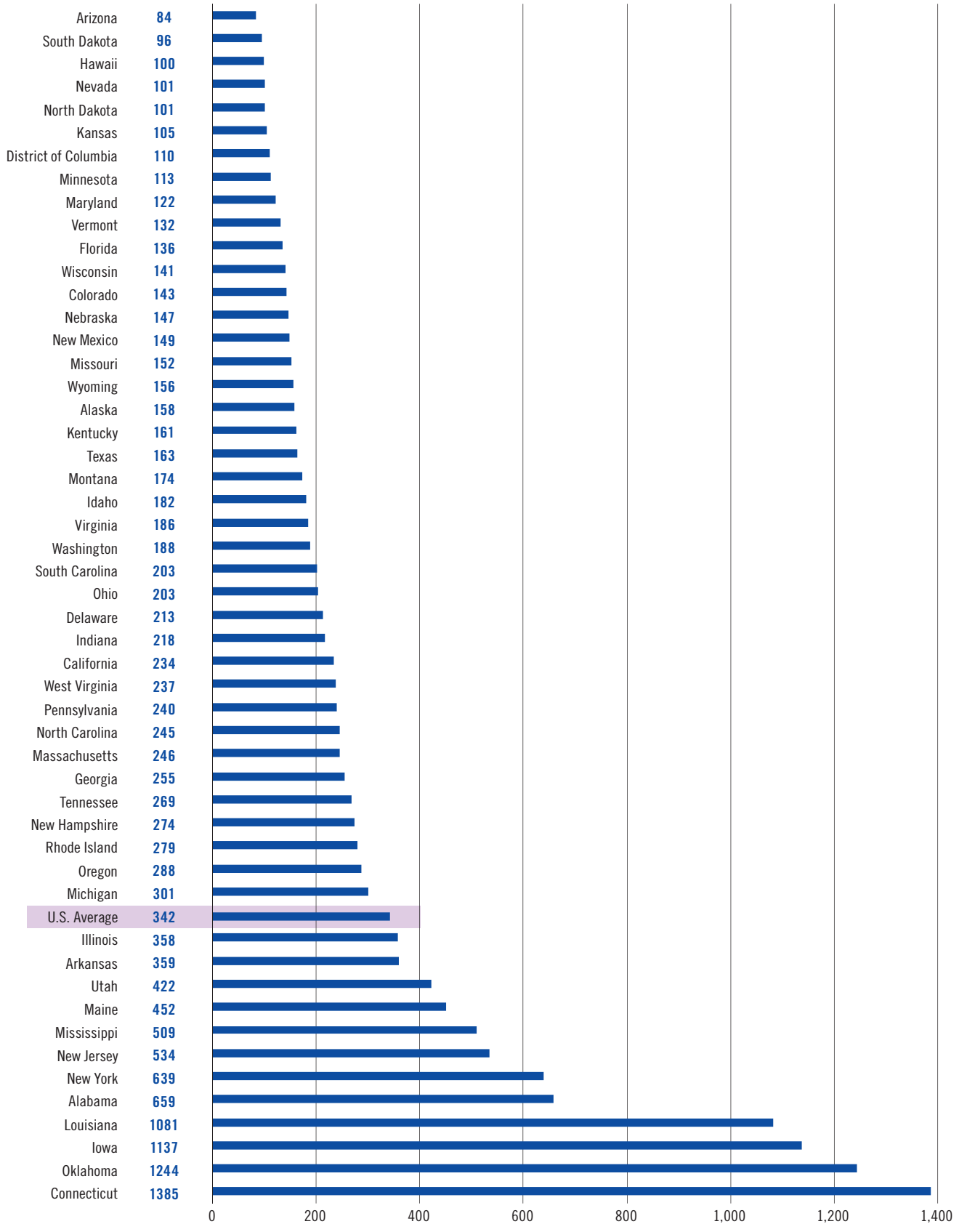


FIGURE 11: 2020 AVERAGE AMOUNT OF TIME TO RESTORE POWER PER CUSTOMER, IN MINUTES (CAIDI) WITHOUT MAJOR EVENT DAYS

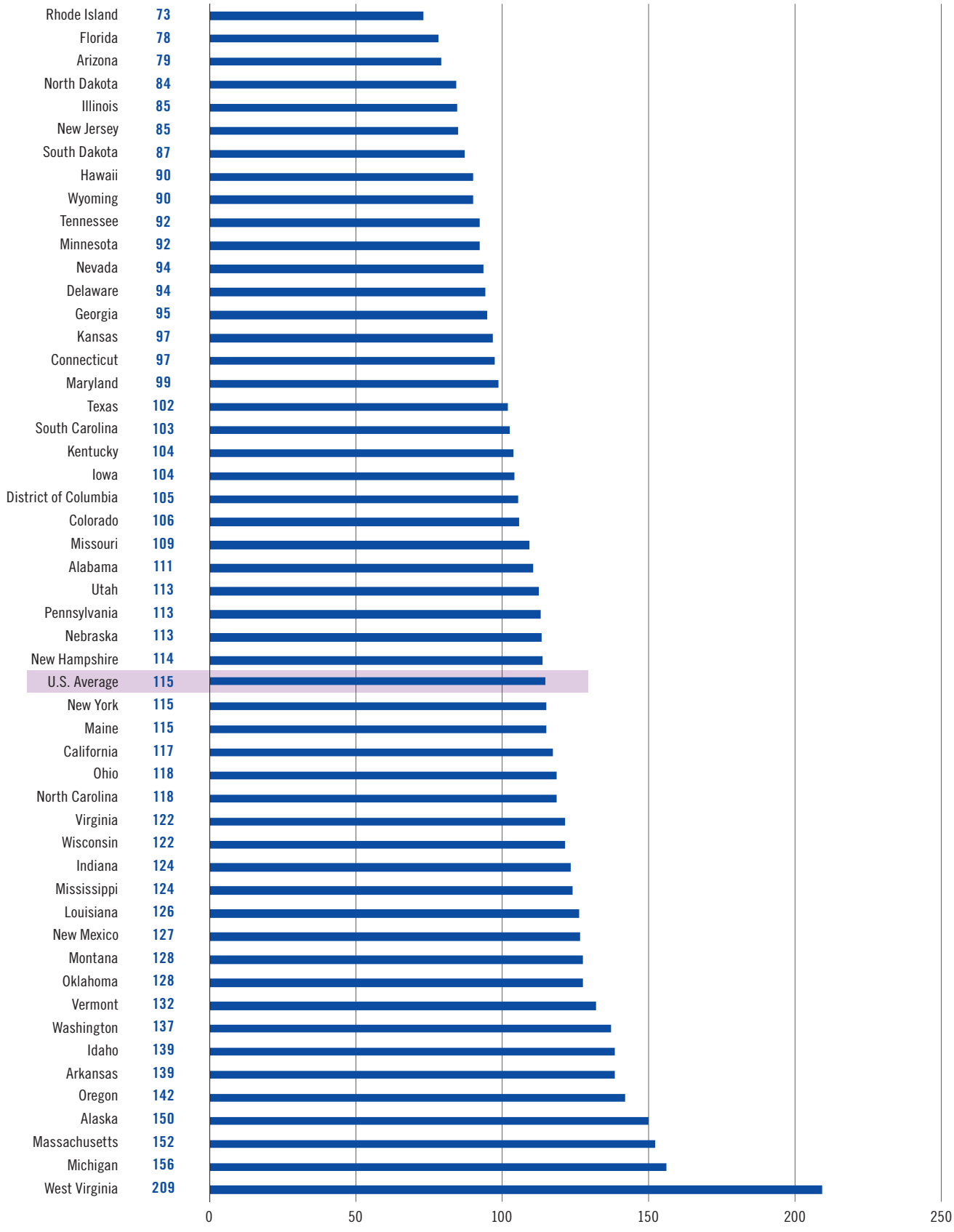


FIGURE 12: 2020 AVERAGE FREQUENCY OF POWER OUTAGES PER CUSTOMER, IN NUMBER OF OUTAGES (SAIFI) WITH MAJOR EVENT DAYS

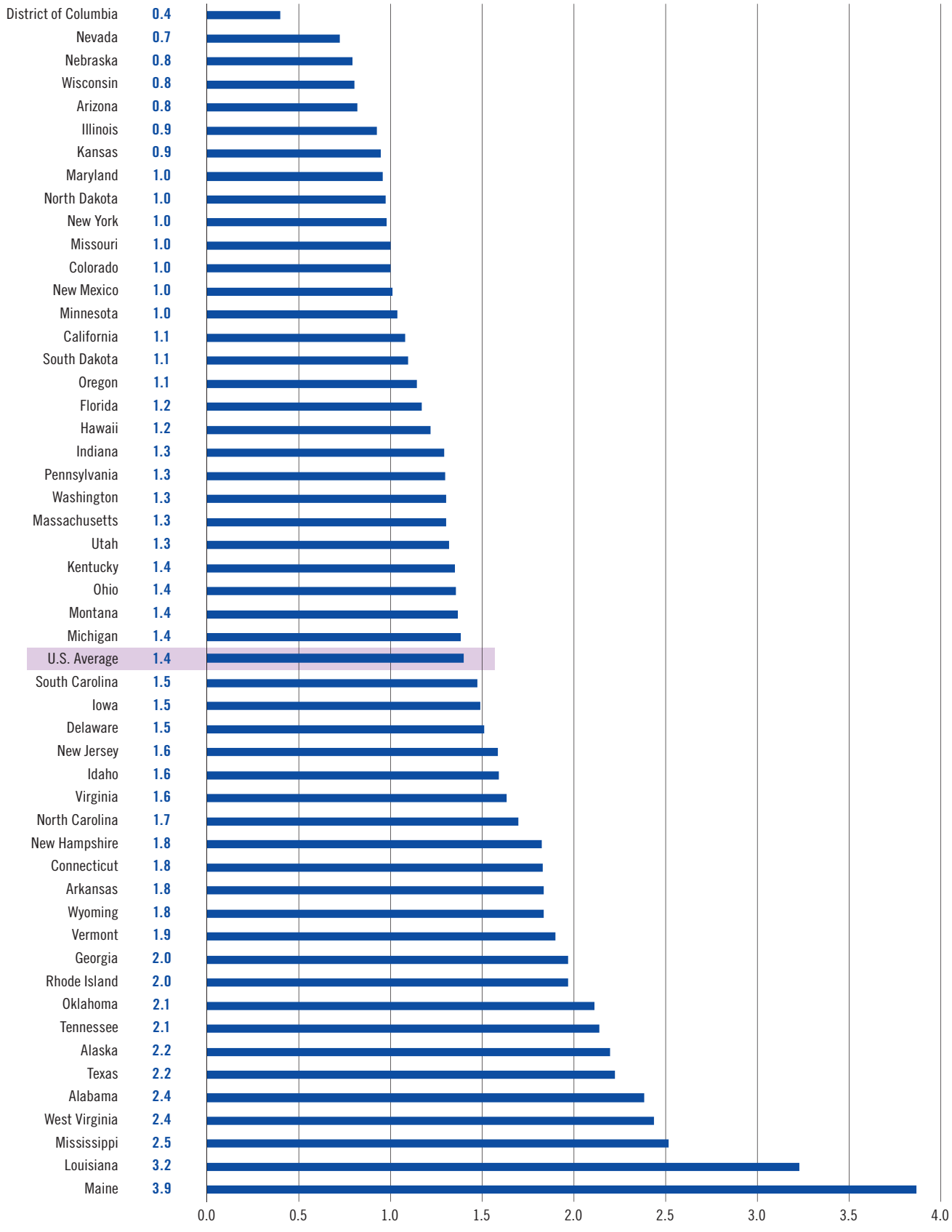
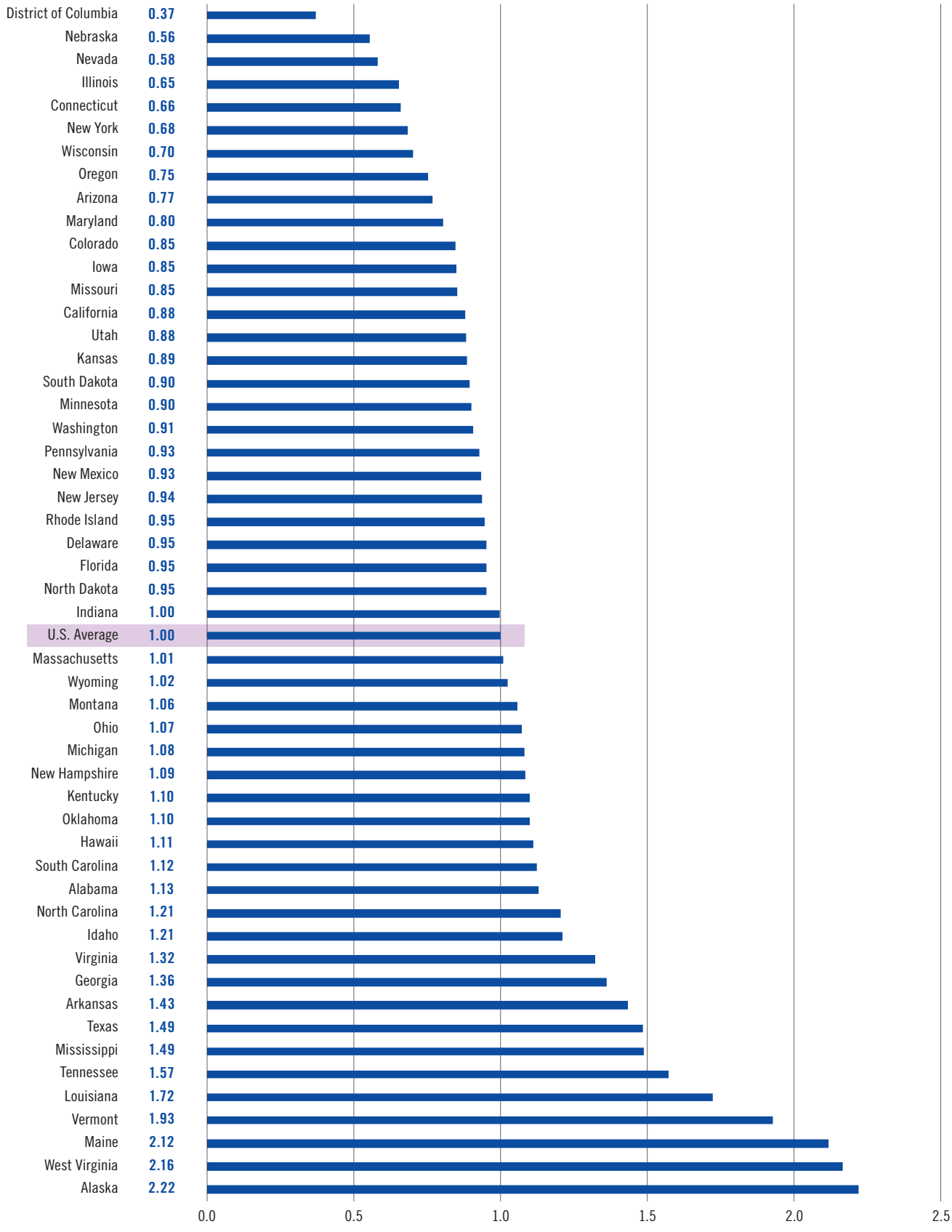


FIGURE 13: 2020 AVERAGE FREQUENCY OF POWER OUTAGES PER CUSTOMER, IN NUMBER OF OUTAGES (SAIFI) WITHOUT MAJOR EVENT DAYS



Environmental Metrics

This section of the report ranks states by the sources of electricity that power them, as well as according to the emissions of key pollutants by power plants. The data come from the **EIA's State Energy Data System (SEDS)** database as well as state electricity profiles.

Electric utilities report emissions of key pollutants from each power plant to the Environmental Protection Agency (EPA), which compiles this information and makes it available to the EIA.

ELECTRICITY SOURCES

The electricity grid interconnects states and generation resources such that at any given time customers cannot know precisely where their electricity is coming from. When you turn on the light switch, your power could originate from an in-state windfarm or a coal plant across state lines. This report is designed to give consumers, researchers and policymakers a birds-eye view of each state's renewable, clean energy and fossil fuel mix.

The figures in this section include:

- 2021 Renewable Electricity Generation, in Terawatt-Hours.
- 2021 Clean Electricity Generation, in Terawatt-Hours.
- Map of 2020 Renewable Electricity Generation and Renewable Imports, as a Percentage of Sales.
- Map of 2020 Clean Electricity Generation and Clean Imports, as a Percentage of Sales.
- 2020 Renewable Electricity Generation and Renewable Imports, as a Percentage of Sales.
- 2020 Clean Electricity Generation and Clean Imports, as a Percentage of Sales.
- Map of 2020 Fossil Electricity Generation and Fossil Imports, as a Percentage of Sales.

As in the Affordability section, the Environmental section for the first time includes an energy efficiency-related metric: "2020 Energy Efficiency Savings as a Percentage of Electricity Sales in the Residential Sector." This metric reflects how aggressively utilities are deploying efficiency programs. Using data from the utilities' **Form 861 filings to the EIA**, it measures the percentage of energy saved, relative to the total amount of power funneled into each state's grid.

In this report, renewable resources are defined as: hydroelectric, utility-scale solar, wind, geothermal and biomass. The definition of clean resources, meanwhile, includes all renewable resources, except for biomass, and with the addition of nuclear. While biomass is considered a renewable resource (it comprises a variety of organic sources that can be regrown and is technically net-zero emissions), it is not considered a clean resource. That is because it produces substantial emissions when burned and may contaminate the atmosphere.

EMISSIONS

Emissions of pollutants into the atmosphere is the most profound way that power generation affects the environment. Power plants produce many pollutants, but the largest quantities with arguably the most detrimental impact are from these gases:

- Carbon dioxide (CO2) is the principal gas behind climate change, and it can impair cognitive function in humans.
- Sulfur dioxide (SO2) causes acid rain, asthma attacks and cardiopulmonary diseases. It also is a chemical precursor to the formation of small particles that cause respiratory problems, miscarriages and birth defects.
- Nitrogen oxides (NOx) cause respiratory problems, including wheezing and asthma, as well as numerous other health problems as a chemical precursor to the formation of small particles and ozone in the air.

The metrics in this section are summarized below:

- 2020 Carbon Dioxide Emissions from the Electric Sector, in Millions of Metric Tons.
- 2020 Sulfur Dioxide Emissions from the Electric Sector, in Thousands of Metric Tons.
- 2020 Nitrogen Oxide Emissions from the Electric Sector, in Thousands of Metric Tons.
- 2020 Carbon Dioxide Emissions from Electricity Generation, in Metric Tons per Gigawatt-Hour.
- 2020 Sulfur Dioxide Emissions from Electricity Generation, in Metric Tons per Gigawatt-Hour.
- 2020 Nitrogen Oxide Emissions from Electricity Generation, in Metric Tons per Gigawatt-Hour.

Effects on the environment and human health can be determined by the quantity of pollution released and, in the cases of sulfur dioxide and nitrogen oxides, by location relative to human population and natural resources. However, as a measure of overall utility performance, it is most appropriate to also consider "intensity"—emissions per unit of power generated. So, for example, while Texas's electricity sector produces the most emissions of all pollutants by a wide margin, its emissions intensity for all pollutants is around the median.

Pollution quantities are shown in metric tons (1 metric ton equals approximately 2,200 pounds) and pollution rates are shown in metric tons per gigawatt-hour (million kilowatt-hours) of electricity generated. For the pollution-related figures that follow, lower numbers signify better performance.

TABLE 7: ENVIRONMENTAL RANKINGS (ALPHABETICAL)

State	Carbon Dioxide Emissions From the Electricity Generation per Gigawatt Hour	Carbon Dioxide Emissions From the Electric Sector	Sulfur Dioxide and Nitrogen Oxide Emissions From Electricity Generation per Gigawatt Hour	Sulfur Dioxide and Nitrogen Oxide Emissions From the Electric Sector	Renewable Electricity Generation	Renewable Generation and Imports, as a Percent of Sales	Clean Electricity Generation	Clean Generation and Imports, as a Percent of Sales	Residential Energy Efficiency Program Savings as a Percentage of Residential Electricity Sales
Alabama	15	39	16	33	14	24	9	12	48
Alaska	42	9	45	21	46	17	46	31	49
Arizona	23	35	15	29	17	23	11	17	8
Arkansas	33	26	33	30	33	32	25	24	28
California	9	41	17	29	2	16	3	29	10
Colorado	37	32	26	24	11	19	24	35	14
Connecticut	12	14	5	8	48	43	28	15	21
Delaware	38	7	16	4	50	49	50	50	34
District of Columbia	31	2	26	1	51	51	51	51	15
Florida	28	50	17	45	19	45	16	41	43
Georgia	18	36	31	44	15	40	13	34	39
Hawaii	46	10	50	25	47	22	48	44	3
Idaho	4	5	24	11	23	10	37	20	31
Illinois	13	43	24	41	10	29	2	8	4
Indiana	48	47	43	46	27	38	40	47	23
Iowa	24	23	31	28	5	7	15	11	29
Kansas	26	21	17	18	8	9	18	7	51
Kentucky	49	46	41	41	34	36	43	46	44
Louisiana	34	40	36	41	40	48	23	39	38
Maine	7	4	44	13	32	8	41	13	7
Maryland	14	13	12	11	39	42	26	32	9
Massachusetts	32	11	27	10	38	39	45	49	2
Michigan	36	45	39	46	24	30	12	25	16
Minnesota	25	22	30	28	12	20	20	22	12
Mississippi	29	28	21	24	45	50	36	42	41
Missouri	44	42	47	47	28	37	32	38	24
Montana	35	15	35	17	22	3	35	5	36
Nebraska	39	20	45	35	25	15	27	18	45
Nevada	22	17	12	12	20	18	33	33	33
New Hampshire	3	3	4	5	42	25	38	1	26
New Jersey	11	18	8	12	43	46	21	27	6
New Mexico	40	19	24	15	21	13	34	28	19
New York	8	30	12	28	7	14	6	14	5
North Carolina	19	38	30	40	9	28	7	23	20
North Dakota	45	31	47	40	13	2	29	3	50
Ohio	43	48	42	49	37	47	22	40	11
Oklahoma	20	27	16	25	6	11	17	21	30
Oregon	5	12	18	20	4	6	14	9	35
Pennsylvania	21	49	17	42	31	41	5	16	22
Rhode Island	27	8	17	4	49	33	49	48	1
South Carolina	10	25	16	24	30	35	8	10	27
South Dakota	6	6	5	5	16	4	30	6	42
Tennessee	16	24	19	24	18	27	10	19	47
Texas	30	51	30	51	1	21	1	30	37
Utah	47	29	37	30	36	26	42	43	17
Vermont	1	1	23	3	44	1	47	2	13
Virginia	17	33	17	28	29	44	19	36	40
Washington	2	16	12	23	3	5	4	4	25
West Virginia	50	44	42	38	41	31	44	45	46
Wisconsin	41	34	32	31	35	34	31	37	18
Wyoming	51	37	46	38	26	12	39	26	32

TABLE 8: ENVIRONMENTAL RANKINGS (BEST-TO-WORST)

Rank Based on Average Performance	State	Rank Change from 2021 Report	Carbon Dioxide Emissions From the Electricity Generation per Gigawatt Hour	Carbon Dioxide Emissions From the Electric Sector	Sulfur Dioxide and Nitrogen Oxide Emissions From Electricity Generation per Gigawatt Hour	Sulfur Dioxide and Nitrogen Oxide Emissions From the Electric Sector	Renewable Electricity Generation	Renewable Generation and Imports, as a Percent of Sales	Clean Electricity Generation	Clean Generation and Imports, as a Percent of Sales	Residential Energy Efficiency Program Savings as a Percentage of Residential Electricity Sales
1	Washington	0	2	16	12	23	3	5	4	4	25
2	South Dakota	1	6	6	5	5	16	4	30	6	42
3	Oregon	-1	5	12	18	20	4	6	14	9	35
4	New York	0	8	30	12	28	7	14	6	14	5
5	Vermont	2	1	1	23	3	44	1	47	2	13
6	New Hampshire	0	3	3	4	5	42	25	38	1	26
7	California	2	9	41	17	29	2	16	3	29	10
8	Idaho	-3	4	5	24	11	23	10	37	20	31
9	Maine	2	7	4	44	13	32	8	41	13	7
10	Oklahoma	0	20	27	16	25	6	11	17	21	30
10	Iowa	7	24	23	31	28	5	7	15	11	29
12	Illinois	8	13	43	24	41	10	29	2	8	4
13	Kansas	-5	26	21	17	18	8	9	18	7	51
14	Arizona	4	23	35	15	29	17	23	11	17	8
15	South Carolina	-3	10	25	16	24	30	35	8	10	27
16	Minnesota	3	25	22	30	28	12	20	20	22	12
17	New Jersey	5	11	18	8	12	43	46	21	27	6
18	Connecticut	-4	12	14	5	8	48	43	28	15	21
19	Maryland	6	14	13	12	11	39	42	26	32	9
20	Nevada	-5	22	17	12	12	20	18	33	33	33
21	Montana	0	35	15	35	17	22	3	35	5	36
22	Tennessee	-9	16	24	19	24	18	27	10	19	47
23	Alabama	-7	15	39	16	33	14	24	9	12	48
24	New Mexico	0	40	19	24	15	21	13	34	28	19
25	North Carolina	-2	19	38	30	40	9	28	7	23	20
26	Colorado	4	37	32	26	24	11	19	24	35	14
27	Rhode Island	4	27	8	17	4	49	33	49	48	1
28	Pennsylvania	-1	21	49	17	42	31	41	5	16	22
29	Texas	0	30	51	30	51	1	21	1	30	37
30	Massachusetts	3	32	11	27	10	38	39	45	49	2
31	North Dakota	-5	45	31	47	40	13	2	29	3	50
32	Virginia	-4	17	33	17	28	29	44	19	36	40
33	Arkansas	4	33	26	33	30	33	32	25	24	28
34	Nebraska	-2	39	20	45	35	25	15	27	18	45
35	Georgia	-1	18	36	31	44	15	40	13	34	39
36	Michigan	-1	36	45	39	46	24	30	12	25	16
37	District of Columbia	5	31	2	26	1	51	51	51	51	15
38	Wisconsin	3	41	34	32	31	35	34	31	37	18
39	Hawaii	6	46	10	50	25	47	22	48	44	3
40	Delaware	-1	38	7	16	4	50	49	50	50	34
41	Florida	-1	28	50	17	45	19	45	16	41	43
42	Alaska	-6	42	9	45	21	46	17	46	31	49
43	Utah	0	47	29	37	30	36	26	42	43	17
43	Wyoming	1	51	37	46	38	26	12	39	26	32
45	Mississippi	-7	29	28	21	24	45	50	36	42	41
46	Missouri	1	44	42	47	47	28	37	32	38	24
46	Ohio	2	43	48	42	49	37	47	22	40	11
46	Louisiana	0	34	40	36	41	40	48	23	39	38
49	Indiana	1	48	47	43	46	27	38	40	47	23
50	Kentucky	1	49	46	41	41	34	36	43	46	44
51	West Virginia	-2	50	44	42	38	41	31	44	45	46

FIGURE 14: 2021 RENEWABLE ELECTRICITY GENERATION, IN TERAWATT-HOURS

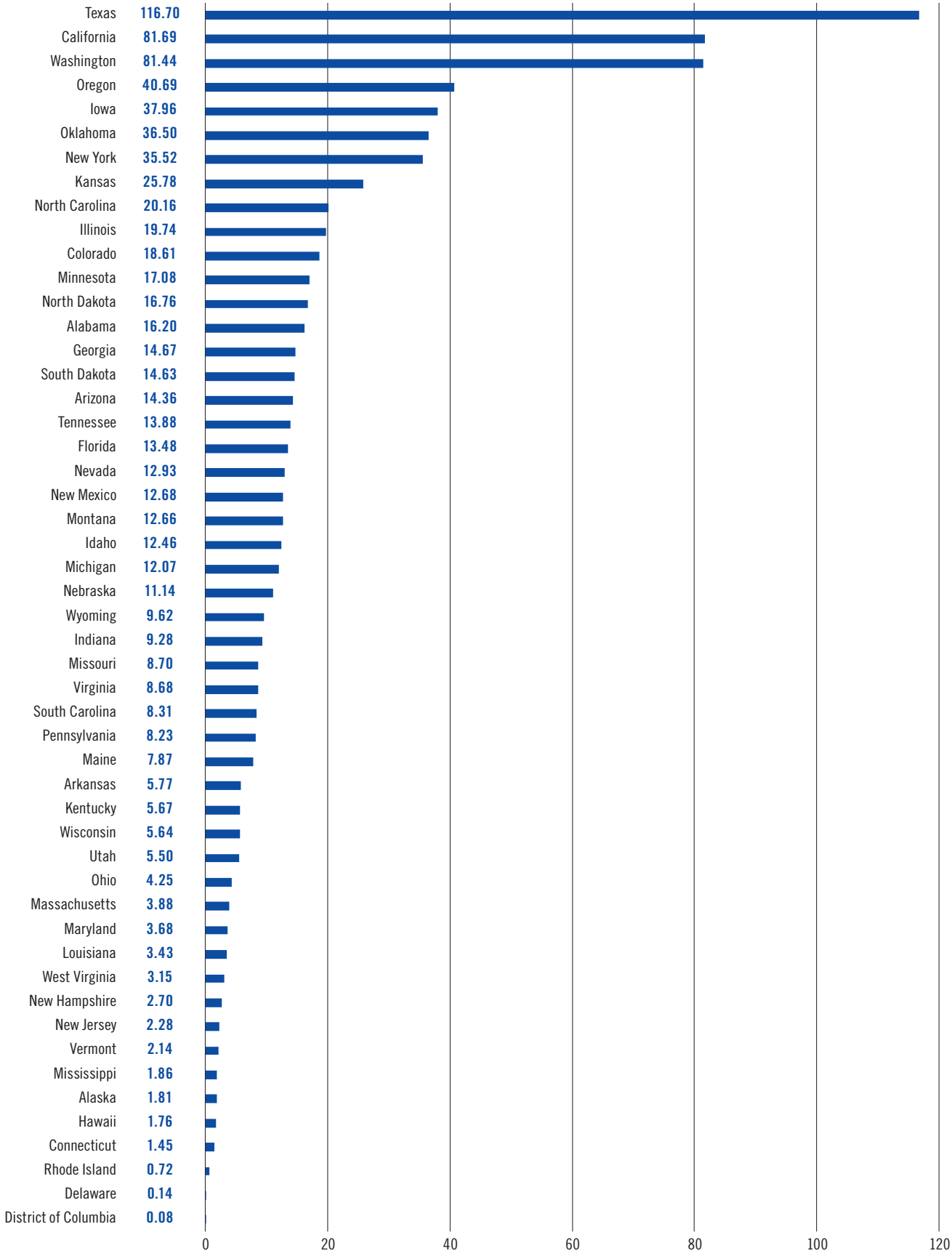


FIGURE 15: 2021 CLEAN ELECTRICITY GENERATION, IN TERAWATT-HOURS

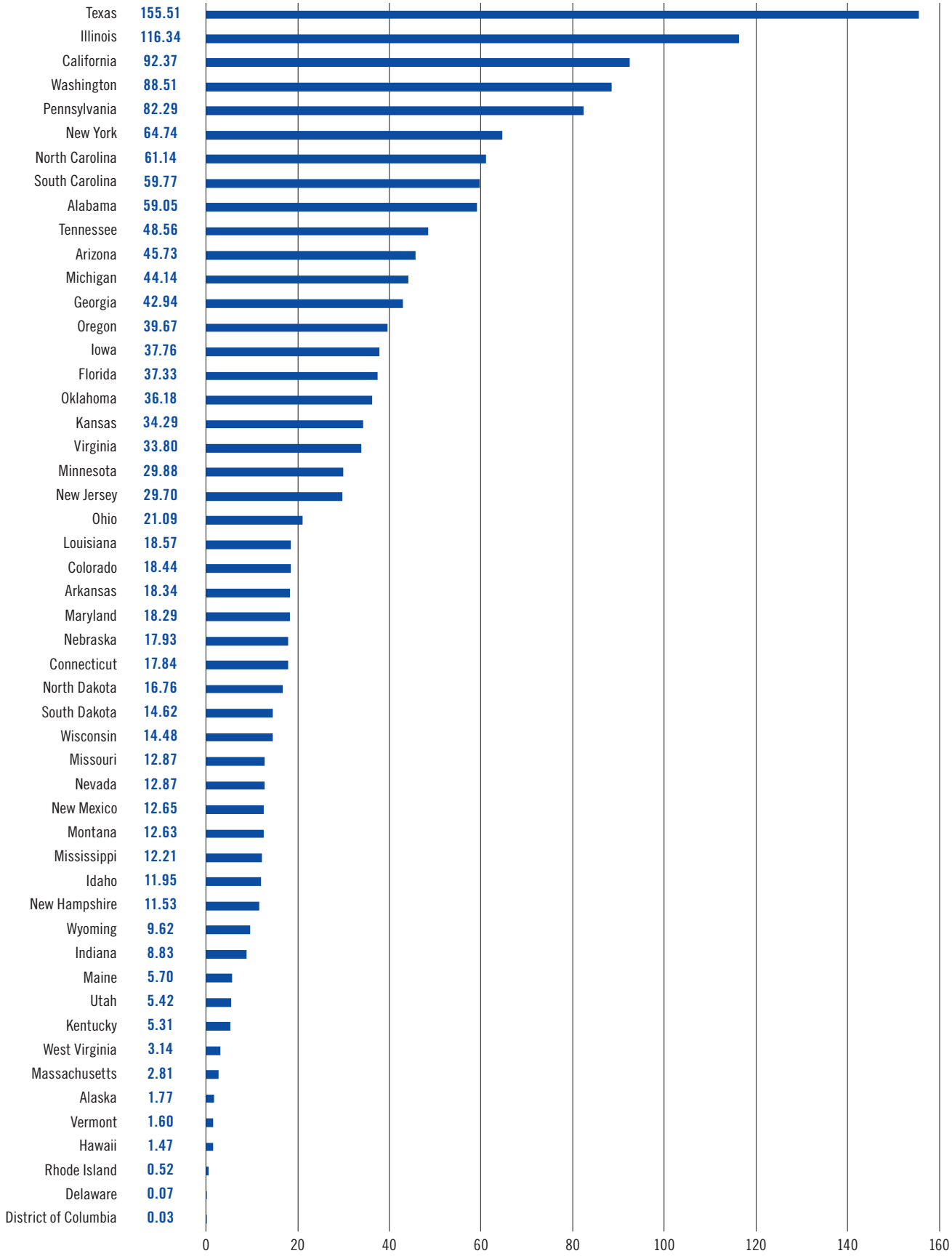


FIGURE 16: MAP OF 2020 RENEWABLE ELECTRICITY GENERATION AND RENEWABLE IMPORTS, AS A PERCENTAGE OF SALES

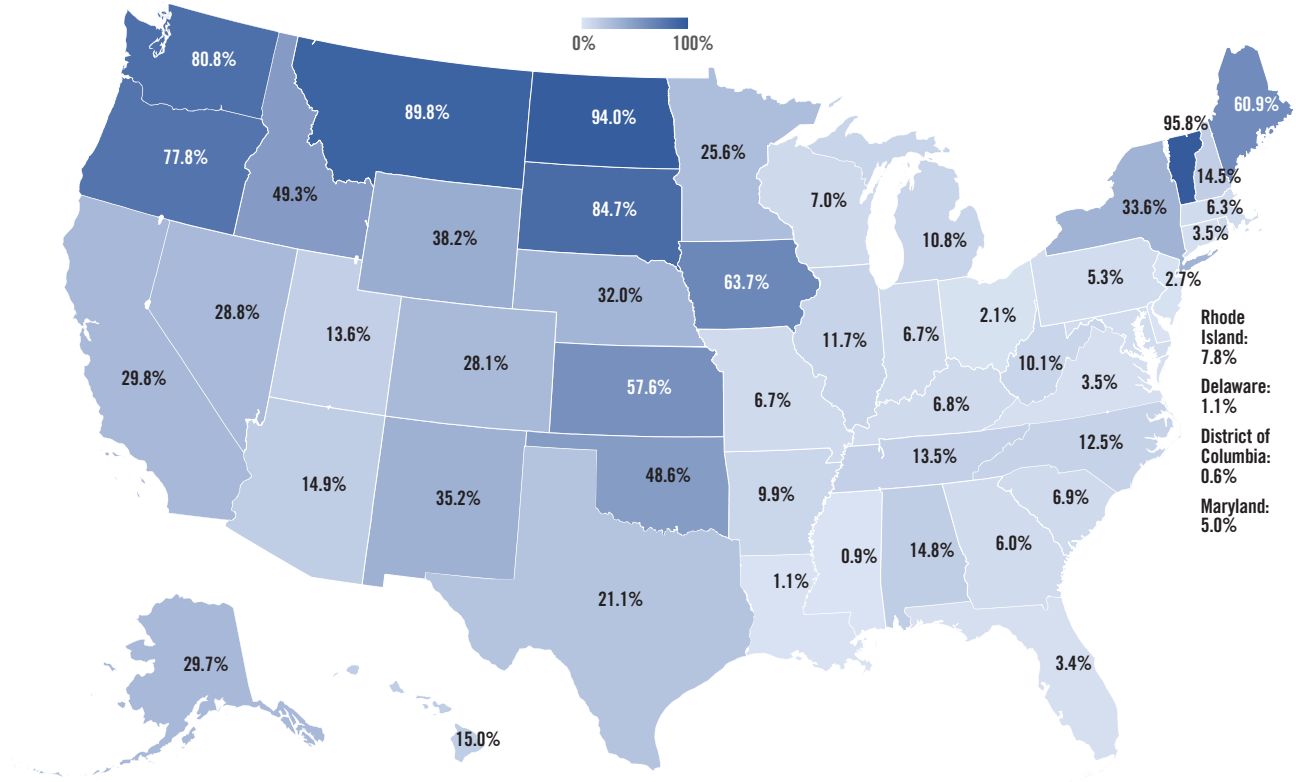


FIGURE 17: MAP OF 2020 CLEAN ELECTRICITY GENERATION AND CLEAN IMPORTS, AS A PERCENTAGE OF SALES

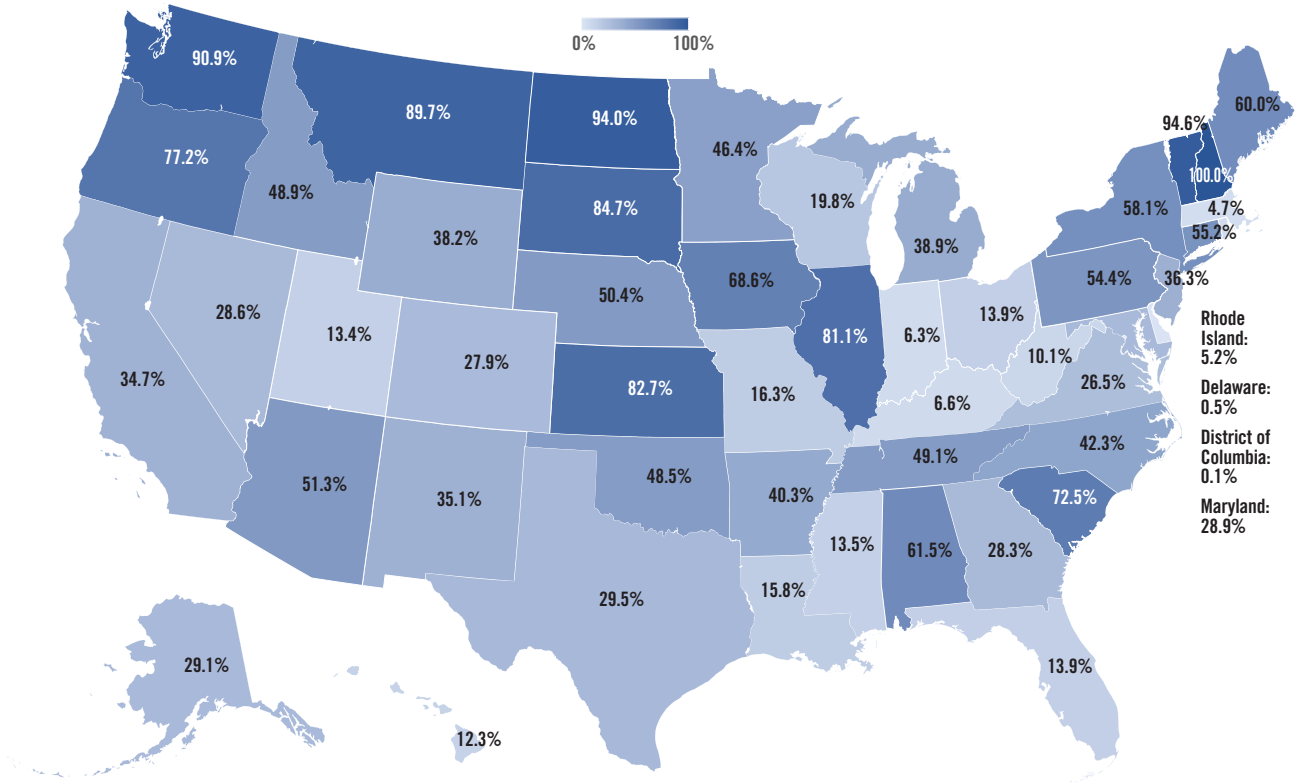


FIGURE 18: 2020 RENEWABLE ELECTRICITY GENERATION AND RENEWABLE IMPORTS, AS A PERCENTAGE OF SALES

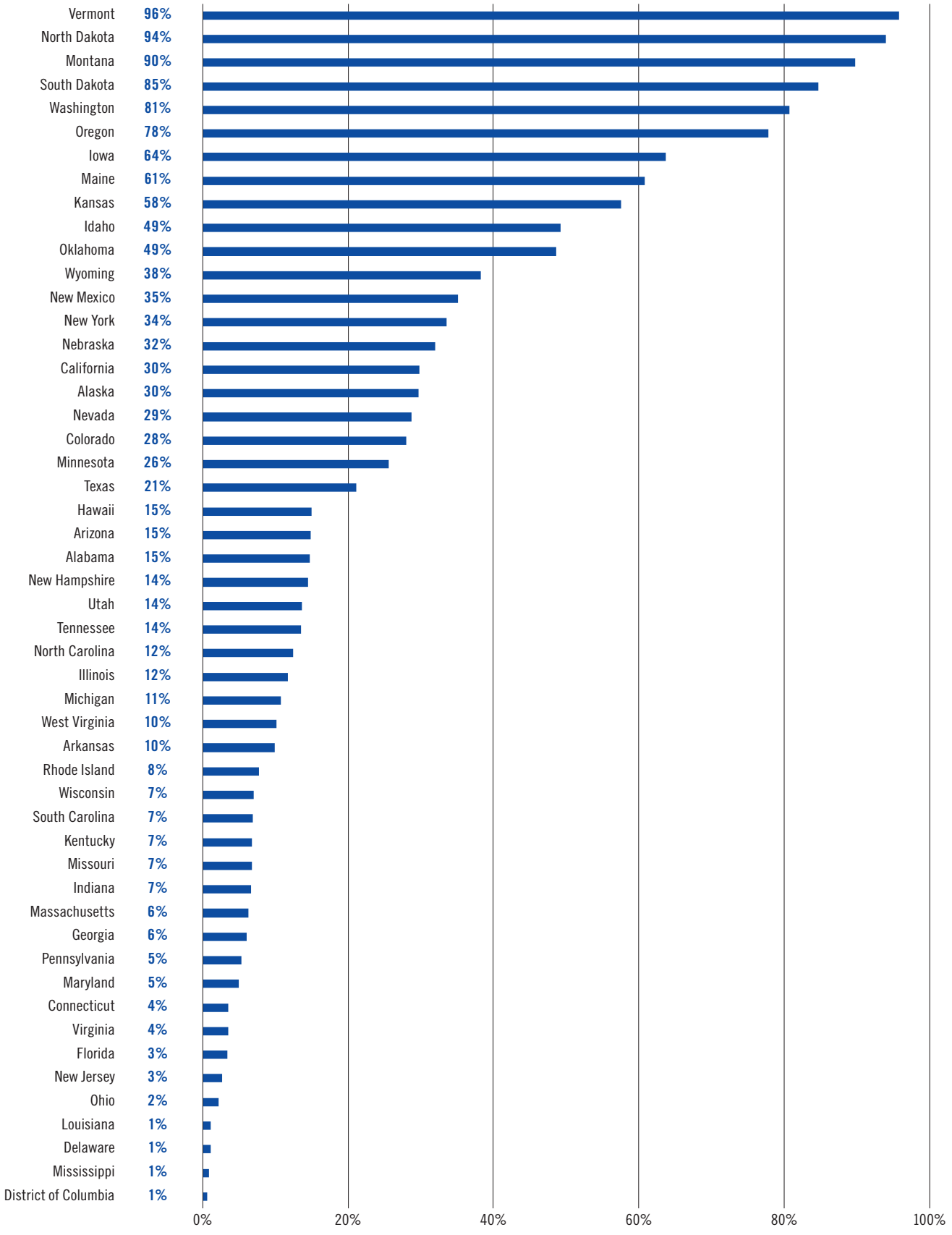


FIGURE 19: 2020 CLEAN ELECTRICITY GENERATION AND CLEAN IMPORTS, AS A PERCENTAGE OF SALES

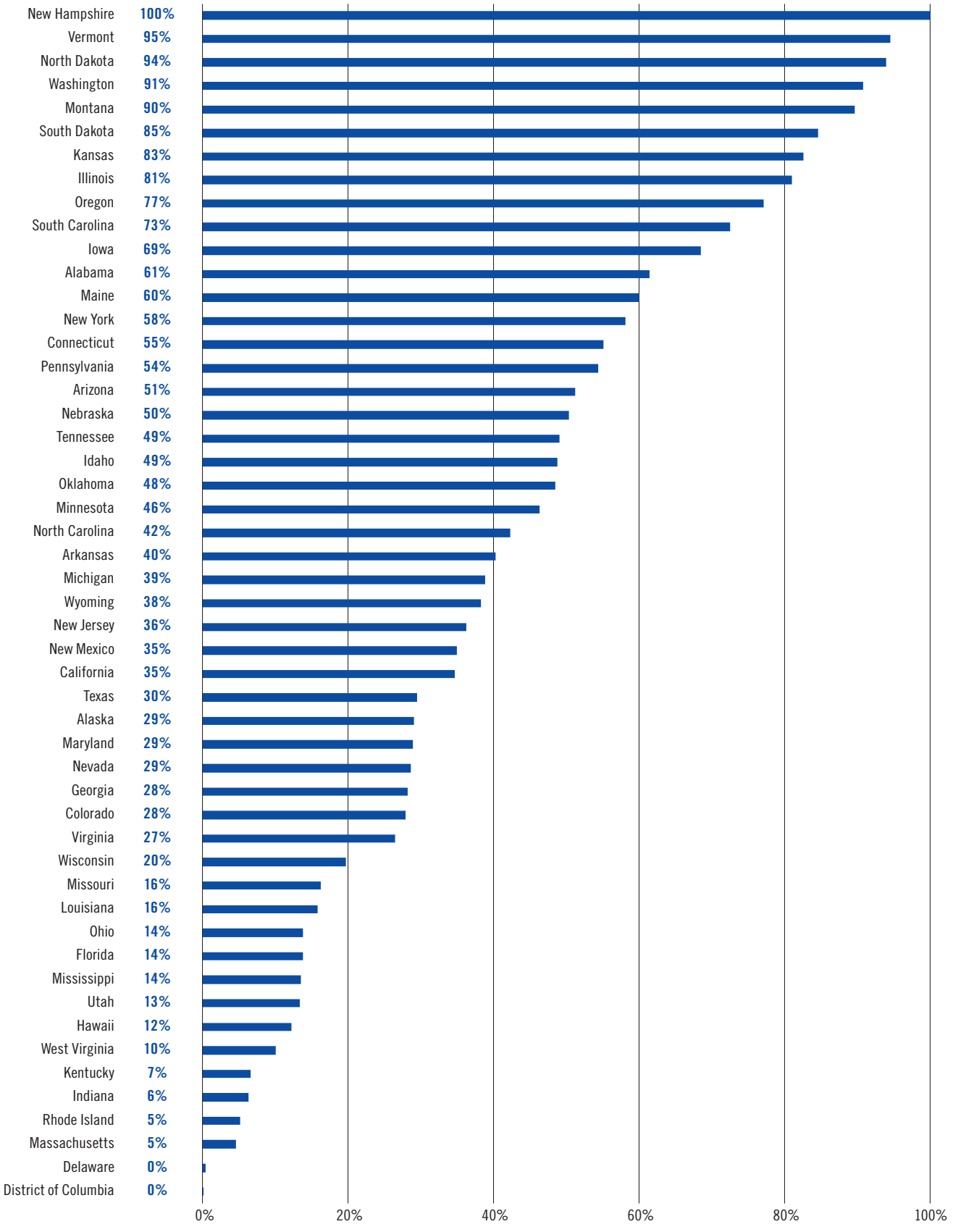


FIGURE 20: MAP OF 2020 FOSSIL ELECTRICITY GENERATION AND FOSSIL IMPORTS, AS A PERCENTAGE OF SALES

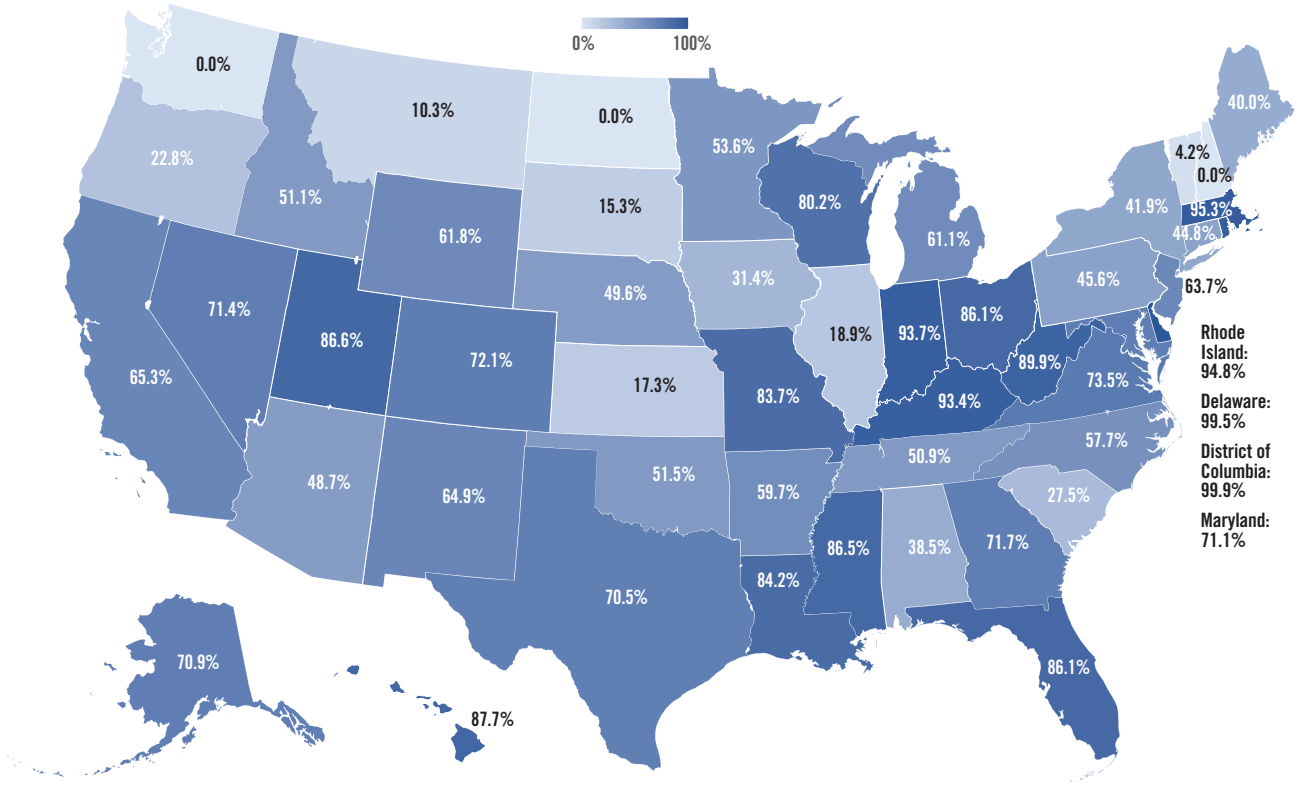


FIGURE 21: 2020 ENERGY EFFICIENCY SAVINGS AS A PERCENTAGE OF ELECTRICITY SALES IN THE RESIDENTIAL SECTOR

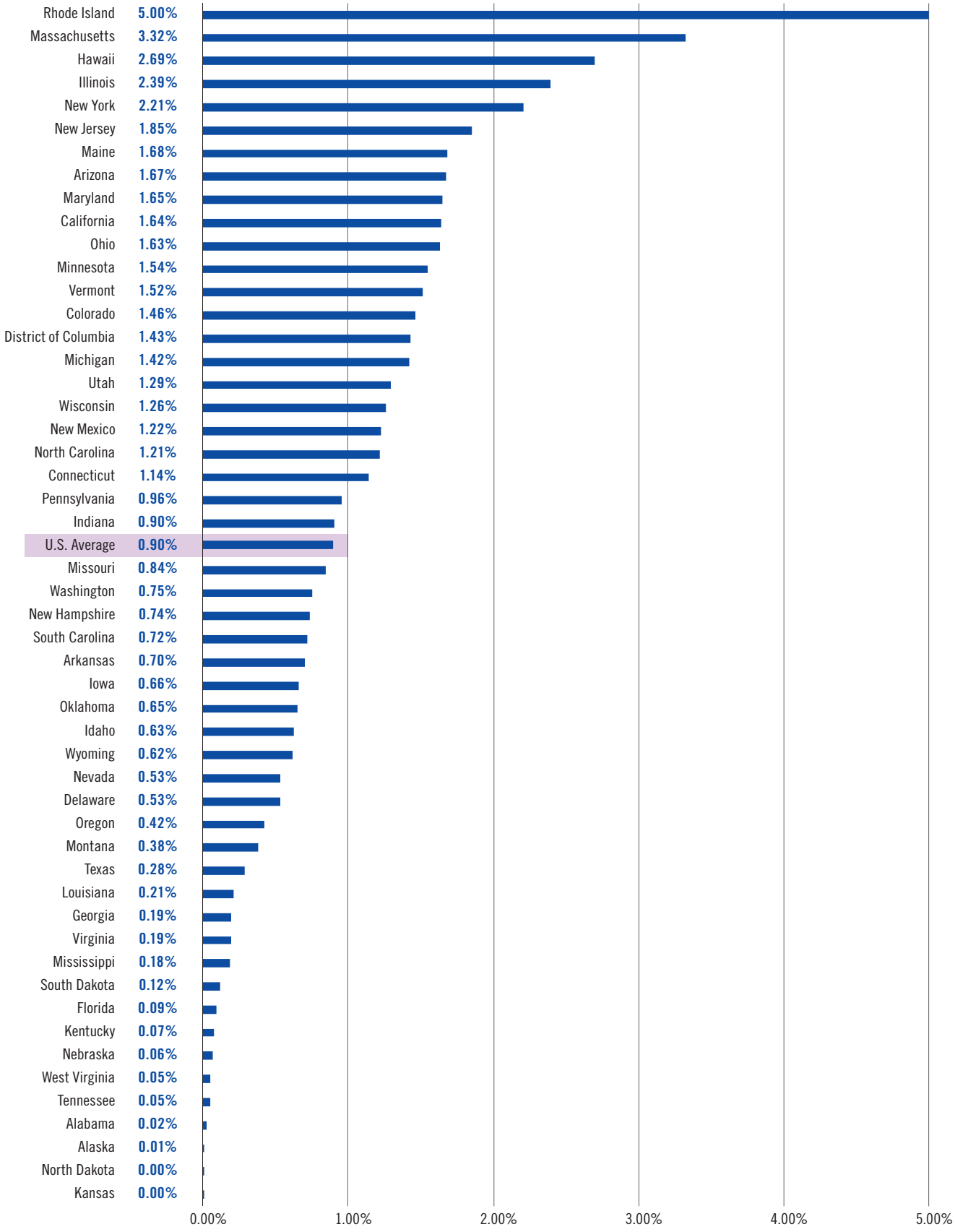


FIGURE 22: 2020 CARBON DIOXIDE EMISSIONS FROM THE ELECTRIC SECTOR, IN MILLIONS OF METRIC TONS

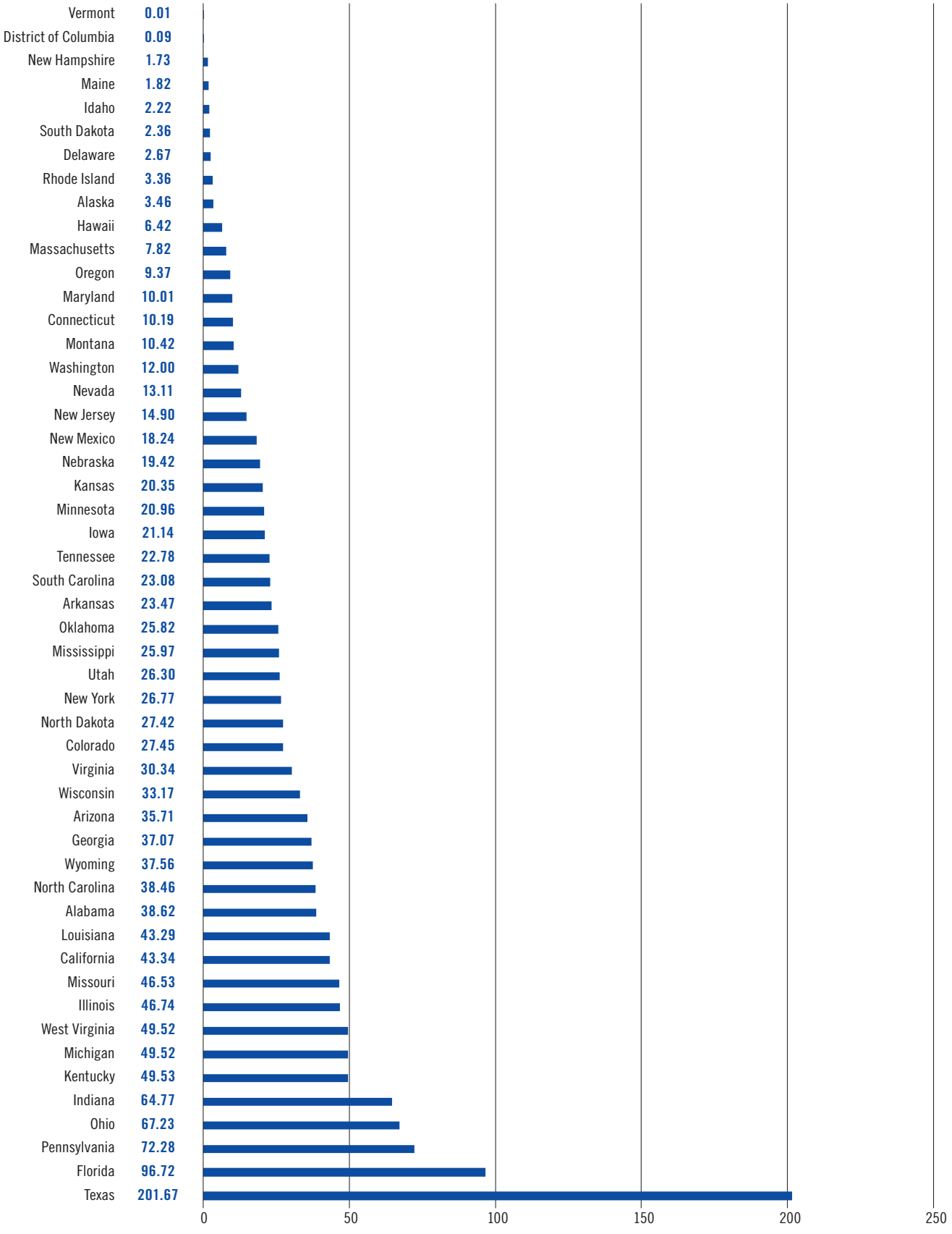


FIGURE 23: 2020 SULFUR DIOXIDE EMISSIONS FROM THE ELECTRIC SECTOR, IN THOUSANDS OF METRIC TONS

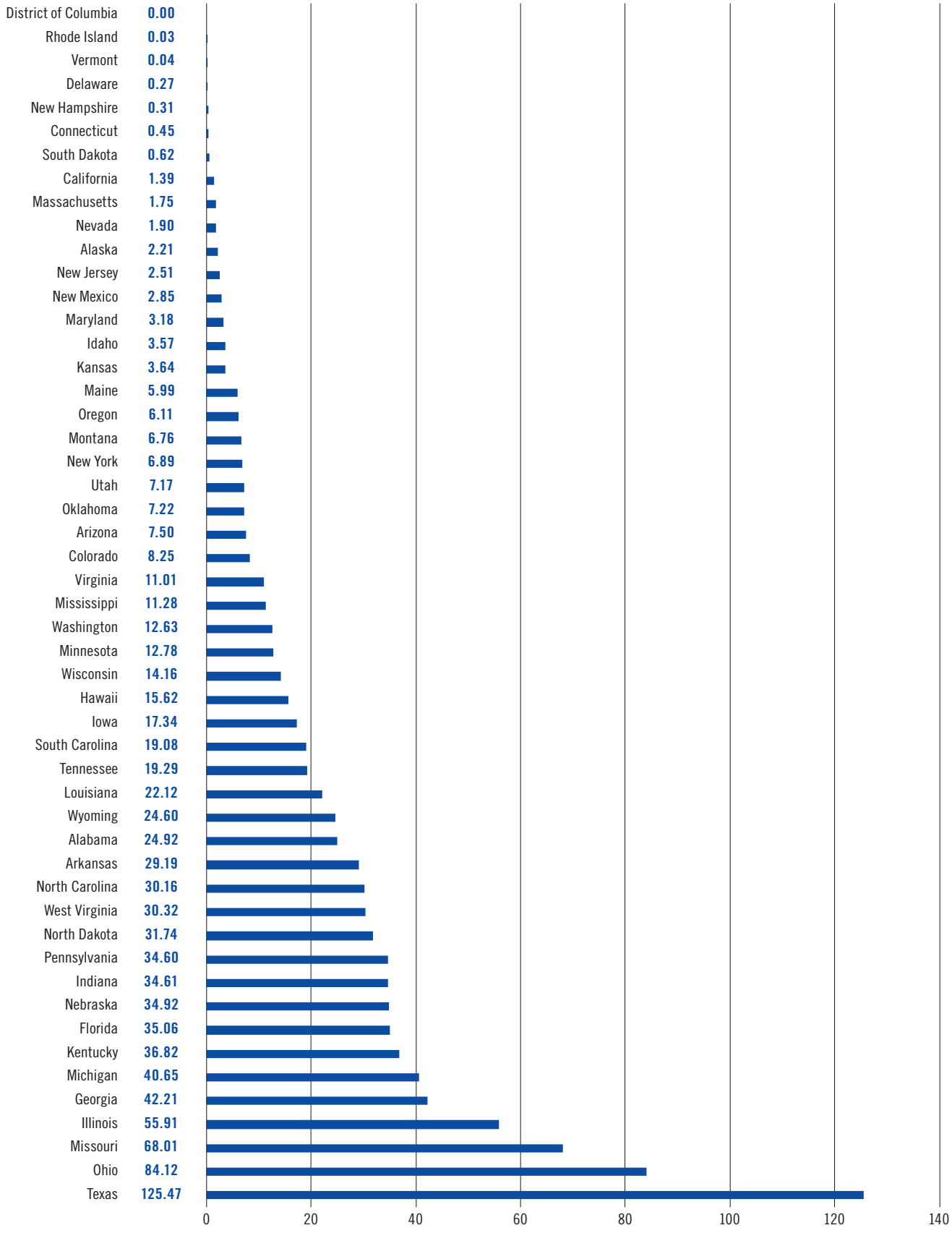


FIGURE 24: 2020 NITROGEN OXIDE EMISSIONS FROM THE ELECTRIC SECTOR, IN THOUSANDS OF METRIC TONS

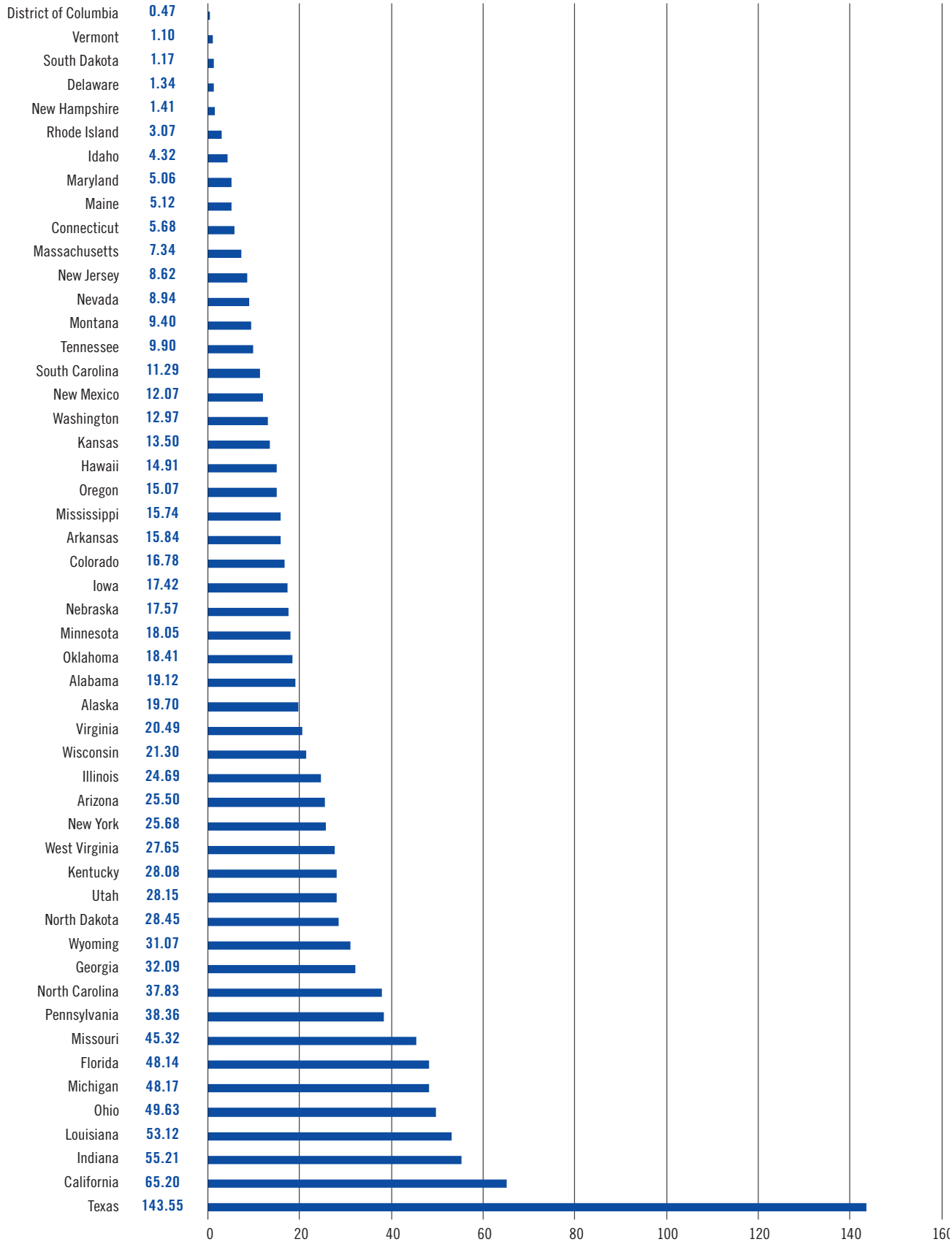


FIGURE 25: 2020 CARBON DIOXIDE EMISSIONS FROM ELECTRICITY GENERATION, IN METRIC TONS PER GIGAWATT-HOUR

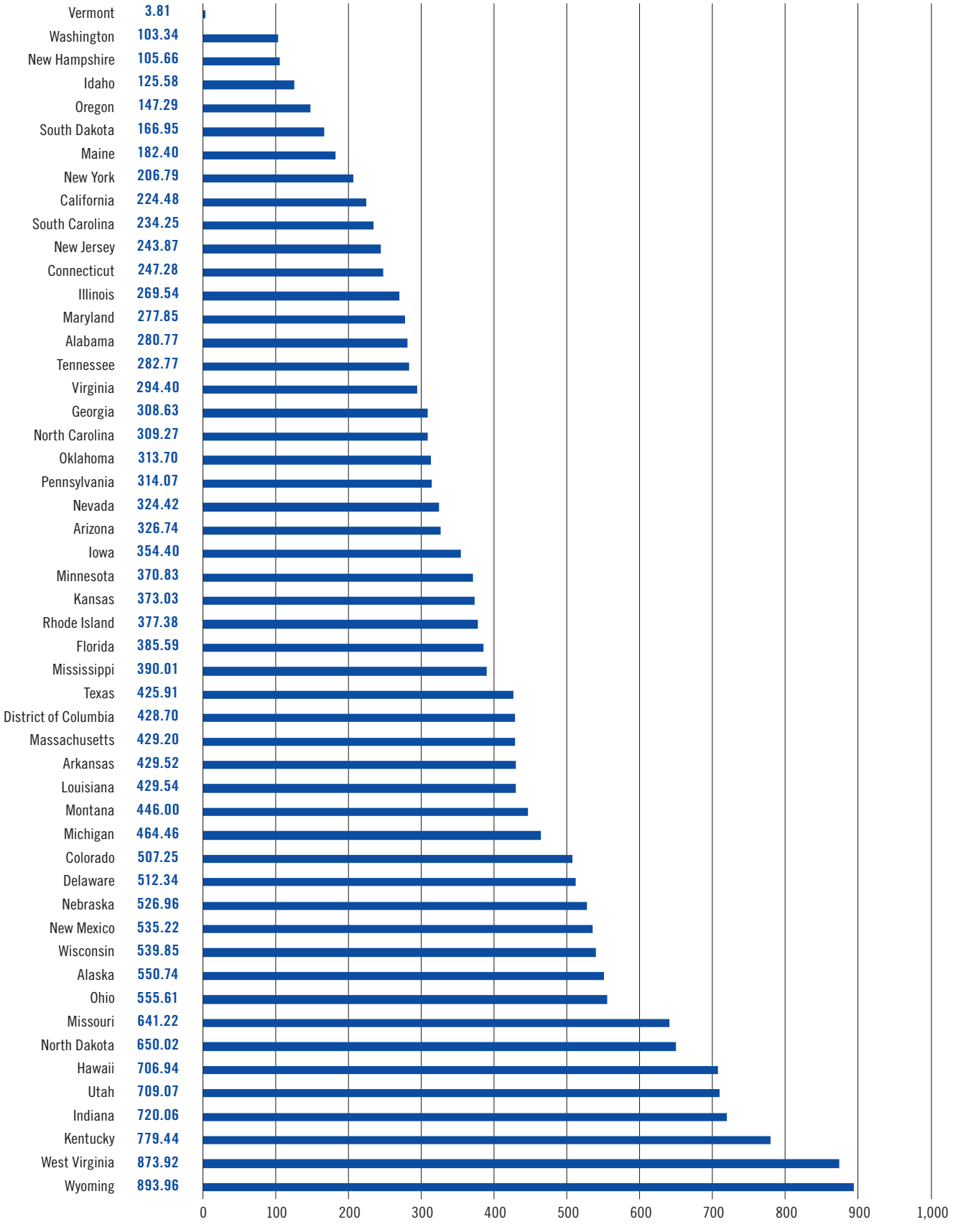


FIGURE 26: 2020 SULFUR DIOXIDE EMISSIONS FROM ELECTRICITY GENERATION, IN METRIC TONS PER GIGAWATT-HOUR

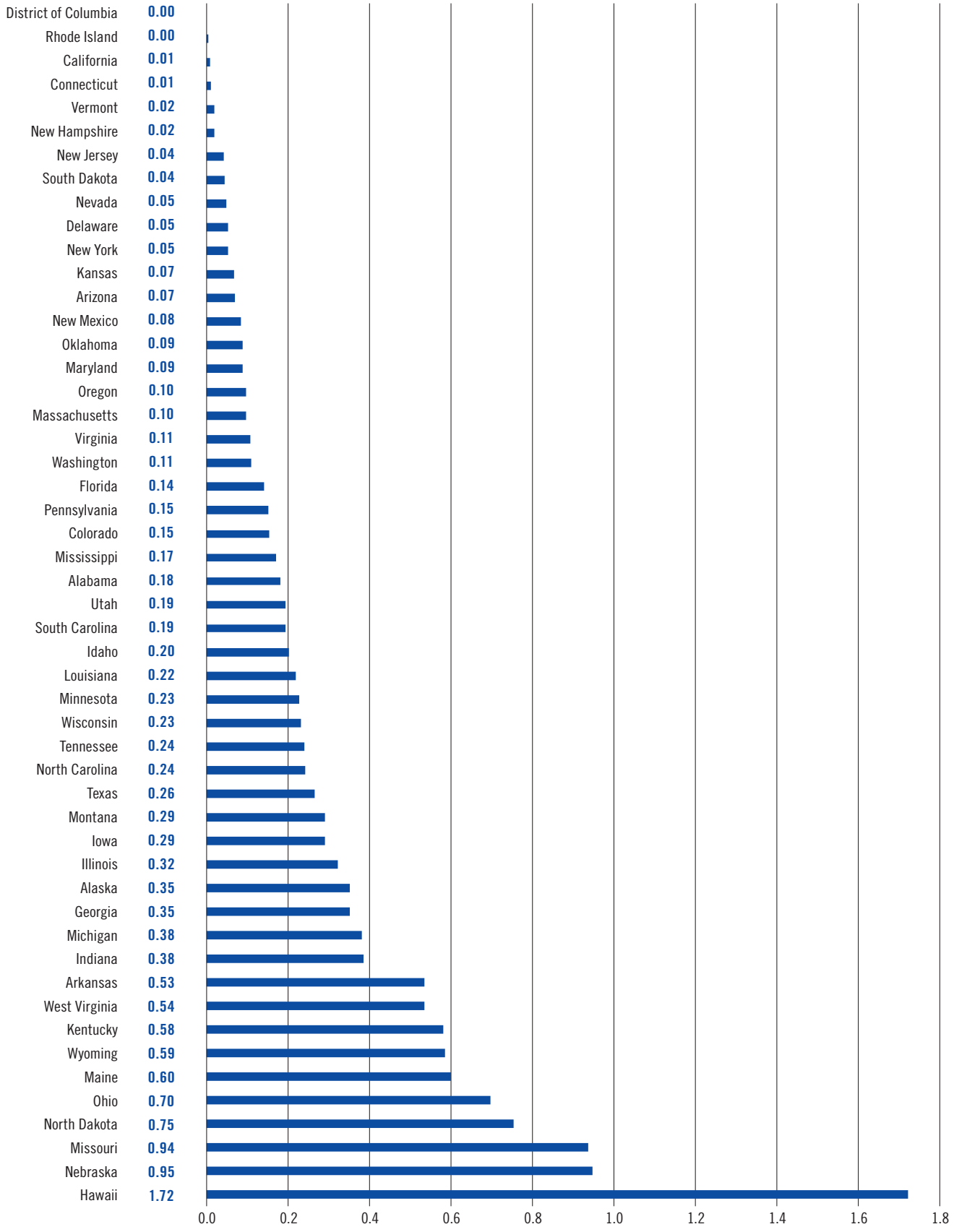
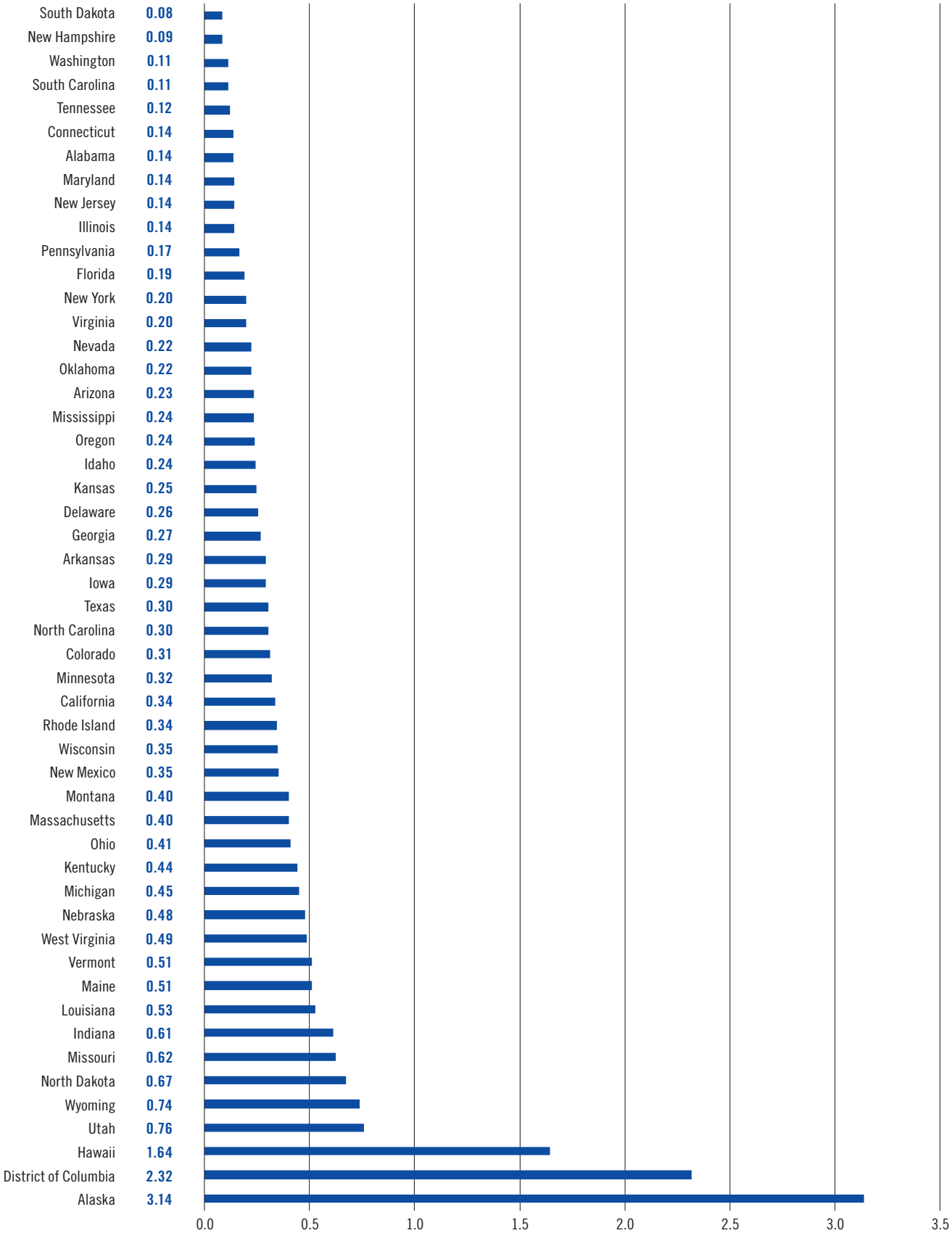


FIGURE 27: 2020 NITROGEN OXIDE EMISSIONS FROM ELECTRICITY GENERATION, IN METRIC TONS PER GIGAWATT-HOUR



Conclusion

As we conclude this second annual report on the performance of electric utilities in the United States, it is worth noting how much this exercise itself reflects the changing climate (in every sense of the expression) for public utility watchdogs. There was a time when consumer advocates, including the Citizens Utility Board, were prone to evaluate utility performance almost exclusively on factors that were divorced from the literal environment in which those electric companies operate. Our attention was largely focused on the cost and consistency of electric service.

But that paradigm no longer reconciles with the world around us. This year has illustrated with grim clarity how dependence on fossil fuels can wreak havoc on the affordability and reliability of electricity. In fact, at the time of this report's publication, Russia, in retaliation against international condemnation of its invasion of Ukraine, was manipulating global natural gas and oil supplies, raising heating and fuel costs for consumers to levels that threatened to either cripple national economies or consign tens, if not hundreds, of millions of households to a cold, expensive winter.

And if it can be argued that this upheaval is a fleeting condition of a temporary geopolitical conflict, the glaring and inexorable toll of climate change decidedly cannot. Once again in 2022, the United States was battered by record heat waves, catastrophic flooding, deadly storms and other ruthless and extreme weather events that can cause electricity costs to balloon, service to falter badly, or both.

By contrast, no nation can gain a stranglehold on sunlight, or wind, making these and other carbon-free energy sources not just a defense against environmental hazards, but also a safeguard against hostile actors in the world trying to stifle our access to electricity. Therefore, consumer advocates who intend to police for affordability and reliability have no choice but to account for the environmental ramifications of utility performance.

Where states excel in any one measure of overall performance but sputter in others, more inquiry is needed to ascertain the reasons for such a divide and where policy reforms can fill the gap. And while a state's record most directly impacts the residents within those boundaries, climate change has by now reinforced in us the lesson that electric utility performance has regional, national and global implications. For example, a utility's environmental shortcomings—namely more carbon-inducing emissions—can travel beyond state boundaries, contributing to climate-related problems that raise electricity bills and hamper the quality of service elsewhere.

For lawmakers, regulators, consumer advocates, industry analysts and the general public, this is the challenging but necessary homework that we hope follows from the publication of this report card.

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