



Clean Investment Monitor: Q3 2023 Update

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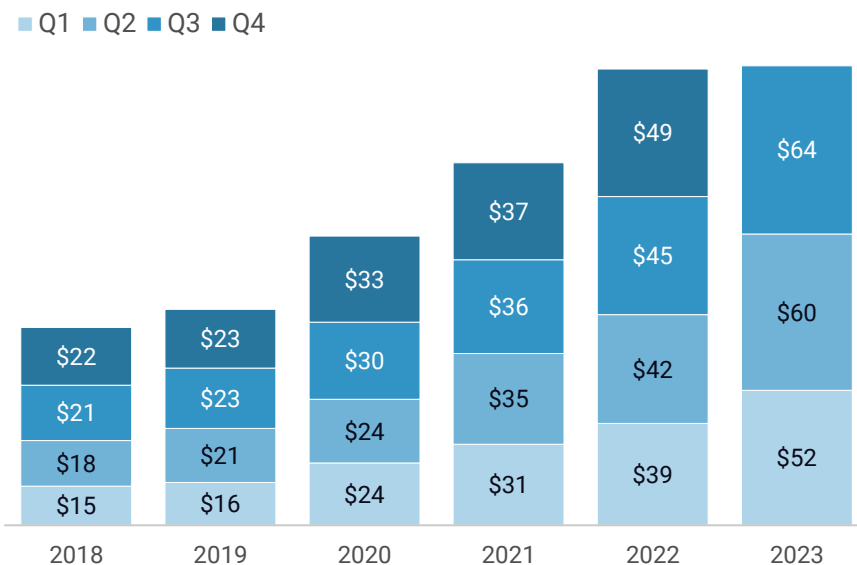
Summary

Investment in clean technologies is continuing at record levels in the United States, as demonstrated by new data from the third quarter of 2023. Actual clean energy and transportation investment in the US reached a record \$64 billion in Q3 2023—an 8% increase from the previous quarter and a 42% increase relative to the same period last year. Clean investment accounted for 4.9% of total US private investment in structures, equipment, and durable consumer goods nationwide in Q3, up from 3.4% at the same time last year.

Across our three investment segments—clean manufacturing, energy & industry production, and retail—clean manufacturing continued to post the most rapid growth, up 171% year-on-year to \$14 billion in Q3. The electric vehicle supply chain continued to account for the majority of this investment, but solar manufacturing investment is growing quickly, with a six-fold increase relative to Q3 of last year. Investment in clean energy production and industrial decarbonization grew by 31% year-on-year, to \$19 billion in Q3. Within that, investment in emerging climate technologies like clean hydrogen, sustainable aviation fuels, and carbon management posted the fastest growth—up ten-fold relative to the same period last year. Retail purchases and installations of clean technologies grew by 22% year-on-year, to \$31 billion in Q3, driven by 37% year-on-year growth in electric vehicle purchases by households and businesses.

Over the past year, the top five states in clean investment as a share of gross state output were Nevada, South Carolina, Arizona, Tennessee, and Montana.

FIGURE 1
Clean investment by quarter
 Billion 2022 USD



Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

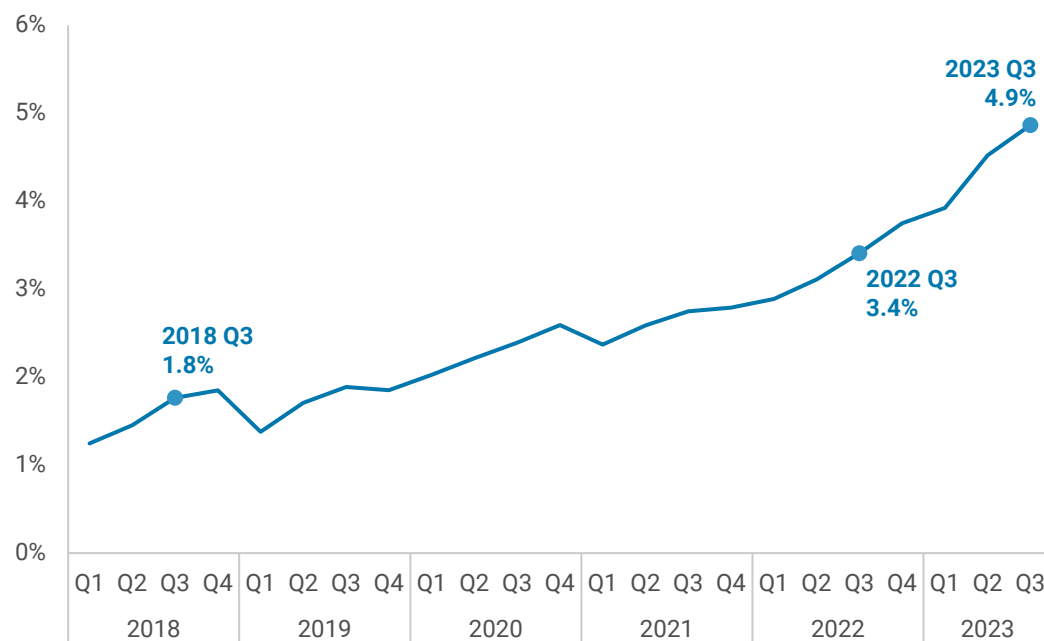
National trends

Clean energy and transportation investment in the United States reached a record \$64 billion in Q3 2023, the highest amount recorded to date, up from \$60 billion in Q2 2023 and \$45 billion in Q3 of 2022 (Figure 1). Clean investment accounted for 4.9% of total US private investment in structures, equipment, and durable consumer goods nationwide in Q3. That’s an increase from 3.4% in Q3 2022 and 1.8% at the beginning of 2018 (Figure 2). So far in 2023, there has been \$178 billion in clean investment in the US, up 40% from the same period last year.

FIGURE 2

Clean investment as a share of total US private investment

Annualized basis, total investment in all private structures, equipment and durable consumer goods



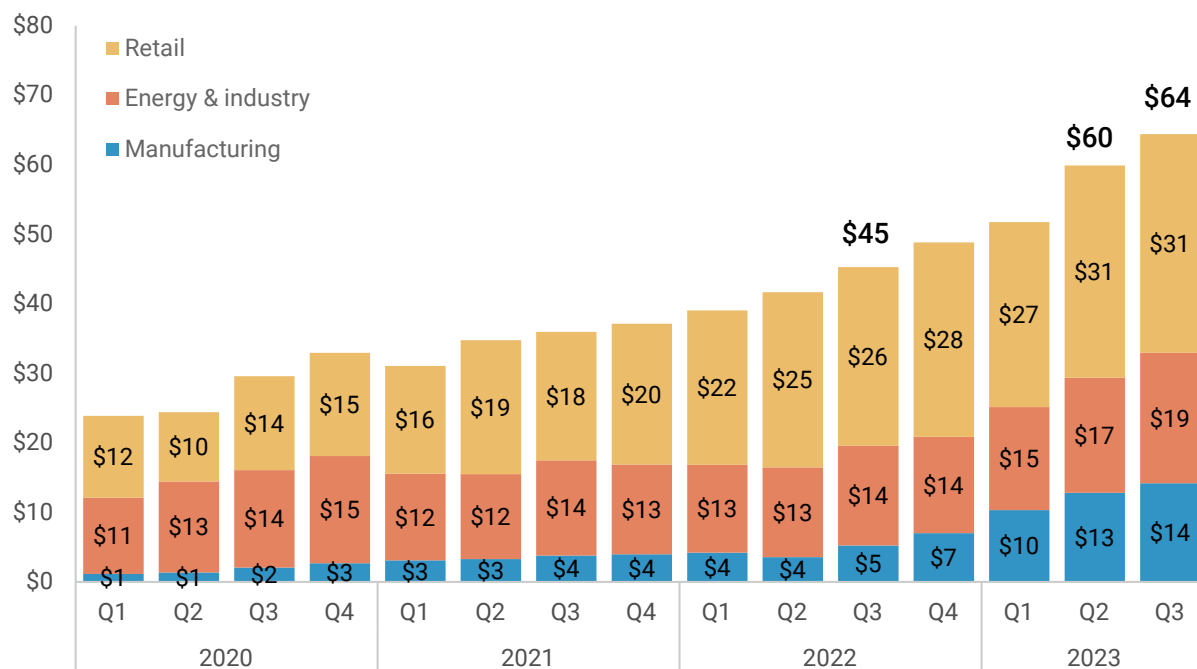
Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

We categorize our clean investment tracking into three segments: investment in the manufacture of GHG emission-reducing technology (“manufacturing”); investment in the deployment of that technology, both to produce clean energy or decarbonize industrial production (“energy & industry”); and through the purchase and installation of that technology by individual households and businesses (“retail”). Each dollar figure in this report is actual investment in Q3 2023, or the real dollars spent within the last quarter.

By segment, retail investment accounted for roughly half of total clean investment in Q3 at \$31 billion. Actual retail investment rose 3% in Q3 relative to the previous

quarter and 22% relative to Q3 2022. In the energy & industry segment, there was \$19 billion in new investment in clean energy production and industrial decarbonization in Q3 of 2023, up 13% quarter-on-quarter and 31% year-on-year. The manufacturing segment saw the most growth in Q3 2023, with \$14 billion of new investment in the manufacture of clean energy and transportation equipment, up 11% quarter-on-quarter and 171% year-on-year.

FIGURE 3
Clean investment by segment
 Billion 2022 USD

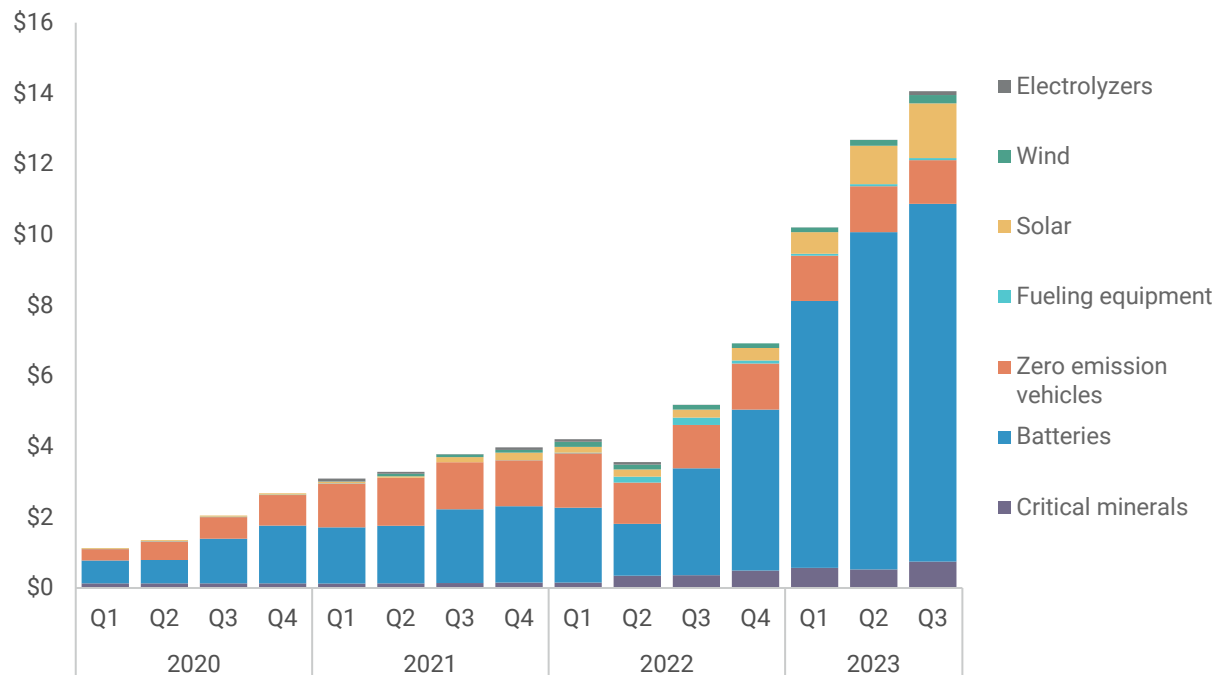


Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

Manufacturing

The electric vehicle supply chain (critical minerals, batteries, vehicle assembly and charging equipment) continued to account for the majority of clean manufacturing investment in Q3, at \$12 billion of the total \$14 billion investment amount. That’s a 6% increase quarter-on-quarter and a 152% increase year-on-year (Figure 4). Solar manufacturing investment saw the biggest jump of any technology in Q3, up 42% quarter-on-quarter to \$1.5 billion. That’s a six-fold increase over Q3 2022. Electrolyzer and wind manufacturing also grew rapidly, but from a lower base.

FIGURE 4
Manufacturing investment by technology
 Billion 2022 USD

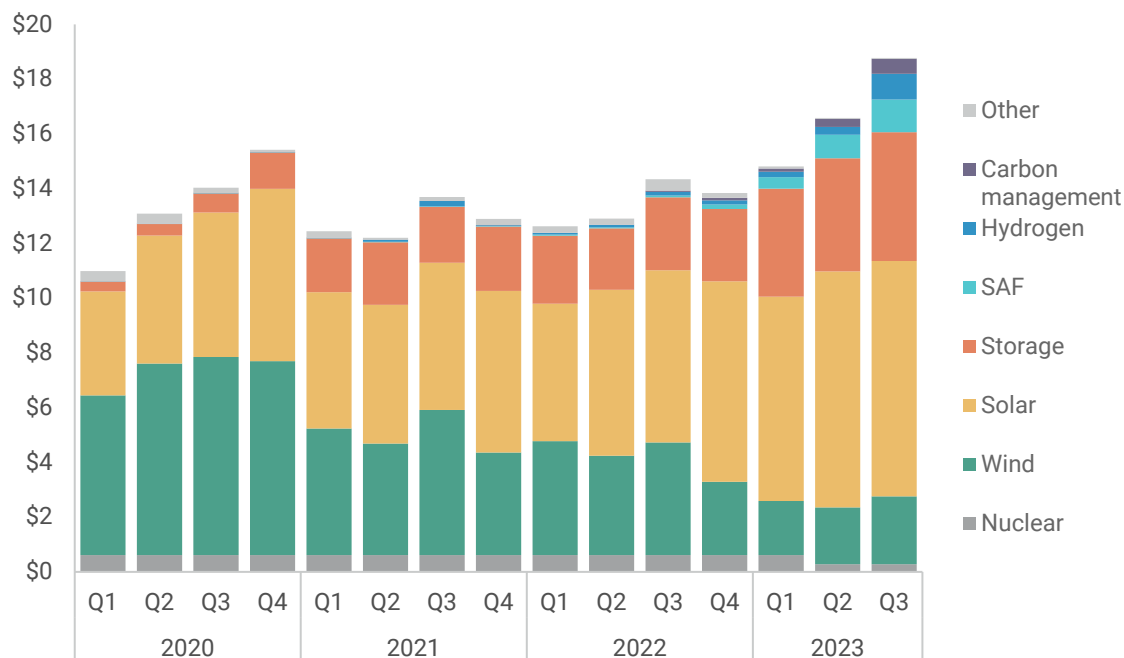


Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

Energy & industry

Of the total \$19 billion in new actual investment in clean energy production and industrial decarbonization in Q3, utility-scale solar and storage investment continued to dominate at \$13 billion (Figure 5). That’s a 4% increase over Q2 2023 and a 49% increase relative to Q3 2022. Wind investment increased 20% quarter-on-quarter to \$2.5 billion in Q3—though still down 40% year-on-year. The most rapid growth occurred in emerging climate technology investment—clean hydrogen, carbon management, and sustainable aviation fuels. In Q3 there was \$2.7 billion in investment in deploying these technologies, nearly double the amount of investment in Q2 and a more than ten-fold increase relative to Q3 2022.

FIGURE 5
Energy & industry investment by technology
 Billion 2022 USD



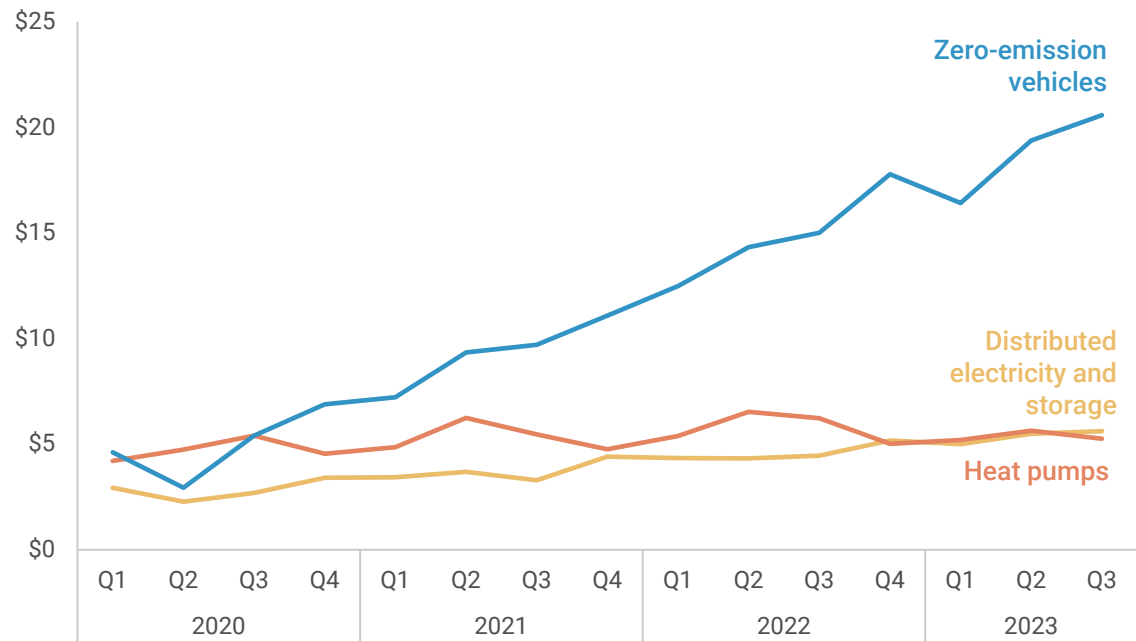
Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

Retail

Total retail purchases in zero-emission vehicles (ZEVs), distributed renewable electricity and storage, and heat pumps remained strong at \$31 billion in Q3 2023. In contrast to media reporting that consumer interest in electric vehicle purchases has cooled, investment in the purchase of zero-emission vehicles by households and businesses increased by 6% quarter-on-quarter in Q3 to \$21 billion (Figure 6). That’s a 37% year-on-year increase, slightly faster annual growth than the 35% posted in Q2. Investment in distributed renewable electricity and storage systems increased 2.3% quarter-on-quarter to \$5.6 billion in Q3, a 26% increase relative to Q3 2022. Heat pump investment, however, declined in Q3, down 7% relative to Q2 and 16% relative to Q3 2022, driven by continued weakness in residential construction activity.

FIGURE 6

Retail investment by technology
Billion 2022 USD



Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

State-level insights

In this quarterly update, for the first time we highlight some key insights about the state-level distribution of clean investment over the past year (Q4-2022 through Q3-2023).

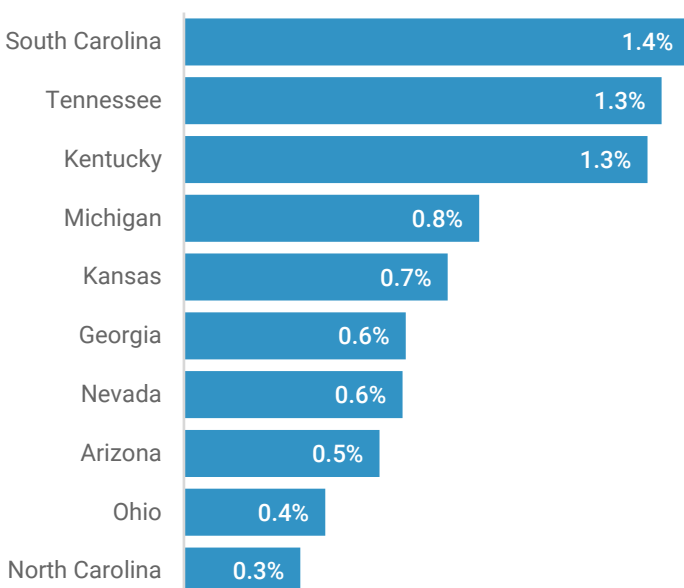
Manufacturing

The top ten states in clean technology manufacturing as a share of gross state product over the past year include traditional auto manufacturing states in the Midwest (Michigan and Ohio at #4 and #9 respectively) and the Southeast (South Carolina, Tennessee, Kentucky and Georgia at #1, #2, #3 and #6 respectively). But there is also a growing EV and solar manufacturing in the Southwest, with Nevada and Arizona ranking #7 and #8 respectively (Figure 7).

FIGURE 7

Top ten states for clean manufacturing investment

Percent of gross state product, Q4-2022 through Q3-2023



Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

Energy & industry

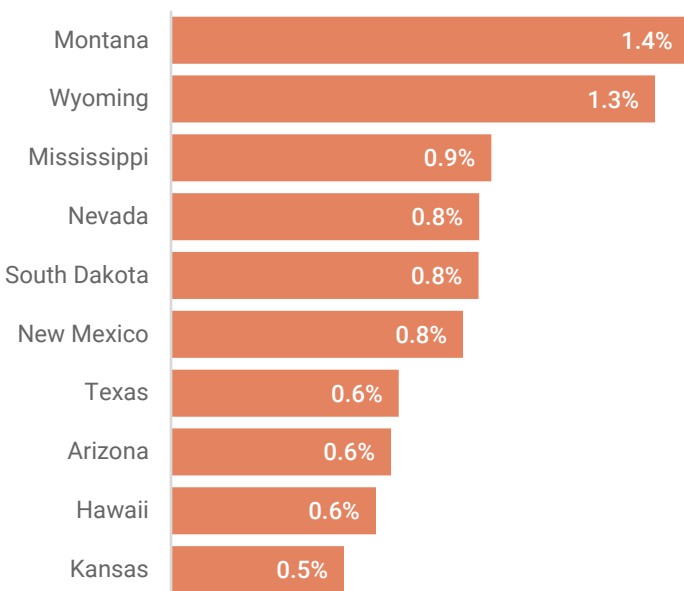
For investment in clean energy generation and industrial decarbonization, the state-level distribution of investment is quite different. Plains/Intermountain West states Montana, Wyoming, South Dakota and Kansas rank #1, #2, #5 and #10 respectively, with substantial wind, sustainable aviation fuel, and carbon management investments (Figure 8). Southeast and Southwest states Mississippi,

Nevada, New Mexico, Texas and Arizona rank #3, #4, #6, #7 and #8 respectively, with investment in utility-scale solar and storage.

FIGURE 8

Top ten states for clean energy and industry investment

Percent of gross state product, Q4-2022 through Q3-2023



Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

Retail

In terms of retail clean investment as a percent of gross state output, California ranks first in the nation in electric vehicle purchases and sixth in distributed electricity and storage investment. That makes it first overall in retail investment (Figure 9). Arizona and Florida rank second and third in overall retail investment, with high scores on all three retail categories in our database—ZEVs, distributed electricity and storage, and heat pumps. Hawaii and Nevada rank fourth and fifth despite low heat pump investment due to high ZEV and distributed electricity and storage.

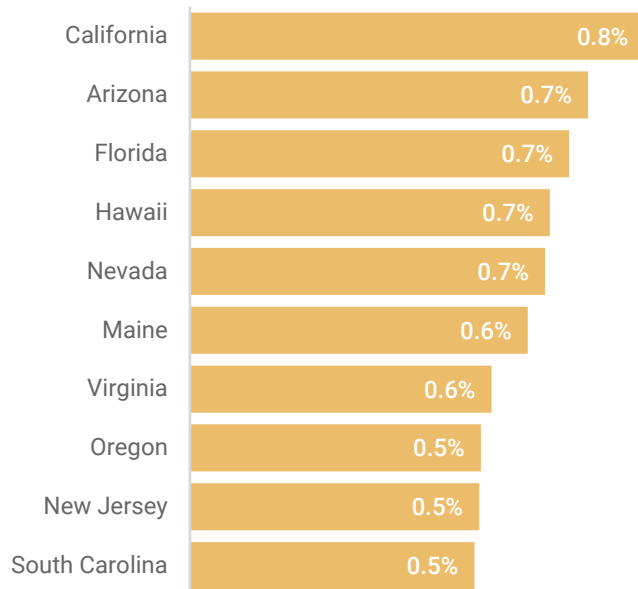
Total

Combining all three investment segments, the top five clean investment states in the country over the past year are Nevada, South Carolina, Arizona, Tennessee and Montana (Figure 10), followed by Kentucky, Wyoming, Georgia, Kansas and California.

FIGURE 9

Top ten states for clean retail investment

Percent of gross state product, Q4-2022 through Q3-2023

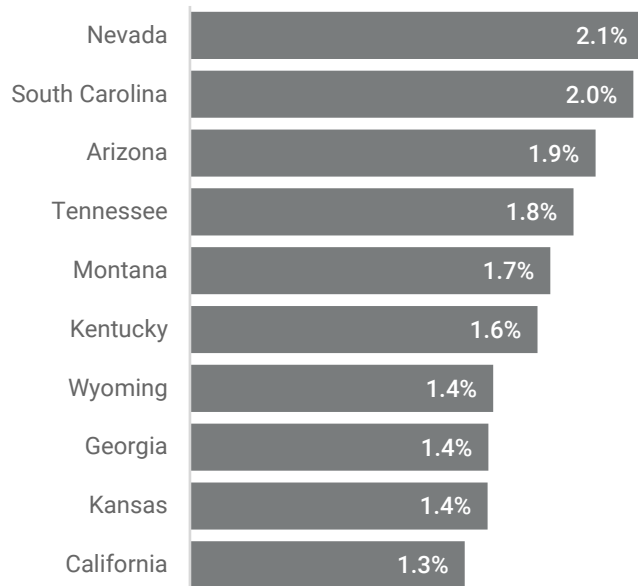


Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

FIGURE 10

Top ten states for total clean investment

Percent of gross state product, Q4-2022 through Q3-2023



Source: Rhodium Group/MIT-CEEPR Clean Investment Monitor

TABLE 1

State clean investment rankings
Percent of gross state product, Q4-2022 through Q3-2023

Total Investment			Manufacturing			Energy & Industry			Retail		
	State	Percent of GSP		State	Percent of GSP		State	Percent of GSP		State	Percent of GSP
1	Nevada	2.1%	1	South Carolina	1.4%	1	Montana	1.4%	1	California	0.8%
2	South Carolina	2.0%	2	Tennessee	1.3%	2	Wyoming	1.3%	2	Arizona	0.7%
3	Arizona	1.9%	3	Kentucky	1.3%	3	Mississippi	0.9%	3	Florida	0.7%
4	Tennessee	1.8%	4	Michigan	0.8%	4	Nevada	0.8%	4	Hawaii	0.7%
5	Montana	1.7%	5	Kansas	0.7%	5	South Dakota	0.8%	5	Nevada	0.7%
6	Kentucky	1.6%	6	Georgia	0.6%	6	New Mexico	0.8%	6	Maine	0.6%
7	Wyoming	1.4%	7	Nevada	0.6%	7	Texas	0.6%	7	Virginia	0.6%
8	Georgia	1.4%	8	Arizona	0.5%	8	Arizona	0.6%	8	Oregon	0.5%
9	Kansas	1.4%	9	Ohio	0.4%	9	Hawaii	0.6%	9	New Jersey	0.5%
10	California	1.3%	10	North Carolina	0.3%	10	Kansas	0.5%	10	South Carolina	0.5%
11	Hawaii	1.2%	11	Alabama	0.3%	11	Oklahoma	0.5%	11	Vermont	0.5%
12	Mississippi	1.2%	12	Indiana	0.2%	12	Louisiana	0.4%	12	Maryland	0.5%
13	Michigan	1.1%	13	North Dakota	0.2%	13	Arkansas	0.4%	13	North Carolina	0.5%
14	New Mexico	1.1%	14	West Virginia	0.2%	14	Idaho	0.4%	14	Colorado	0.5%
15	Texas	1.0%	15	Louisiana	0.2%	15	California	0.4%	15	Oklahoma	0.5%
16	Oklahoma	1.0%	16	Utah	0.2%	16	Georgia	0.3%	16	Rhode Island	0.5%
17	Florida	1.0%	17	Oklahoma	0.1%	17	Indiana	0.3%	17	Washington	0.4%
18	South Dakota	0.9%	18	New York	0.1%	18	Oregon	0.3%	18	Alabama	0.4%
19	North Carolina	0.9%	19	California	0.1%	19	Iowa	0.3%	19	Georgia	0.4%
20	Louisiana	0.9%	20	Missouri	0.1%	20	Wisconsin	0.3%	20	Texas	0.4%
21	Oregon	0.8%	21	Texas	0.0%	21	Florida	0.3%	21	Delaware	0.4%
22	Arkansas	0.8%	22	Idaho	0.0%	22	Utah	0.2%	22	Connecticut	0.4%
23	Ohio	0.8%	23	Washington	0.0%	23	Ohio	0.2%	23	Missouri	0.4%
24	Utah	0.8%	24	Colorado	0.0%	24	Colorado	0.2%	24	Utah	0.4%
25	Alabama	0.7%	25	New Jersey	0.0%	25	North Dakota	0.2%	25	Tennessee	0.4%
26	Maine	0.7%	26	Minnesota	0.0%	26	Virginia	0.1%	26	Arkansas	0.4%
27	Indiana	0.7%	27	Rhode Island	0.0%	27	Rhode Island	0.1%	27	New Hampshire	0.3%
28	Virginia	0.7%	28	South Dakota	0.0%	28	Illinois	0.1%	28	Mississippi	0.3%
29	Colorado	0.7%	29	New Mexico	0.0%	29	South Carolina	0.1%	29	Massachusetts	0.3%
30	Idaho	0.6%	30	Massachusetts	0.0%	30	Maine	0.1%	30	Kentucky	0.3%
31	Rhode Island	0.6%	31	Virginia	0.0%	31	Michigan	0.1%	31	Pennsylvania	0.3%
32	Vermont	0.6%	32	Maryland	0.0%	32	Tennessee	0.1%	32	West Virginia	0.3%
33	New Jersey	0.6%	33	Wisconsin	0.0%	33	New York	0.1%	33	New Mexico	0.3%
34	Maryland	0.5%	34	Connecticut	0.0%	34	Nebraska	0.1%	34	Illinois	0.3%
35	West Virginia	0.5%	35	Pennsylvania	0.0%	35	Vermont	0.1%	35	Montana	0.3%
36	Washington	0.5%	36	Florida	0.0%	36	Minnesota	0.1%	36	Louisiana	0.3%
37	Iowa	0.5%	37	Illinois	0.0%	37	Pennsylvania	0.1%	37	Idaho	0.2%
38	Wisconsin	0.4%	38	Alaska	0.0%	38	North Carolina	0.0%	38	New York	0.2%
39	Missouri	0.4%	39	Arkansas	0.0%	39	Alabama	0.0%	39	Michigan	0.2%
40	North Dakota	0.4%	40	Delaware	0.0%	40	Kentucky	0.0%	40	Minnesota	0.2%
41	Connecticut	0.4%	41	DC	0.0%	41	Connecticut	0.0%	41	Indiana	0.2%

42	Delaware	0.4%	42	Hawaii	0.0%	42	Alaska	0.0%	42	Ohio	0.2%
43	Illinois	0.4%	43	Iowa	0.0%	43	West Virginia	0.0%	43	Kansas	0.2%
44	New Hampshire	0.4%	44	Maine	0.0%	44	New Jersey	0.0%	44	Wisconsin	0.2%
45	Massachusetts	0.4%	45	Mississippi	0.0%	45	Maryland	0.0%	45	Iowa	0.2%
46	New York	0.3%	46	Montana	0.0%	46	New Hampshire	0.0%	46	DC	0.2%
47	Pennsylvania	0.3%	47	Nebraska	0.0%	47	Delaware	0.0%	47	Nebraska	0.1%
48	Minnesota	0.3%	48	New Hampshire	0.0%	48	Massachusetts	0.0%	48	Wyoming	0.1%
49	Nebraska	0.2%	49	Oregon	0.0%	49	Missouri	0.0%	49	Alaska	0.1%
50	DC	0.2%	50	Vermont	0.0%	50	DC	0.0%	50	South Dakota	0.1%
51	Alaska	0.1%	51	Wyoming	0.0%	51	Washington	0.0%	51	North Dakota	0.1%

ABOUT THE CLEAN INVESTMENT MONITOR

The Clean Investment Monitor (CIM) is a joint project of Rhodium Group and MIT's Center for Energy and Environmental Policy Research. The CIM tracks public and private investments in manufacturing and deployment of climate technologies in the United States. Through this data and analysis, the CIM provides insights into investment trends, the effects of federal and state policies, and on-the-ground progress in the U.S. towards net-zero greenhouse gas emissions.

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