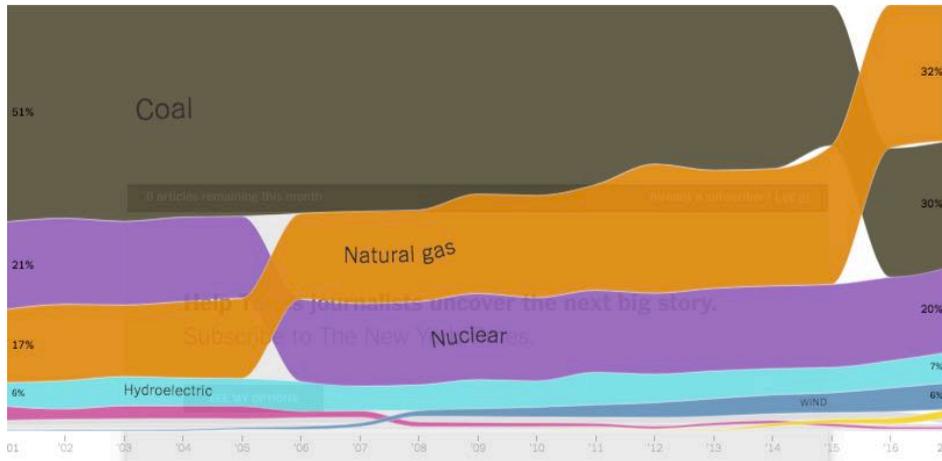


How Does Your State Make Electricity?

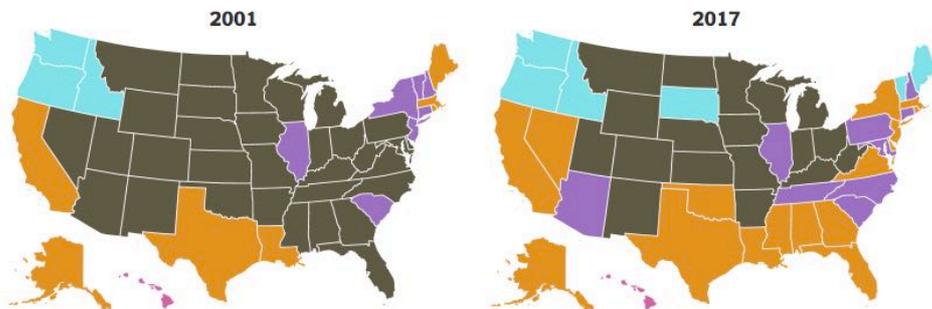
By NADJA POPOVICH DEC. 24, 2018



America isn't making electricity the way it did two decades ago: Natural gas has edged out coal as the country's leading generation source ... and renewables like wind and solar have made small yet speedy gains. But, each state has its own story. In Nevada, natural gas surpassed coal as the top source of electricity generation in 2005, earlier than in many other states. Coal's role in the state's power mix has continued to decline since then. In Iowa, wind power has taken off over the past decade. It now makes up nearly 40 percent of the electricity produced in the state. But in West Virginia, coal still fuels nearly allelectricity generation. Overall, fossil fuels still dominate electricity generation in the United States. But the shift from coal to natural gas has helped to lower carbon dioxide emissions and other pollution. Last year, coal was the main source of electricity generation for 18 states, down from 32 states in 2001.

Top Source of Electricity Generation In Every State

■ Coal ■ Natural gas ■ Nuclear ■ Hydroelectric ■ Petroleum

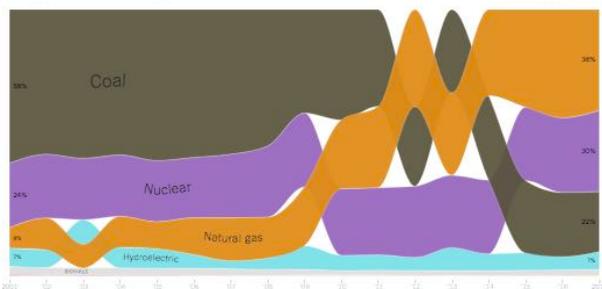


But experts warn that a shift to natural gas alone won't be enough to curb emissions and avoid dangerous global warming. "Switching from coal to gas is a fine thing to do in the short run, but it's not a solution in the longer run," said Severin Borenstein, Director of the Energy Institute at the University of California, Berkeley's Haas School of Business. "Gas still produces a lot of greenhouse gases. We can't stay on gas and solve this problem. Ultimately we're going to have to go to much lower or zero-carbon sources."

We charted every state's electricity generation mix between 2001 and 2017 using data from the United States Energy Information Administration. Scroll down or skip to your state:

How **Alabama** generated electricity from 2001 to 2017

Percentage of power produced from each energy source

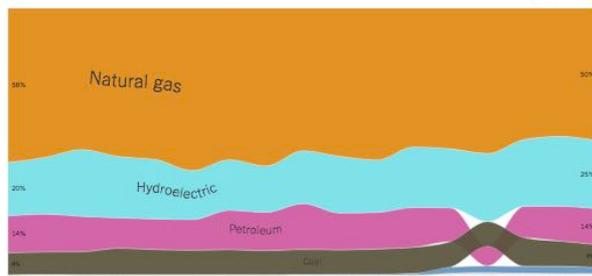


In 2001, coal fueled more than half of the electricity produced in Alabama, but several of the state's aging coal plants have closed since then or transitioned to burning cheaper natural gas. By 2017, natural gas was the top electricity source in the state, followed by nuclear. Coal came in third place, providing just under a quarter of the state's power generation.

Alabama generates more electricity than it consumes, and typically sends about one-third of its output to nearby states.

How **Alaska** generated electricity from 2001 to 2017

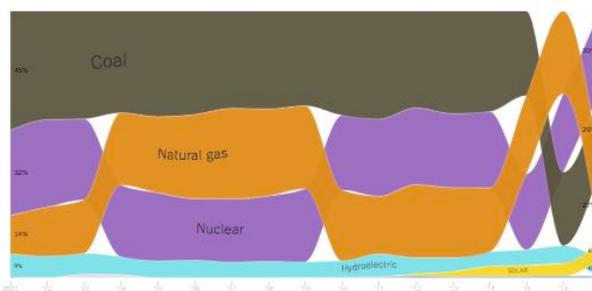
Percentage of power produced from each energy source



Natural gas has been Alaska's top source of electricity generation since 2001, but hydroelectric power has increased its share during that time. The state aims to get 50 percent of its electricity from renewable sources by 2025, but that goal is voluntary and has no legal weight. Alaska has its own electric grid, which means that "whatever electricity is created there is what they're consuming," said Glenn McGrath, a power systems analyst at the Energy Information Administration. "It's about as isolated as you can get." Many of Alaska's rural communities are not connected to the main grid at all and use diesel generators for power.

How **Arizona** generated electricity from 2001 to 2017

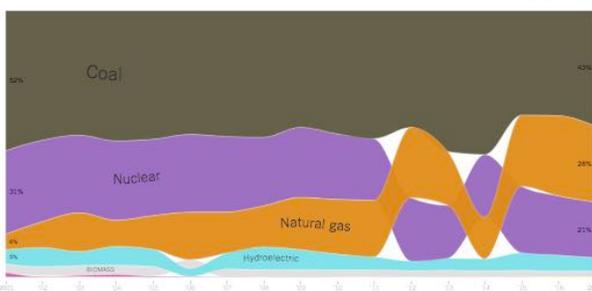
Percentage of power produced from each energy source



Coal was Arizona's top source of electricity generation until 2016, when natural gas produced more power. Last year, natural gas, nuclear and coal each provided a little less than a third of the electricity produced in the state. But coal power is expected to decline further. The state's Navajo Generating Station, the largest coal-fired power plant in the West, is slated to close in 2019, largely because of competition from cheaper natural gas. Arizona supplies electricity throughout the Southwest. The state has abundant solar potential and will require utilities to get 15 percent of their electricity from renewable sources by 2025. In November, voters rejected a ballot initiative that would have raised that target to a more ambitious 50 percent by 2035.

How **Arkansas** generated electricity from 2001 to 2017

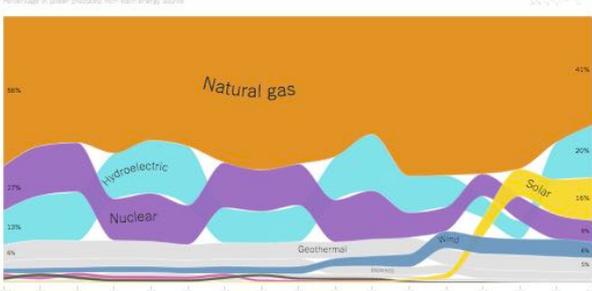
Percentage of power produced from each energy source



Coal was the top source of electricity produced in Arkansas every year between 2001 and 2017, but its generation share slowly decreased during that time. Natural gas, meanwhile, grew to provide more than a quarter of the electricity produced in the state last year, up from just 6 percent in 2001. Arkansas generates more electricity than it consumes and exports power to nearby states.

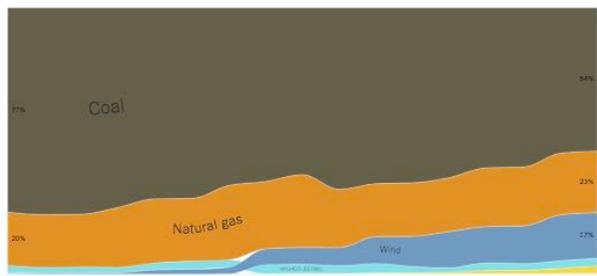
How **California** generated electricity from 2001 to 2017

Percentage of power produced from each energy source



Natural gas has been California's top electricity source since 2001. But half of the power produced in the state last year came from renewable sources, including solar, wind, geothermal, and hydroelectricity. Hydroelectric power, which dwindled between 2014 and 2015 because of drought, rose again last year to provide the largest share of renewable generation in the state. Solar power has grown quickly over the past five years, largely because of state policies like an aggressive renewable energy standard. This year, California committed to get all of its electricity from zero-carbon sources by 2045. Last year, about a fourth of the electricity consumed in the state, including some generated by coal power, came from outside of its borders. (Imports are not pictured in the graphic above.) But California plans to stop buying electricity from coal-burning plants in Utah and other states.

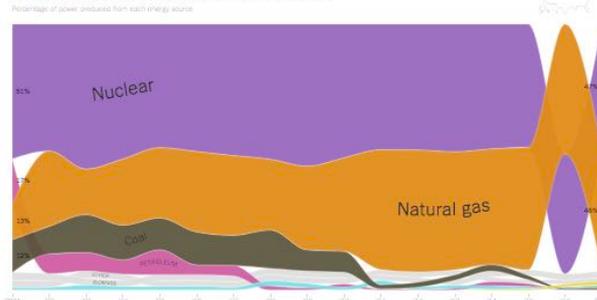
How **Colorado** generated electricity from 2001 to 2017



The vast majority of the electricity generated in Colorado comes from fossil fuel sources: about half from coal, and a quarter from natural gas. But wind power has been on the rise over the past decade. Last year, wind was the third-largest source of electricity produced in Colorado, accounting for nearly a fifth of the state's generation.

Colorado has set a requirement that 30 percent of the electricity sold by utilities come from renewable sources by 2020.

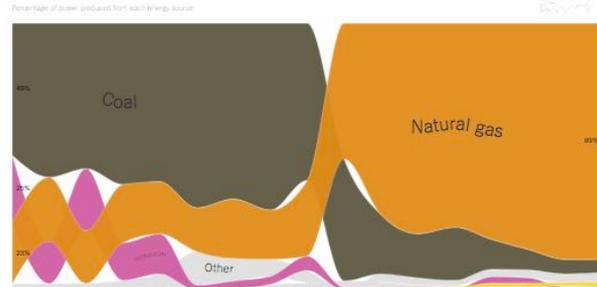
How **Connecticut** generated electricity from 2001 to 2017



Nuclear power and natural gas supplied the vast majority of electricity generated in Connecticut between 2001 and 2017. Natural gas power has been on the rise during that time, accounting for nearly half of the state's electricity generation last year, up from just 13 percent nearly two decades earlier. Coal-fired generation has almost entirely disappeared in the state and Connecticut's last remaining coal plant, Bridgeport Harbor, is scheduled to close in 2021.

Five percent of the electricity generated in Connecticut came from renewable sources in 2017. This year, the state expanded its renewable energy standard to require that utilities get 40 percent of the electricity they sell to consumers from renewable sources by 2030.

How **Delaware** generated electricity from 2001 to 2017

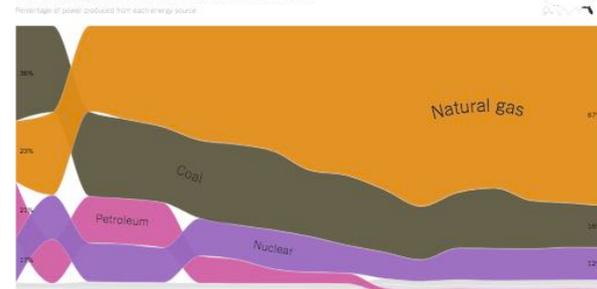


Natural gas displaced coal as the primary source of electricity produced in Delaware in 2010, and coal's generation share has declined dramatically since then. Coal provided 70 percent of the power produced in Delaware in 2008, its peak year, but slightly less than 5 percent by 2017. Natural gas more than quadrupled its generation share during the same period.

Thanks in part to this shift, carbon dioxide emissions from the state's electricity sector have fallen over the past decade. Delaware will require that utilities get 25 percent of their electricity from renewable sources by 2025.

Power produced in the state supplies "between two-thirds and three-fourths of the electricity sold to Delaware customers," according to the E.I.A. The rest comes from neighboring states through the regional grid. (Imports are not shown in the chart above.)

How **Florida** generated electricity from 2001 to 2017

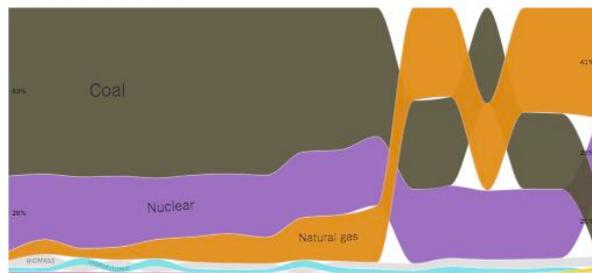


In 2001, more than a third of the electricity produced in Florida came from burning coal, but natural gas surpassed coal as the state's top generation source two years later and continued to expand its share of the state's power mix. By 2017, natural gas made up two thirds of Florida's electricity generation, more than double the national average.

Florida is the second-largest producer of electricity nationwide, after Texas, but still relies on imports from neighboring states to meet consumer demand. Despite its nickname, the Sunshine State generates very little power through solar energy and has no renewable energy requirements.

How Georgia generated electricity from 2001 to 2017

Percentage of power produced from each energy source



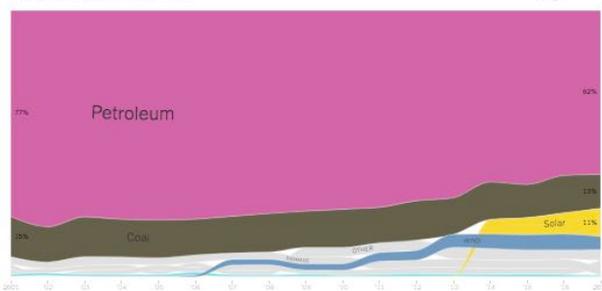
Coal provided the majority of Georgia's power generation through the 2000s but declined as natural gas power increased. In recent years, coal's generation share has dropped sharply as several aging coal-fired plants have been retired.

Utilities in the state are in the process of building two new nuclear reactors, the only new nuclear projects under construction in the country.

About a tenth of Georgia's power generation came from renewable sources last year, mostly biomass and hydroelectricity. But solar power is growing quickly in the state. Georgia doesn't impose any statewide renewable energy requirements, but the city of Atlanta is developing a plan to get all of its electricity from renewable sources by 2035.

How Hawaii generated electricity from 2001 to 2017

Percentage of power produced from each energy source

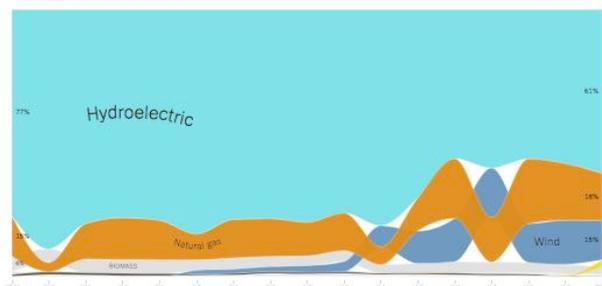


Hawaii has relied heavily on imported petroleum to make electricity for the past two decades. But the state has a bold plan to generate all of its power from local renewable sources by 2045.

Last year, renewables accounted for a fourth of the power produced in Hawaii, up from less than a tenth in 2001. Solar generation, mostly from small-scale rooftop panels, has grown rapidly in the state over the past five years.

How Idaho generated electricity from 2001 to 2017

Percentage of power produced from each energy source

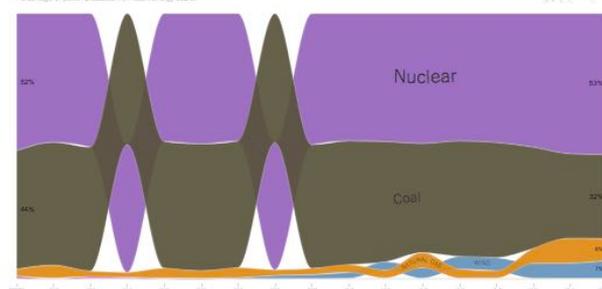


Hydroelectric power has long dominated Idaho's generation mix. But, in recent years, its share has fallen, partly because of drought. The state still produces the majority of its electricity from renewable sources, with wind powering 15 percent of in-state generation last year, up from less than 2 percent a decade ago. Solar power, while still a small share, increased sharply between 2016 and 2017.

Idaho relies heavily on out of state imports to meet electricity demand. While coal makes up only a fraction of in-state generation, in the end "about one-third of the electricity consumed in Idaho is from coal-fired power plants located in other states," according to the E.I.A. (Import data is not shown in the chart above.)

How Illinois generated electricity from 2001 to 2017

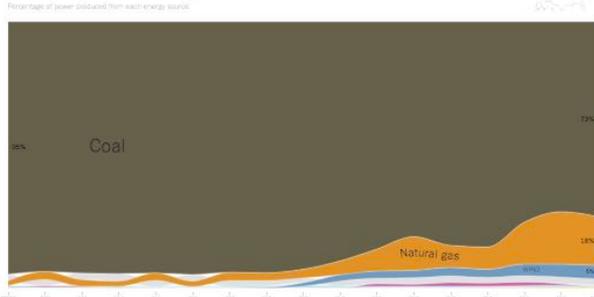
Percentage of power produced from each energy source



Nuclear power is Illinois' top source of electric generation. It has provided more than half of the power produced in the state for nearly two decades. Coal is an important source of power for the state, too – even surpassing nuclear as the top generation source twice over the past decade, in 2004 and again in 2008 – but its share has declined in recent years as old power plants have been retired or converted to burn natural gas. Both natural gas and wind power have increased over the past decade.

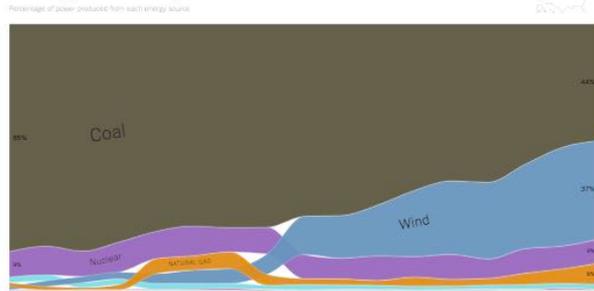
Illinois produces "considerably more" electricity than it uses in-state, according to the E.I.A. It sends the surplus to Mid-Atlantic and Midwestern states through regional grids.

How **Indiana** generated electricity from 2001 to 2017



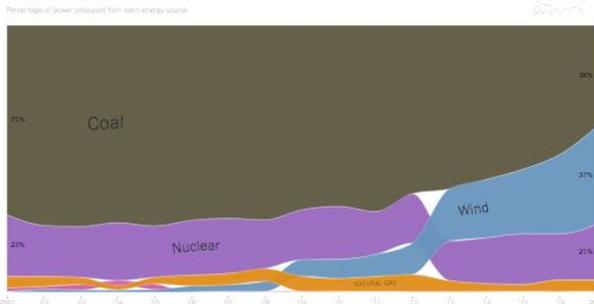
Coal has generated most of the electricity made in Indiana for nearly two decades, but, in recent years, natural gas and wind power have made inroads. Natural gas accounted for 2 percent of the state's electricity generation in 2001 but grew to provide nearly 20 percent in 2017. The Indiana Legislature established a voluntary clean energy standard in 2011 that encourages electric utilities to get an increasing amount of power from renewable and other alternative energy sources. However, no Indiana utilities participated in the program last year, according to the E.I.A.

How **Iowa** generated electricity from 2001 to 2017



Wind power has exploded in Iowa over the past decade. Wind provided just 1 percent of the electricity produced in the state in 2001 but climbed to nearly 40 percent by 2017. Iowa still produces nearly half its electricity from coal, but coal's generation share has declined since 2010. In absolute terms, the state, one of the windiest in the country, was the third-largest producer of wind power last year, after Texas and Oklahoma. Iowa produces more power than it consumes, sending the surplus to nearby states. Iowa in 1983 became the first state to pass legislation requiring utilities to get some amount of electricity from renewable resources, but the state has not updated its standards.

How **Kansas** generated electricity from 2001 to 2017



Like many Great Plains states, Kansas has seen significant growth in wind power over the past decade. The share of electricity generated from wind has increased fivefold since 2010. In 2009, the Kansas Legislature passed a renewable energy standard requiring utilities to get an increasing amount of electricity from wind, solar and other renewable sources – up to 20 percent by 2020. But Gov. Sam Brownback and state legislators softened the measure in 2015, making the goal voluntary, after conservative groups with ties to the industrial conglomerate Koch Industries lobbied against the stricter standard.

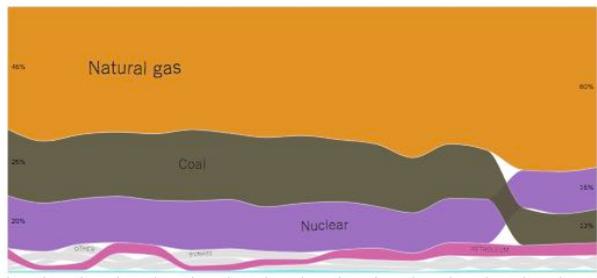
How **Kentucky** generated electricity from 2001 to 2017



Coal still powers the vast majority of the electricity produced in Kentucky, a longtime coal mining state. Last year, coal was the source of nearly 80 percent of state generation, but for most of the past two decades that number hovered closer to 90 percent. Since 2014, a number of Kentucky's older coal plants have been shut down or converted to burn natural gas, which provided 13 percent of the state's electricity generation in 2017.

How **Louisiana** generated electricity from 2001 to 2017

Percentage of power produced from each energy source

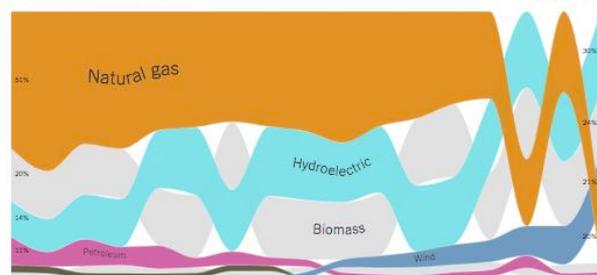


Natural gas provides the bulk of electricity generation in Louisiana, one of the top-five producers of natural gas in the country. Last year, gas accounted for 60 percent of electricity made in the state, up from 46 percent in 2001. During that time, coal-fired generation declined, dropping from its position as the second-biggest source of power in the state to third place.

Louisiana also gets some electricity from neighboring states. (Imports are not in the chart above.)

How **Maine** generated electricity from 2001 to 2017

Percentage of power produced from each energy source



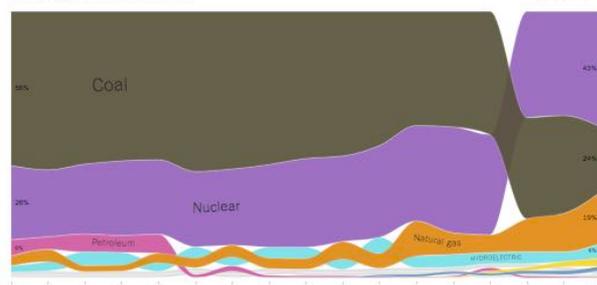
Maine "leads New England in wind power generation," according to the E.I.A. Last year, wind supplied one-fifth of the electricity produced in the state. Hydroelectric and biomass power, which comes from burning wood and other organic material, were the next-biggest sources of generation.

Since 2000, the state has required that electricity providers get 30 percent of the power they sell to customers from existing renewable resources. In 2017, utilities were expected to get 10 percent from new renewable sources. The state has separate goals for wind-energy development.

The total amount of electricity created in Maine has declined since 2010, especially from natural gas power, and the state has increasingly relied on energy imports from Canada. (Imports are not included in the chart above.)

How **Maryland** generated electricity from 2001 to 2017

Percentage of power produced from each energy source



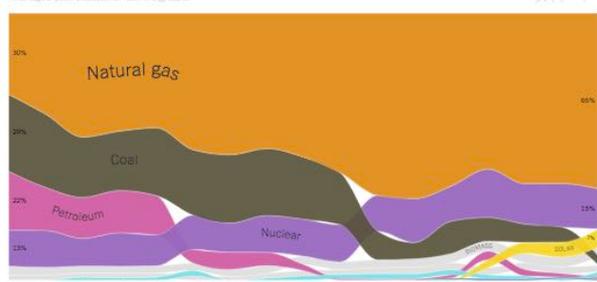
Coal power has been on the decline in Maryland for a decade and has provided less than half of the electricity produced in the state since 2012. During that time, the share of electricity generated by nuclear power and natural gas has increased.

Solar power generation, while still small, has grown quickly over the past several years. Since 2004, the state has required that an increasing amount of the electricity sold by utilities come from renewable sources, with a target of 25 percent by 2020.

Maryland consumes more electricity than it generates and imports nearly half of its power from other Mid-Atlantic States through the regional grid. (Imports are not included in the chart above.)

How **Massachusetts** generated electricity from 2001 to 2017

Percentage of power produced from each energy source

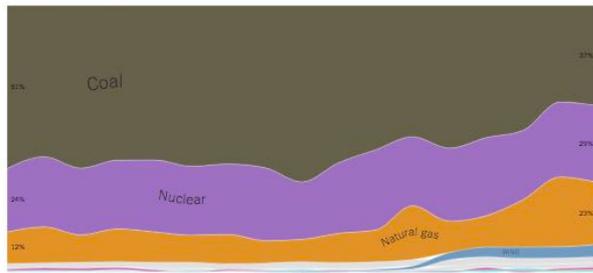


Natural gas has more than doubled its share of electricity generation in Massachusetts over the past two decades. Coal and oil generation fell sharply during that same period, and the state's last large coal-fired power plant shut down last year. The amount of power created from solar energy has increased sharply in the state since 2013.

This year, the state toughened its mandate for utilities to sell electricity from renewable sources, raising the requirement to 35 percent of total sales by 2030. The new legislation also encourages offshore wind development.

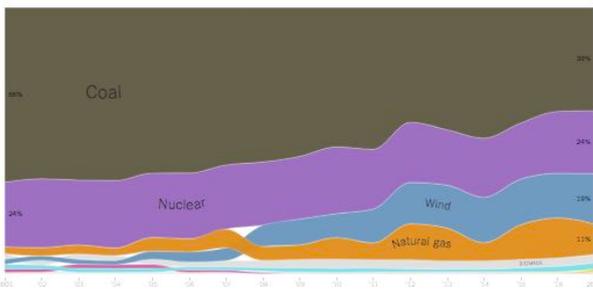
Massachusetts consumes more electricity than it produces in-state and gets the remainder from nearby states through the regional grid. (Imports are not shown in the chart above.)

How **Michigan** generated electricity from 2001 to 2017
Percentage of power produced from each energy source



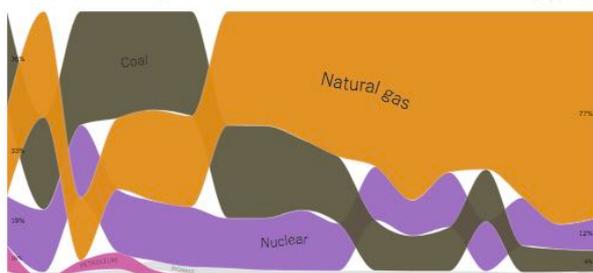
Coal remained the top source of electricity produced in Michigan last year, but its generation share declined from a little over 60 percent in 2001 to just under 40 percent in 2017. During the same period, natural gas nearly doubled its generation share. Wind, Michigan's main renewable energy source, provided nearly 5 percent of the electricity produced in the state last year. In 2008, Michigan required utilities and other electricity providers to get at least 10 percent of the power they sell to customer from renewable sources by 2015. That goal was met and subsequently expanded to 15 percent by 2021.

How **Minnesota** generated electricity from 2001 to 2017
Percentage of power produced from each energy source



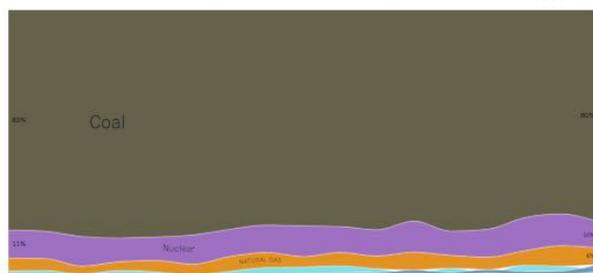
Coal has been the top source of electricity generated in Minnesota for the past two decades. But coal's generation share declined between 2001 and 2017 as wind and natural gas generation grew. The state requires utilities to gradually sell an increasing amount of electricity from renewable sources, with a requirement of 25 percent of total sales by 2025.

How **Mississippi** generated electricity from 2001 to 2017
Percentage of power produced from each energy source



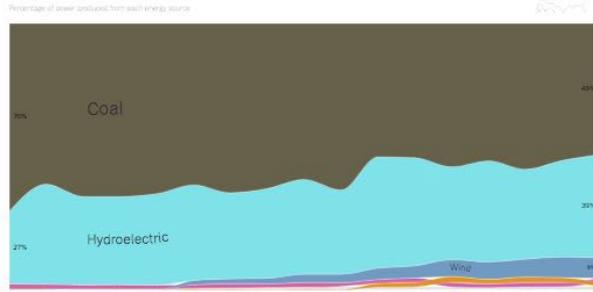
Natural gas powered more than three-quarters of the electricity generated in Mississippi last year. Coal, once the state's top source of electricity, has declined over the past decade, outcompeted by cheaper natural gas. Coal provided 36 percent of the electricity produced in-state in 2001, but just 8 percent in 2017.

How **Missouri** generated electricity from 2001 to 2017
Percentage of power produced from each energy source



Missouri's electricity generation mix hasn't changed much in nearly two decades. Coal provided the vast majority of power generated in the state between 2001 and 2017, declining only slightly during that time as older coal-fired plants went offline or switched to burning natural gas. Missouri will require utilities to get at least 15 percent of the electricity they sell from renewable sources by 2021, including a small amount from solar power.

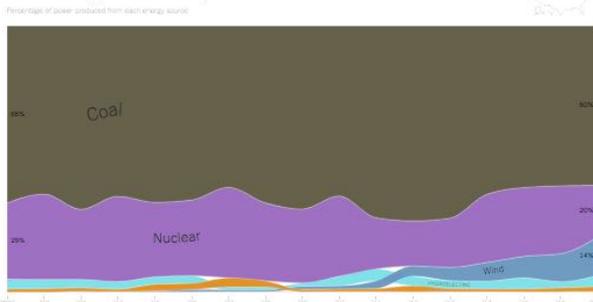
How **Montana** generated electricity from 2001 to 2017



Coal has been the top source of electricity produced in Montana for nearly two decades but its generation share declined from 70 percent in 2001 to just under 50 percent last year. Hydropower, the state's second-largest source of electricity, increased its share during that time to nearly 40 percent, and wind power grew to 8 percent of in-state generation.

Montanans only use about half of the electricity produced in the state, according to the E.I.A. The state sends the rest to its Western neighbors.

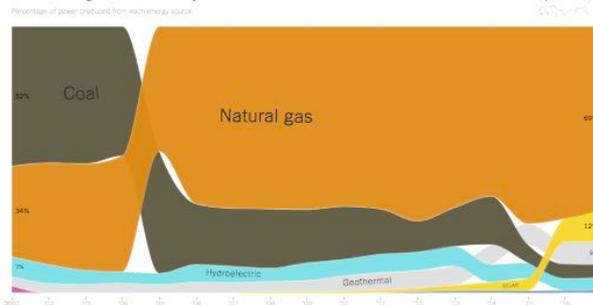
How **Nebraska** generated electricity from 2001 to 2017



Coal has been the top source of electricity produced in Nebraska for nearly two decades, but its generation share declined slightly between 2001 and 2017. Nuclear power provided 25 percent of the state's electricity generation on average during that time, but its share varied from year to year.

Wind has been increasing its share of total generation over the past decade, accounting for 15 percent of the electricity produced in the state last year. Nebraska has the potential for substantially more wind power, according to the E.I.A.

How **Nevada** generated electricity from 2001 to 2017

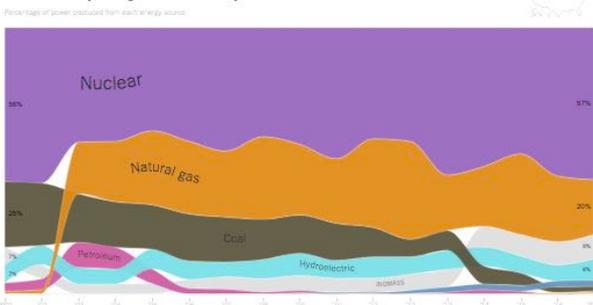


Natural gas edged out coal as Nevada's top electricity generation source in 2005. The state's largest coal plant, the Mohave Generating Station, went offline at the end of that year, further shrinking coal's role in the state's power mix. More Nevada coal generators have shuttered since then because of competition from cheap natural gas and state laws that require renewable energy development.

Last year, natural gas provided nearly 70 percent of electricity produced in the state, followed by solar power, which supplied 12 percent of the state's generation.

Until recently, Nevada required that 25 percent of the electricity sold by utilities in the state come from renewable sources by 2025. In November, Nevadans voted to increase that requirement to 50 percent by 2030.

How **New Hampshire** generated electricity from 2001 to 2017

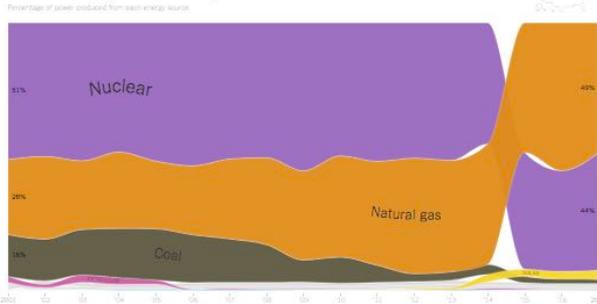


The bulk of electricity generated in New Hampshire comes from the Seabrook nuclear power plant, the largest reactor in New England. Natural gas has provided about a fifth of the power produced in the state since the early 2000s, when two new generating stations began operating. The share of New Hampshire's electricity generated from coal has dwindled over the past two decades, from 25 percent in 2001 to less than 2 percent in 2017.

The state is requiring utilities to get 25 percent of the electricity they sell to customers from renewable resources by 2025. The top two sources of renewable energy in the state are biomass, or energy that comes from burning wood and other organic matter, and hydroelectric power.

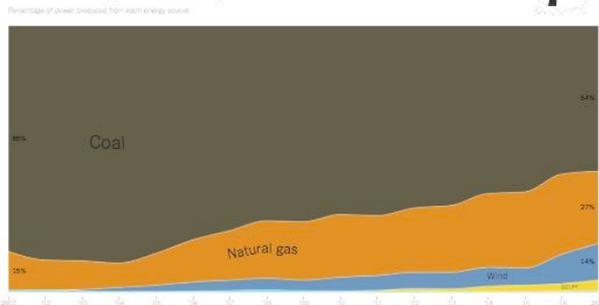
New Hampshire produces more power than is consumed in-state and sends about half to neighboring states through New England's regional electric grid. (Exports are not included in the chart above.)

How **New Jersey** generated electricity from 2001 to 2017



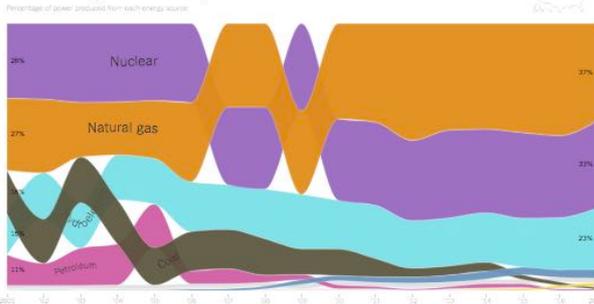
Nuclear power was the top source of electricity generated in New Jersey until recently, when it was edged out by natural gas. Last year, natural gas accounted for nearly half of the state's power generation, and nuclear power supplied 45 percent. Solar energy contributed 4 percent of the state's electricity. This year, New Jersey increased its renewable energy standard to require that 21 percent of the electricity sold in the state come from renewable sources by 2021, with that requirement increasing to 35 percent by 2025 and to 50 percent by 2030. In an effort to further reduce carbon emissions, the state also passed legislation to prop up its nuclear plants, which currently provide the largest portion of zero-emissions energy. The state gets some of the power it consumes through the Mid-Atlantic regional grid. (Imports are not included in the chart above.)

How **New Mexico** generated electricity from 2001 to 2017



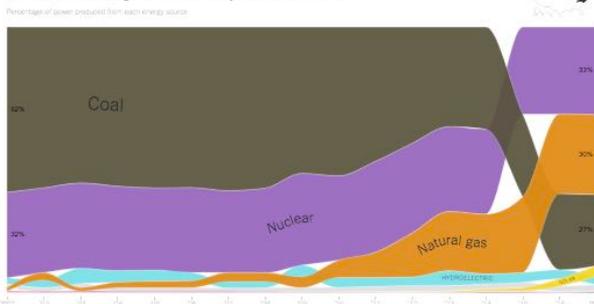
Coal has been New Mexico's primary source of electricity generation for nearly two decades. But coal-fired power declined since 2004 "in response to tougher air quality regulations, cheaper natural gas, and California's decision in 2014 to stop purchasing electricity generated from coal" in neighboring states, according to the E.I.A. Natural gas, wind and solar accounted for a little less than half of the electricity produced in New Mexico last year, up from just 15 percent two decades earlier. The state will require utilities to get 20 percent of the electricity they sell from renewable energy by 2020. New Mexico is also looking to increase generation from zero-carbon sources because it sends a significant amount power to California, a state with some of the strictest renewable energy policies in the country.

How **New York** generated electricity from 2001 to 2017



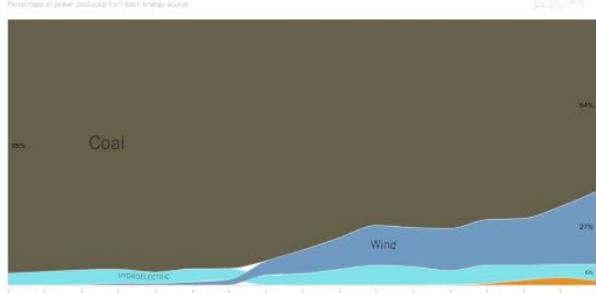
Natural gas and nuclear power have supplied the majority of electricity generated in New York for nearly two decades and their share has expanded as coal use in the state has declined. For the past decade, New York has also produced about a fifth of its electricity from hydropower, the state's largest source of renewable energy. The state will require utilities to get 50 percent of the power they sell to consumers from renewable sources by 2030, an ambitious goal, and aims to substantially reduce greenhouse gas emissions. Wind and solar energy make up a small but growing portion of New York's electricity generation, together providing just over 4 percent of the state's electricity last year. New York tends to consume more energy than it creates and imports some electricity from neighboring states and Canada. (Electricity imports are not included in the chart above.)

How **North Carolina** generated electricity from 2001 to 2017



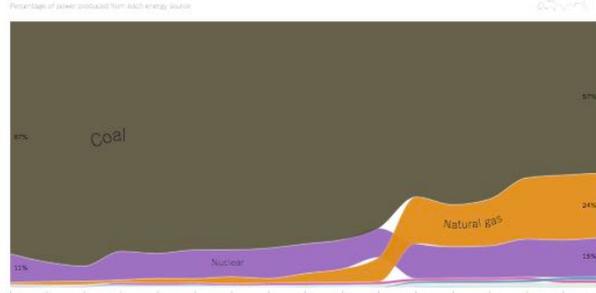
Coal provided the majority of North Carolina's electricity generation between 2001 and 2011. But nearly 30 of the state's coal-burning units shut down over the following six years and, by 2017, coal generation had dropped below nuclear and natural gas power. Natural gas generation increased after the national fracking boom of the late 2000s and became the second-largest source of electricity generation in the state in 2016. North Carolina is currently the only Southern state with significant solar generation. The state's unique implementation of a decades-old federal mandate, the Public Utility Regulatory Policies Act of 1978, has encouraged the growth of utility-scale solar. North Carolina has also set a requirement that utilities get 12.5 percent of the electricity they sell to consumers from renewable energy resources by 2021.

How **North Dakota** generated electricity from 2001 to 2017



As in many Great Plains states, wind energy has taken off in North Dakota over the past decade. Last year, wind powered more than a quarter of the electricity produced in the state, up from less than 2 percent a decade earlier. In 2007, the North Dakota Legislature set a voluntary goal for utilities: to get 10 percent of the electricity sold to consumers from renewable or recycled energy by 2015. That goal was met and even surpassed, according to utility analysts. North Dakota produces more electricity than is consumed in the state and about half is sent to its neighbors. (Exports are not charted above.)

How **Ohio** generated electricity from 2001 to 2017



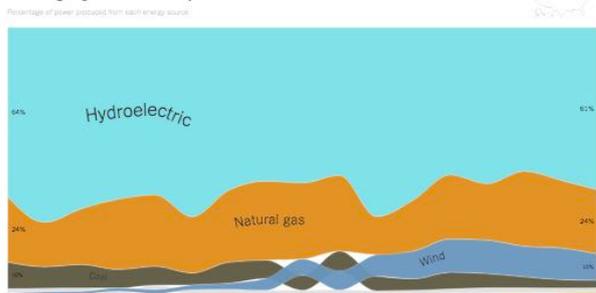
Coal has been the top source of electricity produced in Ohio for nearly two decades but its generation share has been decreasing since 2011 as several of the state's coal-fired power plants have closed down. Over that same period, natural gas has increased its share in Ohio's electric generation mix. Wind is currently the state's top source of renewable energy, though it provided only about 1 percent of the electricity generated in Ohio last year. The state wants to expand that, however. It will require utilities to get at least 12.5 percent of the electricity they sell to consumers from renewable sources by the end of 2026.

How **Oklahoma** generated electricity from 2001 to 2017



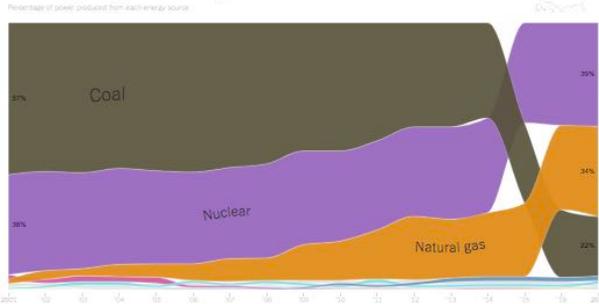
The bulk of Oklahoma's power generation for much of the past two decades has come from natural gas and coal, with the two often competing to be the state's top source of electricity. But in 2016, wind surpassed coal as the second-largest source of electricity produced in the state. Last year, the state was second only to Texas in total electricity generation from wind. In 2010, Oklahoma required that 15 percent of its generation capacity comes from renewable sources by 2015. It also designated natural gas as its preferred choice for new fossil fuel projects. The state had exceeded the renewable target by 2012.

How **Oregon** generated electricity from 2001 to 2017



Most of the electricity produced in Oregon in any given year comes from hydropower but the share produced from water fluctuates with precipitation. Power from natural gas typically increases during drought years, and decreases in years with ample hydroelectricity. Over the past decade, wind power has grown to become the third-largest source of electricity generated in the state. In an effort to encourage more non-hydroelectric renewable energy, Oregon will require its largest utilities to get 50 percent of the electricity they sell from new renewable energy sources by 2040. The program covers projects introduced or upgraded since 1995, a cutoff that would exclude older hydropower.

How **Pennsylvania** generated electricity from 2001 to 2017



Coal powered the bulk of electricity produced in Pennsylvania through 2014, when it fell below nuclear for the first time. Coal's generation share in the state decreased after the late-2000s fracking boom as aging coal power plants closed because of competition from cheaper natural gas.

Last year, nuclear power was the top source of electricity generated in Pennsylvania. But natural gas is putting economic pressure on the state's nuclear generators, too, with one reactor scheduled to shut down in 2019. Pro-nuclear groups, saying the loss of this emissions-free electricity is bad news for climate change, have sought state subsidies for nuclear energy.

Pennsylvania will require that 18 percent of the electricity that utilities sell to consumers come from renewable and alternative energy by 2021, with at least 0.5 percent coming from solar power. Last year, renewable energy made up about 5 percent of in-state generation.

Pennsylvania is the country's third-biggest generator of electricity, behind Texas and Florida. The state is a big supplier of energy to the Mid-Atlantic region.

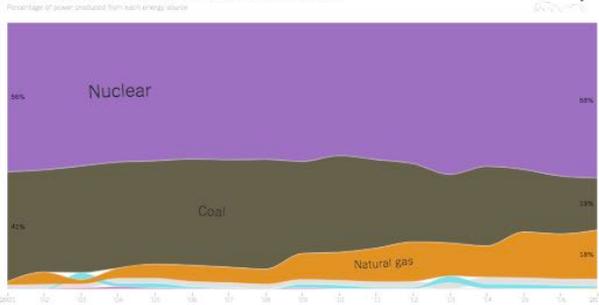
How **Rhode Island** generated electricity from 2001 to 2017



Natural gas dominates electricity generation in Rhode Island, but wind and solar energy, while still small, have grown quickly in recent years.

Rhode Island will require electricity providers to get nearly two-fifths of the power they sell to consumers from renewable sources by 2035. The state consumes more electricity than it generates and gets the rest from neighboring states. (Imports are not included in the chart above.)

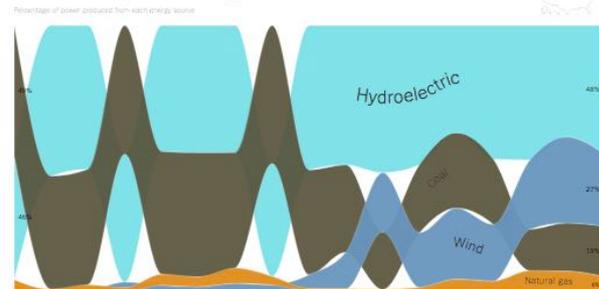
How **South Carolina** generated electricity from 2001 to 2017



A majority of the electricity generated in South Carolina comes from nuclear power, with coal and natural gas taking second and third place, respectively. Coal's generation share has declined over the past decade as power from natural gas has increased.

South Carolina produces more power than it consumes and sends the surplus to neighboring states.

How **South Dakota** generated electricity from 2001 to 2017



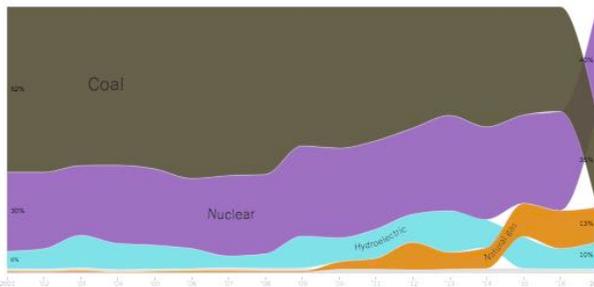
Hydropower has supplied the majority of the electricity created in South Dakota for most of the past two decades, but coal generation surpassed hydroelectricity during three years: 2001, 2004 and 2008. Since then, coal's share of the state generation mix has declined, while the share coming from wind power has increased.

Last year, wind was the second-largest source of electricity produced in South Dakota, accounting for nearly a third of generation in the state.

South Dakota exports power to states across the Central and Western United States.

How Tennessee generated electricity from 2001 to 2017

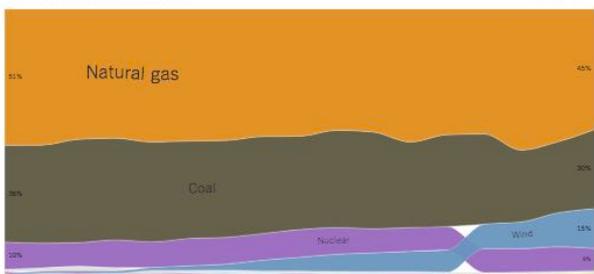
Percentage of power produced from each energy source



Coal supplied most of the electricity produced in Tennessee between 2001 and 2016, but its generation share started to decline about a decade ago as natural gas power gained share. Last year, coal-powered generation dipped below nuclear for the first time in nearly two decades. Tennessee consumes more power than it produces and makes up the shortfall with electricity from nearby states. (Imports are not included in the chart above.)

How Texas generated electricity from 2001 to 2017

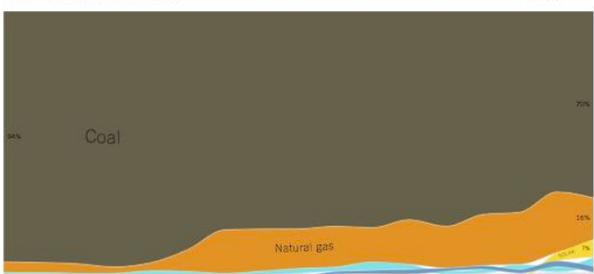
Percentage of power produced from each energy source



Texas produces more electricity than any other state, and natural gas has been its top generation source since 2001, with coal in second place. But coal's generation share has declined as wind power has increased. In 2014, wind overtook nuclear power as the third-largest source of electricity produced in the state. Texas produces more power from wind in total than any other state, with Oklahoma and Iowa in second and third place. Texas adopted a renewable energy requirement in 1999, requiring the state to install 10,000 megawatts of renewable energy capacity by 2025. It has already reached that goal.

How Utah generated electricity from 2001 to 2017

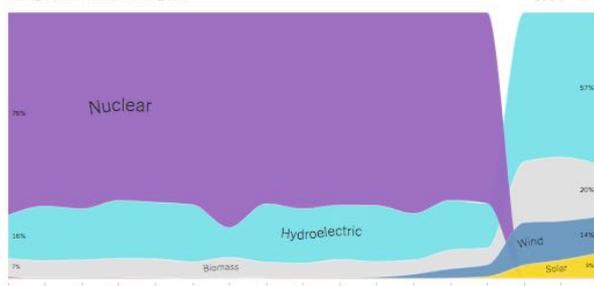
Percentage of power produced from each energy source



The majority of electricity produced in Utah comes from coal, but coal's share has declined over the last several years as natural gas has increased. The state produces more energy than it consumes and sends the surplus to nearby states like California. At least one Utah power plant is switching from burning coal to natural gas to comply with California's stricter environmental regulations. Solar power grew to become the largest renewable generation source in the state in 2016 and expanded its share again last year. Utah has set a goal for utilities to get 20 percent of the electricity they sell from renewable sources by 2025.

How Vermont generated electricity from 2001 to 2017

Percentage of power produced from each energy source



Most of the electricity generated in Vermont came from nuclear power until 2014, when the state's only nuclear plant, the Vermont Yankee station, closed down. Since then, nearly all of the electricity produced in the state has come from renewable sources, including hydropower, biomass, wind and solar. But, Vermont's absolute generation capacity has substantially declined. Vermont imports most of its electricity from nearby states and Canada. Last year, the state's own generation "provided only about two-fifths of the electricity consumed in Vermont," according to E.I.A. Vermont's ambitious renewable energy goal requires that 75 percent of electricity sold in the state come from renewable sources by 2032, including 10 percent from small, in-state sources.

How Virginia generated electricity from 2001 to 2017



Coal was the top source of electricity produced in Virginia between 2001 and 2008, when its share began to decline. Natural gas power increased in the state following the national fracking boom of the late 2000s and took over as the state's primary generation source in 2015. Nuclear generation has provided a little more than a third of Virginia's electricity, on average, over the past two decades. Virginia consumes more electricity than it generates, so it gets additional power from nearby states through the Mid-Atlantic regional grid. The state has established a voluntary goal for utilities to get 15 percent of the electricity they sell from renewable sources by 2025.

How Washington generated electricity from 2001 to 2017



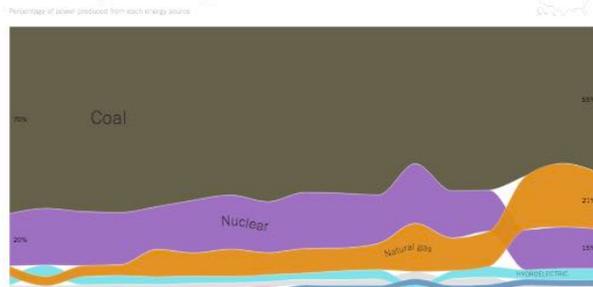
Hydropower has supplied a majority of the electricity created in Washington every year since 2001, but its share of state generation has fluctuated with precipitation. Coal, natural gas, nuclear and wind power have alternated as the second-largest source of electricity produced in the state for most of the past two decades. Washington produces more electricity than it consumes and exports power to Canada and other Western states. The state will require its larger utilities to get 15 percent of their electricity sales from new renewable sources by 2020.

How West Virginia generated electricity from 2001 to 2017



Coal dominates West Virginia's power generation mix, supplying more than 90 percent of the electricity produced in the state every year for nearly two decades. Hydropower provided a small portion of in-state generation between 2001 and 2017. Wind and natural gas have increased their generation share in recent years, but each of those sources only accounted for about 2 percent of electricity created in the state last year. After years of lobbying by conservative groups, West Virginia became the first state to repeal its renewable energy standard in 2015. The law would have required utilities to get 25 percent of their electricity from alternative and renewable energy sources by 2025. Opponents of the standard said it was hurting coal jobs and raising electricity rates, while supporters said it would help to diversify the state's electric sector at a time when the national coal market was in decline. West Virginia generates more electricity than it consumes and supplies about half of its power to other Mid-Atlantic States through the shared regional grid. (Exports are not pictured in the chart above.)

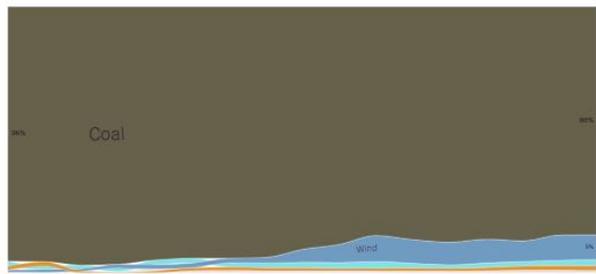
How Wisconsin generated electricity from 2001 to 2017



Most of the electricity produced in Wisconsin comes from coal, but natural gas generation has increased over the past three years. Wind power established a foothold in the state a decade ago and has slowly expanded its share of electricity generation, too.

Wisconsin required its utilities to get 10 percent of the electricity sold in the state from renewable sources by the end of 2015. That goal was surpassed two years ahead of schedule.

How Wyoming generated electricity from 2001 to 2017



The vast majority of electricity generated in Wyoming comes from coal, but wind power has made inroads during the past decade. Last year, wind provided nearly a tenth of the electricity produced in the state. Because of its small population, Wyoming produces much more power than it consumes and sends about 60 percent to nearby states.



When Timothy Nathan Shields wanted to install solar panels on his home in Largo, Fla., Duke Energy pushed back. "Every time I turned around, they would drag their feet," he said.

Zack Wittman for The New York Times

Credit

Zack Wittman for The New York Times

By Ivan Penn

July 7, 2019

ST. PETERSBURG, Fla. — Florida calls itself the Sunshine State. But when it comes to the use of solar power, it trails 19 states, including not-so-sunny Massachusetts, New Jersey, New York and Maryland.

Solar experts and environmentalists blame the state's utilities.

The utilities have hindered potential rivals seeking to offer residential solar power. They have spent tens of millions of dollars on lobbying, ad campaigns and political contributions. And when homeowners purchase solar equipment, the utilities have delayed connecting the systems for months.

Solar energy is widely considered an essential part of addressing climate change by weaning the electric grid from fossil fuels. California, a clean energy trendsetter, last year became the [first state to require](#) solar power for all new homes.

But many utilities across the country have fought homeowners' efforts to install solar panels. The industry's trade organization, the Edison Electric Institute, [has warned](#) that the technology threatens the foundation of the power companies' business.

In Florida, utilities make money on virtually all aspects of the electricity system — producing the power, transmitting it, selling it and delivering it. And critics say the companies have much at stake in preserving that control.

"I've had electric utility executives say with a straight face that we can't have solar power in Florida because we have so many cloudy days," said Representative Kathy Castor, a Democrat from the Tampa area. "I have watched as other states have surpassed us. I think that is largely because of the political influence of the investor-owned utilities."



Florida relies largely on natural gas, and several utilities get as much as a quarter of their power from coal.

Credit
Zack Wittman for The New York Times

The state's utilities have been expanding their own production of solar power. But Florida is one of eight states that prohibit the sale of solar electricity directly to consumers unless the provider is a utility. There is also a state rule, enforced by the utilities, requiring expensive insurance policies for big solar arrays on houses.

In 2009, a measure to require a certain amount of energy to be generated from renewable sources passed the State Senate but died in the House of Representatives when the utilities fought it. Solar proponents have been unable to find legislative traction for similar measures since then. Mayor Rick Kriseman of St. Petersburg — the site of Duke Energy's Florida headquarters — has argued for changing the way utilities are regulated so they would embrace more energy efficiency, residential solar power and energy storage. The companies essentially see the solar-equipped homeowner as a competitor, not a customer, he said.

"If your profits are based on consumption, where's your incentive to reduce electricity use?" Mr. Kriseman said.

A Homeowner's Struggle

Art Graham, chairman of the Florida Public Service Commission, which regulates Duke, Florida Power & Light and other investor-owned utilities, said simple economics was one reason the state had lagged in adopting renewable energy sources. Because Florida has kept electricity rates lower than those in the Northeast and California, he said, the cost savings for homeowners in switching to solar power are more limited.

But there are other obstacles. Timothy Nathan Shields is still stunned by the resistance he faced from Duke, the state's second-largest utility, when he wanted to put solar panels on his home.

Mr. Shields, a 57-year-old retired nurse, wanted a system to cover the electricity needs of his 2,000-square-foot house in Largo, north of St. Petersburg, as well as the cost of charging his electric car. So a year ago he bought a setup twice the size of the average rooftop system from Sunrun, the leading residential solar company.

First, Mr. Shields said, a Duke representative told him that he would not benefit much from solar power because "it rains." Then the utility told him that it wouldn't save him any money. After he made a commitment to buy the system, Duke told him that it needed to be insured, citing its size and saying it could "harm the electric grid."

So he bought a \$1 million insurance policy costing \$200 a year.

"It's absurd," said Brad Heavner, policy director for the California Solar and Storage Association, a trade group. "There's no way you can justify that based on studies of the risk. I would call that an outrageous solar requirement." He said he was not aware of such a rule in other states.

Sunrun installed Mr. Shields's system in days. But Duke took two months to turn it on, forcing him to continue to pay electric bills of as much as \$310 a month. He will pay \$240 a month for the system for the next six years, when it will be paid off, plus a monthly fee of \$11.57 to Duke for a grid connection.

"Every time I turned around, they would drag their feet," Mr. Shields said. "They want you to think it's hard and horrible and difficult."

Randy Wheelless, a Duke spokesman, said that he regretted Mr. Shields's experience, but that the company was simply following state requirements for larger home systems. The utility has been reducing connection times and adding as many as 750 rooftop solar customers a month, he said.



Duke told Mr. Shields that his solar power system needed to be insured, saying it could “harm the electric grid.” So he bought a \$1 million insurance policy costing \$200 a year.

Credit

Zack Wittman for The New York Times

From the state’s perspective, Mr. Graham, the chief regulator, said, “I think we definitely could do some things differently” — like revising the policy that will cost Mr. Shields as much as \$6,000 in insurance premiums over the life of his system, potentially more than 30 years.

Political Dollars

The experience of homeowners like Mr. Shields has largely been shaped by the utilities’ political spending.

From 2014 through the end of May, Florida’s four largest investor-owned utilities together spent more than \$57 million on campaign contributions, according to an analysis by Integrity Florida, a nonprofit research organization, and the Energy and Policy Institute, a watchdog group. FPL, the state’s largest utility, accounted for \$31 million of that total.

The utilities also hired enough lobbyists to have one for every two lawmakers in Tallahassee. From 2014 through 2017, the four companies spent \$6 million on lobbying, Integrity Florida reported.

Sunrun broke through one of the barriers to rooftop solar last year when it won approval to lease solar panels to homeowners, a step subsequently taken by Vivint Solar and Tesla. But regulators stopped short of allowing solar companies to own the panels and simply sell the power directly to consumers, as they can in at least 27 states, the District of Columbia and Puerto Rico.

“There’s no solar competition happening,” said Abigail Ross Hopper, president of the Solar Energy Industries Association, a trade group.



The solar farm for Babcock Ranch, whose developer calls it the nation’s first sustainable town.

Credit

Zack Wittman for The New York Times

When it comes to the expansion of the utilities’ own solar arrays, Florida’s growth rate led the nation in the first quarter, and the state is positioned to hold that ranking for the next six years, according to the energy consulting firm Wood Mackenzie and the Solar Energy Industries Association.

Still, solar energy accounted for only 1 percent of electricity generation in Florida last year, far less than the 19 percent in California and nearly 11 percent in Vermont and Massachusetts, the association said. The state relies largely on natural gas, and several utilities get as much as a quarter of their power from coal.

A spokeswoman for Gov. Ron DeSantis defended the state’s clean energy efforts, saying in an email, “Florida’s renewable energy industry is growing rapidly.”

But solar advocates, rather than the utilities, have been the primary drivers for change at the consumer level.

An unlikely grass-roots coalition has emerged in Florida in the last five years to promote solar power — residential in particular — as environmentalists from the Southern Alliance for Clean Energy and the Sierra Club joined with groups like the Tea Party and the Christian Coalition.

While the groups’ rationales for joining the effort varied from environmental protection to a libertarian view of energy freedom, the issue united them against the utilities, which backed a ballot measure in 2016 to impose more fees on solar users and keep solar companies other than utilities out of the state.



Syd Kitson, the developer of Babcock Ranch, considers himself an environmentalist. He convinced Florida Power & Light that the project could showcase the benefits of solar power.
Credit
Zack Wittman for The New York Times

Although the utilities spent more than \$20 million on the campaign, the measure was defeated. And the next year, the grass-roots effort persuaded lawmakers to exempt up to 80 percent of the value of solar installations from property taxes. It seemed a great victory for consumers — but the utilities also benefited, because it eased their tax burden on dozens or even hundreds of acres of solar farms.

“I would say that none of Florida’s utilities are enthusiastic about their customers’ deploying solar,” said Stephen Smith, executive director of the Southern Alliance for Clean Energy. “I am not surprised at the horror stories.”

A Vision for the Future

FPL points to its role in a particular bet on a solar future: Babcock Ranch, developed near Fort Myers by a company that extols it as the nation’s first sustainable town. The power company built a solar farm that largely supplies the town’s energy needs.

FPL announced four similarly sized projects in April, and Duke says it is also building farms that size.

“FPL has been working for many years to advance solar energy while keeping customer bills low,” said Mark Bubriski, a company spokesman. The utility said it plans to add enough solar capacity to power about 1.5 million homes and provide 20 percent of its total generation by 2030.

During legislative hearings in Tallahassee, Syd Kitson, the developer of Babcock Ranch, which will include 20,000 homes when fully developed, proposed building a town that could showcase the benefits of solar power.

“I’m an environmentalist who is a developer,” Mr. Kitson said. “It is the Sunshine State, so it made a lot of sense to us.”

But solar proponents feel the utilities need to be pushed further.

Scott McIntyre, chief executive of Solar Energy Management, a statewide leader in commercial solar power based in St. Petersburg, said the gains the state appeared to be making were little more than a facade.

“Florida is not going to do any type of energy policy that benefits consumers, not for a long time,” Mr. McIntyre said. “They just keep making the hurdles higher and higher.”