Solar panels have become a common sight in many communities.

Wind power has grown dramatically in the Midwest.

Renewables on the Rise 2020

A decade of progress toward a clean energy future

Over the last decade, America has seen explosive growth among key technologies it will take to repower the country with clean, renewable energy.

Clean energy is sweeping across America

- **Solar energy:** In 2019, the United States generated over 30 times more solar power than it did in 2010, enough to power 16 million average American homes.[1]
- **Wind energy:** In 2019, the U.S. generated more than triple the amount of wind power it did in 2010, enough to power over 33 million homes.
- **Energy efficiency:** In 2018, energy efficiency programs across the U.S. saved more than one and a half times as much electricity as they did in 2010, enough to power nearly 2.5 million homes.
- **Electric vehicles:** There were nearly 330,000 electric vehicles sold in the U.S. in 2019, up from virtually none just a decade earlier.
- **Energy storage:** The U.S. saw a 20-fold increase in utility-scale battery storage from 2010 to 2019.

Battery storage can help to integrate more renewable energy into the grid.

Electric vehicle charging stations make owning an EV more convenient.

1 For a full list of sources, visit https://environmentamerica.org/feature/ame/renewables-rise-2020.

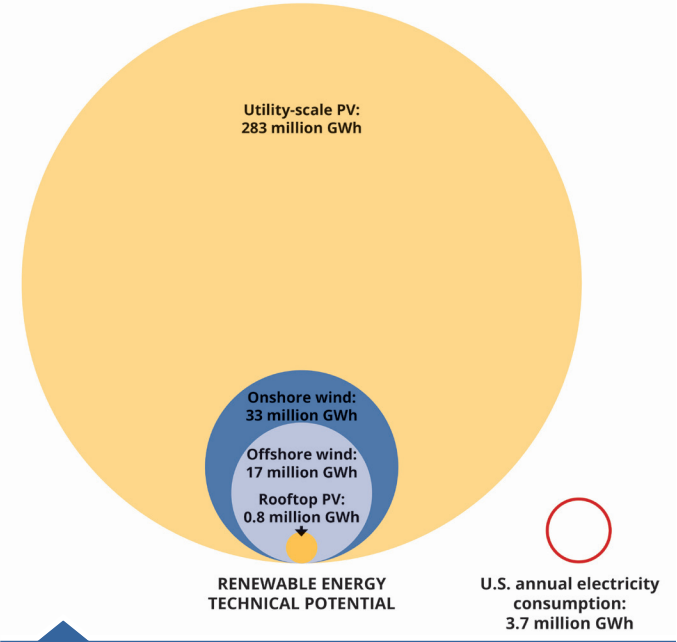
America has tremendous renewable energy potential

- America has massive reserves of renewable energy from the wind and the sun.
- According to the National Renewable Energy Laboratory, the U.S. has the technical potential to meet its current electricity needs more than 75 times over with solar energy and more than 10 times over with wind energy.

America can accelerate clean energy progress

To prevent the worst impacts of global warming, the U.S. must rapidly phase out the use of fossil fuels and commit to 100 percent clean, renewable energy. To get there, state and federal governments should:

- Adopt 100 percent renewable energy goals.
- Provide continued financial and policy support for wind and solar power.
- Strengthen energy efficiency standards and programs to make it easier to repower America with clean energy.
- Invest in technologies like electric vehicles, building electrification and energy storage.



America has enough renewable energy potential to power the nation.

Rank	State	Wind and solar generation as percentage of electricity consumption (2019)
1	Kansas	53.7%
2	Iowa	53.4%
3	North Dakota	51.1%
4	Oklahoma	45.4%
5	New Mexico	34.1%
6	Wyoming	25.3%
7	Nebraska	24.9%
8	South Dakota	23.8%
9	California	23.7%
10	Colorado	22.7%

Top states for wind and solar generation as percentage of electricity consumption.

Renewable energy meets a rising share of America's electricity use

- America generated 10 percent of its electricity from wind, solar and geothermal power in 2019, up from 2.7 percent in 2010.
- Kansas, Iowa and North Dakota generate enough electricity from the wind and sun to cover half of their electricity consumption.
- Six states generate enough electricity from the wind and sun to cover at least one quarter of their electricity consumption.

Explore the growth of renewable energy online

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Photo credits: Thomas Kelsey/U.S. Department of Energy Solar Decathlon via Flickr (CC BY-ND 2.0) , R.J. Cross, U.S. Department of Energy via Flickr, Alana Miller.

LED light bulbs conserve energy.

Air-source heat pumps reduce energy use for heating and cooling.

Energy Efficiency on the Rise 2020

State policies and technological advancements are helping Americans become more energy efficient and reduce per capita energy consumption

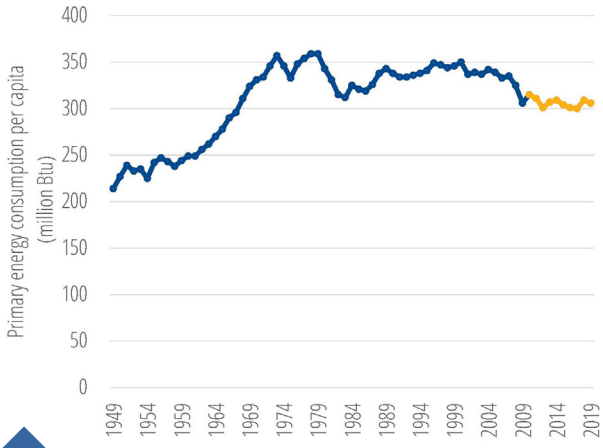
In 2018, energy efficiency programs saved enough electricity to power nearly 2.5 million homes. Improving efficiency makes it easier for America to transition to a future powered by 100% renewable energy.

America continues to become more energy efficient

- From 1950 to 2007, total energy usage in the U.S. nearly tripled. Since then energy usage across the U.S. has stayed roughly the same, despite a growing population and economy, thanks in part to energy efficiency.[1]
- Energy efficiency programs across the U.S. saved more than one and a half times as much energy in 2018 as they did in 2010.

Technological advances reduce energy consumption

- New technologies that reduce energy consumption are becoming increasingly popular, such as LED lighting, which uses up to 80 percent less energy than traditional incandescent light bulbs. The percentage of households with at least one energy-efficient light bulb increased from 58 percent to 86 percent between 2009 and 2015. By 2027, the Department of Energy estimates LEDs could save 348 terawatt-hours of electricity, which is equivalent to the annual electrical output of 44 large power plants.



U.S. per capita energy consumption peaked in the late 1970s and has fallen by 3 percent since 2010.

Home weatherization saves energy and money.

1 For a full list of sources, visit https://environmentamerica.org/feature/ame/renewables-rise-2020.

Public policy has reduced energy consumption

- Cities and states have adopted strong building energy codes that ensure that new and renovated buildings meet minimum standards for efficiency. Adopting model energy codes across the country could save 12.82 quadrillion Btu of energy over 30 years, avoiding as many greenhouse gas emissions as are produced annually by 89 million homes.
- Federal vehicle fuel economy standards have led to more efficient vehicles. From 2010 to 2019, the average fuel economy of a new, light-duty vehicle improved by 13 percent, from 22.6 miles per gallon (mpg) to 25.5 mpg.

The path to greater energy efficiency

There are many tools cities, states and the federal government can use to improve energy efficiency:

- Strong energy efficiency standards for buildings, vehicles, appliances and other consumer products.
- Energy efficiency resource standards that set targets for energy savings across an entire state.
- Energy efficiency and home weatherization programs – including programs funded on electricity bills or through revenues from carbon cap-and-trade – which can help homeowners and businesses to save energy.
- "Lead by example" energy efficiency efforts by local, state and federal governments.

Rank	State	Electricity saved as % of retail sales, 2010	Electricity saved as % of retail sales, 2018	Growth (% points)
1	Rhode Island	1.04	2.79	1.75
2	Massachusetts	1.10	2.82	1.72
3	Maryland	0.48	1.87	1.39
4	Illinois	0.46	1.66	1.20
5	District of Columbia	0.35	1.23	0.88
6	Michigan	0.72	1.46	0.74
7	Ohio	0.47	1.14	0.67
8	Arkansas	0.11	0.68	0.57
9	Pennsylvania	0.23	0.74	0.51
10 (tie)	Minnesota	0.59	1.07	0.48
10 (tie)	Indiana	0.07	0.55	0.48

Top 10 most improved states for electricity efficiency from 2010-2018.

Most improved states for electricity efficiency

Rhode Island, Massachusetts and Maryland led the way as the most improved states for energy efficiency savings between 2010 and 2018, according to data from the American Council for an Energy Efficient Economy. Vermont joined Massachusetts and Rhode Island as the three states with the highest percent savings out of total retail sales through energy efficiency programs in 2018.

Explore clean energy growth online

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Battery technology has advanced and costs have fallen in the last decade.

Home batteries can help residents store solar energy and deal with outages.

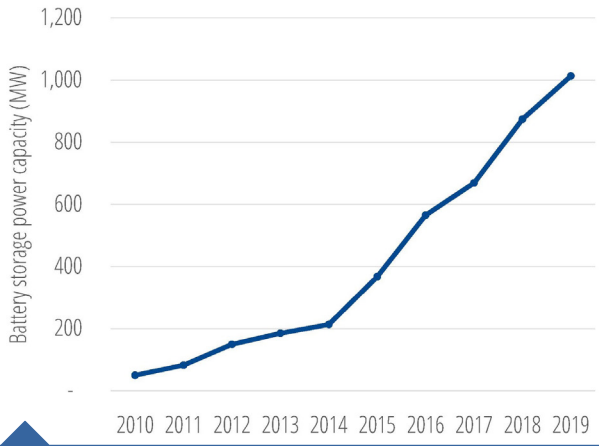
Battery Storage on the Rise

Battery storage can help the transition to clean, renewable energy

Battery storage allows for solar and wind energy to power the grid at all hours of the day or night, bringing America a step step closer to 100% renewable energy. Experts predict that improving batteries will propel rapid growth in energy storage in the coming years.

Utility-scale battery power capacity has grown 20-fold since 2010

- Battery storage is still in its early stages, but recent price declines and improvements in technology have made battery storage a viable and flexible option. The amount of utility-scale battery power capacity on the grid increased by 16 percent in 2019 alone.[1]
- BloombergNEF predicts that the cost of utility-scale lithium-ion batteries will fall by 52 percent between 2018 and 2030, and that the U.S. will exceed 100 gigawatts of installed battery storage by 2040, an almost 100-fold increase from current capacity.



America's utility-scale battery storage capacity grew 20-fold from 2010 to 2019.

Energy storage contributes to a renewable energy future

America can achieve a 100% renewable energy future by tapping our abundant clean energy resources, maximizing energy efficiency, and adding flexibility to the grid. Energy storage technologies like batteries can play a critical role in smoothing the deployment of renewable energy by storing excess clean energy for later use.

Utility-scale batteries can help integrate renewable energy into the grid.

1 For a full list of sources, visit https://environmentamerica.org/feature/ame/renewables-rise-2020.

California and the PJM regional grid lead the way on energy storage

- California accounts for over a quarter of total utility-scale battery capacity nationwide. This is due in part to a California Public Utilities Commission requirement that utilities increase energy storage capacity, pushing California to take the lead in battery storage.
- Five of the top 10 states for battery storage are part of the PJM regional grid, located in the Mid-Atlantic and Midwest, which was the first transmission organization to adjust its policy to reflect a federal rule to increase compensation for grid additions that support rapid changes in electricity production.

Increasing battery storage capacity is essential

In order to reach our renewable energy goals quickly, local, state and federal governments must increase energy storage capacity nationwide by:

- Setting ambitious energy storage goals, including for distributed energy storage in homes and businesses.
- Investing in grid technology improvements to be better able to integrate storage into the grid.
- Driving further development of battery technology through investment in research and development.
- Exploring other options for energy storage beyond batteries.

State	2010 capacity (MW)	2019 capacity (MW)	Growth (MW)	Rank (based on growth)
California	0	254.5	254.5	1
Illinois	0	132.7	132.7	2
Texas	4	114.2	110.2	3
Hawaii	0	63.0	63.0	4
West Virginia	2	49.5	47.5	5
New Jersey	0	42.6	42.6	6
Arizona	0	42.0	42.0	7
New York	0	33.0	33.0	8
Ohio	2	33.0	31.0	9
Pennsylvania	0	28.4	28.4	10

Top 10 states for utility-scale battery storage power capacity growth, 2010-2019.

Battery storage has grown across the country

- California, Illinois and Texas lead the way in battery storage capacity nationally, followed by Hawaii and West Virginia.
- Only five states had significant utility-scale battery storage capacity in 2010. Today, 33 states have at least some battery storage.

Explore the growth of energy storage online

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Electric vehicles are becoming common sights on American streets.

EV owners benefit from the growth of charging infrastructure.

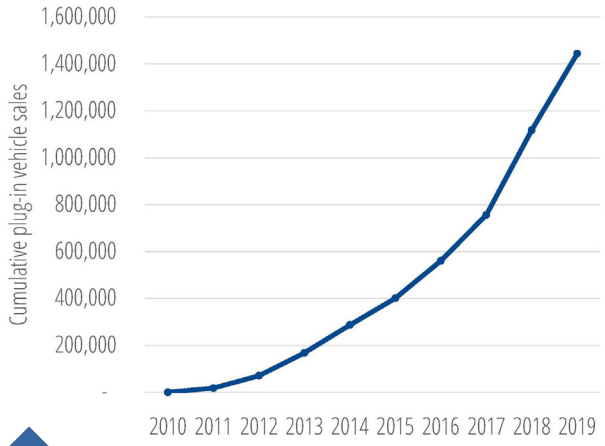
Electric Vehicles on the Rise 2020

Electric vehicles are becoming increasingly popular across the U.S.

Electric vehicles are helping to cut our nation's dependence on fossil fuels. Over 1 million electric vehicles have been sold in the U.S. – bringing America one step closer to a future powered by 100% renewable energy.

Nearly 330,000 electric vehicles were sold in 2019

To achieve an economy powered by 100% renewable energy, adopting electric vehicles (powered by a renewable electric grid) is essential. More than 300,000 plug-in vehicles were sold in 2019, up from virtually none just a decade earlier.[1] Over 1 million battery powered and plug-in hybrid EVs have been sold cumulatively across the U.S., with over 50 models currently on the market.



More than 1 million plug-in electric vehicles have been sold since 2010.

Electric buses take off

Electric buses are on the verge of a boom. By the end of 2019 there were over 650 electric buses in the U.S., twice as many as there had been in 2018. Recent electric bus commitments in California, New York City and Seattle, among other places, will result in at least one third of the country's transit buses being electric by 2045.

Cities like New York are adopting electric buses.

1 For a full list of sources, visit https://environmentamerica.org/feature/ame/renewables-rise-2020.

More charging stations are being installed across the U.S.

With more electric vehicles on the road, Americans will need more places to recharge them. The number of charging stations nationwide is increasing. As of August 2020, there were more than 26,000 charging stations across the country.

Rank	State	Number of charging stations
1	California	6,564
2	New York	1,756
3	Florida	1,451
4	Texas	1,350
5	Washington	1,058

Strong public policies can encourage electric vehicles

Local, state and federal policymakers can encourage the adoption of electric vehicles by:

- Implementing tax incentive programs for EVs.
- Encouraging widespread deployment of electric vehicle charging stations.
- Committing to a full transition to electric buses on a specific timeline, and providing grant programs and subsidies for agencies to buy electric buses.
- In addition, states should follow the lead of California and the other 10 states that require a percentage of each automaker's sales to be zero-emission vehicles.

Rank	State	Battery-electric vehicles	Plug-in hybrid electric vehicles	Total plug-in electric vehicles
1	California	326,038	255,636	581,674
2	New York	19,647	33,672	53,319
3	Washington	33,989	13,797	47,786
4	Florida	28,535	18,773	47,308
5	Texas	21,683	15,006	36,689
6	Georgia	29,944	6,389	36,333
7	New Jersey	15,297	15,252	30,549
8	Massachusetts	12,408	13,776	26,184
9	Illinois	16,373	9,619	25,992
10	Oregon	15,527	9,508	25,035

Top 10 states for cumulative electric vehicle sales (through mid-2019).

Top states for electric vehicle sales

- California, New York and Washington lead the way in sales of electric vehicles nationwide.
- Five of the top 10 states for EV sales require that a certain percentage of each automaker's sales be zero-emission vehicles.

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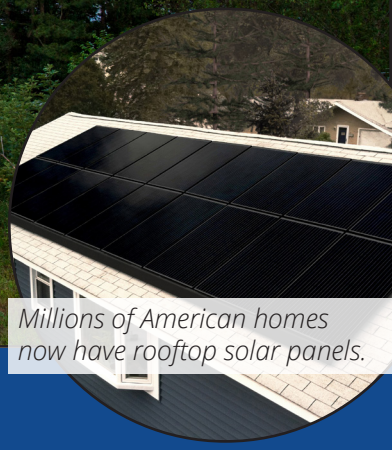
Large-scale solar power is increasingly economically competitive.



Millions of American homes now have rooftop solar panels.

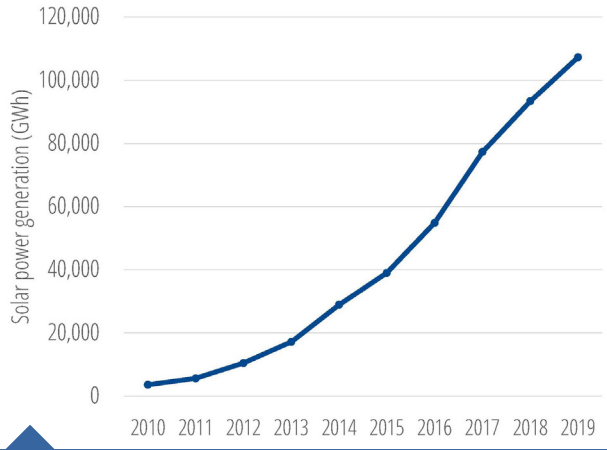
Solar Energy on the Rise

Solar energy is rapidly expanding across the U.S.

Solar energy is emission-free and virtually unlimited. America now generates enough solar electricity to power 16 million homes – bringing America one step closer to a future powered by 100% renewable energy.

Solar energy has grown 30-fold since 2010

- In 2019, the 2 millionth solar photovoltaic system was installed, and experts predict from 2021 to 2025 the U.S. solar market will install 42% more solar than was installed over the past five years.[1]
- Solar energy provided 2.6% of America's electricity in 2019, up from less than one-tenth of a percent in 2010.
- Solar energy accounted for nearly 40 percent of all U.S. electricity generating capacity additions in 2019.



Solar electricity generation grew 30-fold from 2010 to 2019.

Solar technology is improving and prices are falling

- Solar energy is becoming more affordable. The typical residential solar energy system costs less than half as much as it did 10 years ago.
- The average solar panel installed in 2018 is 31 percent more efficient than one in 2010, enabling solar installations to produce more clean energy in less space.
- Solar PV is already among the least expensive sources of new electricity generation, and experts anticipate that prices will continue to fall.

Solar panels being installed in California.

1 For a full list of sources, visit https://environmentamerica.org/feature/ame/renewables-rise-2020.

Solar energy has tremendous potential

- The U.S. has the technical potential to meet its current electricity needs more than 75 times over with solar energy, and every state in the country has enough solar energy potential to supply all of its electricity needs.

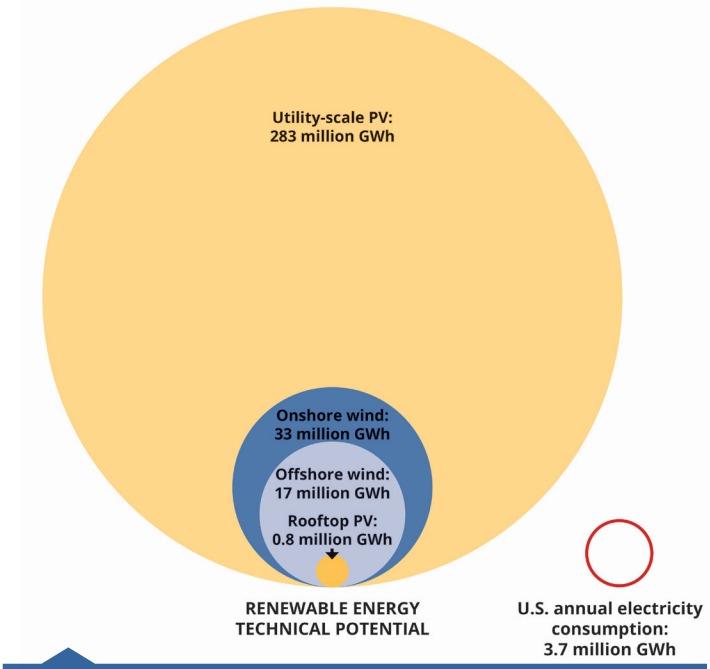
Powering America with solar energy

To take advantage of America's vast solar energy potential and move toward 100% renewable energy, the federal government should:

- Continue and expand tax credits and other support for solar energy.
- Continue to support research to drive solar power innovations.

State governments should:

- Set goals to achieve 100% renewable energy and adopt specific requirements for solar energy adoption.
- Encourage solar energy through rebate programs, tax credits and financing programs.
- Adopt and preserve strong statewide interconnection, net metering and virtual net metering policies.



America has enough solar energy potential to power the nation.

Rank	State	Increase in solar electricity, 2010-2019 (GWh)
1	California	41,725
2	North Carolina	7,545
3	Arizona	7,515
4	Nevada	5,294
5	Texas	5,287
6	Florida	4,491
7	Massachusetts	3,288
8	New Jersey	3,075
9	Utah	2,605
10	New York	2,447

Top 10 states for solar electricity growth from 2010-2019.

Top states for solar energy

- California was responsible for 40 percent of the growth in the solar industry from 2010 to 2019, a legacy of the state's "Million Solar Roofs" program that accelerated solar energy growth starting in the mid-2000s.
- Many of the states with the most rapid solar energy growth have benefited from strong solar policies.

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States such as Texas have seen a surge in wind power in the last decade.

The Block Island offshore wind farm in Rhode Island is the nation's first.

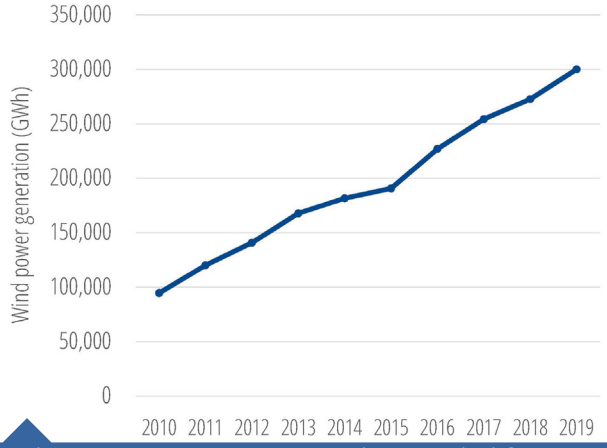
Wind Energy on the Rise 2020

Wind energy is expanding rapidly across the U.S.

Wind energy is abundant and emission-free. Wind energy now generates enough electricity to power over 33 million American homes – bringing America one step closer to a future powered by 100% renewable energy.

Wind energy has more than tripled since 2010

- Wind energy now generates 7 percent of America's electricity, up from 2 percent in 2010. The Midwest and Southwest have led in wind energy growth.[1]
- Wind energy accounted for nearly 27 percent of all U.S. electricity generating capacity additions in 2019.
- Technology for wind turbines has been improving. The average wind turbine today can generate more than twice as much electricity as one built in 2010.



Wind energy generation more than tripled from 2010 to 2019.

Offshore wind energy can power the coasts

- America has tremendous offshore wind potential. Wind power off the Atlantic Coast has the potential to generate four times the East Coast states' current electricity consumption. The West Coast has offshore wind energy potential 10 times its annual electricity use.
- In 2016, America's first utility-scale offshore turbines began operation in Rhode Island.
- Six states on the East Coast have set ambitious targets for offshore wind development.

Wind turbines in Kansas.

1 For a full list of sources, visit https://environmentamerica.org/feature/ame/renewables-rise-2020.

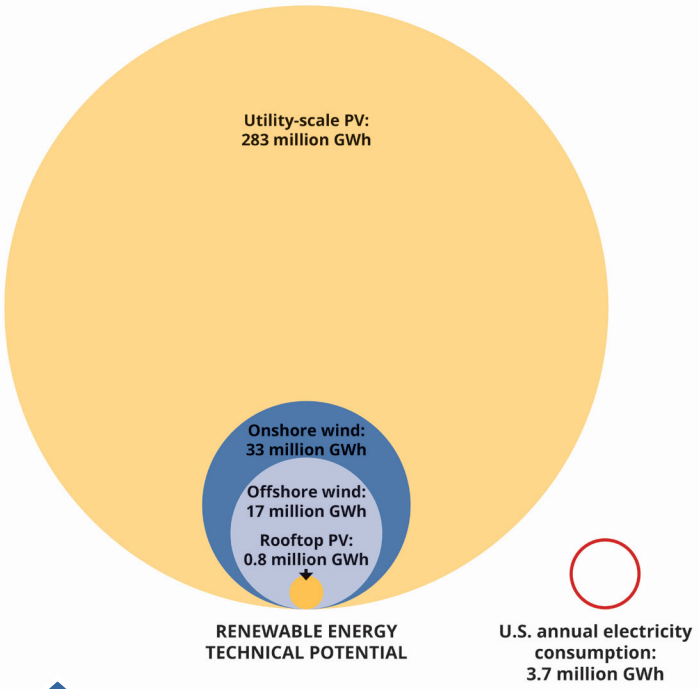
Wind energy's tremendous potential

- The U.S. has the technical potential to meet its current electricity needs more than 10 times over with wind energy.
- Onshore and offshore wind power in Texas alone could technically generate nearly twice as much electricity as the entire United States uses each year.

Achieving America's wind energy potential

State and federal policymakers can help tap America's massive wind energy potential by:

- Committing to 100% renewable energy.
- Setting ambitious goals for development of offshore wind energy.
- Continuing clean energy tax credits and other financial support for wind energy technologies.



America has enough wind energy potential to power the nation.

Rank	State	2010 (GWh)	2019 (GWh)	Growth (GWh)
1	Texas	26,251	84,429	58,178
2	Oklahoma	3,808	28,883	25,075
3	Kansas	3,405	21,501	18,096
4	Iowa	9,170	26,558	17,388
5	Illinois	4,454	13,831	9,377
6	California	6,079	14,970	8,891
7	Colorado	3,452	10,926	7,474
8	Nebraska	422	7,414	6,992
9	North Dakota	4,096	10,754	6,658
10	Minnesota	4,792	11,040	6,248

Top 10 states for wind energy generation growth from 2010-2019.

Top states for wind energy

- Texas, Oklahoma and Kansas are leading the way in wind energy production.
- In Texas alone there are now more than 13,000 wind turbines, the result of an early commitment to renewable energy and a $7 billion investment in the state electric grid. In Kansas and Oklahoma, wind generation grew more than six-fold from 2010 to 2019.

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