

POLICY *focus*

RECIPES FOR RATIONAL GOVERNMENT

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Innovating Our Way to a Cleaner Environment

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What You Should Know

The United States has consistently led the world in technological development to address new challenges. Improving the environment and addressing climate change is no exception.

Importantly, while many assume that improvements in the environment and cleaner energy use solely refers to increased use of renewable energies, like wind and solar, American environmental improvements have included utilizing low-carbon sources like nuclear, making traditional energy sources cleaner and more efficient, as well as expanding the use of renewables.

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In the 1940s, Americans invented **nuclear energy in Illinois**. Just two decades later, American engineers were working to apply **nuclear energy to commercial power production**. Oil and gas entrepreneurs in Texas developed **hydraulic fracturing** in the 1960s, which paved the way for our natural gas boom. Renewable energy has been a fast developing sector: wind and solar power provided **0.11 percent** of our electricity in 1995 but provide more than **17 percent** today.

Americans should be proud of this progress. The United States has taken, and should continue to take, a balanced approach to improving the environment and reducing our carbon emissions, which is making our environment cleaner, as well as ensuring our country has access to reliable and affordable energy.

Why You Should Care

The U.S. is a leader in developing clean energy technology. We have consistently outpaced other countries in our carbon reduction efforts while also balancing the practical realities of our technological capabilities.

- The United States is the only highly-populated country to meet the World Health Organization’s most stringent air quality standards. U.S. energy-related emissions have fallen by **14 percent** since 2005, while the rest of the world has increased their emissions by **20 percent**.
- Cleaning up reliable energy sources, coupled with new renewable energy technology, will help the U.S. to continue to reduce carbon dioxide emissions and lead the world in combating climate change.
- Clean energy is a promising sector that has experienced incredible growth in recent years. We should encourage and support the development of new technology without pushing it beyond its current capabilities.
- Extreme climate policies that stifle innovation backfire by making energy less reliable and less affordable for low-income individuals. Germany shows the dangers of this course: skyrocketing energy costs and dangerously unreliable power.

More Information

The United States Is a Leader In Creating a Clean Environment

In contrast to the popular media **narrative**, the United States is leading the world in terms of environmental improvement and reduction in carbon dioxide emissions. These successes have been driven by innovation, rather than by government regulation or fiat.

Overall, the United States’s energy system has shifted dramatically in recent decades, moving away from a reliance on traditional energy sources with a larger carbon footprint to cleaner energy sources.

Most Americans are aware of how **fracking**, the process of drilling into the earth and injecting high-pressure liquid into subterranean rock to release the gas inside, made natural gas much less expensive and encouraged a move away from coal-powered energy, leading to dramatic improvements in air quality. In addition, the United States has worked to “clean up” more **traditional power sources** like coal with the result that power

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plants have reduced mercury emissions by 90 percent, sulfur dioxide by 94 percent, and nitrous oxide by 86 percent.

Thanks to a combination of renewable energy and cleaner traditional energy sources, emissions have decreased dramatically. U.S. emissions are now around their 1980 levels, when the electricity demand was **one-third lower** than today. This is the **largest absolute decline** among all countries since 2000. This progress has been driven by decades of innovations to make myriad energy sources more effective and environmentally-friendly.

Too often, discussions about how to move toward cleaner energy imply that progress solely rests on transitioning to a few renewable sources, like wind and solar, but innovation across a large spectrum of energy sources is and will continue to be key to environmental progress.

Natural Gas

The fracking boom of the early 2000s brought natural gas to the forefront of U.S. energy production. The improved technology opened up large reserves of natural gas that were previously too expensive to pursue. **In 2018**, natural gas surpassed coal as the largest generator of electricity. Today, natural gas is responsible for **38.4 percent** of U.S. electricity generation. Because natural gas is the cleanest burning of all hydrocarbon fuel sources, its increased use has helped the U.S. to reduce its emissions in the last two decades. Natural gas is used for a **wide variety of purposes**, from electricity production to industrial processes and heating purposes. While not a renewable energy source, the increase in natural gas has led to a dramatic decrease in the use of coal. Last year, coal generation levels dropped **16 percent**, reaching the lowest level since 1976.

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Carbon Capture and Storage

Carbon capture and storage (CCS) technology shows great promise to help reduce the emissions of non-renewable energy sources. This technology can capture up to **90 percent** of the carbon dioxide emissions produced by fossil fuels in commercial processes for electricity and industrial use. CCS involves first capturing the carbon dioxide, transporting it via pipeline or ship, and finally storing it underground in geological rock formations, often in depleted oil and gas fields.

While the first use of CCS began in 1972 with the **Val Verde Natural Gas Plants** in southern Texas, today CCS is being used throughout the United States, with facilities in Texas, Wyoming, and North Dakota and **over two dozen projects** in development across the country. The Shute Creek CCS facility in Wyoming has an annual capacity of 7 million tons and captures approximately **365 million cubic feet** per day of carbon dioxide. That's equivalent to removing

more than 1.5 million cars from the road. The Century Plant in West Texas is the world's largest CCS plant with a carbon dioxide capturing capacity of 8.4 million tons per year.

Nuclear

Nuclear energy has long been a source of carbon-neutral, reliable energy, a role that is often overshadowed by nuclear's negative (but **largely unfounded**) associations with safety issues. But advanced nuclear energy providers, like small modular reactors and microreactors, are working their way through the research and development and regulatory stages and have the potential to be an important--and safe and environmentally friendly--component of our energy mix. These **new nuclear power developments** would help the U.S. to produce carbon-neutral energy in smaller plants, expanding the options for power plant locations, as well as reducing capital investment, thus lowering the barrier for projects to be commissioned.

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Hydropower

Hydropower is produced in almost every state in the U.S. Because hydroelectricity generation depends on rainfall, the production amount varies but on average, it produces about **6.3 percent** of America's total electricity. Despite being used in the country for over a century, there continue to be **new ways** to further employ and improve hydroelectric power. These include adding new generating capability at sites with an elevation difference of less than **five meters** across the country and further research into ways to improve the performance and lower the costs of hydropower through both better materials and coatings for power generation and increased efficiency.

Wind

The United States is also driving innovation in the wind power sector. In 2007, the highest-capacity **wind turbine** in the world was a test prototype that only produced 6 megawatts (MW). In 2019, while the majority of wind farms have turbines rated closer to 2.5MW, there are entire wind farms of 8MW turbines. Shepherds Flat Winds Farm in Oregon has 338 2.5 MW turbines working together to produce enough energy to serve **235,000 households**. General Electric has now set the bar even higher: the **Haliade-X offshore wind turbine** can produce 12MW and will produce 45 percent more energy than any other offshore wind turbine today. A single turbine could produce enough energy to supply nearly **6,500 U.S. homes annually**. The Haliade-X is set to be shipped for new projects next year.

The increased energy production from a single turbine will result in less expenditure for a power plant, reduced risk, simplified operation and maintenance of the wind farm and, ultimately, lower energy costs for consumers. In the last decade, American wind energy production has jumped from **2.1 percent** of the nation's electricity to **7.2 percent**.

Solar

Solar energy has also grown at a striking rate. Since 2009, solar energy has grown **40-fold**. The increase in solar energy production has been a combination of solar panels in power plants as well as on commercial and residential rooftops. The small scale production on rooftops **almost tripled** in the four years following 2014, and utility production grew **74-fold** from 2009 to 2018. While solar energy only generates **2.53 percent** of America's electricity, that is still enough to power more than **9 million** average American homes.

Energy Storage

The U.S. can't scale up and rely solely on wind, solar and other renewable energy sources until we have the ability to store energy produced by them. This makes energy storage one of the most important technological frontiers. There are a variety of ways to store energy including pumped-storage hydropower, compressed air, molten salt (thermal), and battery storage. Pumped-storage hydropower is one of the cheapest forms of large capacity energy storage. But a major deterrent to this form of storage is that each facility is a long-term investment; a facility may not be running until **3-5 years** after its beginning.

Most of the recent energy storage development has been focused on battery storage. The development of electric vehicles helped to increase battery storage capacities and resulted in an **18-fold increase** in capacity. But despite the technological improvements, battery storage must continue to improve dramatically in order to provide the energy storage needed to overcome the intermittent nature of renewables such as solar and wind energy. The U.S. Department of Energy has recognized the importance of improving energy storage capabilities and in January, launched the **Energy Storage Grand Challenge**, a program to accelerate the development, commercialization and utilization of new energy storage technologies.

The United States has faced many challenges throughout the years and its solution to climate change will be no different: using innovation and creativity to overcome.

All of these technological improvements have helped America to take great strides in protecting our planet. The United States has faced many challenges throughout the years and its solution to climate change will be no different: using innovation and creativity to overcome.

Best Steps Forward

Innovation, which will enable energy sources to become more reliable, efficient and affordable, is the real key to progress in making our energy supply cleaner and to reducing our carbon footprint.

Mandates that artificially force dependence on energy sources not yet capable of supporting a population's energy needs can backfire, in terms of creating human suffering (due to loss of power when it is needed most), economic disruption, and eroding support for the use of renewables broadly.

Our energy policies should prioritize creating a reliable and efficient energy supply, while integrating cleaner technologies. The United States has been on that path, which is why it is leading the world in terms of environmental improvements and innovation in energy technology. We need to make sure that continues.

Germany: A Cautionary Tale

Germany has been called “**The World's First Major Renewable Energy Economy**” and has made great strides towards its ambitious goals. In the first half of 2020, **48.7 percent** of Germany's power was produced by “renewables” (wind, hydro power, biomass, and solar). Nuclear made up 11.3 percent, natural gas contributed 16.1 percent, and hard coal only produced 6.4 percent of the power.

But this huge push for renewable energy has come with a cost, especially for lower-income households. Germany's renewable energy is highly subsidized by increased fees passed down to individual consumers. Between 2006 and 2017, Germany increased the cost of electricity for households by **50 percent**. One fifth of each household's electricity bill is composed of the renewables surcharge. Unsurprisingly, grid operators pass on the difference to consumers, resulting in private individuals paying one third of the country's electricity bill despite consuming less than a quarter of the total electricity.

By taking a balanced approach to combating climate change, the United States is able to reduce our emissions and support our burgeoning renewable energy sector, without creating high energy costs for our citizens.

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What You Can Do

Get Informed

Learn more about the United State's leadership on carbon reduction. Visit:

- [ClearPath](#)
- [National Renewable Energy Laboratory](#)
- [American Petroleum Institute](#)

Talk to Your Friends

Help your friends and family understand these important issues. Tell them about what's going on and encourage them to join you in getting involved.

Become a Leader in the Community

Get a group together each month to talk about a political/policy issue (it will be fun!). Write a letter to the editor. Show up at local government meetings and make your opinions known. Go to rallies. Better yet, organize rallies! A few motivated people can change the world.

Remain Engaged Politically

Too many good citizens see election time as the only time they need to pay attention to politics. We need everyone to pay attention and hold elected officials accountable. Let your Representatives know your opinions. After all, they are supposed to work for you!

CONNECT WITH IWF! FOLLOW US ON:

ABOUT INDEPENDENT WOMEN'S FORUM

Independent Women's Forum (IWF) is dedicated to building support for free markets, limited government, and individual responsibility.

IWF, a non-partisan, 501(c)(3) research and educational institution, seeks to combat the too-common presumption that women want and benefit from big government, and build awareness of the ways that women are better served by greater economic freedom. By aggressively seeking earned media, providing easy-to-read, timely publications and commentary, and reaching out to the public, we seek to cultivate support for these important principles and encourage women to join us in working to return the country to limited, Constitutional government.

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information and
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