

A Short History of Energy in the 21st Century (So Far)



At the turn of the 21st century, the energy landscape looked pretty much the same as it had for the past 100 years.

The U.S. electric grid relied on coal-powered electricity for the majority of power generation and an insatiable demand for oil continued to grow, both domestically and abroad. Fossil fuel prices reached all-time highs and the U.S. would launch Operation Iraqi Freedom to oust Saddam Hussein from power.

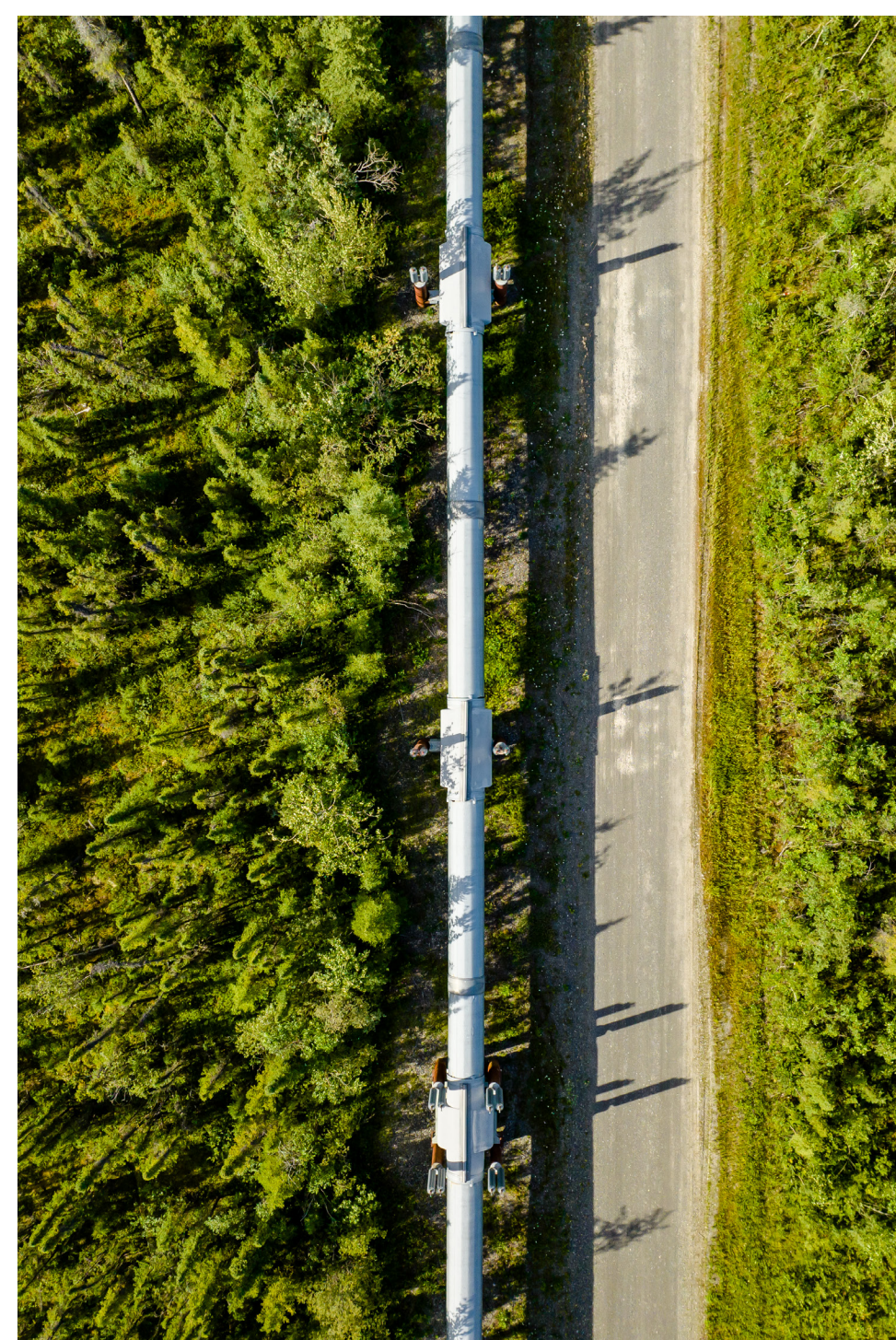
The Iraq War would have deep impacts on U.S. energy and national security policy over the coming decade as the conflict would drag on until 2011. Given the lack of evidence for weapons of mass destruction and the increased toll on the American public from the conflict, legislators looked to increase energy independence in the United States and reduce reliance on foreign oil.

As a result, the renewable energy industry as we know it today started from an unlikely source: President George W. Bush and a Republican majority. The Energy Policy Act of 2005 contained a variety of measures to spark growth of renewable energy, including a 30 percent investment tax credit for residential and commercial solar energy. The next year, a young Jigar Shah left his day job to start a small renewable energy company called SunEdison that sought to make solar energy accessible to the masses through a “no money down” approach.

The winds of an “energy transition” were beginning to blow across the country. Public awareness of carbon emissions and overwhelming evidence of global warming and its impacts would begin to spread. In 2006, former Vice President Al Gore released *An Inconvenient Truth*, which made climate change a household topic. A few years later, Tesla would release the Roadster, an all-electric sports car with a 244-mile range.

Over the next ten years, progress came slowly. Prices gradually fell for renewable energy as it gained economies of scale and earned further policy support through extensions of the federal investment tax credit and state-level support through their own layers of policy. The American Recovery and Reinvestment Act (ARRA) in 2009, passed by President Barack Obama, launched state-level

Below: Tri-State Generation and Transmission plans the early retirement of the 1.3-gigawatt coal-fired plant in Craig, Colorado as part of a statewide program to reduce carbon emissions. The transition away from coal has been a key trend over the last 15 years. (2018)



Left: The Trans-Alaska Pipeline connects oil fields in Prudhoe Bay to the harbour in Valdez. (2022)

Above: A Metro train travels west across the Anacostia River toward RFK Stadium in Washington, DC. Coal trains, like the one pictured, are a common sight in cities across the United States, including in the nation's capital. (2016)

Top-Right: The 2.25-gigawatt coal-fired Navajo Generating Station in Page, Arizona ceased operations in 2019, ending a 40-year lifespan through a lease with the Navajo Nation. Clean up of the site is now underway. (2021)

Bottom-Left: Sun rises over the Cherokee Generating Station in Denver, Colorado. The plant was transitioned to natural gas from coal as part of the state's Clean Air, Clean Jobs Act. (2017)

Bottom-Right: A Tesla Supercharger provides fast charging to electric vehicle drivers along Interstate 15 in Baker, California. (2019)

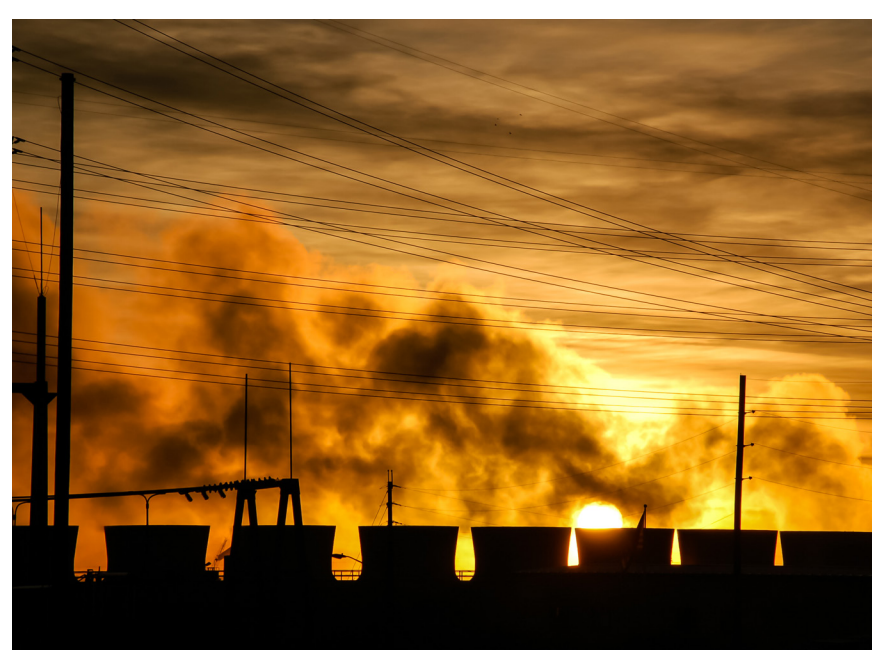


solar policy initiatives through a robust allocation of funding. Some states, like Maryland, would use the funding to catapult their energy departments forward with sustainable policy. Others, like Virginia, would spend the funds as quickly as possible and move on.

The Energy Policy Act of 2005 had other measures that would severely impact the energy industry beyond the support for nascent renewable energy. It also would foster a boom across the country in natural gas extraction using relatively new processes known as hydraulic fracturing (“fracking”) and horizontal drilling. Gas prices would crash from over \$12 per MMBtu in June 2008 to under \$4 per MMBtu less than a year later.

Utilities across the country that relied on coal for electricity now had a cost-effective path to reducing carbon emissions by switching to natural gas. Between 2012 and 2021, nearly 10 gigawatts of coal-fired capacity was retired each year. Natural gas would fill the gap, but it was not alone. Renewable energy would help pave the way. Solar and wind now dominate new capacity figures and the EIA estimates that more than half of all new U.S. electric-generating capacity in 2023 would be from solar. New programs like community solar now make adopting solar more accessible and equitable. Battery energy storage has grown in response to increased renewable energy on the grid so that it can be used to match periods of peak demand.

Despite an initial lag in the transportation sector to reduce carbon emissions, electric vehicle models have gradually made it to the public. Elon Musk would eventually deliver the Tesla Model 3 at his visionary price goal of \$35,000 in 2019. Electric vehicles reflected 7.2% of new light-duty car sales in the first quarter of 2023, a share that continues to grow.



Right: Battery energy storage systems allow customers to reap extra value from on-site renewable energy through price arbitrage and backup power. (2021)

Lower Right: Tesla released the Model 3 in 2017 to incredible demand. The company dominates electric vehicle market share. In the first quarter of 2022, the Tesla Model Y represented the world's best-selling car. (2018)



Far Left: A community solar project in New York provides electricity to residential and commercial customers in National Grid service territory. Community solar policies spread across the country over the last ten years in response to on-site barriers to solar adoption. (2021)

Near Left: Lake Mead stood at just 40% of its capacity in August 2021 due to historic drought conditions. The reservoir along the Colorado River in Nevada was formed by the completion of the Hoover Dam in 1931 and provides two gigawatts of hydropower capacity. (2021)



Two decades after the invasion of Iraq, the winds are moving even more in favor of a cleaner energy future. The passage of the Bipartisan Infrastructure Law (BIL) in 2021 and the Inflation Reduction Act (IRA) in 2022 would further solidify this change. The IRA itself would invest \$369 billion over 10 years into the clean energy economy with a goal to significantly reduce carbon emissions. As a result, the next generation of technologies are beginning to make an impact, from virtual power plants (VPP) to innovative carbon capture, utilization, and storage (CCUS) and green hydrogen.

Through 2020, U.S. carbon emissions have decreased by 20 percent from 2005 levels according to the Environmental Protection Agency. While this may be significant progress (and severely impacted by a global pandemic), there is still a long way to go. Global temperatures and carbon emissions continue to rise.

Experts claim that the 2020s will be a defining decade in this energy transition. Business leaders and government officials have made ambitious renewable energy and carbon reduction goals, but success remains to be seen. Will peak oil finally occur? Will global carbon emissions also peak and start to fall? Will net-zero goals be met?

While we cannot know the answers to these questions for certain, one thing is incredibly clear: this century will certainly not resemble the last.



About the Author

David Ganske is the CEO of DG+Design, a marketing and creative agency that leverages energy expertise, creative skill, and marketing strategy to empower clean energy and sustainable brands. Prior to founding DG+, David held leadership positions at ForeFront Power, SunEdison, and Astrum Solar as well as consultancy positions at the World Bank and UNDP. He is also the Director and Producer of *Front Range Change*, an award-winning documentary film on the transition from coal to renewable energy in Colorado, which is now available on Amazon Prime. David is a self-proclaimed energy nerd and environmentalist with a passion for the power of visual storytelling. He holds an MPA in International Energy Management & Policy from Columbia University and a B.A. in Economics from the University of Virginia.

