

**overview**

***Executive Summary***

*The Green New Deal is a laundry list of lofty and idealistic goals, but it includes very few policy specifics or science to reinforce its environmental mission. Some analysts have suggested that some of the goals are outright impossible. And, the tradeoffs for others border on the absurd, like blanketing over 500,000 square miles with wind turbines.*

*A hard look at the reality of implementing the Green New Deal’s schemes leads to the obvious conclusion that there must absolutely be a better way.*

***Key Points***

* **“Defies The Laws Of Physics”:** Experts say it would be impossible to transition to 100 percent renewable energy because it “defies the laws of physics.” The National Academy Of Sciences said, “It is extremely difficult to achieve complete decarbonization of the energy system, even when using every current technology and tool available.”
* **Impossible Emissions Goal:** The Green New Deal wants to prevent “the world from warming no more than 2.7 degrees Fahrenheit by 2100” all with cuts to U.S carbon emissions—the entire world would have to cut its emissions in half by 2030 to meet that goal.
* **Eliminating Air Travel:** The Green New Deal and a “FAQ” provided by Ocasio-Cortez's office proposed, “Overhauling transportation systems’ to reduce emissions - including … expanding high-speed rail to ‘a scale where air travel stops becoming necessary’.”
* **Solar Power Alone Would Require Thousands Of Square Miles Of Land:** The Heartland Institute found replacing power from energy sources the Green New Deal would ban with solar power would require 57,048 square miles of land—an area equivalent to the size of New York and Vermont—for 18.8 billion solar panels.
* **And, Wind Power Would Require Even More:** Wind power would require 2.12 million turbines on 500,682 square miles of land—an area equivalent to Arizona, California, Nevada, Oregon, and much of West Virginia.
* **Eliminating Over 99 Percent Of U.S. Cars:** An Empowerment Alliance analysis found that over 99 percent of U.S. passenger cars would not meet the Green New Deal’s mandate for a zero-emission transportation system.
* **Require Over 99 Percent Of U.S. Family Farms To Overhaul Their Operations:** An Empowerment Alliance analysis found that meeting the Green New Deal’s mandate for “sustainable farming” could require over 99 percent of U.S. family farms to overhaul their operations.

**The Green New Deal Sets Unrealistic and irresponsible Goals**

***Experts Say It Would Be Impossible To Transition To 100 Percent Renewable Energy Because It “Defies The Laws Of Physics”***

**“Critics say the transition would be impossible. ‘One hundred percent renewable energy defies the laws of physics,’ said Tom Pyle, president of the Institute for Energy Research, a fossil-fuel-backed conservative think tank. ‘It would be impossible to achieve.’”** (Timothy Cama, “Five Things To Know About Ocasio-Cortez’s ‘Green New Deal,’” [*The Hill*](https://thehill.com/policy/energy-environment/417843-five-things-to-know-about-ocasio-cortezs-green-new-deal), 11/24/18)

**The National Academy of Sciences: “… It is extremely difficult to achieve complete decarbonization of the energy system, even when using every current technology and tool available.”**“Many previous studies of deep decarbonization of electric power illustrate that much can be done with wind and solar power but that it is extremely difficult to achieve complete decarbonization of the energy system, even when using every current technology and tool available, including energy efficiency and wind, hydroelectric, and solar energy as well as carbon capture and storage, bioenergy, and nuclear energy (1-6, 8-10). In contrast, ref. 11 asserts that it is cost-effective to fully decarbonize the US energy system primarily using just three inherently variable generating technologies: solar PV, solar CSP, and wind, to supply more than 95% of total energy in the proposal presented in ref. 11. Such an extraordinarily constrained conclusion demands a standard of proof that ref. 11 does not meet.” (Christopher T. M. Clack, et al, "Evaluation Of A Proposal For Reliable Low-Cost Grid Power With 100% Wind, Water, And Solar," [Proceedings Of The National Academy Of Sciences Of The United States Of America](https://www.pnas.org/content/pnas/114/26/6722.full.pdf), 6/26/16)

“**Paul Bledsoe, a strategic adviser at the Progressive Policy Institute, said it does a disservice to the real seriousness of climate change to set such an unrealistic goal. ‘I understand the value of aspirational goals,’ he said. ‘My personal view is, that undermines the credibility of the effort.’”** (Timothy Cama, “Five Things To Know About Ocasio-Cortez’s ‘Green New Deal,’” [*The Hill*](https://thehill.com/policy/energy-environment/417843-five-things-to-know-about-ocasio-cortezs-green-new-deal), 11/24/18)

***The Green New Deal Wants To Prevent “The World From Warming No More Than 2.7 Degrees Fahrenheit By 2100” All With Cuts To U.S Carbon Emissions—The Entire World Would Have To Cut Its Emissions In Half By 2030 To Meet That Goal***

**The Green New Deal Calls for cuts to U.S. carbon emissions fast enough to prevent “the world from warming no more than 2.7 degrees Fahrenheit by 2100.”**“The Green New Deal aspires to cut U.S. carbon emissions fast enough to reach the Paris Agreement's most ambitious climate goal: preventing the world from warming no more than 2.7 degrees Fahrenheit by 2100. In a blockbuster report released in October, an international group of scientists said that meeting this goal could skirt the worst climate effects, such as massive floods, expansive droughts, and irreversible sea-level rise.” (Robinson Meyer, “The Democratic Party Wants To Make Climate Policy Exciting,” [*The Atlantic*](https://www.theatlantic.com/science/archive/2018/12/ocasio-cortez-green-new-deal-winning-climate-strategy/576514/), 12/5/18)

**The entire world must cut carbon emissions in half by 2030 to achieve that goal.** “To actually make the target, though, the world must start reducing its carbon pollution immediately, and cut it in half by 2030.” (Robinson Meyer, “The Democratic Party Wants To Make Climate Policy Exciting,” [*The Atlantic*](https://www.theatlantic.com/science/archive/2018/12/ocasio-cortez-green-new-deal-winning-climate-strategy/576514/), 12/5/18)

* **“And we’re nowhere close. Global emissions levels just hit a record high, and even the Barack Obama administration’s most breakneck climate policy did not put the United States close to making its part of the goal.”** (Robinson Meyer, “The Democratic Party Wants To Make Climate Policy Exciting,” [*The Atlantic*](https://www.theatlantic.com/science/archive/2018/12/ocasio-cortez-green-new-deal-winning-climate-strategy/576514/), 12/5/18)

***The Green New Deal Proposes To Completely Eliminate Air Travel By Expanding High-Speed Rail***

**The Green New Deal and a “FAQ” provided by Ocasio-Cortez's office proposed, “Overhauling transportation systems’ to reduce emissions - including … expanding high-speed rail to ‘a scale where air travel stops becoming necessary’.”**“In addition, the framework, as described in the legislation as well as a blog post — containing an updated version of ‘FAQs’ provided to NPR by Ocasio-Cortez's office — calls for a variety of other lofty goals: ‘upgrading all existing buildings’ in the country for energy efficiency; working with farmers ‘to eliminate pollution and greenhouse gas emissions ... as much as is technologically feasible’ (while supporting family farms and promoting ‘universal access to healthy food’); ‘Overhauling transportation systems’ to reduce emissions - including expanding electric car manufacturing, building ‘charging stations everywhere,’ and expanding high-speed rail to ‘a scale where air travel stops becoming necessary’; A guaranteed job ‘with a family-sustaining wage, adequate family and medical leave, paid vacations and retirement security’ for every American; ‘High-quality health care’ for all Americans.” (Danielle Kurtzleben, “Rep. Alexandria Ocasio-Cortez Releases Green New Deal Outline,” [NPR](https://www.npr.org/2019/02/07/691997301/rep-alexandria-ocasio-cortez-releases-green-new-deal-outline), 2/7/19)

* **NPR: “Similarly, removing combustible engines from the roads or expanding high-speed rail to largely eliminate air travel would require nothing short of revolutionizing transportation.”** (Danielle Kurtzleben, “Rep. Alexandria Ocasio-Cortez Releases Green New Deal Outline,” [NPR](https://www.npr.org/2019/02/07/691997301/rep-alexandria-ocasio-cortez-releases-green-new-deal-outline), 2/7/19)

***An Analysis Found That Replacing All U.S. Energy Sources With Solar Or Wind Power Would Require Thousands Of Square Miles Of Land***

**According to an analysis from The Heartland Institute, replacing power from energy sources the Green New Deal would ban with solar power would require 57,048 square miles of land—an area equivalent to the size of New York and Vermont—for 18.8 billion solar panels.** “Solar panel farms generate only 1.5 percent of the nation’s electricity and would be an inefficient way to generate the more than eight billion Megawatt hours (MWhrs) of power currently provided by fossil fuels and nuclear for industrial, commercial, and residential uses, as well as automotive transportation. If we use the cutting-edge Nellis Air Force Base solar farm as a model of the power such facilities can produce, we find that to generate the more than eight billion MWhrs each year with solar would require completely blanketing 57,048 square miles of land—an area equivalent to the size of the states of New York and Vermont—with 18.8 billion solar panels. Obviously, this would wreak much havoc on the environment. In 2018, fossil fuels and nuclear generated about 85 percent of 4.2 billion MWhrs of electricity used in the United States, about 3.46 billion MWhrs. Replacing 3.46 billion MWhrs of conventional generation with solar would require 108,125 facilities the size of the one at Nellis Air Force Base. At 140 acres per facility, those solar farms would require 7.8 billion panels covering 15.14 million acres, or 23,652 square miles.17 That’s almost the size of West Virginia. But our estimate doesn’t stop there. Only 35 percent of natural gas is used to generate electricity. The other 65 percent of all natural gas production serves industrial, commercial, and residential needs, including about 62 million homes.18 Replacing this non-electricity natural gas component is equivalent to producing an additional 2.73 billion MWhrs, which would require an additional 6.1 billion solar panels that would blanket 18,648 square miles of land.19” (Paul Driessen, “Protecting the Environment from the Green New Deal,” [The Heartland Institute](https://www.heartland.org/_template-assets/documents/publications/EnviHarmsPB.pdf), 12/19)

**According to an analysis from The Heartland Institute, replacing power from energy sources the Green New Deal would ban with wind power would require 2.12 million turbines on 500,682 square miles of land—an area equivalent to Arizona, California, Nevada, Oregon, and much of West Virginia.** “The Fowler Ridge Wind Farm in Indiana covers 68 square miles, an area larger than Washington, DC. If similar facilities were used to replace all of the country’s fossil fuels and nuclear power, it would require 2.12 million turbines on 500,682 square miles of farm, wildlife habitat, and scenic lands. This would require an amount of land as large as the combined total for Arizona, California, Nevada, Oregon, and much of West Virginia. If all U.S. turbines were capable of generating power at Fowler Ridge’s 2018 output rate, it would take 2,662 Fowler-sized facilities to generate the 3.46 billion MWhrs of electricity needed to replace fossil fuels and nuclear. That would require 207,600 square miles of land and 878,308 turbines.31,32 However, wind turbines would also have to replace the natural gas not used to generate electricity. This is equivalent to 2.7 billion MWhrs of power annually to cover natural gas currently used for industrial, commercial, and residential uses. That would necessitate an additional 692,492 turbines on 163,680 square miles of land.33 Replacing America’s gasoline- and diesel-fueled cars, trucks, and buses with electricity-powered versions would demand another 2 billion MWhrs, and thus another 507,692 turbines on 119,964 square miles of land.34 One week of sufficient battery backup for this electricity generation, to cover windless periods, would require an additional 9,438 square miles of land and 39,971 turbines.35 In sum, replacing fossil fuels and nuclear power with wind generation would necessitate 2.12 million turbines and 500,682 square miles of farm, wildlife habitat, and scenic lands—an amount of land as large as the combined total for Arizona, California, Nevada, Oregon, and much of West Virginia. However, the wind does not blow equally in all parts across the country. Wind turbines on the scale imagined by GND advocates would need to be placed in lessthan-optimal locations, requiring even more turbines.36 Further, there is a 5–10 percent loss of power when electricity travels along long transmission lines, and wind turbines lose about 15 percent of their generating capacity per decade. This would undoubtedly increase the number of turbines and land areas impacted. With these factors in mind, the number of required wind turbines could easily double, to 4.2 million turbines on a land area the size of one-third of the entire lower 48 states. Some wind energy advocates argue each wind turbine would require ‘only’ 50 or 60 acres, though actual real-world experience suggests this is not the case. If larger turbines are installed, fewer would be needed, but each one could need more acreage for proper operation. It would be virtually impossible to power the entire United States using only wind power. It is much more likely that in a United States fueled entirely by renewable energy sources, wind would be one part of a larger mix, one that would include solar and hydropower. However, the scale of land disruption caused by wind turbines would nonetheless be significant.” (Paul Driessen, “Protecting the Environment from the Green New Deal,” [The Heartland Institute](https://www.heartland.org/_template-assets/documents/publications/EnviHarmsPB.pdf), 12/19)

***An Empowerment Alliance Analysis Found That Over 99 Percent Of U.S. Passenger Cars Would Not Meet The Green New Deal’s Mandate For A Zero Emission Transportation System***

**The Green New Deal calls for “overhauling transportation systems in the United States to remove pollution and greenhouse gas emissions from the transportation sector” through “zero-emission vehicle infrastructure and manufacturing,” public transit and high-speed rail.** “Recognizing the duty of the Federal Government to create a Green New Deal. … (H) overhauling transportation systems in the United States to remove pollution and greenhouse gas emissions from the transportation sector as much as is technologically feasible, including through investment in—(i) zero-emission vehicle infrastructure and manufacturing; (ii) clean, affordable, and accessible public transit; and (iii) high-speed rail.” ([H.Res.109](https://www.congress.gov/bill/116th-congress/house-resolution/109/actions?KWICView=false) - Recognizing the duty of the Federal Government to create a Green New Deal, Introduced 2/7/19)

**An Empowerment Alliance analysis found that over 110 million passenger cars would not meet the Green New Deal’s mandate for a zero emission transportation system—that’s 99.67% of the cars in the U.S.** “The Green New Deal calls for ‘overhauling’ transportation systems in the United States including ‘zero-emission vehicle infrastructure and manufacturing.’ This monumental goal of social engineering Americans out of their cars and toward often costly and inconvenient zero-emission vehicles and public transportation is one of the plan’s farthest reaches. The table below shows that if a zero-emission transportation overhaul were implemented millions of cars in every state could be removed from the streets.” (“Most American Cars Would Not Meet The Green New Deal’s Zero-Emission Transportation Mandate,” [The Empowerment Alliance](https://empoweringamerica.org/), 4/24/20; “Electric Vehicle Registration Counts by State,” [U.S. Department of Energy Alternative Fuels Data Center](https://afdc.energy.gov/data/10962), Updated 4/19; “State Motor-Vehicle Registrations – 2017,” [U.S. Department of Transportation Federal Highway Administration Office of Highway Policy Information](https://www.fhwa.dot.gov/policyinformation/statistics/2017/mv1.cfm), Updated 1/19)

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| State | Total Automobile Registrations (2017) | Electric Vehicle Registrations (2017) | Vehicles That Would Not Meet The GND Zero-Emission Standard | | |
| U.S. Total | 111,177,029 | 366,940 | 110,810,089 | 99.67% |

(“Most American Cars Would Not Meet The Green New Deal’s Zero-Emission Transportation Mandate,” [The Empowerment Alliance](https://empoweringamerica.org/), 4/24/20; “Electric Vehicle Registration Counts by State,” [U.S. Department of Energy Alternative Fuels Data Center](https://afdc.energy.gov/data/10962), Updated 4/19; “State Motor-Vehicle Registrations – 2017,” [U.S. Department of Transportation Federal Highway Administration Office of Highway Policy Information](https://www.fhwa.dot.gov/policyinformation/statistics/2017/mv1.cfm), Updated 1/19)

**NOTE:** *Information is based on light-duty vehicle registration statistics.*

**California’s Zero-Emission Vehicle Program identifies full battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles as meeting zero-emission standards.** “To meet California's health based air quality standards and greenhouse gas emission reduction goals, the cars we drive and the fuel we use must be transformed away from petroleum. The Zero-Emission Vehicle (ZEV) program is part of CARB's Advanced Clean Cars package of coordinated standards that controls smog-causing pollutants and greenhouse gas emissions of passenger vehicles in California. The ZEV Regulation: The ZEV regulation is designed to achieve the state’s long-term emission reduction goals by requiring auto manufacturers to offer for sale specific numbers of the very cleanest cars available. These vehicle technologies include full battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles. The ZEV regulation is part of the broader Advanced Clean Cars package of regulations, a set of tailpipe regulations put in place to limit smog-forming and greenhouse gas (GHG) emissions.” (“Zero-Emission Vehicle Program,” [California Air Resources Board](https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program/about), Accessed 4/24/20)

**NOTE:** *According to the U.S. Department of Energy Alternative Fuels Data Center, hydrogen fuel cell vehicles only represented 0.1% of alternative fuel vehicle registrations in 2017.* (“Clean Cities Alternative Fuel Vehicle Inventory,” [U.S. Department of Energy Alternative Fuels Data Center](https://afdc.energy.gov/data/10581), Updated 1/20)

***An Empowerment Alliance Analysis Found That Meeting The Green New Deal’s Mandate For “Sustainable Farming” Could Require Over 99 Percent Of U.S. Family Farms To Overhaul Their Operations***

**The Green New Deal calls for removing “pollution and greenhouse gas emissions from the agricultural sector” by “supporting family farming” and investing in sustainable farming, “land use practices” and food system.** “Recognizing the duty of the Federal Government to create a Green New Deal. … (G) working collaboratively with farmers and ranchers in the United States to remove pollution and greenhouse gas emissions from the agricultural sector as much as is technologically feasible, including—(i) by supporting family farming; (ii) by investing in sustainable farming and land use practices that increase soil health; and (iii) by building a more sustainable food system that ensures universal access to healthy food” ([H.Res.109](https://www.congress.gov/bill/116th-congress/house-resolution/109/actions?KWICView=false) - Recognizing the duty of the Federal Government to create a Green New Deal, Introduced 2/7/19)

**96 percent of U.S. farms are already family farms and an Empowerment Alliance analysis found that less than one percent of them farm organically—the Green New Deal’s wide-ranging “overhaul” of the sector will assuredly affect these millions of farming households.** “The Green New Deal calls for the removal of pollution and emissions from the agricultural sector and for a ‘sustainable’ food system and practices. One of the characteristically vague ways the resolution’s writers propose to accomplish this is by ‘supporting family farming.’ The vast majority of U.S. farms—96 percent—are already family farms. So, a wide-ranging ‘overhaul’ of the sector will assuredly affect these millions of farming households. According to the EPA, agriculture accounts for only 10% of U.S. greenhouse gas emissions, yet eliminating emissions from livestock and other animals alone would cost American farmers billions. Further, assuming a ‘sustainable’ food system would incorporate the requirements of organic farming or something similar, then over 99 percent of U.S. farms would have to transform their operations.” (“Family Farms Stand To Lose Billions From The Green New Deal’s Agriculture Mandates,” [The Empowerment Alliance](https://empoweringamerica.org/), 4/24/20; 2017 Census of Agriculture, [USDA National Agricultural Statistics Service](https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/), Updated 2/18/20; “Family Farms,” USDA National Institute of Food and Agriculture, Accessed 4/29/20; “Agriculture Sector Emissions,” [U.S. Environmental Protection Agency](https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#agriculture), Accessed 4/29/20)

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|  | Family Farms (2017) | Percent That Farm Organically (2017) |
| U.S. Total | 96% | 0.89% |

(“Family Farms Stand To Lose Billions From The Green New Deal’s Agriculture Mandates,” [The Empowerment Alliance](https://empoweringamerica.org/), 4/24/20; 2017 Census of Agriculture, [USDA National Agricultural Statistics Service](https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/), Updated 2/18/20; “Family Farms,” USDA National Institute of Food and Agriculture, Accessed 4/29/20; “Agriculture Sector Emissions,” [U.S. Environmental Protection Agency](https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#agriculture), Accessed 4/29/20)