



Testimony of Michael D. Shellenberger,
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For the House Select Committee On the Climate
Crisis

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Good morning Chairperson Castor, Ranking Member Graves, and members of the committee.

My name is Michael Shellenberger, and I am Founder and President of Environmental Progress, an independent and nonprofit research organization.¹ I am an invited expert reviewer of the next assessment report by the Intergovernmental Panel on Climate Change (IPCC), a regular contributor to the *New York Times*, *Washington Post*, *Forbes*, and other publications, and a *Time Magazine* "Hero of the Environment."² In the early 2000s I advocated for the predecessor to the Green New Deal, the New Apollo Project, which President Barack Obama implemented as his \$90 billion green stimulus. I am honored to address the Committee.

I. The High Cost of Renewables

House Democrats propose spending hundreds of billions of public and ratepayer money on renewable energy, new transmission lines, energy

¹ Environmental Progress is an independent non-profit research organization funded by charitable philanthropies and individuals with no financial interest in our findings. We disclose our donors on our website: <http://environmentalprogress.org/mission>.

² Michael Shellenberger, "Founder and President," Environmental Progress, 2020, accessed December 8, 2020, <http://environmentalprogress.org/founder-president>.

efficiency, mass transit, electric vehicles, carbon capture and storage, and advanced nuclear energy. They argue that these federal investments will result in millions of good jobs with high pay, and also pay for themselves through higher economic growth.³

But similar programs over the last decade did not result in the benefits being promised. During the first decade of this century I advocated a suite of policies nearly identical to the ones currently being proposed and watched them fail to create a new manufacturing capacity, good jobs with high pay, or higher economic growth. Rather, they resulted in low-wage service sector jobs, greater dependence on imported Chinese technologies, and higher energy costs. And they resulted in higher electricity prices and the net transfer of wealth from lower to upper income citizens.

A former Obama administration economist at the University of Chicago found last year that consumers in states with renewable energy mandates paid \$125 billion more for electricity in the seven years after passage than they would have otherwise.⁴

Renewables contributed to electricity prices rising six times more in California than in the rest of the US since 2011, the state's "take-off" year for rapid growth in wind and solar, a price rise that occurred despite the state's reliance during the same years on persistently-low-priced natural gas.⁵

Renewables have the same impact everywhere in the world. They have caused electricity prices to rise 50 percent in Germany since 2007, the first year it got more than 10 percent of its power from subsidized

³ Majority Staff Report, "Solving the Climate Crisis," June 2020, <https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf>

⁴ Michael Greenstone and Ishan Nath, "Do Renewable Portfolio Standards Deliver?" *Energy Policy Institute at the University of Chicago* 62 (May 2019): 1-45, <https://epic.uchicago.edu/wp-content/uploads/2019/07/Do-Renewable-Portfolio-Standards-Deliver.pdf>.

⁵ "California," *Environmental Progress*, accessed July 25, 2020, <https://environmentalprogress.org/california>.
Calculations based on data from "Electricity Data Browser: Retail Sales of Electricity Annual," United States Energy Information Administration, accessed January 10, 2020, <https://www.eia.gov/electricity/data/browser>.

wind, solar, and biomass. By 2019, German household electricity prices were 45 percent higher than the European average.⁶

Despite investing nearly a half-trillion dollars, Germany still generated just 42 percent of its electricity from non-hydro renewables last year, as compared to the 72 percent France generated from nuclear.⁷

If Germany didn't count emissions-producing and land-intensive fuels like biomass and biofuels as renewable, which most environmental groups, even Greenpeace, believe it shouldn't, the share of its electricity from non-emitting, non-hydro renewables is just 34 percent.⁸

Solar and wind make electricity more expensive because they are unreliable, requiring 100 percent backup, and energy-dilute, requiring extensive land, transmission lines, and mining. Solar and wind developers do not pay for the costs they create but rather pass them on to electricity consumers and other producers.⁹

Ten years ago, growing opposition by conservationists, community groups, and environmental justice activists to industrial wind and solar projects led me to rethink my support for renewables. Today, opposition to wind and solar projects has grown so much that even renewable energy advocates today admit that the environmental impact of renewables is the greatest obstacle to their deployment.¹⁰ Consider the following recent events:

⁶ Eurostat, "Electricity prices for household consumers - bi-annual data (from 2007 onwards)" December 1, 2019, accessed January 20, 2020, https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_pc_204&lang=en.

⁷ Germany spent 32 billion euros on renewables subsidy every year between 2014 and 2018, or about one percent of its GDP a year, which if adjusted for economy size would be like the United States spending \$200 billion annually but only increasing its share of electricity from solar and wind by 11 percentage points. German spending from Frank Dohmen, "German Failure on the road to a renewable future," *Spiegel*, May 13, 2019, <https://www.spiegel.de/international/germany/german-failure-on-the-road-to-a-renewable-future-a-1266586.html>; Conversions made using OECD data for Purchasing Power Parity.

Increase in German wind and solar percentages from "Annual Electricity Generation in Germany," Fraunhofer ISE, January 10, 2020, accessed January 10, 2020, <https://www.energy-charts.de/energy.htm>.

⁸ "Annual Electricity Generation in Germany," Fraunhofer ISE, January 10, 2020, accessed January 10, 2020, <https://www.energy-charts.de/energy.htm>.

⁹ Steven M. Grodsky, "Reduced ecosystem services of desert plants from ground-mounted solar energy development," *Nature*, July 20, 2020.

¹⁰ Oliver Milman, "Biden plots \$2tn green revolution but faces wind and solar backlash," *Guardian*, July 25, 2020.

- In June, environmentalists in Hawaii urged the state’s Supreme Court to overturn a decision by the state to approve an industrial wind project that threatened seven endangered native bird species;¹¹
- One week later, a federal judge blocked a transmission line, called the R-Line, proposed to be built straight through whooping crane habitat in Nebraska. Transmission lines are the number one cause of mortality among whooping cranes. Industrial wind developers need the transmission line to expand their turbines across the fragile Sand Hills ecosystem;¹²
- In May of this year, Ohio regulators demanded wildlife protections for endangered migratory bird species, including the Kirtland’s warbler, for an industrial wind project proposed for Lake Erie. Such protections, which stop blades from spinning when birds are in the area, undermine the already poor economics of wind energy, and may ultimately kill the project. The lake is a critical habitat for birds migrating between their nesting grounds in Canada to South America for the winter;¹³
- Last December, environmentalists on California’s northern coast successfully blocked industrial wind turbines that they said would have killed an endangered sea bird, the marbled murrelet, which nests in nearby ancient redwood trees;¹⁴
- And just yesterday, environmental and community groups from around the world announced the formation of the Energy and Wildlife Coalition, to support, organize, and make more effective opposition to industrial renewable energy projects in the US and around the world.¹⁵

¹¹ The birds are the nene, pueo, a’o, koloa maoli, ae’o, ‘alae ke’oke’o, and ‘alae ‘ula. “Hawaii Supreme Court asked to block opening of controversial wind project,” KHON2 News, June 17, 2020, <https://www.khon2.com>.

¹² Thomas V. Stehn, “Whooping Crane Collisions with Power Lines: an issue paper,” *Geography*, 2008.

¹³ Karl-Erik Stromsta, “‘This Could Be the Final Nail in Coffin’ for Icebreaker Offshore Wind Project,” *Green Tech Media*, May 22, 2020, <https://www.greentechmedia.com>.

¹⁴ “Board of Supes Sinks Terra-Gen Wind Farm on 4-1 Vote, Following Days of Hearings,” *Lost Coast Outpost*, December 17, 2019, <https://lostcoastoutpost.com>.

¹⁵ Energy and Wildlife Coalition, <https://www.energywildlife.org>.

By occupying large areas of migratory habitat, wind turbines have also emerged as one of the greatest threats to large, threatened, and high-conservation-value birds. Solar and wind farms around the world require at least 300-400 times more land on average than a natural gas or nuclear plant to produce the same quantity of energy, albeit unreliably.

The rapidly spinning blades of wind turbines act like an apex predator that big birds never evolved to deal with. The wind industry claims that house cats kill more birds than wind turbines. But cats mainly kill small, common birds like sparrows, robins, and jays, whereas wind turbines kill big, threatened, slow-to-reproduce species like hawks, eagles, owls, and condors.

And because big birds have much lower reproductive rates than small birds, their deaths have a far greater impact on the overall population of the species. For example, golden eagles will have just one or two chicks in a brood, and usually less than once a year, whereas a songbird like a robin could have up to two broods of three to seven chicks each year.

The renewable industry claims technical innovations will improve solar and wind, but nothing can change the lower power density of sunlight and wind. Even a 10 percent improvement in the efficiency of solar panels would only slightly reduce the staggering amount of land required to produce the same amount of energy: from 400 times more land than nuclear to 360 times more. And over the last decade, the technology used in the vast majority of installed solar panels has only become 2-3 percent more efficient.¹⁶

The problem with renewables is physical. The dilute nature of sunlight means that solar projects require large amounts of land and thus come with significant environmental impacts. This is true even for the world's sunniest places. California's most famous solar farm, Ivanpah, requires 450 times more land than its last operating nuclear plant, Diablo Canyon.¹⁷

These quantities are supported by the best available scholarship. Vaclav Smil, a widely-respected energy scholar, has shown that it would take 25-50 percent of all land in the US to go 100 percent renewable.

¹⁶ National Renewable Energy Laboratory, "Best Research-Cell Efficiency," accessed July 27, 2020, <https://www.nrel.gov/pv/cell-efficiency.html>.

¹⁷ "California," Environmental Progress, accessed 25 July 2020, <http://environmentalprogress.org/california>.

Today, the US uses just 0.5 percent of its land for energy.¹⁸ In 2009, Cambridge physicist David MacKay showed that providing energy to the UK with 100 percent renewables would require a greater area than the landmass of the entire country.¹⁹

The expansion of industrial renewables raises environmental justice concerns. It is notable that the advocacy for industrial wind energy comes from people who don't live near the turbines, which are almost invariably loud and disturb the peace and quiet. Those communities that have proven most able to resist the introduction of a wind farm tend to be more affluent. In 2017, the upper-class residents of Cape Cod, for example, defeated an effort by a wind developer to build a 130-turbine farm, despite the developer having spent \$100 million on the project.

There is something called the "Starbucks Rule" for siting industrial wind projects. Wind developers "plot where Starbucks are in the general area and then make sure their project is at least thirty miles away. Any closer and there'd be too many NIMBYs who'd object to having their views spoiled by a cluster of 265-foot-tall wind towers," reported *Business Week*.²⁰

Renewable energy projects raise serious environmental justice issues. The state legislator in Nebraska seeking to protect the Sandhills, a traditionally sacred area, from industrial wind and its required transmission line, is a citizen of the Oglala Sioux Tribe. A report released earlier this month documents nearly 200 cases of renewable energy companies and their proxies allegedly violating human rights around the world, including through murder, dangerous working conditions, and theft. And in Hawaii, Tēvita O. Ka'ili, a Hawaiian professor of cultural anthropology, testified that "Killing these manu [birds] would deprive current and future generations of a necessary part of their natural environment and, for native Hawaiians, a vital resource for traditional and customary practices."²¹

And yet, in their plan, House Democrats identify as a high priority the creation of a "supergrid" consisting of transmission lines like the one

¹⁸ Vaclav Smil, *Power Density*, MIT Press, 2016.

¹⁹ David MacKay, *Sustainable Energy Without the Hot Air*, UIT Cambridge, Ltd., 2009.

²⁰ John Laumer, "US Wind Industry Follows 'Starbucks Rule' for Turbine Siting," *Treehugger*, October 15, 2009, <https://www.treehugger.com>.

²¹ "Renewable Energy and Human Rights Benchmark," Business and Human Rights Resource Centre, <https://www.business-humanrights.org/sites/default/files/Renewable%20Energy%20Benchmark%20Key%20Findings%20Report.pdf> "Hawaii Supreme Court asked to block opening of controversial wind project," KHON2 News, June 17, 2020, <https://www.khon2.com>.

proposed for the largely pristine Sand Hills of Nebraska, which would have a 3.5 mile buffer and cross 600 individual wetlands.²²

Despite their substantial negative environmental impact, the federal government has repeatedly given the wind industry special rights. The federal government rarely stops wind projects or requires changes in wind turbine locations or operations. Wind developers are allowed to self-report violations of the Migratory Bird Treaty Act, the Endangered Species Act, and the Bald and Golden Eagle Protection Act. Only Hawaii requires bird and bat mortality data to be gathered by an independent third party and to be made available to the public on request.²³

These special rights include the right to kill endangered species. In 2013, the Obama administration gave the wind industry permission to kill condors, an endangered species. No other industry is allowed to kill condors.²⁴ Recently, the "US Fish and Wildlife Service has encouraged wind developers to avoid prosecution for killing eagles," reported the *New York Times*, "by applying for licenses to cover the number of birds who might be struck by wind turbines."²⁵

In the rare circumstances when governments require the wind industry to mitigate its impact, such as by setting aside land elsewhere, there is often little to no enforcement, scientists say. In other circumstances, wind developers do not follow through on their promises and in some cases lie. Apex Clean Energy, based in Virginia, claimed on its 2017 application to the New York Electric Generation Siting Board that there were no known bald eagle nests where it planned to build. But, later, Apex flew a helicopter over an eagle's nest, destroying it.²⁶

²² Majority Staff Report, "Solving the Climate Crisis," June 2020, <https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf>.

²³ Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 194; Michael Hutchins, "To Protect Birds from Wind Turbines, Look to Hawai'i's Approach," American Bird Conservancy, June 21, 2016, <https://abcbirds.org/to-protect-birds-and-bats-from-wind-turbines-adopt-hawaiis-approach>.

²⁴ Louis Sahagun, "Companies won't face charges in condor deaths," *Los Angeles Times*, May 10, 2013.

²⁵ Joseph Goldstein, "A Climate Conundrum: the Wind Farm vs. the Eagle's Nest," *New York Times*, June 25, 2019, <https://www.nytimes.com>.

²⁶ Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 194; Clifford P. Schneider, *pro se*, "Motion for Dismissal for Fraud upon the Siting Board," *Application of Galloo Island Wind LLC for a Certificate of Environmental Compatibility and Public Need Pursuant to Article 10 to Construct a Wind Energy Project*, Case No. 15-F-0327, September 13, 2018, 2; Joseph Goldstein, "A Climate Conundrum: the Wind Farm vs. the Eagle's Nest," *New York Times*, June 25, 2019, <https://www.nytimes.com>.

Curtailment, the intentional halting of turbine blades, can reduce the killing of birds, bats, and insects, but few wind farm developers are willing to curtail because it means losing money. A US National Renewable Energy Laboratory study found that curtailment levels are lower than 5 percent of the total wind energy generation. And curtailment often isn't enough to stop the killings. "In fact, red-tailed hawk fatalities peaked at the 50 percent of turbines that never operated during the three years of monitoring," reported a scientist. He calls the most-studied wind farm in California, Altamont Pass, a "population sink for golden eagles as well as burrowing owls."²⁷

II. Good News on Climate Change

Many defend the high environmental and economic cost of renewables by claiming that they are necessary to address the existential threat of climate change. But no credible scientific body has ever claimed that climate change threatens the collapse of civilization, much less the extinction of the human species, which is what "existential" threat means. And yet policymakers, scientists, and journalists make these claims, which have contributed to rising levels of anxiety and depression, including among adolescents.²⁸

In reality there is a growing amount of good news about climate change. Deaths from natural disasters have declined over 90 percent over the last 100 years, and neither the IPCC nor any other reputable scientific body predicts that trend will reverse itself. We produce 25 percent more food than we consume and experts agree surpluses will continue to rise so long as poor nations gain access to fertilizer, irrigation, roads, and other key elements of modern agriculture.²⁹

²⁷ Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 195; Shawn Smallwood, "Estimating Wind Turbine-Caused Bird Mortality," *Journal of Wildlife Management* 71, no. 8 (2007): 2781-91, doi:10.2193/2007-006.

²⁸ Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 269; Rachel N. Lipari and Eunice Park-Lee, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health*, Substance Abuse and Mental Health Services Administration, US Department of Health and Human Services, 2019; "Adolescent Mental Health in the European Union," World Health Organization Regional Office for Europe, Copenhagen, Denmark.

²⁹ Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 91; FAO, *The future of food and agriculture—Alternative pathways to 2050* (Rome: Food and Agriculture Organization of the United Nations, 2018), 76-77.

All else being equal, it would be best for global temperatures to remain stable. We should not want them to either rise or decline. The reason is because we have built civilization and protected natural areas based on current temperatures. But all else isn't equal. The cause of climate change is energy consumption, and energy consumption has been a critical part of rising resilience to disasters, greater food production, and the protection of the natural environment. As such, there has long been a debate over how much *more* we should pay for energy to reduce climate change.

The good news is that recent and historical events show that economic growth can actually *lower* carbon emissions. Carbon emissions have been declining in the US for nearly a decade and a half thanks to the cheap natural gas, which made electricity cheaper than it otherwise would have been. In fact, experts have long recognized that while the early stages of a nation's industrialization can increase air pollution, later stages can lower it through cleaner-burning coal, natural gas, and nuclear energy. Those technologies and others allowed conventional air pollutants to peak in developed nations the 1960s and 1970s. Among some nations, including Britain, France, and Germany, even carbon emissions peaked in the mid-1970s.³⁰

A new report by the International Energy Agency (IEA) forecasts carbon emissions in 2040 to be lower than in almost all of the IPCC scenarios.³¹ Part of the reason for lower anticipated future emissions and warming is the far greater abundance, and lower prices, of natural gas, which produces half the carbon emissions of coal.

It is thus misleading to describe climate change as either a "crisis" or "emergency." When the US and Soviet Union nearly went to nuclear war over Cuba; when there was nearly a run on the banks in 2008; when the coronavirus forced radical action to prevent millions of deaths earlier this year; each of those events, I believe, can be fairly described as crisis, a time of intense danger, or an emergency, which is not just serious but also unexpected. Climate change is real and we should continue reducing emissions through the use of natural gas and nuclear. But it is neither a crisis nor an emergency.

Nor is climate change one of our most important environmental problems. The continued use of wood as fuel by two billion people; air

³⁰ Michael Shellenberger, *Apocalypse Never*, HarperCollins, 2020, 26.

³¹ "World Energy Outlook 2019" (Paris: International Energy Agency, 2019), <https://www.iea.org/reports/world-energy-outlook-2019>.

pollution that shortens the lives of roughly seven million people per year; the decline of wild animal populations; and the loss of habitat for endangered species, are all more important and urgent environmental problems than climate change.

I fear climate change has become a distraction from far more significant problems including the hollowing out of the middle-class by globalization and automation; our overdependence on China for pharmaceuticals, medical supplies, drones, and other manufactured products; the lack of sufficient housing in our major coastal cities; the intertwined drug addiction and mental health crises which increased annual overdose deaths from 17,000 to 70,000 since 2000; the extreme political polarization tearing our nation apart; and the active destruction of the US nuclear industry.

III. Why Nuclear Energy Is More Important Than Climate Change

Anyone genuinely concerned about climate change, air pollution, or the impact of renewables on wildlife should advocate nuclear energy. Only nuclear can substitute for fossil fuels while maintaining and increasing levels of energy consumption required for universal human prosperity. Nuclear-heavy French electricity produces one-tenth the carbon emissions as renewables-heavy German electricity at nearly half the price. Nuclear is not only the safest way to make electricity, it has actually saved two million lives, according to the best available research. And nuclear requires less than one percent of the land required by solar and wind projects.³²

³² A selection of the literature on public health benefits of nuclear energy, and the consequences of its closure: Anil Markandya and Paul Wilkinson, "Electricity Generation and Health," *Lancet* 370, no. 9591 (September 2007): 979-990, [https://doi.org/10.1016/S0140-6736\(07\)61253-7](https://doi.org/10.1016/S0140-6736(07)61253-7); Anthony J. McMichael, Rosalie E. Woodruff, and Simon Hales, "Climate change and human health: present and future risks," *Lancet* 367, no. 9513 (March 2006): 859-869, [https://doi.org/10.1016/S0140-6736\(06\)68079-3](https://doi.org/10.1016/S0140-6736(06)68079-3); "Ambient Air Pollution: a global assessment of exposure and burden of disease," World Health Organization, 2016, <https://apps.who.int/iris/handle/10665/250141>; "Nuclear Waste State-of-the-Art Report 2016: Risks, uncertainties and future challenges," *Swedish National Council for Nuclear Waste*, 2016, https://www.government.se/49bbd2/contentassets/ecdecd2ee26c498c95aaaa073d6bc095/sou-2016_16_eng_webb.pdf; Pushker Kharecha and James E. Hansen, "Prevented Mortality and Greenhouse Gas Emissions from Historical and Projected Nuclear Power," *Environmental Science and Technology* 47, no. 9 (March 2013): 4889-4895, <https://doi.org/10.1021/es3051197>; Edson R. Severini, "Impacts of nuclear plant

The US has for much of the past 60 years been the global leader in the development and building of nuclear plants around the world. In 1953, President Dwight D. Eisenhower gave his famous “atoms for peace” speech at the United Nations where he pledged that the US would help nations use nuclear energy to lift themselves out of poverty. Today, nine out of every ten gigawatts of global nuclear capacity today is descended from designs invented and commercialized by the United States. American nuclear reactor designs today operate in leading nuclear countries like China, France, South Korea, Japan, and the United Kingdom. American reactors operated in the US are the best in the world, operating 93 percent of the time.

Because of the inherently dual military-civilian nature of nuclear energy, Congress and most presidential administrations have long viewed America’s nuclear power plants, and our involvement in the nuclear energy programs of other nations, as top national security priorities. Thanks to American leadership, nuclear energy has proven to be the safest and cleanest way to make electricity. And, for 75 years, nuclear energy has been used solely for peaceful purposes.

But now, the US is building just one nuclear plant at home and none abroad, allowing China and Russia to dominate the market for nuclear power plant construction. Nations seeking nuclear energy today include Argentina, Bangladesh, Belarus, Bolivia, Brazil, Bulgaria, the Czech Republic, Egypt, Finland, Ghana, Hungary, India, Jordan, Kazakhstan, Kenya, Mexico, Nigeria, Pakistan, Poland, Saudi Arabia, Slovakia, South Africa, Sudan, Turkey, the UAE, the UK, Uzbekistan, and Zambia, among others.

In the seven months that have passed since the last time I testified before Congress, China has stepped up its genocide of its Muslim minority and Russia has modified its constitution to allow its president to serve for decades longer. I greatly admire the Russian and Chinese nuclear energy programs, and indeed believe they represent the standard against which the US must compete. But their rejection of liberal democracy and human rights are profoundly troubling for the future of nuclear energy and the world.

Nations that decide to work with China and Russia rather than the United States or other liberal Western democracy will effectively become

shutdown on coal-fired power generation and infant health in the Tennessee Valley in the 1980s,” *Nature Energy* 2 (April 2017), doi:10.1038/nenergy.2017.51.

part of their sphere of influence. Nuclear power plants are enormous construction projects, and thus marry large construction firms, financial institutions, and governments, in the way that only large projects can do.

But beyond those economic ties are national security ones. The line between soft power and hard power runs through nuclear energy. The creation of a scientific and technical workforce capable of creating nuclear energy brings nations closer to being able to one day create nuclear weapons. It is thus logical that nations gain a national security benefit simply from having nuclear plants.³³ If nations are in partnership with Russia or China in building nuclear plants, they could one day be in partnership with those countries in other ways.

For the US to compete in building nuclear plants abroad we must build them at home. While the nuclear industry deserves great credit for the continuous improvement of power plant safety and efficiency, many utility executives are either resigned to the technology's decline or engaged in wishful thinking about inventing new families of reactor technology.

The reason nations and utilities opt for large light-water reactors is because they produce the cheapest electricity. What makes nuclear cheaper are larger reactors, since they do not require correspondingly larger workforces, and extensive experience building and operating them. But even if nations were to eventually opt for smaller reactors, they would likely purchase them from the nations that offer the most favorable financial terms while having the most experience building reactors, which today are China and Russia.

If the US were to decide to compete with China and Russia, it should consider deepening partnerships with other members of the Western Alliance, and ending imports of uranium from Russia. It might have made sense 20 years ago for the US to ensure the stability of the Russian nuclear industry through purchases of its uranium. But with Russia out-competing the US on new nuclear plant construction, and engaging in cyber attacks on our electrical grid, it is not clear how it any longer makes sense for the U.S. to import uranium from Russia. I thus applaud steps by the Department of Energy to end reliance on imported Russian uranium.³⁴

³³ Matthew Fuhrmann et al, "Almost Nuclear: Introducing the Nuclear Latency Dataset," *Conflict Management and Peace Science*, January 8, 2015.

³⁴ John Funk, "DOE targets end to US reliance on Russian nuclear fuel, revived domestic capability," *Utility Dive*, July 20, 2020.

Given all of that, I would like to pose three questions. First, is it in the interest of American taxpayers to subsidize US electric utilities to operate nuclear plants in the absence of any commitment to build new ones? Second, does Congress believe the US can compete with China and Russia while shutting down half to two-thirds of its nuclear plants? Third, is Congress really comfortable standing by and watching dozens of nations partner with China and Russia to expand their use of nuclear technology over the next century?

If the answer to the latter question is yes, Congress should inform the American people that it has decided to cede America's historic role as creator, promotor, and steward of the world's most sensitive dual-use technology to our main geopolitical rivals.

In the face of nuclear energy's leadership vacuum in the U.S., I urge Congress to consider creating a Green Nuclear Deal as a revision to the Atomic Energy Act that would restore America's nuclear leadership at a global level. The goal should be nuclear energy dominance. The U.S. government should encourage the building of large, standardized nuclear plants at home, and export its natural gas abroad. Doing this would require identifying a national champion company to compete with the state-owned companies of Russia and China, and the president working to sell U.S. nuclear plants abroad, just as the leaders of China and Russia do.

In the 1950s, members of Congress who understood the sensitive and special nature of the technology urged the White House to make America's dominance of nuclear energy a top national security priority. I hope all of you would consider doing so again today.

Thank you again for the opportunity to testify. I look forward to your questions.