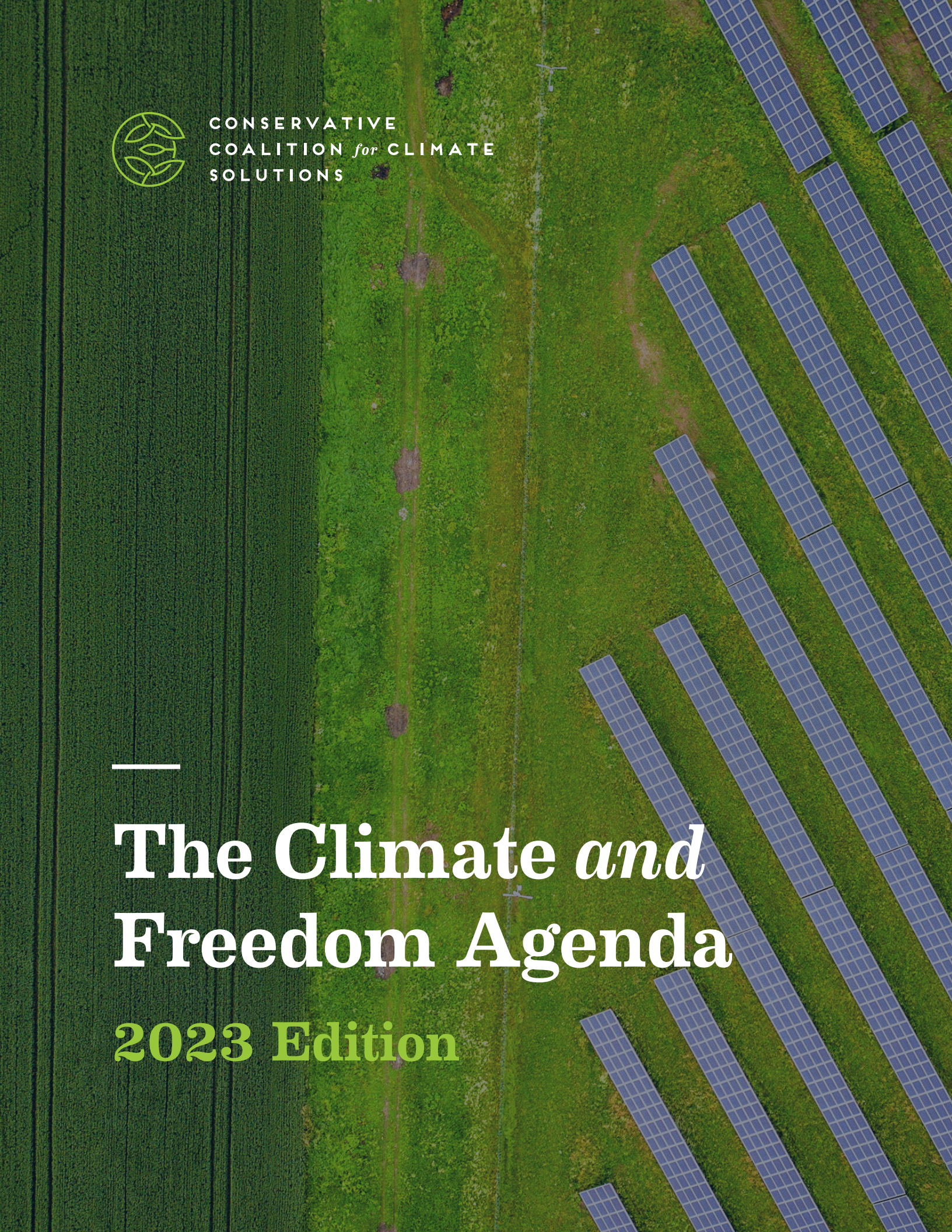

CONSERVATIVE
COALITION *for* CLIMATE
SOLUTIONS

The Climate *and* Freedom Agenda

2023 Edition

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Executive Summary

The Conservative Coalition for Climate Solutions (C3 Solutions) is providing a set of energy, environment, and climate solutions that work for all Americans. In ten chapters, C3 lays out policy and regulatory reforms that would help increase and diversify energy supplies, remove supply chain constraints, invest in healthy ecosystems, and build more resilient communities. Policies that unleash the human ingenuity of innovators and entrepreneurs will provide affordable energy for American families, build a stronger economy, and reduce the risks and costs of climate change.

WHY IT MATTERS:

Sensible policy reforms that open markets and modernize regulations will provide more affordable, dependable power and enhance energy security. Unleashing free enterprise will drive innovation and competition and should increase opportunities for domestic natural resources, nuclear power, and renewable energy technologies. Reducing barriers and speeding up deployment of cleaner, more efficient energy resources will be beneficial for families, businesses, and the planet.

We should empower our original environmentalists (farmers, ranchers, forest managers) to invest in natural climate solutions. Effective climate solutions that work for all Americans go beyond energy. America's agricultural sector is a global leader in producing food for families and environmental stewardship. Investing in healthy natural ecosystems will generate more opportunities for food and timber production and will help with climate mitigation, reducing the risks of extreme weather, and adaptation.

Reforming government-imposed barriers for infrastructure projects will stretch taxpayer dollars, inject more private capital into projects, and deliver cleaner, more resilient infrastructure. Adaptation can be a cost-effective climate solution and the private sector should play a leading role in assessing the risk and potential benefits of investments. Policy reforms should allow for timely construction of more durable infrastructure and fix policies that distort risk and increase the economic and environmental cost of extreme weather.

The United States should demonstrate international leadership by accelerating innovation domestically and opening markets to investment and trade. Any conversation about solutions and reducing the risks and costs of climate change must be global in nature. Reducing energy poverty, protecting the environment, and reducing the cost of climate change are interdependent goals. The most politically and economically plausible path toward global decarbonization is to show that it is in the economic interest of developed and developing economies to pursue those technologies.

Embrace economic freedom. Free economies are clean economies. The connection between free societies and human flourishing is undeniable. Improving the indicators that measure a country's overall economic freedom: property rights, investment freedom, regulatory and tax efficiency, trade freedom, and strong institutions will be essential for environmental and climate progress.

1.

Energy Security

Reforms to Expand Domestic Natural Resource Production and Provide Affordable, Reliable Energy

CAPITALIZING ON AMERICA'S ENERGY ABUNDANCE AND IMPROVING ENERGY SECURITY

Key Takeaways:

- The United States is rich in natural resources and American energy producers are global leaders in supplying families and businesses with affordable, reliable energy. Energy policy should allow price signals to guide energy investments to create a true, diversified, all-of-the-above approach to energy.
- Policies and regulations that restrict natural resource extraction and energy infrastructure will take away American jobs and hinder economic growth but and are likely to have the unintended environmental consequence of increasing global pollution and greenhouse gas emissions.
- Increasing energy supplies, easing supply chain constraints and securing processed minerals will best be achieved by opening domestic and international markets to extraction, processing, and trade.

Russia's invasion of Ukraine was a wake up call for policymakers to remind them that energy affordability and security is indispensable for American families, the economy, and America's allies. Households and businesses need affordable, reliable power from stable, friendly suppliers.

At the same time, governments around the world are working to reduce the risks of climate change. Energy security goals, capitalizing on energy abundance, deploying affordable, dependable energy, and climate progress do not have to conflict with one another. In fact, if there is conflict, there is also a good chance the proposed policy will fail economically and environmentally. Energy policy pragmatism must recognize the need for natural resource extraction for fossil fuels, nuclear energy, renewables, and batteries. Achieving energy security will occur through the development of diverse, cost-competitive technologies that meet the needs of consumers.

The United States has a diverse resource portfolio for electricity generation. Sources include natural gas, coal, nuclear, wind, hydropower, solar, biomass, and geothermal.[1] Petroleum is the dominant source in the American transportation sector, but fully electric, plug-in hybrid, and hybrid vehicle purchases have noticeably grown the past few years. In the fourth quarter of 2021, EVs and hybrids made up 11 percent of all light-duty vehicles.[2] Biofuels, natural gas, and propane also serve as alternatives to gasoline and diesel. [3]

The key to a stable, affordable energy supply is to open access to America's abundance of natural resources. We must also allow markets and price signals to drive energy innovation. Price signals communicate information to investors and energy suppliers that there is a need for more of a certain resource, or that the suppliers should pivot to alternative technologies.

Achieving energy security will occur through the development of diverse, cost-competitive technologies that meet the needs of consumers.

Businesses and investors also need regulatory certainty. Markets will deliver dependable energy while making environmental progress if policies and regulatory frameworks allow that. Opening access to resource development and to domestic and international markets and modernizing regulations will empower innovative companies to build cleaner and faster and provide American households with the affordable, secure energy choices they need.

DOMESTIC OIL PRODUCTION HAS ECONOMIC, ENVIRONMENTAL, AND GEOPOLITICAL ADVANTAGES

While gas prices have fallen from their record highs of more than $5 per gallon in June of 2022, prices at the pump remain uncomfortably high for many Americans. As of July 2023, the national average was $3.54 per gallon,[4] and prices may climb during the summer months. The price of a barrel of crude oil makes up the largest share (57.1 percent) of the price of a gallon of gasoline.[5] Federal and state taxes (12.8 percent), distributing and marketing (12.4 percent) and refining costs and profits (17.7 percent) make up the rest.

For nearly half a century, Democrat and Republican presidents have pledged to make the United States energy independent and eliminate America's dependence on foreign oil.[6] The reality is that oil is a globally traded commodity; therefore, U.S. households will incur higher prices if demand increases in China or there is a supply disruption in Saudi Arabia.

The key to a stable, affordable energy supply is to open access to America's abundance of natural resources. We must also allow markets and price signals to drive energy innovation.

That is not to suggest, however, that Americans are helpless and at the complete mercy of state-owned oil producers like OPEC and Russia. U.S. producers have changed the global landscape for oil. The U.S. is now the largest oil and gas producer in the world, having increased production from just above 5 million barrels per day in 2007 to 11.8 million barrels per day in 2022.[7] Dependence on OPEC for crude oil decreased from 85 percent of total petroleum imports in the 1970s to 11 percent in 2021.[8] It is also worth noting that 59 percent of crude oil imports come from Canada (51 percent) and Mexico (8 percent). Increased domestic supplies acted as a market cushion to prevent prolonged price spikes from supply shocks caused either by natural disasters or disruptions in Middle Eastern production.[9] The EIA projects that U.S. production will increase to a record 12.5 million barrels per day in 2023.[10]

The consumption of oil as a dependable fuel and critical input for fertilizers, industrial processes and plastics is expected to continue for the foreseeable future. Petroleum products, which account for roughly a quarter of total U.S. energy consumption, made up 88 percent of total transportation sector energy use in 2021.[11] The EIA projects energy demand to grow nearly 50 percent by 2050.[12] Although EIA projects the largest growth to come from renewables, the agency predicts that oil will still be the top energy source.[13]

Therefore, policymakers must reject policies that restrict domestic production and recognize the unintended environmental consequences of restricting domestic production. Samantha Gross of the Brookings Institute explains:

> Cutting back domestic oil and gas production without an equally ambitious focus on demand will just increase U.S. imports, rather than reduce consumption. The United States could lose the economic advantages of its oil and gas production without a commensurate reduction in GHG emissions. In fact, such an outcome could actually increase global emissions, depending on how replacement fuels are produced and the emissions produced in transporting them to the United States. We must remember that climate change is a global problem and that the measure that matters is global GHG emissions. Any 'solution' that reduces U.S. emissions, but increases global emissions, is no solution at all. [14]

Policymakers should recognize America's global leadership in oil production is an economic, environmental, and geopolitical advantage. Working with our allies, American producers can be a global leader in supply and continue to reduce the industry's environmental and climate footprint. Domestic production can displace oil from dirtier producers and reduce the influence of political adversaries on the global market.

It is important to see that there is a difference between achieving independence from countries that are hostile to the U.S. and achieving complete energy self-sufficiency.[15] Given the connectedness of global markets and the value consumers derive from

comparative advantages, attempts to achieve self-sufficiency would be extremely costly and ineffective.[16] Americans benefit through lower prices and increased economic activity when there is a more efficient global oil market. Moreover, a barrel of oil extracted in North Dakota is different from one extracted in Saudi Arabia.

Crude oil ranges from very light to very heavy depending on its density, and sweet to sour depending on its sulfur content. In addition to the regulations and rule of law in the country where production occurs, the environmental and climate impacts vary by different types of crude. A continual flow of imports and exports allows countries to match refining capabilities to the different types of crude that are available. As a result, open markets create economic and environmental efficiencies that are better for American consumers and the U.S. economy.

Policymakers should recognize America's global leadership in oil production is an economic, environmental, and geopolitical advantage.

POLICY RECOMMENDATIONS TO EXPAND OIL AND GAS PRODUCTION

To open access to markets, provide secure supplies, and ease the pain at the pump that is caused by poor policies, Congress and the administration should:

- **Approve the Keystone XL pipeline.** Building the pipeline would deliver up to 830,000 barrels of oil per day from Canada to Gulf Coast refineries. Canadian crude would likely displace heavier crudes from Russia, Venezuela, and the Middle East.
- **Implement a 50/50 revenue share for states for production in federal waters.** To encourage states to allow offshore exploration and production, Congress should apply the same 50/50 revenue sharing program that exists between the federal and state governments on federal lands. Gulf Coast states receive 37.5 percent for offshore oil and gas development.[17] If states oversee the environmental review and permitting process, they should collect even more of the revenue.
- **Reform the Outer Continental Shelf Leasing Program by Modernizing the 5-year program.** Rather than having access to offshore federal waters determined by the political whims of different administrations, Congress should reform existing laws so the Department of Interior, working with affected states, can conduct lease sales when commercial interests exist.[18] Conservation leasing opportunities should also exist for lease sales in federal waters.
- **Repeal the Renewable Fuel Standard (RFS).** A 2019 Government Accountability Office (GAO) study found the mandate was "associated with modest gas price increases in areas outside the Midwest" for "limited effect, if any, on greenhouse gas emissions." [19] Corn-based ethanol is an important oxygenate to make gasoline burn cleaner, but the use of it should be determined by market needs rather than government mandates.

LEVERAGING AMERICAN NATURAL RESOURCE ABUNDANCE TO EXPORT ENERGY FREEDOM

Russia's invasion of Ukraine was a reminder to Europeans that the continent is far too dependent on Russian natural gas. As European natural gas production declined, countries became increasingly reliant on natural gas imports.[20] In 2021, Europe imported about 80 percent of its natural gas consumption, roughly 40 percent of which came from Russia.[21] After the invasion of Ukraine, the European Union pivoted its energy strategy to diversify away from Russia. In 2022, the continent was reliant on the U.S., Qatar, and Nigeria for nearly 26 percent of its natural gas imports. Russia supplied 24.6 percent of Europe's gas demand followed by Norway (25 percent), Algeria (11.6 percent), and others–such as Azerbaijan—at 13 percent.[22]

Relative to Europe's entire natural gas consumption, the LNG market is still rather small, but LNG has grown in importance and helped to diversify Europe's natural gas choices. Displacing all Russian gas with other sources would be incredibly challenging

and it is unlikely LNG from other countries could displace the entirety of Russian gas any time soon. Nevertheless, Europe's expansion of LNG facilities provides a roadmap to significantly curtail Russia's ability to manipulate energy markets for political purposes, even if it comes at a marginal price premium.

Importantly, American LNG exports could also help reduce global greenhouse gas emissions. A report from the Citizens for Responsible Energy Solutions (CRES) Forum found that if Europe were to switch its supply of Russian LNG to American LNG, the continent would be able to reduce emissions by 72 million metric tons annually. Similarly, if China were to import liquified natural gas from America, instead of from Russia via pipeline, global emissions would decrease by as much as 65 million metric tons annually.[23]

POLICY RECOMMENDATIONS TO EXPEDITE LNG EXPORTS

To improve opportunities to export more U.S. LNG, policymakers should:

- **Fast-track permitting for LNG exports.** If the U.S. does not have a free trade agreement (FTA) with the country receiving or sending the natural gas, the Department of Energy must make a public interest determination. The reality is LNG exports benefit Americans economically and geopolitically, and private companies should be able to sell natural gas to any buyer, as long as doing so does not compromise national security.

- **Refrain from assessing greenhouse gas impact from natural gas pipelines and LNG infrastructure.** Reducing greenhouse gas emissions and avoiding the costs of human-induced climate change are worthwhile goals. However, a single pipeline project or even all the natural gas pipelines in operation are not going to meaningfully affect the climate. Lengthier reviews will slow the development of a cleaner fuel source, increase opportunities for litigation, and create investment uncertainty. FERC's unanimous decision to reverse course on its greenhouse policies related to natural gas pipelines and facilities should remain in place.[24]

CRITICAL MINERALS

Critical minerals are just that: *critical*. Non-fuel mineral commodities are essential for quality of life, technological progress, national security, and environmental ambitions. Nearly all the modern technologies Americans rely on, such as cell phones, laptops, appliances, and vehicles, require critical minerals. They are the foundation that empowers companies to build, manufacture and innovate. These minerals are necessary inputs to produce affordable energy, stable food supplies, defense technologies, and advancements in modern medicine. In short, critical minerals are the foundation for the products to keep Americans and people around the world safe, healthy, and happy. Whether it is wind, solar, hydro, nuclear, electric vehicles, battery storage, hydrogen, geothermal, or bioenergy, every one of these clean energy technologies requires a moderate or high amount of at least two critical minerals.[25] Several technologies, most notably wind, batteries, and hydrogen, have moderate to high needs for four or more critical minerals.

Russia's invasion of Ukraine was also a reminder that disruptions around the world can threaten supplies of minerals necessary for renewable, nuclear, and alternative energy technologies. As a major supplier of nickel, copper, and palladium (important inputs for batteries and semiconductors), sanctions on the Russian economy drove up prices for these elements.[26] In addition, the U.S. imports many of the rare earth elements (REE) necessary for many defense and commercial technologies that support daily life. REEs are critical to scaling up clean energy deployment such as solar cells, batteries, and wind turbine magnets, which are needed for global decarbonization. According to a recent report from the Citizens for Responsible Energy Solutions (CRES), the U.S. is completely import-dependent for 14 critical minerals and greater than 50 percent-dependent for 17 other mineral commodities. [27]

Despite the name, rare earth elements are very abundant, including in the United States. However, most rare earth minerals are currently mined and processed in China.[28] According to the U.S. Geological Survey, China accounted for 80 percent of the rare earth minerals imported into the U.S. in 2020.[29] Policymakers warn about trading dependence on foreign oil for dependence on Chinese minerals; however, protectionism and taxpayer subsidies are ill-suited mechanisms to diversify the mining and processing of rare earths. Alternatively, allocating resources to research and development, opening access to the abundance of rare earths in the U.S., and trading with allies will reduce the ability of China to manipulate the rare earth market.

Realistically, it would be difficult for China to stop trading rare earth elements to the U.S. and the rest of the world. One reason is that U.S. companies are not solely importing the rare earth elements or oxides but products that contain them. The processed rare earths are sent to another country for assembly and exported to the U.S., so China would have to restrict rare earths trade to all those countries. In many cases, the company manufacturing the end product also resides in China.

Another data point worth mentioning is that China tried to cut off rare earths exports to Japan a decade ago, and the rare earths markets diversified. Prices increased, and mines opened in other countries including Australia, Brazil, Malaysia, and Vietnam. Canada's rare earth mining project opened in 2021 and is functioning without any tailings ponds, making it much more environmentally friendly. [30] Japan, through state backing, is investing to extract an abundance of rare earths off its coast.[31] Mountain Pass mine in California re-opened, and it has a processing facility.[32] Several other mining projects and processing facilities opened in the U.S., and many non-Chinese rare earth processing facilities opened around the world.[33]

Thus far, the Biden administration has taken a frustratingly contradictory approach to procuring the minerals necessary for an energy transition. In January, the Department of Interior issued a withdrawal of 225,000 acres in Minnesota's Superior national forest that will ban mining in the area for the next two decades. This area has one of the largest underdeveloped deposits of copper, nickel, and cobalt in the world. Similarly, other mining projects in Arizona, Nevada, and Alaska have faced regulatory and permitting challenges.[34]

Julie Padilla, the chief regulatory officer for Twin Metals Minnesota recently testified, "We can mine here better than anywhere else in the world. But the United States will not be able to do that under the current regulatory process that is unpredictable, subject to political manipulation with changing rules in each administration, and in conflict with the priorities of our nation."[35] If the U.S. and countries like Canada and Australia develop more resources, fewer minerals will need to come from countries that have lax environmental standards and use morally unconscionable labor practices.

Regrettably, rather than streamline the process while maintaining environmental and public health safety, the Biden administration added layers of bureaucracy through changes to the National Environmental Policy Act (NEPA).[36] Instead of reducing regulatory barriers, President Biden is using the Defense Production Act to procure several critical minerals.[37] Using the Defense Production Act not only sidesteps the necessary system reforms but worryingly sets a dangerous precedent to have the government usurp the role of the free, competitive markets. Eugene Gholz also warns that government subsidies would disrupt private investment because of the glut of rare earths in the market. He remarked, "US government investments using the Defense Production Act to create still more rare earth production capacity would add to this glut. The government investment could even drive the privately funded, already-operating US mine out of business again."[38]

POLICY RECOMMENDATIONS TO EXPAND DOMESTIC MINERAL PRODUCTION

Easing supply chain constraints and securing processed minerals will best be achieved by opening up domestic and international markets to extraction, processing, and trade. Congress should liberalize the domestic mining market while maintaining necessary environmental safeguards. In fact, upstream mining and refining has been identified as a challenge to meet the objectives targeted in the infrastructure bill and the Biden administration's climate targets.[39] In addition to modernizing environmental reviews and permitting (see next section), policymakers should:

- **Prohibit both pre-emptive and retroactive vetoes under Section 404 of the Clean Water Act.**
- **Narrow government procurement and purchase of rare earth elements to Department of Defense and national security needs.**[40]
- **Continue research and development into projects that can turn mine waste into useful products for clean energy and other technologies.**[41]
- **Provide research and development support for alternative mining technologies that would reduce environmental byproducts.**

The federal government should work with the private sector to maximize the efficiency of money allocated for research, development, and demonstration included in the Infrastructure Investment and Jobs Act. The Act includes National Science Foundation grants for basic research on domestic critical minerals mining and recycling, $320 million for the U.S. Geological Survey for its Earth Mapping Resources Initiative, and $140 million to build a Rare Earth Demonstration Facility.[42]

Additionally, policymakers and companies should not reflexively close the door to deep seabed mining. The ocean floor contains nodules that are rich in minerals that can be used for batteries, renewable energy and defense technologies. The nodules can effectively be scooped up from the ocean floor and the deep ocean (down to 20,000 feet). There is no actual mining, extraction, or tailings associated with deep seabed mining, and studies have shown the climate and environmental impact is far smaller than the conventional mining of minerals.[43] While it is critical to understand the ecological and environmental risks and impacts of deep seabed mining, it is also important to evaluate the trade-offs between the various ways to extract and refine minerals. More collaboration among companies, coastal countries, and scientists should establish a transparent, science-based assessment of seabed mining.

Easing supply chain constraints and securing processed minerals will best be achieved by opening up domestic and international markets to extraction, processing, and trade.

POLICY RECOMMENDATIONS TO REDUCE BARRIERS FOR ALL FORMS OF ENERGY

Several policy reforms would help with the development of oil, natural gas, critical minerals and energy infrastructure. Congress and the administration should:

- **Expedite permitting for natural resource extraction, energy projects and infrastructure.** The Lower Energy Costs Act of 2023 has several reforms that modernize the permitting process under NEPA, including limiting the page lengths of environmental assessments and environmental impact statements and reducing the statute of limitations for NEPA-related lawsuits to 120 days.

- **Open opportunities for state-led environmental reviews and permits.** Empowering states to conduct the environmental review and issue permits could create more efficient and localized reviews that better address the needs of local communities. State regulators could acquire technical expertise from the Federal Energy Regulatory Commission, the Bureau of Land Management, and the Environmental Protection Agency as necessary.

- **Repeal the Jones Act**, which mandates that oil (and other goods) shipped between two ports in the U.S. must be transported on a U.S.-built, U.S.-flagged vessel with a crew that is at least 75% American. Southern Methodist University professor James Coleman pointed out that refiners in the northeast U.S. paid triple the price to ship oil from Texas than from West Africa or Saudi Arabia. The Jones Act also distorts the transportation and delivery of LNG.

- **Eliminate steel and aluminum tariffs**, which drive up the cost of energy development and energy infrastructure.

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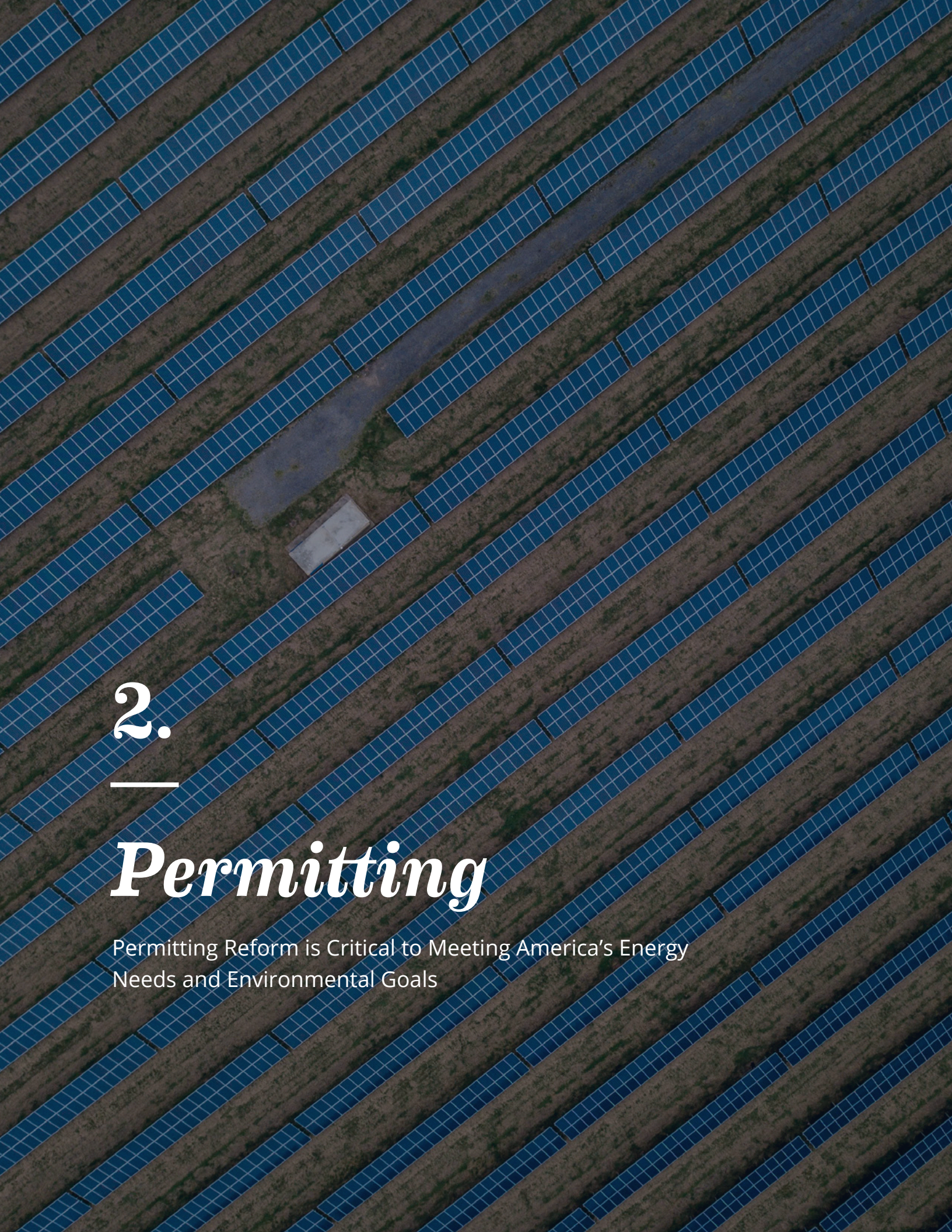

2.

Permitting

Permitting Reform is Critical to Meeting America's Energy Needs and Environmental Goals

NEPA PERMITTING REFORM IS CRITICAL TO MEETING AMERICA'S ENERGY NEEDS AND ENVIRONMENTAL GOALS

Key Takeaways:

- Cost reduction and rapid, wide-scale deployment are two of the most crucial factors for meeting America's energy needs and environmental goals. However, permitting challenges and frivolous lawsuits increase costs and delay the implementation of a wide range of projects.
- Permitting reform would significantly advance mitigation, natural ecosystems, and adaptation projects without sacrificing environmental safeguards or public participation.
- The National Environmental Policy Act (NEPA) stalls projects, including those for clean energy, natural climate solutions, and more resilient infrastructure. NEPA reform would expedite timelines, increase accountability, improve efficiency, and curb excessive litigation.

Entrepreneurs and innovators have developed and continue to develop energy sources and technologies that meet the needs of families and businesses while making progress on climate change. Cost reduction and rapid, wide scale deployment are two of the most crucial factors for meeting America's energy needs and environmental goals. Turning baby steps on decarbonization into leaps forward will require removing government-imposed barriers to innovation, investment, and deployment. Efficient permitting, construction, and deployment is critical not just in the United States but around the world, where developing countries will account for the overwhelming majority of future emissions. [1]

HOW BURDENSOME PERMITTING PROCESSES STUNT CLIMATE SOLUTIONS

Permitting challenges slow projects by increasing costs and delaying timelines to build. Most projects that would reduce emissions, improve the environment, and help communities adapt to climate change would benefit from an improved environmental review and permitting process and expedited judicial review. Activist organizations may tie up these projects in court for years. Moreover, investments in healthy ecosystems such as forest management often run into onerous permitting and legal challenges.

Turning baby steps on decarbonization into leaps forward will require removing government-imposed barriers to innovation, investment, and deployment.

Permitting reform is not the only climate solution, but it would significantly advance mitigation, healthy ecosystem, and adaptation projects.

Understanding a project's environmental impact is important, as is engaging affected communities and stakeholders. Projects should meet a set of criteria to minimize environmental risk and protect communities. A predictable, transparent environmental review should accomplish those objectives in a timely fashion; however, the process has only become more bureaucratic and opaque over time.

At the federal level, the National Environmental Policy Act (NEPA) causes regulatory paralysis and opens doors for litigious organizations to block projects even if the environmental assessment deems the project to be safe. Since President Nixon signed NEPA into law more than 50 years ago, many federal, state, and local environmental laws have been enacted and amended. The result is a complex web of unclear, overlapping, and complex requirements that slow reviews and stifle

investment without providing meaningful environmental benefits. Increased NEPA delays occur at the federal, state, and local level and open doors for legal challenges.

As an example: a runway expansion for an airport in Seattle took nineteen years to complete (fifteen for the environmental review and four to build).[2] Unsurprisingly, some of the most ardent supporters of NEPA reform are renewable energy developers. NEPA delayed a wind farm proposal in Nevada for seven years.[3]

The *Bloomberg* Editorial Board explained the challenges of NEPA:

> *Reviews can run for hundreds of pages. Lawsuits, often brought by activist groups, can extend the process interminably. Green projects aren't immune from this burden: An analysis last year found that of the projects undergoing NEPA review at the Department of Energy, 42% concerned clean energy, transmission or environmental protection, while just 15% were related to fossil fuels. Across the renewables industry, such regulation — state and federal — is impeding progress.*
>
> *Wind power advocates complain of "unreasonable and unnecessary costs and long project delays." Geothermal projects routinely face permitting hassles for seven to 10 years. Relicensing a hydropower plant can cost $50 million and take more than a decade. Solar projects often contend with a maze of permitting and certification requirements. Want to build a nuclear reactor? Compliance costs alone might exceed your profit margin.* [4]

The pace of environmental reviews, permitting, and judicial review has simply not kept up with the pace of innovation or consumer needs. Worse, these obstacles are delaying innovation and action that would expedite mitigation, natural climate solutions, and adaptation. Some of the significant problems at the federal level include differing interpretations of NEPA requirements, failed interagency coordination, administrative bottlenecks, and outdated requirements that fail to consider a dynamic, ever-changing environment. [5]

Permitting reform is not the only climate solution, but it would significantly advance mitigation, healthy ecosystem, and adaptation projects.

THE NEPA PROCESS AND ATTEMPTS AT REFORM

NEPA requires federal agencies to conduct comprehensive environmental assessments for projects that receive federal funding including highways, energy development, and activities on federal land, to name a few.[6] The NEPA process commences when a federal agency proposes a major action that could significantly impact the environment. There are multiple steps in the NEPA process, beginning with an environmental assessment as to whether the proposed action significantly affects the environment. If the project does not, the agency will make a Finding of No Significant Impact determination. If the project does significantly affect the environment, the agency must prepare an Environmental Impact Statement (EIS). Following the EIS, the agency offers a Record of Decision.

Categorical exclusions may be granted, which effectively waives NEPA requirements if the agency determines the project to have no significant environmental impacts. Categorical exclusions do not require an environmental assessment or an environmental impact statement.

The pace of environmental reviews, permitting, and judicial review has simply not kept up with the pace of innovation or consumer needs.

A 2018 study from the White House Council on Environmental Quality (CEQ) found that across all federal agencies, the average time to complete an EIS was four and a half years.[7] One quarter of the 1,161 EISs reviewed took more than six years to complete.[8] The average cost to complete a review is $4.2 million.[9] A 2020 CEQ study cataloged 118 times between 2010-2018 where an agency finished an EIS but failed to issue a decision; on average agencies took five months to issue a Record of Decision after finalizing an EIS.[10]

There is bipartisan support for improving the permitting processes, and both Republican and Democratic administrations have recognized the need to improve NEPA. Congress and several administrations have proposed to improve NEPA, with varying degrees of success.[11]

POLICY RECOMMENDATIONS FOR MORE EFFICIENT PERMITTING

One of the most comprehensive attempts to modernize NEPA is the Lower Energy Costs Act of 2023 (H.R.1). The bedrock of H.R.1's permitting reforms is the Building United States Infrastructure through Limited Delays and Efficient Reviews Act of 2023 (BUILDER Act), introduced by Representative Garret Graves (R-LA).

The major permitting provisions of H.R.1 include:[12]

- Limiting the page length of an EA and EIS to 75 pages and 120 pages, respectively.
- Limiting the time to complete an EA and EIS to one year and two years, respectively.
- Designating one federal agency as the lead agency to conduct a NEPA review for each project and reducing the statute of limitations on lawsuits to 120 days (currently 6 years).
- Directing the Secretary of a lead agency to use previously conducted EAs and EISs for projects that are "substantially the same."
- Bolstering domestic mining operations by streamlining the approval of actions such as feasibility studies, mine waste reclamation, and modernization of mining processing facilities.

In June, President Biden signed the Fiscal Responsibility Act (FRA) into law which included several meaningful components of the BUILDER Act. The FRA limits page lengths and the timeframe of EAs and EISs and establishes one federal agency to conduct NEPA reviews. Under FRA, federal agencies and developers can also use past NEPA reviews for similar projects to speed up the permitting process. Notably, the law allows project developments to take agencies to court if they fail to fulfill their statutory obligations. Other permitting bills, including one introduced by Senator John Barrasso (R-WY) and one by Senator Shelley Moore Capito (R-WV) would build on that success.[13]

While the FRA made some significant strides, it did not address one of the most problematic aspects of the federal permitting process: excessive litigation. Obstructionist activists can hold up projects for years in court, despite the reality that these projects would often yield better economic and environmental outcomes. Reducing the statute of limitations for NEPA-related lawsuits and limiting those who have standing to individuals and groups that have submitted comments would improve judicial review. Furthermore, policymakers could improve the federal permitting process by:

- Expanding the time period for public comment under NEPA. Working with local stakeholders initially would reduce litigation in the future and garner trust with the community.
- Repealing or reforming New Source Review, which disincentivizes investments in new technologies, plant upgrades and more efficient equipment.
- Prohibiting pre-emptive and retroactive vetoes under Section 404 of the Clean Water Act, which will provide more certainty for mining activities.
- Allowing state-led environmental reviews or even private sector created environmental reviews (with proper oversight and accountability).
- Establishing an efficient, technology neutral framework for licensing and permitting new nuclear reactors at the Nuclear Regulatory Commission.
- Repealing the Foreign Dredge Act, which inhibits more cost-effective upgrades to America's ports.
- Putting geothermal on equal footing with oil and gas projects on federal lands by including geothermal activities in the same set for categorical exclusions.
- Expediting permits for liquefied natural gas exports by making a determination that all LNG exports are in America's national interest because of the economic, geopolitical and environmental benefits of American LNG.
- Streamlining the process for states to receive primacy to regulate Class VI injection wells (which stored captured carbon from captured CCUS projects). Primacy, which is granted by the federal government, allows a state, rather than the EPA, to permit and regulate injection wells under stricter environmental standards and with less federal red tape and oversight.

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3.

Tax Reform

Pro-growth Tax Policies Will Accelerate Innovation, Unleash Competition

SMART TAX REFORM WILL HELP THE ECONOMY AND THE ENVIRONMENT

Key Takeaways:

- Pro-growth tax reform will incentivize more investment and innovation, creating American jobs and strengthening the U.S. economy. Competitive tax policies will empower companies to supply affordable, dependable, and cleaner-sourced power.
- Removing biases against investment and lowering rates broadly would drive investments in newer, more efficient technologies. Targeted tax subsidies for various energy sources have often been costly and inefficient. Congress should phase out tax credits for all forms of mature energy technologies. At the very least, simplifying the energy tax provisions would improve competition among technologies.

The tax code has been a popular mechanism to bolster support for specific energy sources. Different tax treatments provide specific benefits to coal, oil, natural gas, renewables, biofuels, energy efficiency, and nuclear power. Decades of laws have entrenched specific tax credits and exemptions. Some credits, initially designed to be temporary provisions to jumpstart nascent technologies, have become near permanent fixtures in the tax code. Some rules, including the percentage depletion allowance for oil and gas producers, have been around for nearly a century.[1] The result is a complicated web of preferential tax provisions including production tax credits, investment tax credits, deductions for passive trade or business activities, and many other tax advantages.

CONCERNS WITH USING THE TAX CODE TO PICK WINNERS AND LOSERS

There are many problems with using the tax code to boost specific technologies. One problem is that subsidies enable cronyism and increase dependence. Mature, cost-competitive energy sources do not need help from the taxpayer. Yet, even if a technology is financially viable, businesses that benefit will lobby to extend their preferential treatment. Politicians, who assume that their districts benefit from this treatment, will work to make it happen. In the instances that targeted tax credits incentivize more fossil fuel extraction and generation, such preferences have increased pollution and greenhouse gas emissions.

In many cases, energy subsidies have been an expensive, inefficient policy when it comes to reducing emissions. For instance, several programs and targeted tax credits have had high per-dollar costs per amount of carbon dioxide reduced. Economic analysis shows that subsidies routinely have abatement costs reaching several hundred dollars per ton. In some instances, including solar PV subsidies, the costs were projected to be as high as $2,100 per ton of CO2 (in 2017 dollars).[2] Other tax credits, like the electric vehicle tax credit, have gone to wealthy consumers who did not need the tax credit in the first place.[3]

Another problem with targeted tax credits and subsidies is that they could have the perverse effect of impeding energy innovation by disadvantaging those emerging technologies that do not receive government support. Because private capital is limited, when tax credits steer investment toward specific resources and technologies, other promising

There are many problems with using the tax code to boost specific technologies. One problem is that subsidies enable cronyism and increase dependence.

entrepreneurs and innovators that do not enjoy tax credits may miss out. For instance, targeted tax credits that result in more tax equity financing for mature technologies may create another barrier for nascent or newer technologies. Tim Latimer, CEO of geothermal startup Fervo Energy, remarked: "To the extent that your goal is to incentivize new technologies onto the grid, [tax equity financing] has a pretty counterproductive impact because the big financiers of tax equity have a rinse and repeat model and they like to go with big companies, big transactions and proven technologies."[4] Not only do these programs create substantial opportunity costs, companies that do not receive support will spend resources lobbying to expand the subsidy pool.

PRO-GROWTH TAX POLICY WILL BENEFIT THE ECONOMY AND THE ENVIRONMENT

Congress can, in fact, provide certainty to businesses and investors and should do so through pro-growth, technology-neutral tax reform. Simplifying the energy tax provisions would improve competition among technologies. Removing biases against investment and lowering rates broadly would drive investments in newer, more efficient technologies, which could supply affordable power, grow the economy, and reduce emissions. To spur energy innovation and drive decarbonization, Congress should phase out the costly, ineffective tax subsidies and equalize the beneficial ones.

POLICY RECOMMENDATIONS FOR SMART TAX REFORM

To move toward a pro-growth, simplified, and technology-neutral tax code, Congress and the administration should:

Congress can, in fact, provide certainty to businesses and investors and should do so through pro-growth, technology-neutral tax reform.

- **Make immediate expensing permanent and apply it to longer asset class lives and research and development (R&D)**. Immediate expensing allows companies to deduct the cost of capital purchases at the time they occur rather than deducting that cost over many years based on cumbersome depreciation schedules. Without expensing, the tax code is biased against new investment; however, full and immediate expensing would incentivize investments in cleaner, more efficient technologies. Immediate expensing is a way to incentivize energy efficiency without subsidizing or mandating it.[5]

  The Tax Cuts and Jobs Act of 2017 allowed for immediate expensing for assets with lives of 20 years or less, and the expensing began phasing out by 20 percent in 2023 through 2026. Philip Rossetti, senior research fellow at the R Street Institute, found that the implementation of research and development expensing through the 2017 tax reform bill had significant positive effects on private sector energy and environment research and development (E&E R&D). Rossetti found that: "Prior to the tax reform, private sector E&E R&D was relatively stagnant, only increasing by 2 percent from 2012-2017. After the tax reform, E&E R&D jumped by $3.3 billion, or 11.8 percent. Private sector E&E R&D is roughly seven times as large as public sector R&D and fulfills a fundamentally different role in the innovation life cycle than public sector R&D, so the increase in private sector innovation may mark a win for investment in technologies that are key in the pursuit of global climate objectives."[6] In the long run, businesses may adjust R&D expenditures as they adjust to the permanency of immediate expensing. However, the option to deduct costs immediately rather than amortize over five years would likely generate more R&D.[7] Congress should make immediate expensing available for short-lived and long-lived assets, including for research and development (R&D).

- **Reform the research and development tax credit.** The United States is one of the most innovative countries in the world.[8] The private sector is a clear leader on R&D investment. According to the National Science Foundation's 2022 report on research and development trends, R&D conducted in the U.S. reached $667 billion in 2019 and an estimated $708 billion in 2020. The report notes that businesses: "are the predominant performers (75% in 2019) and funders (72%) of U.S. R&D. This sector performs most of U.S. R&D classified as experimental development, more than half

of applied research, and a sizable (and increasing) share of basic research (32% in 2019)."[9] Recognizing the positive economic and knowledge spillovers of R&D (as well as the private sector's leadership role), Congress passed an R&D tax credit in 1981. After expiring in 1985, Congress reinstated an R&D tax credit that included four different types of credits: regular research, alternative simplified research, basic research, and energy research.[10] Section 174 of the tax code also allows immediate expensing of qualified research activities.[11] Businesses can expense R&D costs or use the tax credit but not both.

Targeted tax credits distort the market and often result in costly, inefficient ways to reduce emissions.

Economic research has generally shown that the tax credit increased R&D spending, though to varying degrees.[12] Several documented problems have reduced the efficacy of the R&D tax credit, most notably the high compliance costs, which disproportionately affects smaller companies.[13] The bipartisan American Innovation and Jobs Act, introduced by Sens. Todd Young (R-IN) and Maggie Hassan (D-NH) would look to make it easier for small businesses to qualify for the R&D tax credit by updating the definition of a "qualified small business" to include an entity that is eight years old or younger with $15 million in revenue (up from the current five year, $5 million threshold). The bill would also increase the credit that businesses qualify for to $500,000, before increasing incrementally to $750,000 in 2033. Today, this credit is capped at $250,000. The bill would also make immediate expensing a permanent fixture in the tax code.

- **Phase out targeted energy tax credits for mature technologies.** Targeted tax credits distort the market and often result in costly, inefficient ways to reduce emissions.[14] In addition, there are opportunity costs if the subsidies allocate public and private money to less cost-effective clean technologies and crowd out investment in technologies that do not receive federal or state support. Furthermore, if the subsidies displace other clean energy sources (such as wind or solar replacing nuclear or hydro), there is little change in the emissions portfolio. Consequently, the value of a subsidy measured by carbon dioxide and other greenhouse gas emissions avoided can vary greatly. The best policy outcome would be to eliminate all preferential tax treatment, broadly lower corporate rates, and make immediate cost recovery available to all firms.

  One fundamental way for policymakers to maintain American economic competitiveness and spur innovation is to ensure that U.S. corporate tax rates are among the lowest in the world.

  Short of that, however, Congress should replace specific energy provisions with a technology-neutral, emissions-based credit that focuses on the most efficient abatement cost. The Inflation Reduction Act (IRA) included two technology-neutral tax credits (45Y and 48E) that will replace the existing, more technology-specific production and investment tax credits in 2025 (Section 45 and 48, respectively). While these provisions are a step in the right direction, the IRA also includes several technology-specific tax credits that further subsidize mature technologies and ostensibly lead to the government picking winners and losers. While it is important not to pull the rug out from companies that benefit from these tax credits, a more prudent policy moving forward would be to eliminate technology specificity to the greatest extent possible and lower rates more broadly.

- **Maintain competitive corporate tax rates**. Tax rates matter for innovation. A May 2021 research paper from a team of Harvard economists examined how corporate taxes and personal income taxes affected the quantity, the quality, and the location of innovation. The researchers found that: "At the macro state level, personal and

corporate income taxes have significant negative effects on the quantity of innovation, as captured by the number of patents, and on the number of inventors residing in the state."[15] The paper also found that higher corporate taxes adversely affect corporate inventors' innovation production and cross-state mobility while personal income taxes "significantly affect the quantity of innovation overall and the mobility of inventors."[16] Similarly, a 2020 article in the *Journal of Financial and Quantitative Analysis* found that large corporate income tax cuts increase corporate innovation, particularly among financially constrained companies with fewer tangible assets.[17]

One fundamental way for policymakers to maintain American economic competitiveness and spur innovation is to ensure that U.S. corporate tax rates are among the lowest in the world. Before the 2017 Tax Cuts and Jobs Act, the U.S. had the fourth-highest corporate tax rate in the world; it now ranks in the middle of the pack globally (85th with a combined federal and state statutory rate of 25.77 percent).[18] Including federal and state (national and subnational) corporate tax rates, the U.S. has the 13th highest out of the 38 OECD countries.[19] At the very least, Congress and the administration should maintain the 21 percent corporate tax rate at the federal level.

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4.

Research and Development

Research and Development Drives Environmental, Economic Progress

RESEARCH AND DEVELOPMENT

Key Takeaways:

- Research and development at the private and public levels spur scientific discoveries and technological breakthroughs to improve our knowledge base, human wellbeing, and the environment.
- Commercial breakthroughs that create jobs, drive economic growth, and reduce the risks of climate change will come from a variety of research channels.
- Removing barriers to private R&D and providing consistent expenditures for public R&D will accelerate the deployment of next generation technologies, strengthen American energy security, reduce global emissions, and strengthen the resilience of communities.

Research and development (R&D) at the private and public levels is essential to advance scientific discoveries, contribute to public knowledge, and accelerate next-generation technologies. The United States is home to Silicon Valley, some of the world's most entrepreneurial companies, world-class research facilities, and top-quality colleges and universities. R&D at these institutions and other places can deliver groundbreaking innovations and generate enormous positive economic spillovers.

THE ROLE OF RESEARCH AND DEVELOPMENT

Federal research expenditures should take on endeavors of national significance and focus on efforts that are not being undertaken by the private sector. Philip Rossetti, senior fellow at the R Street Institute, stresses that, "Public spending on R&D is most effective when complementary to the private sector, and crowding out from public spending on R&D is most likely to occur when spending is too high, as the Organization for Economic Co-operation and Development (OECD) notes that funding business R&D beyond 25 percent of costs is more likely to crowd out rather than stimulate business R&D."[1] Public R&D should be complementary to private sector investments. Granted, what research the government should undertake versus what the private sector should undertake is not always obvious. Federal agencies have provided some guidance by establishing Technology Readiness Levels (TRLs), but even so, the exact point at which commercialization is the sole responsibility of the private sector remains a gray area. [2]

Commercial breakthroughs that create jobs, drive economic growth, and reduce the risks of climate change will come from a variety of research channels and in a variety of forms. For instance, Department of Defense research for national security objectives has spawned many revolutionary commercial products such as the global positioning system (GPS) and the internet.[3] DOD's research in clean energy, whether that is solar photovoltaics, micro nuclear reactors, or battery storage, can enhance the mission capabilities of America's military while validating exciting, innovative technologies.[4] The same can be said for basic research at the Department of Energy's Office of Science.

Federal investments in clean technologies have positive economic impacts. In 2018 federal R&D directly and indirectly supported 1.6 million jobs, $126 billion in labor income, $197 billion in added economic value, and $39 billion in federal and state tax revenue.[5] In the 2023 fiscal year, the United States

In 2018 federal R&D directly and indirectly supported 1.6 million jobs, $126 billion in labor income, $197 billion in added economic value, and $39 billion in federal and state tax revenue.

will invest close to $6.6 billion across the Department of Energy's applied energy offices (Energy Efficiency and Renewable Energy, Nuclear Energy, Fossil Energy and Carbon Management, and ARPA-E). This level of funding represents a 7% to 8% increase in funding over FY22 levels. [6]

THE IMPORTANCE OF PRIVATE SECTOR R&D

From individual financiers to large corporate R&D investments, the private sector invests heavily in climate innovation research, development, and early-stage startups. For example, Earthshot Ventures launched a new venture capital fund to "invest in entrepreneurs solving climate's toughest challenges."[7] Earthshot invests in both hardware and software companies from Seed through Series B funding. The fund spun off from Elemental Excelerator and brings a team that has invested in more than 150 climate startups.[8] The proliferation of startup incubators in recent years is an exciting model that brings together innovators, entrepreneurs, and investors.[9]

According to the National Science Foundation's 2022 report on research and development trends, R&D conducted in the U.S. reached $667 billion in 2019 and an estimated $708 billion in 2020. The report notes that: "[b]usinesses are the predominant performers (75% in 2019) and funders (72%) of U.S. R&D. This sector performs most of U.S. R&D classified as experimental development, more than half of applied research, and a sizable (and increasing) share of basic research (32% in 2019)."[10]

An April 2021 report from the International Energy Agency on global trends in clean energy innovation provides more encouraging news. Patents for low-carbon energy technologies grew significantly from 2004-2014 and, after a bit of a slump from 2014-2016, climbed again from 2017-2019.[11] Importantly, the report emphasizes: "Countries are specializing nationally and collaborating internationally to foster local technology advantages."[12] Free and open markets encourage innovators in different countries to specialize, producing goods in which they have a competitive advantage. The result is greater productivity, greater trade flows, and greater deployment of a wide variety of clean energy technologies.

From individual financiers to large corporate R&D investments, the private sector invests heavily in climate innovation research, development, and early-stage startups.

FEDERAL SPENDING ON R&D

Over the past few years, the United States government has made significant commitments to next-generation technologies and demonstration projects. Congress passed the Energy Act of 2020, which packaged together many bipartisan energy and climate bills. The Energy Act authorized several research and development programs and demonstration projects for carbon capture, energy storage, and advanced geothermal. It also authorized the Advanced Reactor Demonstration Project. which will give seven awards to U.S. nuclear reactor companies: two for advanced reactor demonstrations by 2027, and five for risk reductions for future demonstrations in the early 2030s.[13]

In 2021, Congress again made big commitments for energy research and development and for next generation technologies through the Infrastructure Investment and Jobs Act (IIJA). The IIJA includes funding for direct air capture and carbon capture demonstration projects. The IIJA expanded DOE's hydrogen research program and included funding for four clean hydrogen hubs which could accelerate the commercialization and deployment of the technology. The legislation also included $3 billion for battery recycling research and development and $500 million for R&D to support greenhouse gas reductions from industrial sources.[14] The IIJA also appropriated $21.5 billion in funding to the first-year Office of Clean Energy Demonstrations.

THE FOUNDATION FOR ENERGY SECURITY AND INNOVATION AS A CONDUIT FOR INNOVATION

The CHIPS and Science Act of 2022 authorized the creation of the DOE's first agency-related foundation, the Foundation for Energy Security and Innovation (FESI).[15] FESI should be instrumental in enhancing energy security, driving environmental progress, and accelerating the commercialization of transformative technologies. More specifically, FESI can help leverage private capital and serve as a coordinator to better connect researchers, investors, and entrepreneurs. To accelerate innovation, DOE should seek the support of FESI to help accelerate what is working (effective programs, best practices, etc.) and to fix what is broken at the agency. FESI could become the work-around to many well documented frustrations of commercializing technologies from DOE spending. Those frustrations include but are not limited to stovepiped funding, inflexibility, conflict of interest laws, a culture of risk aversion (dictated by and in some cases necessary because of existing laws and regulations), budget micromanagement, weakened engagement with industry, and lack of interagency or across-agency collaboration.

Free and open markets encourage innovators in different countries to specialize, producing goods in which they have a competitive advantage. The result is greater productivity, greater trade flows, and greater deployment of a wide variety of clean energy technologies.

Due to those existing constraints, DOE could use the flexibility of FESI to help carry out its mission. DOE should also seek FESI's help in conducting a thorough audit of the agency's ability to commercialize technologies, identifying legal, regulatory, policy, and cultural barriers that create inefficiencies and include a list of fixes similar to a Government Accountability Office report. Finally, DOE could seek support from FESI in attracting private capital for investments and infrastructure that is complementary to DOE and the private sector, not overlapping.

FESI could build off existing, complementary models and programs to help accelerate energy innovation. That could include the expanded use of prizes and competitions and coordinating opportunities for demand-side, private sector procurement. Additionally, FESI could serve as a clearinghouse for information that could help industry and small businesses leverage public investment and de-risk technologies (expanding and/or learning from initiatives like the American-Made Network). Depending on funding and donation levels, several models could help accelerate the commercialization of emerging technologies.

A bold ambition would be to establish a U.S. equivalent of Germany's Fraunhofer Energy Alliance to create a sustainable model where industry utilizes research expertise in a variety of ways. This could include consortium partnerships in which rising tides lift all boats for a technology or leveraging research assets for a specific company need. The U.S. Economic Development Administration's blue economy clusters could be a useful model for certain regions and communities. The Mercatus Center's Fast Grants program could be an effective model for getting smaller chunks of money out the door quickly, which could be particularly beneficial and effective for small businesses and for inexpensive but potentially transformative technologies.

DOE and FESI's engagement should be carried out in a way that identifies gaps that the private sector is not reaching. FESI could be a coordinating force between national lab expertise and early-stage investors and philanthropic venture capital and drive more private sector funding for emergent technologies. FESI could be a market facilitator when and where DOE is not suited to deal with philanthropies and venture capitalists.

POLICY RECOMMENDATIONS TO EXPAND R&D AND INCREASE COMMERCIAL OPPORTUNITIES FOR INNOVATIVE BREAKTHROUGH TECHNOLOGIES

The U.S. has made important strides at the federal and private level to accelerate energy innovation, but policymakers can do more to capitalize on public R&D and unleash more private R&D. To accelerate R&D expenditures for breakthrough technologies, Congress and the administration should:

- **Make immediate expensing permanent and apply it to longer asset class lives and research and development.** Immediate expensing allows companies to deduct the cost of capital purchases at the time they occur rather than deducting the cost over many years based on cumbersome depreciation schedules. Without expensing, the tax code is biased against new investment; however, full and immediate expensing would incentivize investments in cleaner, more efficient technologies. After immediate expensing was implemented in the 2017 Tax Cuts and Jobs Act, private sector environmental and energy R&D jumped by $3.3 billion, or 11.8 percent in 2018.[16] At the beginning of 2023, immediate expensing provisions began the process of being phased out by 20 percent annually through 2026.

- **Reinstate and reform the research and development tax credit.** The United States is one of the most innovative countries in the world.[17] Recognizing the importance of R&D and the private sector's leadership role, Congress passed an R&D tax credit in 1981 which initially "equaled 25 percent of a corporation's research spending in excess of its average research spending in the preceding three years, or alternatively, 50 percent of its current-year spending." [18]

  After expiring in 1985, Congress reinstated an R&D tax credit that included four different types of credits: regular research, alternative simplified research, basic research, and energy research.[19] Section 174 of the tax code also allows immediate expensing of qualified research activities.[20] Businesses can expense R&D costs or use the tax credit but not both. Research has generally shown that the tax credit increased R&D spending, though to varying degrees.[21] Several documented problems have reduced the efficacy of the R&D tax credit, most notably the high compliance costs, which disproportionately affect smaller companies.[22] In fact, the beneficiaries of the tax credit have largely been big businesses, though changes through the PATH Act made the credit more accessible to small businesses by allowing "businesses with less than five years of revenues and less than $5 million in current year revenues to use the R&D tax credit to offset up to $250,000 in payroll tax liability."[23] The 2017 Tax Cuts and Jobs Act expanded the research and development tax credit to allow companies to deduct 100 percent of their R&D costs in the year that they occurred. Congress failed to extend the tax credits' provisions in the 2022 omnibus, which now means that companies are required to amortize domestic and foreign R&D expenditures over a 5 and 15 year period, respectively.[24] Congress should reinstate and reform the R&D tax credit. Ways to simplify and improve the R&D tax credit and expand opportunities for small businesses include:

    - Harmonizing the definition of research expenditures for the R&D tax credit and for R&D expensing.
    - Eliminating the regular credit and replacing it with a modified alternative simplified credit. [25]
    - Raising the payroll tax liability that can be offset from the R&D credit to benefit small businesses and startups.
    - Expanding eligibility for startups and new businesses by raising the gross receipts threshold. [26]

- **Maintain support and continue to fund key programs at the Department of Energy.** Programs such as ARPA-E, the Advanced Reactor Demonstration Program (ARDP), the Milestone-based Fusion Development Program, and others have yielded significant developments for clean energy technologies and play a pivotal role in advancing early-stage technologies that would otherwise not be profitable.

- **Provide strong oversight on R&D spending.** The IIJA authorized over $73 billion in new funding for clean energy projects[27] while the IRA authorized nearly $400 billion[28] to advance clean energy technologies, albeit mostly through subsidies and tax credits. The CHIPS and Science Act also authorized substantial funding for research and development and workforce training programs.[29] Given the high level of funding that all three of these bills authorized and will receive over the coming years, Congress must make sure that federal spending is properly allocated and not subject to fraud and abuse or is duplicative of private sector efforts. To get the most public good and energy innovation out of these bills as possible, efficient and honest spending–as well as effective permitting reform–must occur.

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5.

Accelerating Nuclear Energy Deployment

Innovation, Regulation Reform, and Policy Recommendations for the Future of Nuclear Power

NUCLEAR ENERGY OVERVIEW

Key Takeaways:

- Nuclear power is safe, reliable, and the world's second-largest source of carbon-free electricity.
- Innovative companies are paving the way for the next generation of nuclear power plants.
- Modernizing regulations will accelerate the deployment of nuclear energy in the United States, and opening markets will encourage the safe deployment of emissions-free nuclear power around the world.

This comprehensive analysis explores the current state and future potential of nuclear power, emphasizing its safety, reliability, and capacity for considerable expansion. It also examines various innovative technologies in advanced reactor designs, the potential of small modular reactors (SMRs), and unique applications like recycling spent nuclear fuel. The report highlights a significant barrier to nuclear power expansion, namely outdated and cumbersome regulations, which, if modernized, could accelerate the deployment of nuclear energy. The document concludes with a robust set of policy recommendations aimed at streamlining permitting, modernizing radiation standards, adopting consent-based nuclear waste siting strategies, and encouraging more efficient and equitable licensing processes. This multifaceted approach is presented as a way to facilitate the growth of the nuclear power industry, fulfilling its promise to provide clean, affordable, and safe energy on a global scale.

THE POTENTIAL FOR NUCLEAR TO SUPPLY CLEAN, AFFORDABLE POWER

Nuclear power is the second largest emissions-free source of electricity in the world, after hydropower. With 435 reactors (and 58 more reactors under construction across 50 countries), nuclear provides about 10 percent of the world's power.[1] In the United States, 94 reactors in 28 states generate approximately 20 percent of the country's electricity and about half of the country's emissions-free electricity.[2] In addition to commercial nuclear plants that provide electricity, "there are about 220 research reactors operating in over 50 countries, with more under construction. As well as being used for research and training, many of these reactors produce medical and industrial isotopes."[3]

In the U.S., support for nuclear power is the highest it has been in a decade, with 55 percent of adults strongly or somewhat favoring the energy source.

Nuclear power has significant potential to meet the world's energy needs and climate goals. Innovative companies are paving the way for the next generation of nuclear power plants that are designed to pose even fewer public safety or proliferation risks than the ones that are currently operating. In fact, nuclear is already among the safest forms of energy that exists today. Nuclear power is responsible for only 0.03 deaths per terawatt-hour of electricity produced, making it the second-safest form of energy behind solar power.[4]

The vast majority (90%) of waste from nuclear power plants consists of lightly-contaminated items such as tools or workers clothing and only contains 1% of total radioactivity. Spent nuclear fuel is responsible for 3% of the total volume of waste, but holds 95% of the total radioactivity.[5] Spent nuclear fuel is safely stored onsite in dry or wet storage. In total, all of the spent nuclear fuel since the 1950s would cover a full football field at a height of less than three stories.[6] There have been no recorded deaths from nuclear energy waste and the radiation of a nuclear waste depository is 50 times smaller than the average radiation of our natural background.[7] In fact, the Netherlands' COVRA nuclear waste facility doubles as an art museum and provides field trips to schoolchildren to teach them about the safety of the nuclear energy industry.[8]

Different technologies, including advanced water-cooled reactors, molten-salt reactors, and fusion reactors, could improve upon an already-safe nuclear industry. Another technology is sodium cooled reactors— which are being deployed by TerraPower at the site of a retired coal plant in Kemmerer, Wyoming and could power 400,000 homes.[9] Advanced nuclear reactors, whether they are small modular reactors (SMRs) or microreactors, offer several potential advantages to complement the large (1,000 megawatt) light-water fleet of reactors that exist in the United States today. Smaller reactors have lower upfront capital costs, can be built in remote areas or underground, and have smaller (and in some cases nonexistent) waste streams.[10]

Some small reactor designs, such as Oklo's 1.5-megawatt reactor, are micro-reactors.[11] It would use spent nuclear fuel as an energy source[12], Oklo is partnering with two Department of Energy national laboratories (Argonne and Idaho) and Deep Isolation for an advanced fuel recycling demonstration project. The facility "will enable Oklo to convert nuclear waste from existing used nuclear fuel into clean energy, as well as to recycle fuel from Oklo's plants, allowing for a dramatic cost reduction and solving for a key supply chain need."[13]

In January 2023, the Nuclear Regulatory Commission (NRC) certified NuScale's small modular reactor (SMR) design, making it the first design to receive approval in the United States.[14] This ruling is significant, as it will allow companies to reference NuScale's SMR design when applying for a license from the NRC which will speed up the licensure process. NuScale has also signed memorandums of understanding with Poland[15] and Romania[16] to deploy its SMR to these European nations. While domestic certification approvals and DOE partnerships represent a significant milestone, they also represent an opportunity to learn and improve the process. NuScale's initial design certification application, for instance, consisted of 12,000 pages and 2 million pages of additional documents for regulatory audits.[17] While safety is a priority, NuScale's experience also speaks to the need for more efficiency and expediency in the regulatory process. NuScale spent half a billion dollars and over two million labor hours to get through the approval process.[18]

The aforementioned developments are a mere snippet of the innovation, investment, and deployment of nuclear power in the U.S. and around the world (For a more detailed picture, please see Third Way's advanced nuclear map).[19] With promising technologies and a global desire for emissions-free power sources, the future of nuclear energy is bright.

POLICY RECOMMENDATIONS

In the U.S., support for nuclear power is the highest it has been in a decade, with 55 percent of adults strongly or somewhat favoring the energy source.[20] Nuclear power will be critical to meeting domestic and international climate targets, but antiquated policies and regulations inhibit its progress. Congress and the administration should establish a flexible, technology-neutral framework to enable different nuclear energy technologies to compete in the marketplace. Whether it is research and development, licensing and permitting, or spent fuel management, policymakers should remove impediments to nuclear energy innovation, investment, and spent fuel management.

Nuclear power will be critical to meeting domestic and international climate targets, but antiquated policies and regulations inhibit its progress.

To promote nuclear innovation, cost reduction and deployment, policymakers and regulators should:

- **Streamline permitting for new reactor construction, whether for large light-water reactors, small modular reactors, or microreactors.** Specifically, Congress and the administration should:

    - Require the NRC to use prior environmental impact assessment and information "to the maximum extent possible" for permitting new plants at existing locations.

    - Use Environmental Assessments and Finding of No Significant Impact before conducting an EIS when applicable (more efficient designs and/or sited at brownfield locations).[21]

    - Adopt the process of allowing applicants to draft Environmental Impact Statements and Environmental Assessments (a process that is already accepted at the Federal Energy Regulatory Commission and Bureau of Land Management).[22]

    - Include nuclear power generation in categorical exclusions as part of Section 390 of the Energy Policy Act of 2005 for activities that are part of prior NEPA reviews or other regulatory actions that would qualify.

    - Narrowly tailor design and site alternatives under NEPA for demonstration projects connected to DOD facilities or national laboratories.

- **Modernize radiation standards.** Radiation standards vary across federal agencies and vary from international standards. The NRC requires that nuclear companies reduce radiation to a level "as low as is reasonably achievable," or ALARA.[23] The result is higher costs for no meaningful benefit and can disincentivize the development of innovative nuclear technologies. Transitioning to evidence-based regulations that comport with international standards would continue to protect public health and safety while creating a more competitive environment for reactor technologies.

- **Develop a modernized licensing process to better accommodate innovation.** In 2019, Congress directed the NRC to develop a new licensing framework for next generation nuclear technologies. In 2022, the NRC staff released its initial rulemaking, which is twice as long as prior frameworks. It mandates that advanced reactors "demonstrate that they have the same design elements required for large light water reactors," and retains ALARA radiation standards. While the ruling still has to be finalized, NRC Commissioners should direct staff to implement a framework that is technology-neutral and adopts a truly risk-informed radiation standard.

- **Appropriate funds for Low Dose Radiation Research.** Continued support for the Department of Energy's research on low dose radiation will support our understanding of radiation risk and should better inform evidence-based regulations surrounding radiation.

- **Adopt a strategy for consent based siting for nuclear waste.** As seen in the Yucca Mountain debate, successfully establishing a centralized and national location for the long-term disposal of nuclear waste will be hard to achieve if left to the political whims of elected officials. Instituting consent based siting can meet community needs and address their concerns while it incentivizes communities for spent fuel management and provides a long-term storage solution that breaks national political gridlock.

- **Continue to support and appropriate funds for federal research and development.** Research and development programs such as the Department of Energy's Advanced Reactor Demonstration Program and the Department of Defense's Project Pele, which funds the development of transportable microreactors to enhance the military's capabilities while ushering in a new generation of commercial reactors, have yielded several positive technological breakthroughs for nuclear power.

- **Produce an annual report about spent nuclear fuel and high-level radioactive waste in the U.S. including updating the amount of waste generated, the potential lifecycle costs of various spent fuel management options, and options for cost-effective solutions.** The study should also examine successful international models of spent fuel management and what it would take to implement a similar program in the U.S.

- **Amend the Nuclear Waste Policy Act to state that new reactors do not need to contract with the Department of Energy for waste management for an NRC license.** As Katie Tubb, formerly of The Heritage Foundation, writes, "Even as Congress deliberates broader waste management policy, it should modify and implement a recommendation by the Obama Administration's 2012 Blue Ribbon Commission on Nuclear Waste directing nuclear operators to set aside funds for waste disposal in private escrow accounts. New nuclear power plants should use these accounts to finance their waste management and disposal."

- **Shift application and safety costs to the federal government.** The provisions of nuclear safety are a public good and thus the costs should be borne by the taxpayer. Congress should appropriate money to extend cost-sharing on license applications or eliminate NRC licensing fees (which the NRC charged at $290 per hour per person in FY 2022) for all nuclear applicants. Further, Congress should appropriate money to the extent necessary to NRC for nuclear security and environmental safeguards at power plants.

- **Expand international cooperation on commercial nuclear power.** U.S. cooperation on commercial nuclear power will help expand the deployment of nuclear power, which will be critical in meeting future global energy demand and reducing global greenhouse gas emissions. Specifically, Congress should:

    - Require the NRC to coordinate and engage in nuclear import and export licensing, international cooperation, exchange programs and training with other countries, technical assistance, and other nuclear regulatory and legal frameworks (as stipulated by Section 101 of the American Nuclear Infrastructure Act).

    - Allow foreign ownership and investment by amending the Atomic Energy Act to allow the NRC to grant a license to companies under the jurisdiction of an allied government, such as a NATO member, Australia, Japan, or South Korea, as well as other countries in which the NRC determines there is no national security threat. As Tubb points out, "Foreign-ownership restrictions have halted investment in civilian nuclear energy projects in Texas (by Japanese company, Toshiba) and Maryland (by French company, Électricité de France), among others in recent decades."[24]

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6.

Renewables

Government-Imposed Barriers
Hinder Clean Energy Development

ACCELERATING RENEWABLE ENERGY DEPLOYMENT

Key Takeaways:

- Cost-competitive renewable energy generation will diversify America's energy supply and provide families and businesses with affordable, clean power.
- Modernizing and streamlining regulations is essential for allowing the expansion of renewable energy projects and building of new transmission lines.
- Measures that hinder trade, such as tariffs, drive up costs for Americans and hamstring renewable energy development in the U.S. but provide no meaningful economic, national security, or environmental benefit.

Currently, wind and solar make up a relatively small percentage of America's electricity generation. Wind (10.2%) and solar (3.4%) energy provided 13 percent of the nation's power generation in 2022.[1] Renewable energy has made incredible strides in cost reduction and deployment over the last 15 years. Subsidies and state renewable portfolio standards aid in some of that growth. Nevertheless, it is clear that private capital is mobilizing toward wind, solar, and other renewable energy technologies and this is likely to continue without preferential treatment. The business case for renewable energy sources is strong. Policymakers should remove barriers that drive up the cost and slow the deployment of renewable energy and should establish a level playing field among all energy sources and technologies.

WIND AND SOLAR

From 2009-2019, the cost of solar and onshore wind declined 89 percent and 70 percent, respectively.[2] Roughly over that same time, renewables' share of the global electricity generation mix increased from 20 percent to 29 percent (2010-2020).[3]

In the United States, wind and solar investments are thriving. While utility-scale solar installations declined slightly in 2022[4] because of inflationary pressures and supply chain constraints, total private investment in renewable energy increased by 35 percent.[5] Given the significant cost reductions and the mobilization of private capital toward new wind and solar projects, a new policy strategy is necessary. Rather than distorting markets by subsidizing mature technologies with targeted tax credits, Congress and the administration should fix the policy problems that artificially drive up the cost of renewable hardware, software, and connection. The same holds true for all energy technologies. Of course, the market is far from free. However, the solution is not to layer on more market-distorting interventions, but instead to level the playing field by removing them. For instance, policymakers should phase out targeted tax credits for all energy sources and technologies. A next-best solution would be to provide a technology-neutral tax credit and explore the implementation of a reverse auction that improves economic efficiency and

Rather than distorting markets by subsidizing mature technologies with targeted tax credits, Congress and the administration should fix the policy problems that artificially drive up the cost of renewable hardware, software, and connection.

delivers better stewardship of taxpayer money. In a reverse auction, the utility (or energy customer) would select the project developer that meets certain criteria and also offers to supply the electricity at the lowest price.

POLICY RECOMMENDATIONS TO EXPAND WIND AND SOLAR DEPLOYMENT

To drive more private sector investment in wind and solar projects, Congress and the administration should:

- **Fully eliminate Section 201 tariffs.** In 2018, President Trump used Section 201 of the Trade Act of 1974 to levy a tariff on certain solar cells and modules. American solar modules are among the priciest in the world, and solar consumers paid an additional $1.3 billion in higher costs because of the Section 201 tariffs.[6] The Biden administration extended the tariffs for another four years, though it eased the burden slightly by raising the tariff rate quota and continuing to exclude bifacial panels.[7] Tariffs have failed to accomplish the objective of growing a domestic manufacturing industry. Wood Mackenzie estimates that the tariffs make solar projects in the United States 55 percent more expensive when compared to projects in Europe.[8] The administration should reconsider its stance and eliminate the Section 201 tariffs.

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- **Extend Master Limited Partnerships to renewable projects.** Under a Master Limited Partnership (MLP), firms have the tax structure of a partnership or a limited liability company, but ownership equity trades publicly on a securities exchange. The combination of the partnership tax status and the liquidity of a publicly traded company make MLPs an attractive investment vehicle. In the energy sector, MLP formation is available for mineral extraction, oil and gas pipelines, processing, transportation, and storage, as well as for the transportation and storage of ethanol, biodiesel, and other alternative fuels.[9] MLPs are also available for geothermal energy.[10] Congress and the administration should extend MLP structures to all renewable energy projects.

- **Repeal the Jones Act or waive Jones Act requirements to increase the competitiveness of offshore wind.** The Jones Act mandates that goods shipped between two ports in the U.S. must be transported on a U.S.-built, U.S.-flagged vessel with a crew that is at least 75% American. That includes vessels used to build and service offshore wind projects. *The Washington Post* highlighted that the lack of Jones Act compliant vessels made an offshore wind project off Virginia's coast logistically more difficult and more expensive. Rather than using a closer port, "supplies shipped from Europe were first staged in Canada before being ferried on repeated trips to the construction site."[11] Using Jones Act ships is pricier, adds to the cost of projects, and could delay projects from coming online.[12] Congress should repeal the Jones Act or at the very least repeal the foreign-build requirement.

- **Increase revenue sharing for offshore wind.** Through the Outer Continental Shelf Renewable Energy Program, the Department of Interior conducts competitive and noncompetitive lease sales.[13] The company that wins the bid or negotiates the contract with DOI pays bonus bids, rent, and royalties. These revenues accrue to the federal and state governments.[14] Congress should increase the revenue sharing for offshore energy development to be a 50/50 split among the federal government and states. Coastal states and adjacent coastal states receive 27 percent of revenues generated from qualified projects.[15] Increasing the states' share would attract more buy-in, and states could allocate those resources toward coastal protection and restoration, or however they see fit.

TRANSMISSION POLICY

To expand renewable energy generation, additional transmission capacity is necessary to deliver electricity to consumers. As with other energy infrastructure, however, transmission lines can take up to a decade to build.[16] Through the years, Congress and the Federal Energy Regulatory Commission (FERC) have taken several actions to improve transmission planning, siting, and permitting.[17] In July 2021, FERC issued a Notice of Proposed Rulemaking on reforms for electric regional transmission planning, cost allocation, and generator interconnection.[18] FERC's rulemaking would take a longer-term approach to transmission buildout and would help ensure the transmission investment is more competitive and cost effective. R Street electricity experts Jennifer Chen and Devin Hartman stress that the proposed rulemaking would reform flawed transmission and generator interconnection regulations that "constrain trillions of dollars' worth of productive investment and skew capital deployment toward inefficient applications, all to the detriment of consumers, innovation and the clean transition."[19]

Making transmission more transparent, holistic, and independently administered would help consumers and reduce emissions. The creation of an Independent Transmission Monitor could significantly help to carry out these objectives. Furthermore, consumer-focused groups including the Electricity Consumers Resource Council recommend setting minimum criteria for FERC to consider for further improving transparency and better assessing what transmission investments are needed. The recommended minimum criteria include: grid enhancing technologies and other measures to increase the performance and capacity of existing infrastructure; the frequency and intensity of extreme weather; anticipated energy resource mix taking into account federal, state, local, utility, industrial, and commercial clean energy goals; age and potential retirement of existing generation and transmission; anticipated increase in levels of electrification in the transportation, home heating, and manufacturing sectors; anticipated load profiles; future penetrations of distributed energy resources; increased use and cost-effectiveness of energy storage; and existing rights-of-way including usage of highway and railway corridors to inform siting decisions.[20]

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GEOTHERMAL

Geothermal energy uses the earth's heat to power homes and heat buildings. Geothermal taps into steam and hot water reservoirs below the earth for direct heat or to power generators. The potential for geothermal to supply affordable, reliable, and clean heat and electricity is enormous. In contrast to intermittent sources of electricity such as wind and solar, geothermal is an "always-on" renewable resource. Traditional geothermal systems used heat and water close to the surface, like hot springs, along with natural fractures in the earth. However, advancements in smart extraction technologies, like those used in the oil and gas industry, have increased the potential for geothermal as a firm, clean energy source. Innovation is taking geothermal from a geographically constrained clean power source to being accessible across the globe.

For instance, companies like Fervo have enhanced geothermal systems, which "applies proven technologies– such as horizontal drilling and distributed fiber optic sensing – to geothermal reservoir development, unlocking geothermal power in previously uneconomic locations and dramatically increasing the resource potential for geothermal globally."[21] GreenFire Energy deploys

The potential for geothermal to supply affordable, reliable, and clean heat and electricity is enormous.

geothermal heat with a closed-loop system using much less water for power generation, direct use, and industrial purposes.[22]

In a closed-loop system, "fluids are circulated through the system and heated by high underground temperatures, forming what they call a 'massive radiator.'"[23] According to DOE, these modern closed-loops systems have lifecycle greenhouse gas emissions four times lower than solar photovoltaics and six to 20 times lower than natural gas.[24]

POLICY RECOMMENDATIONS TO EXPAND GEOTHERMAL ENERGY

One way to improve the economic outlook for geothermal is to address the policy barriers that stifle its development. A 2019 DOE study concludes that putting geothermal permitting on equal footing with small oil and gas well exploration on federal lands would more than double geothermal electricity generation capacity (from six gigawatts in the business-as-usual case to seven gigawatts).[25] A 2023 Western Governors Association report on geothermal identifies several ways which policymakers can provide regulatory certainty for geothermal projects in the U.S.[26] To expand geothermal generation, policymakers should:

- **Expand the use of categorical exclusions to bypass the National Environmental Policy Act reviews for geothermal exploration activities (similar to oil and gas exploration wells).**
- **Require the Secretary of Interior to identify priority areas for geothermal development on federal lands.**[27]
- **Open a central permitting office within the Bureau of Land Management and require BLM to process geothermal drilling permits at a similar pace for permits on state- and privately-owned lands.**[28]
- **Ensure that no less than 25 percent of the revenue generated from geothermal generation on federal lands goes to the county and no less than 50 percent goes to the state where the production is occurring.**

HYDROPOWER

Hydropower provided 6.3 percent of America's power generation in 2021, roughly one-third of the country's renewable electricity.[29] As a low-cost, reliable, and flexible power source, hydropower will be a critical resource in supplying affordable energy and meeting decarbonization objectives. Pumped storage hydropower offers utility-scale backup power to complement intermittent wind and solar resources. Pumped storage uses two water reservoirs: a company pumps water to an upper reservoir as a source of energy storage, and the water flows down through a turbine to the lower reservoir to generate energy.[30]

The main priorities for policymakers should be to make it easier to relicense the existing hydropower fleet and make it easier to capitalize on America's hydropower potential. In a January 2022 testimony before the Senate Energy and Natural Resources Committee, Malcolm Woolf, President and CEO of the National Hydropower Association, outlined some noteworthy statistics that underscore the need for reform. Woolf points out that:

- **281 hydropower and pumped storage facilities, about 30 percent of active licenses, are set to expire by 2030.**
- **Relicensing takes on average 7.6 years and routinely takes more than a decade, according to the Department of Energy.**
- **Relicensing a hydropower plant takes longer than relicensing a nuclear plant.**
- **The processing of a license for a 100-megawatt hydropower facility can cost upwards of $100 million.**[31]

POLICY RECOMMENDATIONS TO EXPAND HYDROPOWER

Expanding the use of pumped storage would provide additional supply and storage, which would be particularly beneficial to accompany future wind and solar buildout.[32] The Infrastructure Investment and Jobs Act allocated $700 million to "improve efficiency, maintain dam safety, reduce environmental impacts, and ensure generators continue to provide emission-free electricity."[33] To stretch taxpayer dollars further and incentivize investment in existing fleet upgrades and increasing new hydropower generation, deeper regulatory improvements are necessary. These reforms include:

- **Designate the Federal Energy Regulatory Commission as the lead agency for federal permitting and improving interagency coordination.**

- **Expedite licensing for small and next generation hydropower projects that are unlikely to affect critical habitat or endangered species and for technologies that enhance environmental protection.**

- **Require a report to Congress to further reduce barriers for conventional, pumped-storage, conduit, and emerging hydropower technologies.**

- **Include hydropower in the definition of renewable power, which would allow hydropower to count towards the federal government's renewable power procurement requirements.**[34]

- **Allow the U.S. Army Corps of Engineers to engage in private-sector financing for the federally owned fleet of power projects.**[35] The Army Corps is the largest owner of hydropower in the United States, and while Congress should require a study to examine which parts could be privatized, incorporating private financing could be beneficial for maintaining and expanding the government's hydropower fleet.

- **Empower states to manage their water resources while preventing them from abusing Section 401 of the Clean Water Act to block projects for non-water issues.**[36]

Even without legislative fixes, the Federal Energy Regulatory Commission could reduce timeframes, improve coordination, extend licenses for longer durations, eliminate duplicative processes, and implement more dispute resolutions to avoid litigation.[37] Such fixes should instill more regulatory discipline, reduce costs for companies and the taxpayer, keep existing hydropower online longer, and provide more certainty for new hydropower investment.

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7.

Farmers and Ranchers

Policy Priorities for Agricultural Innovation

EMPOWERING AMERICA'S FARMERS AND RANCHERS

Key Takeaways:

- American farmers and ranchers are essential to putting safe food on the table for families in the United States and around the world. Farmers are also on the front lines of climate change.
- A stronger agricultural economy and higher incomes for American farmers and ranchers can drive environmental progress.
- Public policy should protect private property rights, empower ranchers and farmers (rather than governments), and harness the power of incentives.
- Expanding opportunities for investment in new equipment, precision and regenerative agriculture, and removing barriers to tackling genetically modified plants and foods, invasive species, and agricultural trade will boost farm output and income while improving soil health, yielding better environmental outcomes, and building more natural climate resiliency.

American farmers and ranchers put safe food on the table for families in the United States and around the world. The people working in the domestic agricultural sector are also some of the world's leading innovators. By investing in new technologies, inventing new techniques, and identifying cost savings, farmers and ranchers have dramatically improved efficiency—producing more crops with fewer inputs. A 2018 study found that, "[i]nnovations in animal and crop genetics, chemicals, equipment, and farm organization have enabled continuing output growth while using much less labor and farmland. As a result, total agricultural output nearly tripled between 1948 and 2015—even as the amount of labor and land (two major inputs) used in farming declined by about 75 percent and 24 percent, respectively." [1]

Greater food supplies for American families and higher incomes for American farmers and ranchers can increase environmental progress.

Newer farm equipment and precision agriculture technologies will improve fuel efficiency and reduce input costs. After food leaves the farm, reducing food waste and developing alternative sources of protein will also save money, minimize environmental impacts, and provide consumers with more choices. The spread of genetically engineered crops and animals will increase productivity with a smaller environmental and climate footprint. [2]

Furthermore, natural climate solutions such as regenerative and precision agriculture allow for farmers to diversify income with a better environmental outcome. Researchers from the Soil Health Institute examined soil health management practices in the midwestern U.S. and reported, "that you could increase net revenue to farmers by $52/acre for corn and $45/acre for soybeans. Additionally, combining silviculture into farming operations can provide greater income stability, which can improve the economic resilience of farms."[3] Increased animal grazing has improved soils, biodiversity and generated climate benefits.[4] Cover crops improve soil health and reduce erosion, water pollution, and emissions.[5] While these practices are beneficial for soil biodiversity, the exact emissions reduction impact is unclear[6] and any part of farming practices as a natural climate solution would benefit from rigorous monitoring, reporting, and verification programs.[7]

POLICY PRINCIPLES TO MEET OUR FOOD NEEDS AND ENVIRONMENTAL OBJECTIVES

The aforementioned cost-saving, innovative technologies and processes underscore one important fact: Greater food supplies for American families and higher incomes for American farmers and ranchers can increase environmental progress.

As policymakers deliberate how to boost the agricultural economy and address climate change, they should adhere to three fundamental principles:

- **Protect private property rights.** Property owners benefit economically and environmentally from taking care of the asset they own. Conversely, when everyone owns something, no one has an incentive to take care of it. Countries with well-defined and protected private property rights have the strongest environmental records[8].

- **Empower farmers and ranchers.** American farmers and ranchers are global leaders in agricultural innovation. Government mandates and regulations would take decisions away from farmers and ranchers. Instead, policymakers should eliminate government-imposed barriers to agricultural innovation and provide technical assistance and guidance when applicable.

- **Harness the power of incentives.** Whether it is endangered species, invasive species or carbon offset markets, regulations and poor policy frameworks can disincentivize conservation and stewardship efforts and misallocate resources toward unproductive uses. Reforming regulations to provide incentives for farmers, ranchers, and property owners would increase agricultural output and deliver healthier natural ecosystems.

Countries with well-defined and protected private property rights have the strongest environmental records.

POLICY RECOMMENDATIONS FOR THE FARM BILL

The American agricultural industry is the global leader, but better policies would leverage America's competitive advantages, incentivize productive land and forest management practices, and expand economic opportunities for U.S. farmers and ranchers. One way to implement better policies is the 2023 farm bill. Dating back to the 1930s, Congress passes a comprehensive farm bill about every five years. The Nutrition title of the 2018 farm bill, primarily Supplemental Nutrition Assistance Program (SNAP), comprises more than 80 percent of the mandatory spending in the farm bill.[9] Along with Nutrition, the Commodities, Crop Insurance, and Conservation titles make up 99 percent of the funding in the farm bill. Policies should commit to basic and applied research and development, apply technology neutrality to energy and conservation programs, and improve opportunities for investments in more efficient and innovative technologies. Specifically, the farm bill should:

- **Commit to basic and applied research at the Department of Agriculture.** Federal funding for agricultural research and development helps America's farmers and consumers. From 1990 to 2011, every $1 spent on federal agriculture R&D yielded $20 in benefits to the U.S. economy.[10] Yet public funding levels for agricultural R&D have fallen by a third over the past two decades. After adjusting for inflation, it is at the same level as in 1970.[11]

  A key component of capturing the benefits of agriculture R&D is connecting farmers and ranchers to the research institutions. Stronger partnerships between the agricultural industry and the research community will encourage more collaboration and adoption of potentially groundbreaking technologies and practices. The bipartisan, bicameral Conservation and Innovative Climate Partnership Act would help create competitive grants for conservation practices and establish more efficient pathways to connect farmers and researchers.[12]
  Policymakers should support research programs at the Department of Agriculture that aim to increase crop yields, drive innovation, improve resilience, and lower the sector's environmental footprint. Key programs to fund include:

  - **Agriculture Advanced Research and Development Authority:** AgARDA would fund emerging and breakthrough research on "long-term and high-risk food and agriculture challenges."[13] The ARPA model is meant to find high-risk, high-reward research projects and technologies that the private sector would not undertake. Research could include everything from plant disease and invasive species to storage and packaging. Congress

authorized AgARDA in the 2018 Farm Bill and the program received $1 million in FY2023 appropriations, but the USDA has asked for $45 million to commit to a portfolio of disruptive science in agriculture.[14]

- **The Foundation for Food Agriculture Research (FFAR):** Created in the 2014 Farm Bill, FFAR is a nonprofit funded by the federal government to foster public-private partnerships for innovative food and agricultural research. Importantly, every dollar of federal funding is matched with at least one dollar of private funding, which increases the impact of federal investment and requires buy-in from the private sector.[15] FFAR-funded research helped show that a 45-second digital X-ray is a safe, reliable method for analyzing bone density in live hens. The study "could help poultry producers optimize bird selection to improve bone strength and reduce fracturing."[16]

- **Research and development for biochar:** The use of biochar, or biomass-based charcoal, has numerous documented health benefits for farm animals, soil health, water quality improvement, and improved forest health.[17] Biochar could be particularly effective at sequestering carbon, too, especially if the sources come from agriculture and forest feedstocks and residues like corn stalks and tree trimmings.[18] The bipartisan, bicameral Biochar Research Network Act of 2023 would help research and capitalize on biochar's use for crop productivity, soil health, and carbon sequestration.[19]

- **Provide consistent funding for research, development, and deployment for invasive species treatment.** A 2021 study estimated that invasive species cost North America $2 billion per year in the early 1960s, and now cost more than $26 billion per year (since 2010).[20] Private property owners have a direct incentive to eradicate invasive species, but those incentives are weaker if eradication requires active planning, coordination, and action from multiple landowners as well as state and local governments.[21] USDA's Agricultural Research Service has collaborated with private landowners and states to treat and eradicate invasive species. Expanding research within USDA, at universities, nonprofits, and the private sector can expand the availability of low-cost solutions.

- **Maximize the efficiency of rural broadband spending.**
  Reliable telecommunications are essential for farmers, not just for precision agriculture practices but also to aid in telehealth, sales, and employment. The 2018 Farm Bill allocated $350 million to the Rural Broadband Program, which awards grants and direct loans to rural communities. The farm bill also established the ReConnect Program, which helps to fund the cost of "construction, equipment, or acquisition of facilities and equipment needed to provide broadband service in rural areas."[22] To improve the efficiency of rural broadband spending, policymakers should:

  - **Consider turning funding into voucher programs.** Vouchers for rural broadband users would empower broadband purchasers, force providers to compete for customers, prevent overbuilding, and be technology neutral.[23]

  - **Improve the process to receive federal rights-of-way.** Past Congresses considered bipartisan legislation to require agencies to review and respond to federal right-of-way requests within 60 days and authorize agencies to approve the licensing for all broadband equipment on a federal right-of-way.[24] Streamlining the process to receive federal rights-of-way would improve access to broadband services in rural and tribal communities.

  - **Leverage public-private partnerships to expand mapping, especially in underserved communities.** The private sector is the primary deployer of broadband and has access to data that can improve the allocation of federal resources and better illustrate gaps in internet needs.[25]

  - **Prioritize unserved and underserved areas and ensure technology neutrality.** According to the Federal Communications Commission, 96 percent of Americans had access to broadband in 2019. Spending on rural broadband expansion should focus on the truly unserved and underserved locations, ensure technology neutrality (whether it be cable, fiber, satellite or other) and not favor municipalities, cooperatives, etc. over private providers.

- **Adopt a technology-neutral approach for USDA energy programs.**
  Current rural development energy programs at USDA provide grants and funding for renewable energy installations and advanced biofuel manufacturing. While these energy sources are important, they may not make sense for every farm across the country. The Department should adopt a more technology-neutral approach to allow for sources such as geothermal and advanced nuclear power, including microreactors and small modular reactors, to be deployed on farmlands.

RECOMMENDATIONS BEYOND THE FARM BILL

Meanwhile, there are other ways, outside the farm bill, to expand precision farming and regenerative agriculture:

- **Expand opportunities for precision farming and sustainable intensification.**
  This would enable farmers and ranchers to produce more with less. With access to more data, better information, and newer equipment, producers can improve yields while reducing emissions and unwanted environmental byproducts. Automated technologies, GPS, and enhanced imagery allow optimized seed planting while reducing inputs like fertilizers, pesticides, and fuel and water use.[26] Studies show that precision agriculture adoption increased corn and soybean yields on existing lands and allowed farmers to avoid cultivating another 10.2 million acres of new cropland, the size of 4.5 Yellowstone National parks.[27] Another case study examined the adoption of precision agriculture on a family farm in Illinois and found the family reduced its per acre costs by $67 and reduced greenhouse gas emissions more than 15 percent.[28]

American farmers are already global leaders in precision agriculture practices.[29] To magnify opportunities for precision agriculture, Congress and the administration should:

- **Make immediate expensing permanently available.** Immediate expensing would allow farmers and ranchers to deduct the cost of automated, more efficient equipment in the year the cost is incurred rather than following cumbersome depreciation schedules.

- **Leverage existing programs for farmers to purchase precision agriculture equipment.** The Producing Responsible Energy and Conservation Incentives and Solutions for the Environment Act (PRECISE Act) would expand USDA conservation loans and programs to include precision agriculture investments and provide technical assistance for farmers and ranchers who want to pursue soil health planning.[30]

- **Expand opportunities for regenerative agriculture**
  Regenerative agriculture can diversify farmers' and ranchers' income streams and produce many environmental and climate benefits, including improved soil health, better air and water quality, added carbon sequestration, and diversified wildlife habitats. Improved soil health also reduces soil erosion and makes areas more flood- and drought-resistant.[31] Transitioning, however, can be a costly and time-consuming endeavor. Congress should repurpose funds to compensate farmers for lost revenue as they switch to a healthier soil cropping system. USDA should make funds available for technical assistance for farmers and ranchers as they consult with USDA's conservation service experts, non-profits, and other farmers.[32] The Naturally Offsetting Emissions by Managing and Implementing Tillage Strategies (NO EMITs Act) would achieve several of these goals.[33]

Continued innovation will drive efficiency, increase output, maintain American leadership in agriculture and improve the environment. The Farm Bill provides ample opportunity for policymakers to enact pro-growth policies and support agricultural R&D.

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8.

Forest Management

Active Management Means Healthier Forests

FOREST MANAGEMENT

Key Takeaways:

- Healthy forests provide many economic and environmental benefits to communities and the planet. If improperly managed, however, America's forests are an economic, environmental, and public safety liability.
- Forest management through controlled burns, mechanical thinnings, and timber development will reduce the risks communities face from wildfires and will prevent the release of hundreds of millions of metric tons of carbon dioxide into the atmosphere. An ounce of prevention is worth a pound of cure.
- Reducing regulatory barriers and modernizing funding pathways will improve the health of America's forests and reduce the damage caused by wildfires.

Healthy forests provide many economic and environmental benefits to communities and the planet. Wood products are ubiquitous in the global economy, and forests promote healthier ecosystems by providing food and shelter to a wide range of animals and plants. Importantly, more robust, resilient forests are a natural climate solution. Trees, plants, and greenery purify the air and absorb carbon dioxide. In fact, forests in the United States sequester about 16 percent of annual domestic carbon dioxide emissions.[1]

If improperly managed, however, America's forests are an economic, environmental, and public safety liability. Wildfires threaten communities, lives, and livelihoods and spew exorbitant amounts of pollutants and carbon dioxide emissions into the atmosphere. In 2020, California's wildfires emitted more carbon dioxide than the entire state's fossil fuel emissions.[2] Meanwhile, 2021's wildfires in North America and Eurasia released an estimated 176 billion tons of CO2, a 150% increase over the annual mean between 2000 and 2020.[3]

Not only are wildfires damaging lives and the environment, but they are economic burdens as well. A January 2023 study in the *American Economics Association* totaled the suppression costs for 11 states at more than $13 billion from 1995-2016.[4] The Forest Service spent $3.7 billion and the Department of Interior spent $648,000 in suppression costs in 2021. The five-year average for federal suppression costs is more than $2.8 billion annually.[5] State, local, and private suppression costs can also reach tens of millions of dollars per year. In California's case, it was more than $1 billion (which includes federal reimbursement).[6]

Perhaps the most comprehensive analysis of the economic burden of wildfires is a 2017 report from the National Institute for Standards and Technology. The authors provide a literature review and explanation for calculating intervention costs, prevention, mitigation, suppression, and direct/indirect net losses. They find: "The annualized economic burden from wildfire is estimated to be between $71.1 billion to $347.8 billion ($2016 US). Annualized costs are estimated to range from $7.6 billion to $62.8 billion. Annualized losses are estimated to range from $63.5 billion to $285.0 billion."[7] Although the NIST study does not include the economic damages of more recent fires, the report is wide-ranging and comprehensive in its literature review and estimates.

THE IMPORTANCE OF ACTIVE FOREST MANAGEMENT

Climate change is exasperating drought-like conditions and prolonging fire seasons. One study by UCLA estimates that the number of days with extreme fire weather in the fall has more than doubled over the past 40 years.[8] In 2023, Americans and Canadians have seen the impacts of dry conditions first-hand as wildfires ravaged throughout Canada, sending smoke into cities along the eastern United States. As of June 2023, "About 4.3 million hectares (10.6 million acres) have already burned, roughly 15 times the annual average of the past decade."[9]

Today, about 85 percent of wildfires are caused by humans who engage in risky activities such as burning debris or leaving campfires unattended.[10] While global decarbonization will help minimize human-induced warming's impact on wildfires and wildfire seasons, a more immediate and effective solution to reduce the size and intensity of wildfires is to proactively take

care of forests. The most pressing issue for forest managers and communities threatened by wildfires is density and overgrowth, which creates a greater fuel load for fires. The fuel load includes grass, shrubs, small trees, dead leaves, and materials on the forest floor.[11] When a fire occurs in a forest with a full fuel load, the fire races up the trees and rages across the canopy, making a fire more intense and widespread and therefore more difficult to contain.

Active forest management through prescribed or controlled burns[12] and through timber harvesting will significantly reduce the fuel load. Yet federal and state policies can delay or prevent the use of forest thinning, prescribed burns, and timber development. Both processes must go through a lengthy approval process and could be subject to the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and the Clean Air Act. NEPA review alone delays mechanical thinning on federal lands 3.6 years on average and prescribed burns on federal lands by 4.7 years on average.[13] Prescribed burns must also comply with federal, state, and local air quality standards, which restrict the days forest managers may conduct them. Of course, delaying burns increases the likelihood that a wildfire will be larger and more difficult to contain, resulting in poorer air quality and higher levels of greenhouse gas emissions.

While global decarbonization will help minimize human-induced warming's impact on wildfires and wildfire seasons, a more immediate and effective solution to reduce the size and intensity of wildfires is to proactively take care of forests.

Even if a forest management plan secures the permits, litigious activists may block the project[14]. Jonathan Wood, a research fellow at the Property and Environment Research Center (PERC) noted, "What you'll often find is that there are projects which have been extremely well-vetted, which have been years in the works. There will be a 5,000-page document, which no one could conceivably ever read because it's so long and complicated, but then the project will still get put on hold for an indefinite period of time, because some special interest group filed a lawsuit."[15] Wood has documented several instances where litigation blocked a forest management project for years[16].

POLICY REFORMS FOR WILDFIRE PREVENTION AND HEALTHY FORESTS

Forest management will reduce the risk communities face from wildfires and will prevent the release of hundreds of millions of metric tons of carbon dioxide into the atmosphere. Welcomingly, policymakers at the federal and state level are turning their attention to prevention, leaning into the expression: *an ounce of prevention is worth a pound of cure.*

An April 2021 report by PERC research fellows Jonathan Wood and Holly Fretwell offers compelling evidence for the benefits of forest restoration and includes many practical recommendations to expedite restoration processes and encourage collaborative partnerships for healthier natural ecosystems.[17] They include:

- **Clarifying the language for categorical exclusion applications, which take an average of seven months to navigate.** More specific guidance should cut that average application to 30 days and categorical exclusions should be issued in one year or less.
- **Expanding the acreage limit for categorical exclusions so that a prescribed burn can safely cover more ground under one restoration project.**
- **Allowing prescribed burns to be excluded from state emissions calculations.**
- **Narrowing the scope of who can file lawsuits, limiting preliminary injunctions and stays to 60 days, and setting a six-month statute of limitation on National Environmental Policy Act challenges.**

- **Limiting Endangered Species Act consultation to projects with on-the-ground impacts on protected species.**

- **Lifting the export ban on unprocessed timber from federal lands.** A portion of the revenues from timber exports could be used at the Forest Service's discretion for forest management and fire prevention.

- **Permanently reauthorizing the Forest Service and the Bureau of Land Management to be a "Good Neighbor" through longer, more flexible partnerships with states, tribes, and counties and define prescribed burns and reforestation as program objectives.** The bipartisan, bicameral Root and Stem Project Authorization Act, introduced by Senator Steve Daines (R-MT) and Dianne Feinstein (D-CA) and Congressman Dan Newhouse (R-WA) would allow the Forest Service and Bureau of Land Management (BLM) to enter into agreements with local entities to conduct certain forest management projects on federal lands. The success of the pilot project in Washington's Colville National Forest could serve as a model for future endeavors.[18]

- **Solving burdensome budgeting challenges of long-term forest restoration projects.** As the PERC report underscores: "Under the Antideficiency Act and appropriations rules, the Forest Service cannot obligate funds in advance of appropriations or after funding has expired. This constrains its ability to participate as an equal financial partner when states, tribes, or private groups are willing to contribute funds to forest restoration."[19] PERC recommends the creation of a restoration fund that would provide funding certainty and commitment toward long-term projects.

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9.

Transportation

Recommendations to Reduce Congestion,
and Build More Resilient Infrastructure

MEETING AMERICA'S INFRASTRUCTURE NEEDS

Key Takeaways:

- Americans need affordable, dependable transportation to maintain our way of life. However, the transportation sector is also the largest source of greenhouse gas emissions in the United States.
- Reforming government-imposed barriers for infrastructure projects will give taxpayers more bang for the buck, inject more private capital into projects, and deliver cleaner, more resilient infrastructure.
- Reducing congestion provides many economic and environmental benefits including savings on fuel, reduced pollution, fewer greenhouse gas emissions, and less traffic noise.
- Congress and the administration should eliminate energy subsidies, including preferential treatment for fossil fuels. A next-best strategy should be to make existing subsidies more economically and environmentally efficient while not adding more to the federal debt.

Affordable, dependable transportation options are critical for Americans' daily needs. Whether it is driving to work, busing to school, flying to a favorite vacation spot, or transporting goods on a barge, transportation makes our lives easier, safer, and more efficient. By sector, transportation is also the largest source of greenhouse gas emissions in the United States, accounting for 29 percent of domestic emissions.[1] The largest sources of transportation emissions are light-duty vehicles (58%), medium- and heavy-duty trucks (24%), and aircraft (10%).[2] Some 90 percent of America's transportation needs are met through petroleum (gasoline, diesel, and jet fuel).[3]

Globally, transportation accounts for about 20 percent of total carbon dioxide emissions.[4] Passenger road vehicles comprise 45.1% with road freight (29.4%), aviation (11.6%), and shipping (10.6%) making up the rest.[5]

The widespread use of oil as a transportation fuel is because it is affordable and reliable, not because the industry has a monopoly or manipulates the market. The market is changing, however, and innovation and competition is diversifying the transportation sector, providing consumers more choices. As a multi-trillion-dollar market, the transportation sector is ripe for competition and disruption, where economic alternatives to oil-based fuels will benefit tremendously from the profit opportunity that is available. Those alternatives could be batteries, biofuels, natural gas, propane, hydrogen, drop-in fuels, or a fuel that may not even exist yet. For instance, December 2021 marked the first time that electric vehicle sales in Europe outpaced diesel.[6] Still, most vehicles rely on the internal combustion engine.[7]

For their part, U.S. policymakers have not wanted to follow the European model where petroleum prices have been consistently high, mostly because of high taxes. Because international demand for oil (and thus the price) is always changing, higher taxes may not meaningfully reduce consumption or drive a switch to alternative fuels. A July 2019 paper in the National Bureau of Economic Research estimates a global carbon tax of $200 per ton would only eliminate four percent of oil production and could impose high costs for relatively low cumulative emissions avoided.[8] However, a paper in the *American Economic Journal*, using Sweden as a case study, found that using price elasticity simulations may in fact underestimate the emissions reductions impact of a carbon tax.[9]

Whether or not carbon taxes might work, they are politically difficult to impose and maintain. When prices are high and the economy is slumping, people tend to worry less about the environment and climate change and more about simply making ends meet.[10] In the spring of 2022, as American prices at the pump soared above $4 per gallon, the priority for most families was determining ways to get to work and take their kids to baseball practice without busting their budget. The stark reality is that even when the economy is strong and energy prices are more affordable, Americans' willingness to pay to reduce emissions is still quite low.[11] Consequently, the role for public policymakers should be to open market opportunities and remove barriers for the development of lower-cost alternatives rather than raise prices on households and businesses. Taxes,

regulations, and subsidies will change behavior at some level, but a policy that works best for consumers will be one that unleashes innovation and competition and empowers the market to reduce any green premiums that exist.

Furthermore, as in every sector, transportation climate policy requires pragmatism and careful consideration of costs and benefits. Oil use has an environmental cost, as does mining for batteries, charging an electric vehicle from a coal-fired plant, or converting land for biofuel use. Effective climate policy must take into consideration lifecycle emissions, potential unintended environmental consequences, and abatement costs per dollar spent. Energy pragmatism should also recognize that oil is expected to be a transportation fuel source well into the future, so policies that restrict development in the United States could outsource production to dirtier authoritarian regimes (For further discussion, see energy security chapter).

The role for public policymakers should be to open market opportunities and remove barriers for the development of lower-cost alternatives rather than raise prices on households and businesses. A policy that works best for consumers will be one that unleashes innovation and competition and empowers the market to reduce any green premiums that exist.

POLICY RECOMMENDATIONS TO BUILD MORE INFRASTRUCTURE, REDUCE CONGESTION, AND ACCELERATE INNOVATION

Reforming government-imposed barriers that delay infrastructure projects and increase congestion would stretch taxpayer dollars, inject more private capital into projects, and deliver cleaner and more resilient infrastructure in a timelier manner. A May 2017 Heritage Foundation report outlined many potential reforms to make infrastructure spending more efficient.[12] These recommendations, which are still relevant today, include:

- **Modernizing the National Environmental Policy Act (NEPA).** While the Fiscal Responsibility Act included several reforms to modernize NEPA, such as instituting page limits and timeframes to complete Environmental Impact Statements and Environmental Assessments, the law failed to tackle one of the biggest NEPA-related challenges: litigation. The current statute of limitations for NEPA litigation is six years. To speed up the development of infrastructure and clean energy projects, lawmakers should reduce the statute of limitations, ideally to 120 days. (For more information, see permitting chapter).

- **Repealing Davis-Bacon Act (DBA) requirements.** From Heritage: "The Davis–Bacon Act, enacted in 1931, effectively requires construction contractors on federal projects to use union wage and benefit scales and follow union work rules. These rules inflate the cost of federal construction by nearly 10 percent on average. Eliminating the DBA has current support in Congress and would stretch each federal construction dollar further, delivering more infrastructure without the need to increase spending levels. Barring complete elimination, the Labor Department should shift to using more accurate Bureau of Labor Statistics data to estimate DBA 'prevailing wages' so they more closely reflect market pay."[13]

- **Ending Buy-America Restrictions.** Also from Heritage: "Like with the [Davis-Bacon Act] most federally funded infrastructure projects must comply with 'Buy America' mandates, which require that certain input components must be manufactured in the United States. This protectionist mandate limits selection and price competition among input manufacturers, which often leads to higher costs for projects."[14]

- **Improving Opportunities for Public Private Partnerships.** Recommendations to increase the private sector's role in major infrastructure projects, as recommended by the Heritage report, include:
    - Remove the grant repayment requirements mandated by Executive Order 12803 (issued in 1992), which requires the repayment of federal grants in order to lease or sell certain infrastructure assets intent on entering into a public-private partnership (P3). This payment amounts to a tax on P3s.
    - Lift the ban on tolling existing federal interstate highways.
    - Comprehensively audit and amend other regulatory impediments to private infrastructure investment."[15]

Another priority for federal, state, and local policymakers should be to reduce congestion. Reducing congestion provides many economic and environmental benefits including savings on fuel, reduced pollution, fewer greenhouse gas emissions, and less traffic noise.[16] Recently, New York City cleared the final hurdle to implement a congestion pricing scheme that will charge higher fees for driving into Midtown during rush hour. Money collected from these tolls will go toward investments in the city's mass transit.[17] In addition to exploring congestion pricing, policymakers should:

- **Repeal the Foreign Dredge Act.** More than a century old, the Act prohibits any foreign-built or chartered ships from dredging in the U.S. Consequently, some of the world's best dredgers, ships that could deepen and widen America's ports at a fraction of the cost and time, cannot bid on contracts. The Dutch and Belgians own these dredgers, not countries that are hostile to the U.S.

  More competitive dredging bids would be beneficial to taxpayers, American consumers and companies, and the environment. With just an inch of additional depth, a cargo ship could transport millions of dollars in more products per trip. The National Oceanic and Atmospheric Administration equates that additional inch of depth to "50 more tractors, 5,000 televisions, 30,000 laptops, or 770,000 bushels of wheat."[18] Deeper, wider port channels would also improve transportation efficiency, reducing emissions from unwanted congestion and light-loading.

Deeper, wider port channels would also improve transportation efficiency, reducing emissions from unwanted congestion and light-loading.

- **Repeal the Jones Act,** which mandates that oil (and other goods) shipped between two ports in the U.S. must be transported on a U.S.-built, U.S.-flagged vessel with a crew that is at least 75% American. Colin Grabow of the Cato Institute writes, "By disincentivizing the use of water transport—by far, the most carbon-friendly means of transporting goods—the Jones Act serves to drive up the emission of greenhouse gasses. Rather than transporting cargo by water, a portion is instead diverted to more carbon-intensive modes, such as trucking and rail."[19]

- **Deploying smart technologies.** Technology can improve efficiency, reduce congestion, and lower emissions. The installation of an Intelligent Transportation System, which is a "network of technology embedded in transport infrastructure and vehicles to improve safety and mobility,"[20] has helped cities significantly reduce congestion and emissions. This includes cameras, sensors, and technologies that help communicate real-time information to commuters and local governments. A study examined the implementation of these technologies from 1994-2014 in 99 urban areas in the United States and found they saved "over $4.7 billion dollars and 175 million hours of travel time annually in US cities. It also reduced fossil fuel consumption by about 53 million gallons and saved over 10 billion pounds of CO2 emissions."[21] Technological innovation is also making bus service more efficient by transitioning to an on-demand service rather than having the vehicle stop at each bus stop.[22] With funding available, states, cities, and localities should expand the use of cutting-edge technologies to help drivers and commuters and reduce emissions.

Policymakers should also voice concern over the market-distorting effects of subsidies. In addition to the direct cost to taxpayers,[23] subsidies tip the scale toward one energy source or technology over another, taking capital away from potentially promising technologies. As a result, public and private resources are stuck in unproductive places, stifling competition and innovation. Or, if the technology is successful, public dollars merely displace private dollars that would have been invested. Ideally, Congress and the administration would eliminate energy subsidies, including fossil fuel subsidies. A next-best strategy should be to make existing policies more economically and environmentally efficient while not adding more to the federal debt. While maintaining revenue neutrality, improvements could:

Subsidies tip the scale toward one energy source or technology over another, taking capital away from potentially promising technologies. As a result, public and private resources are stuck in unproductive places, stifling competition and innovation.

- **Replace targeted transportation fuel and EV tax credits in favor of a technology-neutral one.** Swapping the convoluted mix of credits for an emissions-based, technology-neutral one would bring more efficiency and reward performance over political preference. Neutrality should also harmonize tax credits available for alternative fuels and alternative technologies (ie, biofuels[24] and EVs). A reverse auction that awards the lowest-priced bidder could improve the efficiencies of production tax credits. Similar to the Energy Sector Innovation Credit, credits should expire once a defined market penetration has been met to support nascent transportation fuels.
- **Explore ways to incorporate ridesharing.** Recent research has demonstrated that one of the quickest and most effective ways to reduce emissions is through pooled rides, or ridesharing.[25]
- **Consider shifting the EV tax credit to hybrid-electric vehicles and secondary markets.** A common complaint about EV tax credits is that they accrue to the wealthiest Americans who would have bought an EV without the credit. Repurposing existing credits to apply to hybrids and secondary markets could be a more effective and equitable use of the funds and could go much further in reducing emissions.[26]
- **Consider replacing the Renewable Fuel Standard and Corporate Average Fuel Economy Standards (CAFE) with higher octane standards.** Rather than prolong policies that pick winners and losers and have mandates with complex formulas based on antiquated notions of energy scarcity such as CAFE, Congress should charge agencies to simply address the source of emissions. A higher octane standard would likely still benefit corn ethanol, as it is an effective oxygenate for fuel, and could lower emissions significantly.[27]
- **Continue research and development into breakthrough alternative fuels.** Drop-in hydrocarbon biofuels and hydrogen transportation could be economic and climate gamechangers for the transportation sector.[28] Congress should continue to support basic research, development, and demonstration for alternative fuels and maximize public expenditures allocated in the bipartisan Infrastructure Investment and Jobs Act.

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10.

Adaptation

Investments Now Will Reduce Future Risk

JULY 2023

ADAPTATION FOR SAFE, RESILIENT COMMUNITIES

Key Takeaways:

- Adaptation is a cost-effective climate solution. Collaboration with the scientific community, federal, state, local governments, the private sector, and other stakeholders can maximize resiliency and preparedness for natural disasters.
- Bad policy exacerbates the risks and costs of extreme weather. Poor planning, overly burdensome permitting timelines, socialized risk, and failed coordination misallocates resources and inhibits the ability of communities to adequately prepare and respond to natural disasters. The private sector should play a leading role in assessing climate risk
- Policy reforms should allow for timely construction of more durable infrastructure. Quicker deployment of more resilient buildings, flood control prevention, and forest management practices will reduce the risks and costs of extreme weather events.

For the American people, there is perhaps no greater connection to climate change than when a natural disaster hits their community. Whether it is a heat dome in the Pacific Northwest, wildfires in Colorado, or a hurricane ravaging the Gulf Coast, the personal costs of extreme weather are far too real. Natural disasters take lives, ruin livelihoods, and destroy homes and businesses. From droughts that threaten crops to flooding at military installations, extreme weather affects nearly every aspect of the U.S. economy and government.

Of course, the scientific link between anthropogenic warming and extreme weather is extremely complicated. While there is scientific uncertainty about how climate change affects some extreme weather events, other effects are clearer. For instance, sea levels are rising at accelerating rates, and some regions of the planet are more susceptible to extreme heat. However, there is low confidence to link human-caused emissions to the frequency and intensity of tornadoes.[1]

The National Oceanic and Atmospheric Administration (NOAA) summarizes the science of climate change's impact on hurricane activity in the Atlantic and around the world. In summarizing the literature, NOAA calls it "premature to conclude with high confidence" that there is a link between greenhouse gas concentrations and past hurricane activity in the Gulf Coast. However, NOAA projects with medium- to high-confidence that major hurricanes will increase in number and intensity if the planet warms by two degrees Celsius.[2]

The improvement of detection and attribution science will better inform policymakers about anthropogenic activity's effect on natural disasters. Further, climatologists may be able to better estimate the likelihood of an extreme weather event caused by human-induced warming. This chapter is not meant to be an exhaustive review of a tie between climate change and extreme weather. For trends, detection, attribution, and projections, see the Intergovernmental Panel on Climate Change's latest assessment report. Climate change should not be an excuse for ineffective policies that increase the vulnerability of communities to extreme weather events. Encouragingly, the human and economic vulnerability from climate-related disasters has been declining.[3]

The reality is that, with or without manmade climate change, natural disasters are going to strike in the United States and around the world. Policy reforms should better enable preparation, response, and recovery. The examples of what we know and do not know about anthropogenic warming and extreme weather are meant to communicate four important points:

1. **Scientific knowledge is vital to help communicate our understanding of climate change and extreme weather.** Even with imperfect knowledge, the best available science should be a guide for policymakers. Accurately communicating risk and uncertainty will help allocate resources to their most valuable use to prepare and respond to natural disasters.

2. **Adaptation is a cost-effective climate solution, and the private sector should play a leading role in assessing climate risk.** Adaptation has already been instrumental in reducing climate-related deaths and risks. Even simple measures like access to affordable air conditioning and home heating are instrumental in protecting people from extreme weather. Furthermore, collaboration with the scientific community, federal, state, local governments, the private sector, and other stakeholders can maximize resiliency and preparedness for natural disasters..

3. **Bad policy exacerbates the risks and costs of extreme weather.** Poor planning, overly burdensome permitting timelines, socialized risk, and failed coordination misallocates resources and inhibits the ability for communities to adequately prepare and respond to natural disasters.

4. **Adaptation investments are a complement, not a substitute, for global decarbonization.** Adaptation is a more immediate solution to reduce the public health and safety risks of extreme weather. But that does negate the need to reduce emissions globally. As with any approach, policymakers should carefully weigh costs, benefits, and tradeoffs.

ADAPTATION POLICY IN THE U.S.

In the United States, policy reform should allow for timely construction of more durable infrastructure. Quicker deployment of more resilient buildings, flood control prevention, and forest management will reduce the risks and costs of extreme weather events. The longer it takes to conduct an environmental review and permit for a project, the longer an area is susceptible to the next natural or manmade disaster. Take Offutt Air Force Base, south of Omaha, Nebraska, for example. An *NBC News* and *InsideClimate News* report covered the flooding at the Air Force Base in March 2019. Reporter David Hasemyer wrote that the base knew flooding was a risk as water had come close to the base's runway eight years earlier.[4] Hasemyer observed, "Crucially, construction was never approved to begin reinforcing an earthwork levee system to protect the vital base from the Missouri River the next time it raged over its banks. Winkler said approval for the levee construction was complicated by myriad requirements from the Army Corps of Engineers that took six years to navigate."[5] Identifying vulnerabilities and ways to reduce those vulnerabilities is the first step in reducing the risk of extreme weather. Carrying out plans with expediency (and with proper environmental and public safety vetting) is just as critical.

The Infrastructure Investment and Jobs Act dedicated $47 billion for climate resiliency projects to improve preparedness for fires, floods, droughts, and hurricanes.[6] $2.6 billion will go to NOAA, of which $492 million will provide resources "to map and forecast inland and coastal flooding, including 'next-generation water modeling activities.'"[7] "NOAA [will] also get $50 million to predict, model and forecast wildfires."[8] The bill included nearly $6 billion for forest restoration, management, and wildfire prevention, and contains measures for watershed and coastal restoration, $11.6 billion to the Army Corps of Engineers for flood control and river dredging, and money for the environmental remediation of abandoned mines. Additionally, the Inflation Reduction Act provided $24.9 billion for different conservation, forestry, and agriculture programs. Included in this funding is $1.8 billion to the U.S. Forest Service to conduct wild-fire reducing activities and $350 million for vegetation management. While these bills made notable investments to the country's natural ecosystems, policymakers should do more to remove barriers for climate adaptation investments.

POLICY RECOMMENDATIONS FOR SAFER, MORE RESILIENT COMMUNITIES

To enable investments for safer, more resilient communities, Congress and the administration should:

- **Enact full expensing for buildings and structures.** Full expensing allows a business to deduct expenses immediately rather than over a long depreciation schedule. For a residential building the depreciation schedule is 27.5 years and for a nonresidential building the depreciation schedule is 39 years. As the Tax Foundation notes, "This is problematic; due to inflation and the time value of money, a dollar in the future is worth less than a dollar today. Thus, delaying deductions for the cost of business investments means that the real value of the deductions is less than the original cost."[9] Immediate expensing for long-lived assets would not only provide a boost to the economy, but it would encourage the development of more efficient, environmentally friendly, and climate resilient buildings.[10]

- **Modernize the National Environmental Policy Act.** While the Fiscal Responsibility Act included several reforms to modernize NEPA, such as instituting page limits and timeframes to complete Environmental Impact Statements and Environmental Assessments, the law failed to tackle one of the biggest NEPA-related challenges: litigation. The current statute of limitations for NEPA litigation is six years. To speed up the development of climate-friendly infrastructure, conservation and clean energy projects, lawmakers should reduce the statute of limitations, ideally to 120 days. (For more information, see permitting chapter).

- **Reform the National Flood Insurance Program.** A fundamental problem that increases the public's vulnerability to extreme weather is the misperception of risk as well as policies that distort and socialize that risk. The National Flood Insurance Program (NFIP) is a prime example where the federal government has, for years, used out-of-date flood maps and subsidized insurance premiums for homeowners living in high-risk areas (often wealthy families).[11] The distortion of risk has resulted in overbuilding in areas susceptible to flooding. When flooding does occur, taxpayers are on the hook to massively bail out the program.[12] In October 2021, the Federal Emergency Management Agency (FEMA) launched its new Risk Rating 2.0 to have insurance premiums more accurately reflect the risk of living in certain areas. Productively, the new rating system uses methodology that builds off "years of investment in flood hazard information by incorporating private sector data sets, catastrophe models and evolving actuarial science."[13] The more the federal government and public can rely on private risk assessors to communicate the risks of climate change and have prices accurately reflect that risk, the safer people will be. Meanwhile, developers will think more carefully about where they build. Risk Rating 2.0 is a much-needed step in the right direction, but deeper reforms are needed, including transferring NFIP to the private sector as much as possible.[14] At the very least, homeowners and builders will more fully bear the cost of their decisions.

- **Repeal the Foreign Dredge Act.** More than a century old, the Act prohibits any foreign-built or foreign-chartered ships from dredging in the U.S. Consequently, some world class dredgers that could deepen and widen America's ports at a fraction of the cost and time cannot bid on contracts. The Dutch and Belgians own these dredgers and present minimal risk to American national security. In addition to making America's ports more competitive and removing inefficiencies created by congestion and light loading, dredging is an effective tool to replace sediment and protect against coastal erosion.[15]

- **Better coordinate federal activities on adaptation.** Several federal agencies provide resources for prevention of, response to, and recovery from natural disasters. Along with more funds committed through the infrastructure bill and appropriations bills, better coordination is necessary to protect communities and be good stewards of taxpayer dollars.

- **Limit emergency use spending to emergencies.** According to policies established by the Office of Management and Budget in 1991, emergency spending should be necessary (essential or vital, not merely useful or beneficial); sudden (coming into being quickly, not building up over time); urgent (requiring immediate action); unforeseen; and not permanent.[16] Any emergency funding to respond to natural disasters should adhere to these criteria.

- **Maintain steady support for resiliency research and development.** The private sector will be the leader in resiliency innovation as there is an economic incentive to make buildings safer and crops more weather resistant. However, government research facilities and academic institutions play an important role in studying basic physics, chemistry, novel materials, biosciences, and more. Research in these sciences can lead to groundbreaking discoveries and consequently innovative new technologies that help communities adapt to climate change. Congress should continue supporting basic science research and continue to support research to help policymakers and the public better understand climate vulnerabilities and how to prepare and respond to them.[17]

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11.

Legislative Appendix

ENERGY SECURITY					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
A bill to cut red tape for critical energy resource facilities	H.R.1131	Joyce (R-PA-13)		Allen (R-GA-12)	
A bill to streamline permitting for refining critical minerals	H.R.1070	Carter (R-GA-1)			
A bill to unlock critical energy materials	H.R.1140	Pence (R-IN-6)			
Combating Obstruction Against Leasing (COAL) Act	H.R. 1457	Hageman (R-WY- At Large)			
Committing Leases for Energy Access Now (CLEAN) Act	H.R.1449	Fulcher (R-ID-1)			
CREATE Act	S.2002		Sinema (I-AZ)		Murkowski (R-AK), Whitehouse (D-RI), Capito, (R-WV)
Critical Electric Infrastructure Cybersecurity Incident Reporting Act	H.R.1148	Walberg (R-MI-5)			
Elimination of Future Technology Delays Act of 2023	H.R.1158	Curtis (R-UT-3)			
ETAC Establishment Act of 2023	S.914		Risch (R-ID)		Manchin (D-WV)
Expediting Natural Gas Exports to Allies Act of 2023	S.2028		Rubio (R-FL)		Cassidy (R-LA)
Guarding America's Stoves (GAS) Act	H.R.337	Issa (R-CA-48)		Norman (R-SC-5), Posey (R-FL-8), Bice (R-OK-5), Mace (R-SC-1), Garcia (R-CA-27), and more	
Keeping America's Refineries Act	H.R.1155	Crenshaw (R-TX-2)		Weber (R-TX-14), Pence (R-IN-6), Joyce (R-PA-13), Carter (R-GA-1), Duncan (R-SC-3)	

Lower Energy Costs Act	H.R.1	Scalise(R-LA-1)		McMorris Rodgers (R-WA-5), Westerman (R-AR-4), Graves (R-MO-6)	
Natural Gas Export Expansion Act	S.438		Cruz (R-TX)		Capito (R-WV), Kennedy (R-LA), Cramer (R-ND)
Natural Gas Tax Repeal Act	H.R. 484	Pfluger (R-TX-11)		Arrington (R-TX-19), Newhouse (R-WA-4), Estes (R-KS-4), Perry (R-PA-10), Carey (R-OH-15), and more	
North American Energy Act	S.989		Hoeven (R-ND)		Mullin (R-OK), Sullivan (R-AK), Budd (R-NC), Murkowski (R-AK)
Primacy Certainty Act of 2023	S.1718 & H.R.3568	Crenshaw (R-TX-2)	Sullivan (R-AK)	Pfluger (R-TX-11), Weber (R-TX-14), Lesko (R-AZ-8), Curtis (R-UT-3)	Lummis (R-WY), Ricketts (R-NE)
Promoting Cross-border Energy Infrastructure Act	S.23 and H.R.1058	Armstrong (R-ND-At Large)	Mullin (R-OK)		
Promoting Interagency Coordination for Review of Natural Gas Pipelines Act	H.R.1115	Burgess (R-TX-26)			
Promoting Interagency Coordination for Review of Natural Gas Projects Act	S.988		Hoeven (R-ND)		Sullivan (R-AK), Murkowski (R-AK)
Protecting American Energy Production Act	H.R.1121	Duncan (R-SC-3)		Estes (R-KS-4), Weber (R-TX-14), Stauber (R-MN-8), Norman (R-SC-8), Jackson (R-TX-13), and more	
Protecting International Pipelines for Energy Security Act	H.R.1197	Walberg (R-MI-5)			
Protecting Our Wealth of Energy Resources (POWER) Act of 2023	S.319 & H.R.923	Hageman (R-WY- At Large)	Lummis (R-WY)	Reschenthaler (R-PA-14), Stauber (R-MN-8), Higgins (R-LA-3), Tenney (R-NY-24), Newhouse (R-WA-4), and more	Barraso (R-WY), Braun (R-IN), Britt (R-AL), Capito (R-WV), Cotton (R-AR), and more

Reduce Russian Uranium Imports Act	S.763		Barrasso (R-WY)		Manchin (D-WV), Risch (R-ID), Heinrich (R-NM), Lummis (R-WY), Coons (D-DE), and Marshall (R-KS)
Researching Efficient Federal Improvements for Necessary Energy Refining (REFINER) Act	H.R.1085	Latta (R-OH-5)			
Restore Onshore Energy Production Act	H.R.1043	Rosendale (R-MT-2)		Carl (R-AL-1), Boebert (R-CO-3), McClintock (R-CA-5)	
Save Our Gas Stoves Act	H.R.1640	Lesko (R-AZ-8)		Burgess (R-TX-26)	
Securing America's Critical Minerals Supply Act	H.R. 1068	Bucshon (R-IN-8)			
Securing Our Propane Supply Act	S.515		Stabenow (D-MI)		Thune (R-SD)
To repeal section 134 of the Clean Air Act, relating to the greenhouse gas reduction fund	H.R.1023	Palmer (R-AL-6)		Griffith (R-VA-9), Duncan (R-SC-3), Bucshon (R-IN-8), Curtis (R-UT-3), Allen (R-GA-12)	
Transparency, Accountability, Permitting, and Production of American Resources (TAPP) Act	H.R.1335	Westerman (R-AR-4)		Graves (R-LA-6), Stauber (R-MN-8)	
Unleashing American Energy Act	H.R. 356	Carl (R-AL-1)		Foxx (R-NC-5), Rosendale (R-MT-2), Letlow (R-LA-5), Guest (R-MS-3), Graves (R-LA-6), and more	
Unlocking our Domestic LNG Potential Act of 2023	H.R.1130	Johnson (R-OH-6)			

PERMITTING					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
A bill to cut red tape for critical energy resource facilities	H.R.1131	Joyce (R-PA-13)		Allen (R-GA-12)	
A bill to streamline permitting for refining critical minerals	H.R.1070	Carter (R-GA-1)			
A bill to unlock critical energy materials	H.R.1140	Pence (R-IN-6)			
American Energy Act	H.R.1067	Boebert (R-CO-3)		Nehls (R-TX-22), Ogles (R-TN-5), Tiffany (R-WI-7), Stauber (R-MN-8), Burlison (R-MO-7), and more	
Building United States Infrastructure through Limited Delays and Efficient Reviews (BUILDER) Act of 2023	H.R.1577	Graves (R-LA-6)			
Combating Obstruction Against Leasing (COAL) Act	H.R. 1457	Hageman (R-WY-At Large)			
Determination of NEPA Adequacy Streamlining Act	H.R.1430	Valadao (R-CA-22)			
Lower Energy Costs Act	H.R.1	Scalise(R-LA-1)		McMorris Rodgers (R-WA-5), Westerman (R-AR-4), Graves (R-MO-6)	
New Source Review Permitting Improvement Act	H.R.165	Griffith (R-VA-9)			
NRC Survey Act	H.R.1006	Donalds (R-FL-19)		Fleischmann (R-TN-3), Nehls (R-TX-22), Mace (R-SC-1)	
Permitting for Mining Needs Act	H.R.209	Stauber (R-MN-8		Newhouse (R-WA-4), Crenshaw (R-TX-2), Graves (R-LA-6), Owens (R-UT-4), Calvert (R-CA-41), and more	

Primacy Certainty Act of 2023	S.1718 & H.R.3568	Crenshaw (R-TX-2)	Sullivan (R-AK)	Pfluger (R-TX-11), Weber (R-TX-14), Lesko (R-AZ-8), Curtis (R-UT-3)	Lummis (R-WY), Ricketts (R-NE)
Promoting Interagency Coordination for Review of Natural Gas Pipelines Act	H.R.1115	Burgess (R-TX-26)			
Reducing Environmental Barriers to Unified Infrastructure and Land Development (REBUILD) Act of 2023	H.R.495	Calvert (R-CA-41)			
Revitalizing the Economy by Simplifying Timelines and Assuring Regulatory Transparency (RESTART) Act	S.1449		Capito (R-WV)		Barrasso (R-WY), Cramer (R-ND), Lummis (R-WY), Ricketts (R-NE), Boozman (R-AR), and more
Salvaging American Lumber Via Action with Greater Efficiency (SALVAGE) Act	H.R.567	Obernolte (R-CA-23)		Newhouse (R-WA-4), LaMalfa (R-CA-1), Rosendale (R-MT-2), Moylan (R-GU-At Large), Zinke (R-MT-1)	
Spur Permitting of Underdeveloped Resources (SPUR) Act	S.1456		Barrasso (R-WY)		Capito (R-WV), Risch (R-ID), Lee (R-UT), Daines (R-MT), Murkowski (R-AK), and more
Transparency, Accountability, Permitting, and Production of American Resources (TAPP) Act	H.R. 1335	Westerman (R-AR-4)		Graves (R-LA-6), Stauber (R-MN-8)	
Water Supply Permitting Coordination Act	H.R.186	McClintock (R-CA-5)		LaMalfa (R-CA-1), Stauber (R-MN-8), Valadao (R-CA-22)	

TAX REFORM					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
American Innovation and Jobs Act	S.866		Hassan (D-NH)		Young (R-IN), Cortez Masto (D-NV), Barrasso (R-WY), Sinema (I-AZ), Tillis (R-NC), and more
ALIGN Act	H.R.2406	Arrington (R-TX-19)		Estes (R-KS-4), Buchanan (R-FL-16), Miller (R-WV-1), Steel (R-CA-45), Hern (R-OK-1), and more	
Build It in America Act	H.R.3938	Smith (R-MO-8)			
Small Business Jobs Act	H.R.3937	Smith (R-MO-8)			

RESEARCH AND DEVELOPMENT

Legislation	Bill Number(s)	House Sponsor	Senate Sponsor	House Cosponsor(s)	Senate Cosponsors(s)
Abandoned Well Remediation Research and Development Act	S.429		Lujan (D-NM)		Cramer (R-ND), Heinrich (D-NM), Mullin (R-OK)
Agrivoltaics Research and Demonstration Act of 2023	S. 1778		Heinrich (D-NM)		Braun (R-IN)
ALIGN Act	H.R.2406	Arrington (R-TX-19)		Estes (R-KS-4), Buchanan (R-FL-16), Miller (R-WV-1), Steel (R-CA-45), Hern (R-OK-1), and more	
American Innovation and Jobs Act	S.866		Hassan (D-NH)		Young (R-IN), Cortez Masto (D-NV), Barrasso (R-WY), Sinema (I-AZ), Tillis (R-NC), and more
Biochar Research Network Act of 2023	S.732		Grassley (R-IA)		Tester (D-MT), Thune (R-SC), Brown (D-OH)
Build It in America Act	H.R.3938	Smith (R-MO-8)			
Clean Energy Demonstration Transparency Act of 2023	H.R.1069	Carrey (R-OH-15)		Lucas (R-OK-3), Lofgren (D-CA-18), Williams (R-NY-22), Davids (D-KS-3), Donalds (R-FL-19)	
CREATE Act	S.2002		Sinema (I-AZ)		Murkowski (R-AK), Whitehouse (D-RI), Capito, (R-WV)
CREST Act of 2023	S. 1576		Collins (R-ME)		King Jr. (I-ME), Cassidy (R-LA), Cantwell (D-WA), Coons (D-DE)
DOE and NASA Interagency Research Coordination Act	H.R.2988	Williams (R-NY-22)		Sorensen (D-IL-17),	
DOE and NSF Interagency Research Act	H.R.2980	Stevens (D-MI-11)		Baird (R-IN-4)	

FAA Research and Development Act of 2023	H.R.3559	Lucas (R-OK-3)			
FAST Fix Act	S.1003		Hoeven (R-ND), Risch (R-Idaho)		Cortez Masto (D-Nev.), Crapo (R-Idaho), Capito (R-W. Va.), Rosen (D-Nev.)
Hydrogen Infrastructure Finance and Innovation Act	S.649		Cornyn (R-TX)		Coons (D-DE), Cassidy (R-LA), Heinrich (D-NM), Murkowski (R-AK), Lujan (D-NM)
NRC Survey Act	H.R.1006	Donalds (R-FL-19)		Fleischmann (R-TN-3), Nehls (R-TX-22), Mace (R-SC-1)	
Nuclear Assistance for America's Small Businesses Act	H.R.1007	Donalds (R-FL-19)		Fleischmann (R-TN-3), Salazar (R-FL-27), Nehls (R-TX-22), Bishop (R-NC-8), Mace (R-SC-1), and more	
Recycling Infrastructure and Accessibility Act of 2023	S. 1189		Capito (R-WV)		Carper (D-DE), Boozman (R-AR), Warnock (D-GA), Sullivan (R-AK), King (I-ME), Casey (D-PA), Stabenow (D-MI), Kelly (D-AZ), Duckworth (D-IL), Collins (R-ME)
Water Quality and Environmental Innovation Act	H.R.873	Donalds (R-FL-19)		Gottheimer (D-NJ-5)	

NUCLEAR					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
ADVANCE Act	S. 1111		Capito (R-WV)		Whitehouse (D-RI), Barrasso (R-WY), Carper (D-DE), Crapo (R-ID), Booker (D-NJ), and more
Advanced Nuclear Deployment Act	H.R.___	Hudson (R-NC-9)			
Advanced Nuclear Support Act	H.R.3487	Donalds (R-FL-19)			
Advanced Nuclear Reactor Prize Act	H.R.___	Curtis (R-UT-3)			
Advanced Reactor Fee Reduction Act	H.R.___				
Advancing Nuclear Regulatory Oversight Act	H.R.___	Lesko (R-AZ-8)			
Efficient Nuclear Licensing Hearings Act	H.R.___				
Global Nuclear Energy Assessment and Cooperation Act	H.R.995	Carter (R-GA-1)		Peters (D-CA-50)	
International Nuclear Energy Act of 2023	H.R.2938	Donalds (R-FL-19)		Clyburn (D-SC-6)	
Modernize Nuclear Reactor Environmental Reviews Act	H.R.___				
National Strategy to Utilize Microreactors for Natural Disaster Response Efforts Act	H.R.1009	Donalds (R-FL-19)		Fleischmann (R-TN-3), Mace (R-SC-1), Feenstra (R-IA-4), Obernolte (R-CA-23)	
NRC Mission Alignment Act	H.R.___				

Nuclear Assistance for America's Small Businesses Act	H.R.1007	Donalds (R-FL-19)		Fleischmann (R-TN-3), Salazar (R-FL-27), Nehls (R-TX-22), Bishop (R-NC-8), Mace (R-SC-1), and more	
Nuclear for Brownfields Site Preparation Act	H.R.___				
Nuclear Fuel Security Act	S.452 and H.R.1086	Latta (R-OH-5)	Manchin (D-WV)		Barrasso (R-WY), Risch (R-ID)
Nuclear Licensing Efficiency Act	H.R.___				
Prohibiting Russian Uranium Imports Act	H.R.1042	McMorris Rodgers (R-WA-5)		Latta (R-OH-5)	
Strengthening American Nuclear Competitiveness Act	H.R.___	Johnson (R-OH-6)			
Reduce Russian Uranium Imports Act	S.763		Barasso (R-WY)		Manchin (D-WV), Risch (R-ID), Heinrich (R-NM), Lummis (R-WY), Coons (D-DE), and Marshall (R-KS)

RENEWABLES					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
American Offshore Wind Opportunity Act	H.R.3614	Scott (D-VA-3)		Panetta (D-CA-19), Auchincloss (D-MA-4), Ross (D-NC-4)	
CLEAN Act	H.R.1449	Fulcher (R-ID-1)			
Community and Hydropower Improvement Act	S.1521		Daines (R-MT)		
Hydropower Clean Energy Future Act	H.R.4045	McMorris Rodgers (R-WA-5)			
POWER Our Reservoirs Act	S. 1215 & H.R.2731	Tonko (D-NY-20)	King Jr. (I-ME)	Huffman (D-CA-2)	
Public Land Renewable Energy Development Act of 2023	H.R.178	Levin (D-CA-49)			
RISEE Act of 2023	S.373 & H.R.913	Fletcher (D-TX-7)	Whitehouse (D-RI)	Weber (R-TX-14), Davis (D-NC-1), Mace (R-SC-1), Spanberger (D-VA-7), Eshoo (D-CA-16), and more	Cassidy (R-LA), Kennedy (R-LA), King (I-ME), Shaheen (D-NH), Coons (D-DE), and more

AGRICULTURAL INNOVATION

Legislation	Bill Number(s)	House Sponsor	Senate Sponsor	House Cosponsor(s)	Senate Cosponsors(s)
Advancing Cutting Edge (ACE) Agriculture Act of 2023	S.834		Bennet (D-CO)		Marshall (R-KS)
Agriculture Export Promotion Act of 2023	H.R.648	Newhouse (R-WA-4)		Costa (D-CA-21), Mann (R-KS-1), Schrier (D-WA-8), Hinson (R-IA-2), Panetta (D-CA-19)	
Agrivoltaics Research and Demonstration Act of 2023	S.1778		Heinrich (D-NM)		Braun (R-IN)
Assistance for Rural Water Systems Act of 2023	S.1079		Shaheen (D-NH)		Tillis (R-NC), Duckworth (D-IL), Sullivan (R-AK), Ernst (R-IA)
Biochar Research Network Act of 2023	S.732		Grassley (R-IA)		Tester (D-MT), Thune (R-SC), Brown (D-OH)
Conservation and Innovative Climate Partnership Act of 2023	S.900 & H.R.2719	Newhouse (R-WA-4)	Thune (R-SD)	Pingree (D-ME-1)	Smith (D-MN), Braun (R-IN), Schatz (D-HI)
Conservation Reserve Program Improvement Act of 2023	S.174		Thune (R-SD)		Klobuchar (D-MN)
Emergency Conservation Program Improvement Act of 2023	S.231		Fischer (R-NE)		Lujan (D-NM)
EQIP Improvement Act of 2023	S.658		Booker (D-NJ)		Lee (R-UT)
Food and Agriculture Industry Cybersecurity Support Act	H.R.1219	Pfluger (R-TX-11)		Veasey (D-TX-33), Curtis (R-UT-3), Matsui (D-CA-7)	
Livestock Regulatory Protection Act of 2023	S.997		Thune (R-SD)		Sinema (I-AZ), Boozman (R-AR), Kelly (D-AZ)
Precision Agriculture Loan Program Act of 2023	S.719 & H.R.1495	Feenstra (R-IA-4)	Fisher (R-NE)	Panetta (D-CA-19), Tokuda (D-HI-2), Thompson (D-CA-2), Guest (R-MS-4)	Klobuchar (D-MN)
Precision Agriculture Satellite Connectivity Act	H.R.1339	Latta (R-OH-5)		Kelley (D-IL-2)	

Producing Responsible Energy and Conservation Incentives and Solutions for the Environment (PRECISE) Act	S.720 & H.R.1459	Hinson (R-IA-2)	Fisher (R-NE)	Panetta (D-CA-19), Finstad (R-MN-1), Craig (D-MN-2)	Klobuchar (D-MN)
Promoting Precision Agriculture Act of 2023	S.734		Thune (R-SD)		Warnock (D-GA)
Root and Stem Project Authorization Act of 2023	H.R.674 and S.199	Newhouse (R-WA-4)	Daines (R-MT)	Peters (D-CA-50), Zinke (R-MT-1)	Feinstein (D-CA)
RURAL Broadband Act of 2023	H.R.922				
Rural Broadband Protection Act of 2023	S.275		Capito (R-WV)		Klobuchar (D-MN)
Rural Internet Improvement Act of 2023	S.130		Thune (R-SD)		Lujan (D-NM), Fisher (R-NE), Klobuchar (D-MN)

FOREST MANAGEMENT					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Accurately Counting Risk Elimination Solutions (ACRES) Act	H.R.1567	Tiffany (R-WI-7)			
CREATE Act	S.2002		Sinema (I-AZ)		Murkowski (R-AK), Whitehouse (D-RI), Capito, (R-WV)
Direct Hire To Fight Fires	H.R.3499	Issa (R-CA-48)		LaMalfa (R-CA-1)	
Expediting Forest Restoration and Recovery Act of 2023	S.808		Thune (R-SD)		
Expediting Forest Restoration and Recovery Act of 2023	S.808		Thune (R-SD)		
Fire Department Repayment Act of 2023	H.R.3396	Harder (D-CA-9)		Curtis (R-UT-3), Stewart (R-UT-2), LaMalfa (R-CA-1)	
Fire Grants and Safety Act	S.870		Peters (D-MI)		Collins (R-ME), Murkowski (R-AK), Carper (D-DE)
Fire Grants and Safety Act of 2023	H.R.4090	Kean (R-NJ-7)		Pascrell (D-NJ-9), Bost (R-IL-12), Golden (D-ME-2), Fitzpatrick (R-PA-1), Hoyer (D-MD-5), and more	
Forest Data Modernization Act of 2023	S.1743		Ossoff (D-GA)		Cassidy (R-LA)
Forest Litigation Reform Act of 2023	H.R.636	Rosendale (R-MT-2)			
Forest Protection and Wildland Firefighter Safety Act of 2023	H.R.1586	LaMalfa (R-CA-1)		Panetta (D-CA-19), Newhouse (R-WA-4), Fulcher (R-ID-1), Scott (R-GA-8), Garamendi (D-CA-8), and more	

Forest Protection and Wildland Firefighter Safety Act of 2023	S.796		Lummis (R-WY)		Crapo (R-ID), Risch (R-ID), Daines (R-MT), Sullivan (R-AK) Capito (R-WV)
Invasive Species Prevention and Forest Restoration Act	S.1238		Welch (D-VT)		Braun (R-IN), Hassan (D-NH)
Neighborhood Tree Act of 2023	S.1380		Brown (D-OH)		Booker (D-NJ), Sinema (I-AZ)
NIST Wildland Fire Communications and Information Dissemination Act	H.R.369	Kim (R-CA-42)		Stansbury (D-NM-1), Neguse (D-CO-2)	
Root and Stem Project Authorization Act of 2023	H.R.674 and S.199	Newhouse (R-WA-4)	Daines (R-MT)	Peters (D-CA-50), Zinke (R-MT-1)	Feinstein (D-CA)
Salvaging American Lumber Via Action with Greater Efficiency (SALVAGE) Act	H.R.567	Obernolte (R-CA-23)		Newhouse (R-WA-4), LaMalfa (R-CA-1), Rosendale (R-MT-2), Moylan (R-GU-At Large), Zinke (R-MT-1)	
Wildfire Grid Resiliency Act	H.R.3615	Torres (D-CA-35)			

TRANSPORTATION					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
American Offshore Wind Opportunity Act	H.R.3614	Scott (D-VA-3)		Panetta (D-CA-19), Auchincloss (D-MA-4), Ross (D-NC-4)	
Building United States Infrastructure through Limited Delays and Efficient Reviews (BUILDER) Act of 2023	H.R.1577	Graves (R-LA-6)			
National Construction Safety Team Act of 2023	H.R. 4143	Lofgren (D-CA-18)		Lucas (R-OK-3)	
Rebuilding Rural Roads Act	H.R.3002	Finstad (R-MN-1)		Stauber (R-MN-8)	
Transparency, Accountability, Permitting, and Production of American Resources (TAPP) Act	H.R. 1335	Westerman (R-AR-4)		Graves (R-LA-6), Stauber (R-MN-8)	
To improve the environmental review process for highway projects	H.R.4621	Johnson (R-SD-At Large)		Stanton (D-AZ-4)	

ADAPTATION					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Agrivoltaics Research and Demonstration Act of 2023	S.1778		Heinrich (D-NM)		Braun (R-IN)
Biochar Research Network Act of 2023	S.732		Grassley (R-IA)		Tester (D-MT), Thune (R-SC), Brown (D-OH)
Combat Harmful Algal Blooms Act	H.R.1008	Donalds (R-FL-19)		Schultz (D-FL-25), Diaz-Balart (R-FL-26), Frost (D-FL-10), Posey (R-FL-8), Frankel (D-FL-22), and more	
CREATE Act	S.2002		Sinema (I-AZ)		Murkowski (R-AK), Whitehouse (D-RI), Capito, (R-WV)
Floriculture and Nursery Plant Health Initiative Act of 2023	H.R.1426	Tokuda (D-HI-2)		Case (D-HI-1)	
Forest Data Modernization Act of 2023	S.1743		Ossoff (D-GA)		Cassidy (R-LA)
MATCH Act of 2023	S.757		Romney (R-UT)		Bennet (D-CO)
Neighborhood Tree Act of 2023	S.1380		Brown (D-OH)		Booker (D-NJ), Sinema (I-AZ)
NIST Wildland Fire Communications and Information Dissemination Act	H.R.369	Kim (R-CA-42)		Stansbury (D-NM-1), Neguse (D-CO-2)	
Plant Biostimulant Act of 2023	S.802		Braun (R-IN)		Padilla (D-CA)
Protecting Coasts and Cities from Severe Weather Act	H.R. 4069	Kean (R-NJ-7)			
Root and Stem Project Authorization Act of 2023	H.R.674 and S.199	Newhouse (R-WA-4)	Daines (R-MT)	Peters (D-CA-50), Zinke (R-MT-1)	Feinstein (D-CA)

SAND Act of 2023	S.47		Rubio (R-FL)		
Water Supply Permitting Coordination Act	H.R.186	McClintock (R-CA-5)		LaMalfa (R-CA-1), Stauber (R-MN-8), Valadao (R-CA-22)	
Water Quality and Environmental Innovation Act	H.R.873	Donalds (R-FL-19)		Gottheimer (D-NJ-5)	
Wildfire Grid Resiliency Act	H.R.3615	Torres (D-CA-35)			