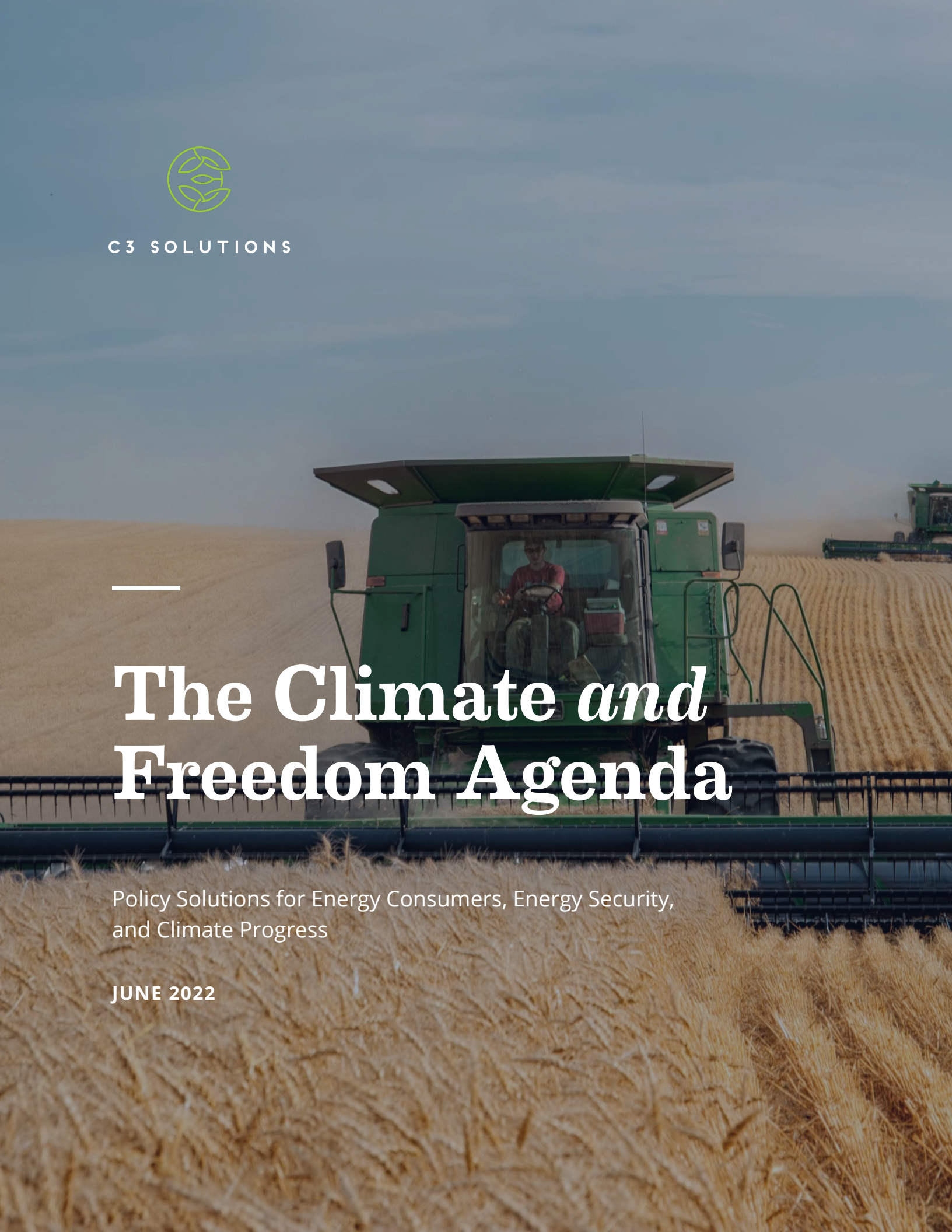

C3 SOLUTIONS

The Climate *and* Freedom Agenda

Policy Solutions for Energy Consumers, Energy Security, and Climate Progress

JUNE 2022

Table *of* Contents

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 Solutions 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:

In the wake of high prices at the pump, rising energy bills, elevated inflation, and Russia's invasion of Ukraine, energy prices and energy security are at the top of Americans' minds. A global pandemic that challenged supply chains and the war in Ukraine have created turbulent energy markets. Antiquated policies and regulations have made it more difficult for investors and businesses to respond.

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

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 not only cost American jobs and economic growth but will likely have the unintended environmental consequence of increasing pollution and global 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 stark wakeup call for policymakers 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. They cannot be dependent on geopolitical adversaries that manipulate energy markets to exert political muscle. As an example, 77 percent of Americans were in favor of sanctions on Russian oil and gas with 63 percent still in support even if it meant higher prices at the pump (including majority support from Democrats, Republicans, and Independents).[1]

At the same time, governments around the world are pursuing efforts to reduce the risks of climate change. The goals of energy security, capitalizing on energy abundance, 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.[2] Petroleum is the dominant source of the transportation sector in the U.S., but fully electric vehicle, 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.[3] Biofuels, natural gas, and propane also serve as alternatives to gasoline and diesel.[4]

The key to a stable, affordable energy supply is to open access to America's abundance of natural resources and 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. When price information is available, it informs the behavior of consumers in the short run (by conserving energy) and in the intermediate to longer run (switching to a more fuel-efficient or hybrid vehicle).

"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 it to happen. 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

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

High gas prices are a major concern for families and businesses. In May, prices hit record highs as the national average surpassed $4.50 per gallon.[5] Several states surpassed $5 per gallon and California eclipsed $6 per gallon.[6] The price of a barrel of crude oil makes up the largest share (53.6 percent) of the price of a gallon of gasoline.[7] Federal and state taxes (16.4 percent), distributing and marketing (15.6 percent) and refining costs and profits (14.4) make up the rest. (These percentages are for the 2021 retail price of gasoline, which tracks closely with the 2012-2021 average).[8]

The triple digit per barrel oil prices after Russia's invasion of Ukraine was the result of geopolitical risk added onto a convergence of factors. Global production was lower, because production had plummeted during the 2020 pandemic. Demand outpaced supply as countries lifted Covid-19 restrictions. The lack of spare capacity, which the U.S. Energy Information Administration (EIA) defines as "the volume of production that can be brought on within 30 days and sustained for at least 90 days,"[9] also caused quicker spikes prices as markets could not respond as quickly.[10]

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.[11] 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.

That is not to suggest, however, that Americans are helpless and at the complete mercy of state-owned oil producers like OPEC and Russia. In fact, smart extraction technologies unleashed an energy revolution in the U.S. that dramatically increased domestic supply, created millions of jobs, and lowered energy bills for households and businesses. 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 12.3 million barrels per day before the Covid-19 pandemic struck.[12] Dependence on OPEC for crude oil decreased from 85 percent of total petroleum imports in the 1970s to 14 percent in 2020.[13] It is also worth noting that 72 percent of crude oil imports come from Canada (61 percent) and Mexico (11 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.[14] The EIA projects that U.S. production will increase to a record 12.8 million barrels per day in 2023.[15]

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 90 percent of total transportation sector energy use in 2020.[16] The EIA projects energy demand to grow nearly 50 percent by 2050.[17] Although EIA projects the largest growth to come from renewables, the agency projects that oil will still be the top energy source.[18]

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

> *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.*[19]

Instead, **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.[20] 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.[21] 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 allow 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 driven 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.[22] If states oversee the environmental review and permitting process, they should collect even more of the revenue.
- **Allow competitive bidding processes on federal lands for activities like conservation leasing.** When the federal government auctions public lands for oil and gas development, it is illegal for a private party to bid on a lease to conserve the land. This excludes market participants who may want to bid on the lease to protect the land. Congress should open the auction process to all interested bidders, which could open opportunities for conservation leasing.[23]
- **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.[24] 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."[25] 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.

ENDING EUROPE'S DEPENDENCE ON RUSSIAN GAS AND AMERICA'S ROLE AS A RELIABLE ENERGY ALLY

Russia's invasion of Ukraine was a reminder to Europeans that the continent is far too dependent on Russian natural gas. As domestic European natural gas production declined, Europe countries became increasingly reliant on natural gas imports, even as demand has been flat or declined.[26] Europe imports about 80 percent of its natural gas consumption and depends on Russia for roughly 40 percent. Some countries are almost exclusively reliant on Russian gas.[27] Encouragingly, Europe has

diversified its imports as well as infrastructure dependence from Russia. For instance, the amount of natural gas flowing through Ukraine decreased from 80 percent in 2006 to 18 percent today.[28]

Europe is importing more liquified natural gas (LNG) from the U.S. and Qatar. In 2020, LNG accounted for 26 percent of Europe's total natural gas imports.[29]The U.S. was the largest exporter of LNG to Europe in 2021, and American exporters nearly doubled supply from November to January to help Europe's winter energy crunch as natural gas inventories across Europe were low.[30] In fact, Europe was on the "receiving end of nearly 77% of U.S. LNG cargoes exported in January."[31]

Furthermore, the Biden administration's commitment to deliver more LNG to European consumers is a welcome pledge. The administration committed to shipping an additional 15 billion cubic meters of LNG to Europe in 2022 and 50 billion cubic meters of LNG through 2030, about one-third of Europe's imports from Russia in 2021.[32]

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. The Department of Energy's National Energy Technology Laboratory (NETL) analyzed life cycle greenhouse gas emissions from LNG exports compared to consumption of other energy sources.[33] In different scenarios comparing U.S. LNG shipped to European markets, when compared to coal use or Russian piped gas, the study found life cycle emissions from U.S. LNG exports to be lower.[34]

POLICY RECOMMENDATIONS TO EXPEDITE LNG EXPORTS

The United States is on track to become the world's largest exporter of LNG this year.[35] 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. The Energy Security Cooperation with Allied Partners in Europe Act (ESCAPE Act) would accomplish this. Specifically the legislation:
    - Directs the U.S. permanent representative to NATO to work with NATO member states to address energy security for the organization's members and partners in Europe and Eurasia.
    - Calls for a comprehensive U.S. government transatlantic energy strategy that focuses on increasing the energy security of our NATO allies and partners and increasing American energy exports to those countries.
    - Requires the Secretary of Energy to expedite approvals of natural gas exports to NATO allies, Japan, and any other foreign country where exports of natural gas would promote the national security interests of the United States.
    - Authorizes mandatory U.S. sanctions on the development of Russian energy pipeline projects, such as Nord Stream II.

- **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.[36]

"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."

MINERAL RESOURCES AND RARE EARTH ELEMENTS

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.[37] In addition, the U.S. imports many of the rare earth elements necessary for many defense and commercial technologies that support daily life. The value of REEs lies in their unusual physical and chemical properties that give them unique magnetic and optical capabilities. Rare earth elements are essential for solar cells, batteries, and wind turbine magnets. They are critical to scaling up clean energy deployment and global decarbonization.

Despite the name, rare earth elements are very abundant, including in the United States. In addition to mining, "the ores must be thoroughly refined before they can be used in manufacturing. Raw ores, for example, often undergo 'solvent extraction' which entails moving the minerals through hundreds of liquid-filled vats that separate individual elements—and this process must be repeated hundreds or even thousands of time[s]."[38]

Currently, most rare earth minerals are mined and processed in China.[39] According to the U.S. Geological Service, China accounted for 80 percent of the rare earth minerals imported into the U.S. in 2020.[40] Policymakers have been quick to 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. Eugene Gholz, professor of political science at Notre Dame, writes:

> *In some cases, like the rare-earth content of Apple's iPhones, the final assembly of the consumer product takes place in China; to stop those rare earths from getting to U.S. consumers, China would have to ban consumer product exports. Perhaps the Chinese government would contemplate banning iPhone sales in a huge trade conflagration, but at that point, access to rare earths would be the least of America's concerns.*[41]

Another data point worth mentioning is that China tried to cut off rare earths 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 – to name a few. Canada's rare earth mining project opened in 2021 and is functioning without any tailings ponds, making it much more environmentally friendly.[42] Japan, through state backing, is investing to extract an abundance of rare earths off its coast.[43] Mountain Pass mine in California re-opened, and it has a processing facility.[44] Several other mining projects and processing facilities opened in the U.S., and many non-Chinese rare earth processing facilities opened around the world.[45]

Thus far, the Biden administration has taken a frustratingly contradictory approach to procuring the minerals necessary for an energy transition. A lithium mine project in Nevada and nickel mine project in Minnesota, for example, are facing challenging permitting hurdles. 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."[46] The more the U.S. and countries like Canada and Australia develop their resources, fewer minerals will 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).[47]

Instead of reducing regulatory barriers, President Biden is using the Defense Production Act to procure several critical minerals.[48] 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. Eli Lehrer, president of the R Street Institute, observed:

> *While Congress has previously acted to stretch the law by expanding "national defense" to include terrorist attacks and pandemics, President Biden's action stretches a power beyond what should be its breaking point.*
>
> *In the abstract, more domestic electric vehicle battery production might be a good thing, but it has almost nothing to do with any commonsense definition of "national defense." Not only is the United States at peace for the first time since 9/11, but an extensive 2021 report from the National Academies of Science, Engineering and Medicine concluded that widespread use of batteries for warfighting won't be possible until at least 2035.*
>
> *And it doesn't stop there. As it must also transport, clothe, house, entertain and educate its troops, the Department of Defense buys some of just about everything; if batteries are necessary for a military that won't use them widely for more than a decade, then what isn't?*
>
> *What's more, the current law also lets the president make loans, guarantees, purchase agreements and more without congressional authorization. In short, letting Biden's current actions go unreviewed raises the possibility of a future president carrying something close to a national industrial policy (a less intense form of central planning that involves the government blatantly picking winners and losers) on the basis that "bread and meat" or even "pogo sticks" are national defense necessities. And those who find environmental reasons to cheer Biden's recent actions should consider how they would feel if a future president made exactly the same determination about the "national defense" need for coal.*[49]

"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 the necessary environmental safeguards."

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."[50]

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 the 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.[51] In addition to modernizing environmental reviews and permitting (see next section), policymakers should:

- Clearly define "navigable waters" in the Clean Water Act to strictly limit federal authority.[52]
- 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.[53]
- Continue research and development into projects that can turn mine waste into useful products for clean energy and other technologies.[54]
- 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.[55]

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.[56] 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.

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 Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act)[57] and the Building United States Infrastructure through Limited Delays and Efficient Reviews Act of 2021 (BUILDER Act)[58] are two bills that would modernize NEPA and significantly improve the permitting process for energy security, capitalizing on America's abundance of natural resources and diversifying America's energy sources.
- **Open opportunities for state-led environmental reviews and permits.** Empowering states to conduct the environmental review and permits could create more efficient and localized reviews that better addresses 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.

2.

Permitting

PERMITTING REFORM TO MEET 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. However, economically viable innovations do little good if burdensome, time-consuming regulatory barriers prevent their implementation.

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 emit 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. Next-generation nuclear technologies, new transmission lines, and more resilient infrastructure all face cumbersome and lengthy permitting schedules. Activist organizations may tie up these projects in court for years. Moreover, investments in healthy ecosystems and natural climate solutions often run into onerous permitting and legal challenges. This leads to missed opportunities to thin forests or eradicate invasive species, resulting in much worse environmental and climate outcomes.

Permitting reform is not a climate silver bullet, but 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.

"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."

President Nixon signed NEPA into law more than 50 years ago. Since then, 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]

New York Times columnist Ezra Klein wrote that NEPA is: "part of a broader set of checks on development that have done a lot of good over the years but are doing a lot of harm now. When they were designed, these bills were radical reforms to an intolerable status quo. Now they are, too often, powerful allies of an intolerable status quo, rendering government plodding and ineffectual and making it almost impossible to build green infrastructure at the speed we need."[4]

"Permitting reform is not a climate silver bullet, but would significantly advance mitigation, healthy ecosystem, and adaptation projects."

Similarly, the *Bloomberg* Editorial Board opined:

> *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.*[5]

Protracted permitting schedules and costly, drawn-out lawsuits particularly harm smaller businesses that may not have the means to fight the fight. Whether big or small, however, regulatory red tape results in companies dedicating more resources to lawyers and lobbyists when that money could be better spent innovating and building.

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.[6]

THE NEPA PROCESS AND ATTEMPTS AT REFORM

NEPA requires federal agencies to conduct comprehensive environmental assessments for a wide range of projects, including highways, energy development, projects receiving federal funds, and activities on federal land to name a few.[7] 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 which must include:

1. Statement of [agency's] environmental decision.
2. Identification of all alternatives considered by the agency, including the preferred alternative(s).
3. Decision of all factors – economic, social, technical, environmental factors, financial considerations, and other New Starts considerations (23 CFR Part 771.127(a)).[8]
4. Discussion of national policies that were balanced in the decision-making process and how each factor weighed in the decision.
5. Explanation of whether the decision was designed to avoid or minimize environmental harm and, if not, why not.[9]

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 Obama Administration recognized that NEPA reviews can be expedited to speed up project investment without sacrificing the environment by effectively relinquishing NEPA requirements for projects funded by the American Recovery and Reinvestment Act, better known as the stimulus package. The Obama Administration granted more than 179,000 categorical exclusions for stimulus projects.[10]

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.[11] One quarter of the 1,161 EISs reviewed took more than six years to complete.[12] The average cost to complete a review is $4.2 million.[13] 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.[14]

"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."

There has been bipartisan support to improve 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. CEQ guidance documents on NEPA over the years may have been well-intentioned but had no teeth and were advisory or optional in practice.

Signed into law by President Obama in December 2015, the Fixing America's Surface Transportation Act (FAST Act) attempted to expedite the environmental review for large infrastructure projects, streamline decision making, shorten judicial review, and improve transparency in the process. Notably, the bill created the Federal Permitting Improvement Steering Council (FPISC) and codified the federal permitting dashboard into law.[15] A 2020 FPISC report to Congress reported an average 45 percent time savings to complete an EIS compared to 2010-2018 times (2.5 years compared to 4.5 years).[16]

In August 2017, President Trump published Executive Order (EO) 13807, Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects.[17] The EO established a "One Federal Decision" policy that designated a lead agency to manage the NEPA process. The EO aimed to reduce environmental reviews to "not more than an average of approximately two years" and established a Record of Decision deadline of 90 days. In his first day in office, however, President Biden issued Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis that charged CEQ to formulate a new NEPA rule.[18] In October 2021, CEQ issued a Notice of Proposed Rulemaking (NPRM) that initiates Phase 1 of two phases of rulemaking.[19] The first phase makes more immediate changes such as removing certain categorical exclusions and reinstating the consideration of cumulative or indirect environmental effects. Phase 2, in which CEQ will issue another NPRM, will include more comprehensive changes.

In addition to CEQ changes, Congress and the Biden administration reformed NEPA through the Infrastructure Investment and Jobs Act (IIJA). Signed into law in November 2021, the $1.2 trillion infrastructure bill codifies several notable improvements. Those provisions include:

- Lifting the sunset on FAST-41, thereby making the reforms in the FAST Act permanent.
- Extending FAST-41 provisions to tribal lands.
- Setting a two-year goal for permitting for covered projects.
- Requiring the preparation of a single EIS document and codifying the "One Federal Decision."
- Allowing for Categorical Exclusions for projects, including for certain activities on federal lands, certain forest management activities, projects that receive limited federal funding (receiving $6 million or less in federal funding and have overall implementation costs of $35 million), and for certain oil and gas gathering lines that reduce venting, flaring, or vehicular traffic that service oil and gas wells.[20]

Regrettably, the Biden administration has undone some NEPA improvements that will increase the cost and slow the deployment of projects the administration needs to accomplish its climate objectives.[21]

POLICY RECOMMENDATIONS FOR MORE EFFICIENT PERMITTING

Two legislative proposals that would properly narrow the scope of NEPA are the Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act), introduced by Senator Mike Lee (R-UT) and Representative Liz Cheney (R-WY), and the Building United States Infrastructure through Limited Delays and Efficient Reviews Act of 2021 (BUILDER Act), introduced by Representative Garret Graves (R-LA).

The UNSHACKLE Act aggregates four NEPA reform bills to expedite timelines, increase accountability, improve efficiency, and curb excessive litigation. The bill includes the:

- **NEPA Agency Process Accountability Act**
  - Mandates only one Environmental Impact Statement (EIS) and Environmental Assessment (EA) for each project.
  - Mandates that agencies must re-use relevant environmental research from related prior projects and cannot offer alternatives that are not economically feasible.
  - Allows agencies to use state environmental documents for proposed projects.

- **NEPA Accountability and Enforcement Act**
  - Requires federal agencies to complete the NEPA process in two years for proposed projects that need an EIS.
  - Imposes a one-year deadline for agencies to issue a Categorical Exclusion (CE) and complete the NEPA process for projects with an EA.
  - Requires agencies to approve or deny permits within 90 days of completion of the NEPA process.

- **NEPA State Assignment Expansion Act**
  - Expands the NEPA assignment program to let federal agencies delegate NEPA review authority to relevant state entities, which can carry out NEPA review on the agency's behalf, under the supervision of the agency.

- **NEPA Legal Reform Act**
  - Clarifies requirements necessary to receive judicial review for NEPA-related claims.

- Sets a 150-day statute of limitations for NEPA-related claims.
- Reforms the evidentiary standards and requirements for a court to consider when granting injunctive relief for a NEPA-related claim.

- **NEPA Data Transparency Act**
  - Requires agencies to report to Congress the number of CEs, EISs, and EAs issued in the past year, and the time it took to process proposed projects.
  - Requires the Office of Management and Budget (OMB) and Council on Environmental Quality (CEQ) to develop a way to calculate the comprehensive cost of the NEPA process, and federal agencies to report the costs of NEPA processes they've completed.[22]

The major provisions of the BUILDER Act[23] include:

- **Statutory Clarity and Section 102 of NEPA.** This bill amends NEPA to clarify and narrow agency considerations to "reasonably foreseeable environmental impacts with a reasonably close causal relationship to the proposed action," "reasonably foreseeable adverse environmental effects," and "a reasonable number of alternatives to the proposed action that are technically and economically feasible, are within the jurisdiction of the agency, meet the purpose and need of the proposed action, and, where applicable, meet the goals of the applicant."

- **Interagency Coordination and Timely Reviews.** This bill codifies key elements of the One Federal Decision Framework, including development by the lead agency of a joint schedule, procedures to elevate delays or disputes, preparation of a single Environmental Impact Statement (EIS) and joint Record of Decision (ROD) to the extent practicable, reasonable time limits for environmental reviews, and paper reduction measures.

- **NEPA Thresholds and Streamlining.** This bill includes threshold considerations for agencies assessing whether NEPA applies to a proposed activity or is otherwise fulfilled through another statute. This recognizes that the application of NEPA by Congress and the courts has evolved over the last four decades in light of numerous other statutory requirements implemented by federal agencies. The bill also includes provisions facilitating adoption of categorical exclusions where the action is substantially the same as an action previously categorically excluded by another agency.

- **Project Sponsor Preparation.** This bill permits a project sponsor to assist agencies in conducting environmental reviews to help speed up the process and to resolve issues without taking control or authority away from the lead agency.

- **Major Federal Action.** This bill amends NEPA and clarifies that a major federal action is limited to those which are "subject to Federal control and responsibility." It establishes a threshold consideration that is independent of the significance of impacts that may follow. It includes examples of actions that are not "major Federal actions."

- **Transparency and Data.** To address data gaps relating to the administrative costs of NEPA compliance, this bill requires agencies to provide the estimated total cost of preparing an EIS, including full-time equivalent personnel hours, contractor costs, and other direct costs.

- **Scientific Accuracy and Modern Technology.** This bill includes provisions requiring agencies to use reliable existing data sources and clarifies NEPA does not require undertaking new scientific and technical research to inform analyses.

- **Recognition of the Sovereign Rights, Expertise of Tribes.** To ensure consultation with tribal entities and reaffirm existing NEPA practice to coordinate or consult with affected tribal governments, this bill amends NEPA to add "tribal" to the phrase "state and local" throughout the statute and the addition of new sections.

- **Judicial Review.** Requires those who have abused or weaponized NEPA in the past to have participated meaningfully in the NEPA process before filing suit and provides a reasonable timeline to file those lawsuits.[24]

3.

Tax Policy

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 energy companies to supply families with affordable, dependable, and cleaner power.
- Removing biases against investment and lowering rates broadly would drive investments in newer, more efficient technologies. Reforming the research and development tax credit would spur more groundbreaking discoveries and increase opportunities for small businesses to conduct R&D.
- 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. These include, but are not limited to, electricity generation and transportation fuels. 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 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 the preferential treatment, and politicians, whose 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]

Although not a tax credit, "cash for clunkers" was another woefully inefficient and expensive climate program because it merely shifted the timeline when a car buyer would purchase a new vehicle. Economist Jeffrey Sachs called it a "clunker of a policy."[4]

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

Another problem with targeted tax credits and subsidies is that they could have the perverse effect of impeding energy innovation by disadvantaging breakthrough technologies that do not receive government support. Because private capital is limited, when tax credits steer investment toward specific resources and technologies, other promising entrepreneurs and innovators that do not enjoy tax credits may miss out. Not only do these programs create substantial opportunity costs, companies that do not receive support will spend resources lobbying to expand the subsidy pool. Devin Hartman, director of Energy and Environmental Policy at the R Street Institute notes: "The legacy of green industrial policy consists of unnecessary costs, modest pollution reductions and deepened political tensions. This led to calls for counter-industrial policy that seeks

preferential treatment for technologies excluded from the initial green industrial policy agenda."[5] Regardless of the efficacy of the policy, special interests will spend resources to protect the status quo and, if successful, extend and expand the preferential treatment. The benefits concentrate to the politically connected few, while the costs disperse among all taxpayers and energy consumers.

Yet another problem is the uncertainty created by temporary provisions expiring or threatening to expire. Future investments may hinge on end-of-the-year tax extender packages. Certainty could come in the form of allowing temporary provisions to permanently expire, but it has proven difficult for policymakers to exercise such restraint.

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

Congress should, 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 – supplying affordable power, growing the economy, and reducing emissions. To spur energy innovation and drive decarbonization, Congress should phase out the costly, ineffective tax subsidies and equalize the beneficial ones.
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POLICY RECOMMENDATIONS FOR SMART TAX REFORM

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

- **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 increases capital stock turnover in energy systems, manufacturing equipment, retrofits and new equipment that saves energy and reduces emissions.[6] Immediate expensing would also improve energy efficiency in homes, buildings, vehicles, and equipment, one of the most cost-effective ways to reduce emissions. However, businesses have many needs and may forego energy-efficient investments (knowing the energy savings would pay off) to hire more workers or invest in the business elsewhere. Immediate expensing is a way to incentivize energy efficiency without subsidizing or mandating it. As emphasized by the Alliance to Save Energy and the Clean Energy Business Network, immediate expensing enables more businesses to replace rather than repair, resulting in more cost and emissions saving equipment installations, such as HVACs and roofs.[7]

  > ***"Congress should provide certainty to businesses and investors and should do so through pro-growth, technology-neutral tax reform."***

  The Tax Cuts and Jobs Act of 2017 allowed for immediate expensing for assets with lives of 20 years or less, and the expensing begins phasing out by 20 percent from 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."[8] In the long-run businesses may adjust R&D expenditures as they adjust to the per-

manency of immediate expensing, however, the option to deduct costs immediately rather than amortized over five years would likely generate more R&D.[9]

Congress should remove the phase out and 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.[10] The private sector is a clear leader on R&D investment. According to the National Science Foundation's 2020 report on research and development trends, R&D conducted in the U.S. in 2017 (the most recent year available) totaled $547.9 billion. The report notes that "[b]usinesses continue as the predominant performers and funders of U.S. R&D (73% and 70%, respectively, in 2017)."[11] Businesses spent $400 billion on R&D while higher education spent $71 billion, and the federal government spent $53 billion.[12]

  Public investments in research and development at the federal government and at higher education institutions contribute to the general knowledge base and scientific inquiry but also lead to groundbreaking discoveries and attract the brightest minds to America.

  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. The credit 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."[13] 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.[14] Section 174 of the tax code also allows immediate expensing of qualified research activities.[15] Businesses can expense R&D costs or use the tax credit but not both.

  Economic research has generally shown that the tax credit increased R&D spending, though to varying degrees.[16] Several documented problems have reduced the efficacy of the R&D tax credit, most notably the high compliance costs, which disproportionately affects smaller companies.[17] 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."[18] Tax Foundation economists Alex Muresianu and Garrett Watson have highlighted several ways to simplify and improve the R&D tax credit, including ways to expand R&D for small businesses (some of which are in proposed legislation).[19] These 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.[20]
  - 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.[21]

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

- **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.**[22] 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 (ie, 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.

  Short of that, however, Congress should replace the 44 energy tax provisions[23] with a technology-neutral, emissions-based credit that focuses on the most efficient abatement cost. One more simplified option offered by Senator Ron Wyden (D-OR) would lump the 44 tax provisions into three categories: electricity, transportation, and conservation. The bill would:

  - Provide a technology-neutral credit to electricity facilities that are at least 35 percent cleaner than average.
  - Allow clean electricity facilities to take either a production tax credit of up to 2.4 cents per kilowatt hour or an investment tax credit of up to 30 percent.
  - Provide a technology-neutral credit to all transportation fuels, available to fuels that are at least 25 percent cleaner than average.
  - Provide a production tax credit of up to $1 per gallon.
  - Provide a performance-based tax credit for energy efficiency.
  - Phase out the tax credits once greenhouse gas emissions have been reduced 50 percent.

  "A bottom-up, private sector-led approach to ushering in and scaling up technologies of the future will be much more effective than a top-down, centrally planned approach."

- The legislation offers a much cleaner, efficient alternative than the current energy tax policy that benefits entrenched interests. One way to improve the bill would be to ensure that alternative fuels are on the same playing field as electric vehicles. Policy improvements should concentrate on how to get the best bang for the taxpayers' buck: the greatest emissions savings at the lowest possible cost. One additional mechanism for policymakers to explore is a reverse auction to improve the efficiency of the subsidy, reward the most economically viable and lowest-priced energy sources and technologies, and therefore increase clean energy generation at a lower cost to taxpayers.

- **Ensure any emerging energy technology tax credit is limited.** A bottom-up, private sector-led approach to ushering in and scaling up technologies of the future will be much more effective than a top-down, centrally planned approach. The development and global deployment of low-carbon and carbon-free technologies may come from technologies in early stages of development or ones that may have not been invented yet. As such, policymakers have historically sought to help infant industries scale up, either through subsidies or through protection from international competition. While well-intended, infant industry protectionism can be problematic in that it is subjective for the government to determine when a technology is mature and when the subsidies or tariffs should end. Another concern is that companies become dependent on preferential treatment. As economist Milton Friedman said, "The so-called infants never grow up" even though the technology is in fact mature.[24] Policy design can assuage these concerns by making it more difficult for more mature technologies to take advantage of a tax advantage or subsidy.

  For instance, the Energy Sector Innovation Credit Act (ESIC):

  - Offers an investment tax credit or protection tax credit to emerging technologies with less than a three percent market penetration level.
  - Includes all U.S. generation (ITC or PTC), energy storage (ITC), carbon capture (ITC), and

hydrogen production (PTC).
    - Phases down as the emerging technology reaches a higher market penetration until its fully phased out at three percent market penetration.
    - Allows Congress, upon recommendations from the Department of Energy, to include additional qualifying technologies every five years.
    - Prevents against backsliding if market penetration falls below three percent.[25]

- Granted, legislators could always change the market penetration percentage to four percent or five percent to extend the subsidy (for example, the discussion draft of ESIC initially had market penetration at two percent). Moreover, given the rapid pace and promise of energy innovation, five years can be a long time to exclude certain technologies from taking advantage of the credit. One potential way to improve the legislation would be to have a more responsive vetting system through the Department of Energy to examine other technologies that may qualify. Nevertheless, ESIC is a preferred alternative to subsidizing mature technologies and welcomingly limits the scope of the credit.

"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."

- **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 of innovation, the quality of innovation, 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."[26] 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."[27] 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.[28]

  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).[29] Including federal and state (national and subnational) corporate tax rates, the U.S. has the 13th highest out of the 38 OECD countries.[30] At the very least, Congress and the administration should maintain the 21 percent corporate tax rate at the federal level.

4.

R&D

RESEARCH AND DEVELOPMENT DRIVES ENVIRONMENTAL, ECONOMIC PROGRESS

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. Through the private sector, federal agencies, research institutions, and universities, R&D 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] Therefore, 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 abundantly clear. 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.

> ***"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."***

Other programs have a more direct mission to stimulate the commercialization of energy technologies to improve energy security and combat climate change. One example is DOE's Advanced Research Projects Agency-Energy, or ARPA-E. The agency has a mission to "overcome long-term and high-risk technological barriers in the development of energy technologies" that will reduce energy imports, reduce emissions, and improve energy efficiency.[5] The agency is meant to fund "scientific discoveries into marketable technologies"[6] in which venture capitalists would not yet invest. In FY21, the U.S. government awarded ARPA-E $427 million to conduct essential research and development for clean technologies. Importantly, federal dollars spent at ARPA-E have had positive ripple effects in private markets. In its ten-year history, more than 800 patents have been issued as a result of ARPA-E. Additionally, 185 projects supported by ARPA-E have attracted some $9.87 billion in private-sector follow-on funding, and 129 projects have gone on to form new companies.[7]

Outside of ARPA-E, 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.**[8] In 2022's fiscal year, the United States will invest close to $17 billion (0.3% of GDP) of public money into climate-related research and development. This more than doubles the $7.8 billion that the government allocated in 2021.[9]

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

Research institutions also play a vital role in research and development. For instance, researchers from the Massachusetts Institute of Technology created a new material that is stronger than steel and lighter than plastic, calling the discovery "a feat thought to be impossible."[10] The commercial application remains to be seen, but innovative breakthroughs like this could be the answer for hard-to-decarbonize industrial sectors of the economy and for improved climate resiliency.

THE IMPORTANCE OF PRIVATE SECTOR R&D

Of course, one cannot overlook the leading role the private sector plays in climate entrepreneurship. **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."[11] 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.[12] The proliferation of startup incubators in recent years is an exciting model that brings together innovators, entrepreneurs, and investors.[13]

Another innovative, private sector led funding model is philanthropic VC. For example, Prime Coalition is a "nonprofit organization focused on addressing the critical funding gap for transformative, early stage solutions to climate change. Prime's unique model blends different forms of catalytic capital to support innovative technologies with the potential to reduce or sequester greenhouse gas (GHG) emissions at the gigaton scale by 2050."[14] Catalytic capital differs from other capital investments in that investors may accept more risk or wait longer for returns. The hope and expectation is that the investment could result in the commercialization of profitable, game-changing technologies.[15] Those game changers could pay off big for investors and the planet. Not every venture investment falls explicitly into the research and development category. Nevertheless, the appetite for venture capital to make aggressive commitments toward climate innovation, even at very early stages, is extremely promising.

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.[16] Importantly, the report emphasizes: "Countries are specializing nationally and collaborating internationally to foster local technology advantages."[17] **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.**

> ***"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."***

Indeed, the private sector in America is investing heavily in research and development. In 2019, the private sector spent $493 billion on total R&D, $429 billion of which was funded

by companies themselves, nearly a 12% increase.[18] Climate specific private sector R&D is also increasing. **In 2021 companies made historic investments in clean energy and low-carbon technologies on the global stage, with total spending reaching $920 billion.** $165 billion of that was categorized as funding for climate technology innovation (versus deployment). Of this $165 billion, $111 billion came from public markets; $62.4 billion came from IPOs and secondary offerings; $53.7 billion came from private investors; and $35 billion came from SPAC reverse mergers.[19]

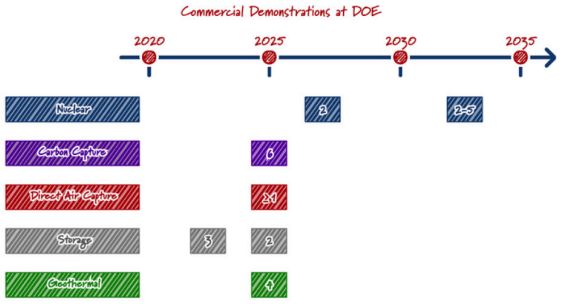
In the Americas, investments in low or zero-carbon technologies grew by 21% to $150 billion in 2021, with electric vehicle investment growing by 84%. While impressive, the Americas rank third (out of 3) in energy transition investments. The Asia Pacific region is first (49% of total investments) and Europe and the Middle East is second, accounting for 31%.

"In 2021 companies made historic investments in clean energy and low-carbon technologies on the global stage, with total spending reaching $920 billion."

FEDERAL SPENDING ON R&D

Over the past few years, the United States government has made significant commitments at the federal level for next-generation technologies and demonstration projects. In 2020, Congress passed the Energy Act of 2020, which packaged together several bipartisan energy and climate bills. The most comprehensive energy legislation in over a decade, the Energy Act authorized several research and development programs and demonstration projects to accelerate clean energy deployment in the United States.[20]

Importantly, the Energy Act programs included funding for research and development for a wide range of technologies including carbon capture for natural gas operations (LEADING Act), energy storage (BEST Act), and advanced geothermal (AGILE Act). The Energy Act also authorized the Advanced Reactor Demonstration Program (ARDP), 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.[21]



Source: ClearPath

In 2021, Congress again made big commitments for energy research and development and for next generation technologies, this time through the Infrastructure Investment and Jobs Act (IIJA). The IIJA includes funding for direct air capture projects and for 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.[22]

In addition to funding several new and Energy Act programs, the IIJA also appropriated $21.5 billion in funding to the first-year Office of Clean Energy Demonstration (OCED). The OCED will distribute funds for a wide range of technologies including regional hydrogen hubs ($8 billion), carbon capture and storage demonstration ($2.5 billion), energy storage ($355 million), and several others. Importantly, the OCED will seek to bridge the "valley of death" between funding and development for early stage energy projects.[23]

While American research and development at the federal level has had positive economic and environmental impacts, the United States still lags globally. In the Information Technology and Innovation Foundation's (ITIF) 2021 Global Energy Innovation Index, the United States ranked 17 out of 34, a 13-place drop from its ranking in 2016. ITIF's Knowledge Development and Diffusion subindex, which includes public R&D and invention, placed the United States 20th overall.[24]

"While American research and development at the federal level has had positive economic and environmental impacts, the United States still lags globally. In the Information Technology and Innovation Foundation's (ITIF) 2021 Global Energy Innovation Index, the United States ranked 17 out of 34, a 13-place drop from its ranking in 2016."

Public sector investment may be lagging compared to other nations, but the U.S. ranks high (7th overall) in ITIF's Entrepreneurial Experimentation and Market Formation subindex. The reality is 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. As the authors note:

> *The United States also does well in the entrepreneurial ecosystem category. It is home to many more high-impact start-ups and far more venture capital funding in absolute terms than any other country, although these totals pale a bit when scaled by GDP, leaving it in third place in this category. The United States is pulled down to the 12th spot on this subindex, however, by its dismal rankings in trade and market readiness. It held fourth place in the subindex in 2016, when it scored much better in market readiness and came in first in entrepreneurial ecosystem.*

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.

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

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 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 increases capital stock turnover in energy systems, manufacturing equipment, retrofits and new equipment. This would save energy and reduce emissions.[25] Immediate expensing would also improve energy efficiency—one of the most cost-effective ways of reducing emissions—in homes, buildings, vehicles, and equipment. However, because energy efficient technologies typically have higher upfront costs, businesses may forego these investments.

  The Tax Cuts and Jobs Act of 2017 allowed for immediate expensing for assets with lives of 20 years or less, and the expensing begins phasing out by 20 percent from 2023 through 2026. Congress should remove the phase out and make immediate expensing available for short-lived and long-lived assets, including for research and development (R&D). Rossetti (R Street Institute) found that the implementation of R&D expensing through the 2017 tax reform bill had profound positive effects on private sector energy and environment R&D.[26] Rossetti noted 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."[27] 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 amortized over five years would likely generate more R&D.[28]

- **Reform the research and development tax credit.** The United States is one of the most innovative countries in the world.[29] Public investments through research and development by the federal government and through higher education contribute to the general knowledge base and scientific inquiry but also lead to groundbreaking discoveries and attract the brightest minds to America. Importantly, the private sector is a clear leader on R&D spending. According to the National Science Foundation's 2020 report on research and development trends, R&D conducted in the U.S. in 2017 (the most recent year available) totaled $547.9 billion. The report notes that "[b]usinesses continue as the predominant performers and funders of U.S. R&D (73% and 70%, respectively, in 2017)."[30] Businesses spent $400 billion on R&D while higher education spent $71 billion, and the federal government spent $53 billion. Recognizing the importance of R&D and the private sector's leadership role, Congress passed an R&D tax credit in 1981. The credit 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."[31]

  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.[32] Section 174 of the tax code also allows immediate expensing of qualified research activities.[33] 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.[34] Several documented problems have reduced the efficacy of the R&D tax credit, most notably the high compliance costs, which disproportionately affects smaller companies.[35] 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."[36] 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 replace it with a modified alternative simplified credit.[37]
    - 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.[38]

- **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 or have significant potential to spark commercial breakthroughs. These programs, and similar ones, play a pivotal role in advancing early-stage technologies that would otherwise not be profitable. ARDP, for instance, is funding America's first small modular reactor projects with TerraPower and X-energy. Importantly, these programs enlist a competitive process to determine which projects receive funding. Every year, ARPA-E awards funding to only 5% of applicants, when roughly 20% are judged through a peer review process to be both scientifically sound and potentially transformative.

- **Identify and remove barriers for commercialization federally funded research and development.** Many commercial breakthroughs originating from federally funded research have come through collaborative relationships with the private sector. Furthermore, agencies have created catalytic programs within the federal government for researchers with an entrepreneurial eye to identify and accelerate the development of innovative technologies. For example, the Defense Advanced Research Projects Agency (DARPA) has its Embedded Entrepreneurship Initiative to connect DARPA researchers with entrepreneurs, investors, mentors, and other business experts. Congress, the administration, and agencies should continue to identify and remove any obstacles to create more productive relationships with researchers, research facilities, and the private sector.

5.

Nuclear

ACCELERATING NUCLEAR ENERGY DEPLOYMENT

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.

THE POTENTIAL FOR NUCLEAR TO SUPPLY CLEAN, AFFORDABLE POWER

Nuclear power is the second largest emissions-free source of electricity in the world. With 440 reactors (and 50 reactors in construction across 50 countries), nuclear provides about 10 percent of the world's power.[1] In the United States, 93 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]

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 may pose even fewer public safety or proliferation risks than the ones that are currently on the market. In fact, nuclear is already among the safest forms of energy, if not the safest form of energy, that exists today.[4]

Different technologies such as advanced water-cooled reactors, sodium-cooled, molten-salt reactors, and fusion reactors could improve upon an already-safe nuclear industry. 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.[5]

> ***"Nuclear power has significant potential to meet the world's energy needs and climate goals."***

Some small reactor designs, such as Oklo's 1.5-megawatt reactor, are micro-reactors.[6] Oklo's advanced design would use spent nuclear fuel as an energy source.[7] 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."[8]

In August 2020, the Nuclear Regulatory Commission approved a design certification for NuScale's small modular reactor.[9] A few months later, the U.S. and Romania announced a partnership for Romania to build six small reactor modules designed by American SMR company NuScale.[10] NuScale has similar commitments with several other European countries. Expanded SMR technology throughout Europe using American technologies can help Europe achieve its energy security and climate objectives. While domestic certification approvals and DOE partnerships represent a significant milestone, they also represent an opportunity to learn and improve the process.

Another advanced nuclear reactor startup, TerraPower, announced that Kemmerer, Wyoming would be the location for the company's first demonstration reactor.[11] The power plant is a sodium-cooled reactor that could safely power up to 400,000 homes.

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).[12] With

promising technologies and a global desire for emissions-free power sources, the future of nuclear energy is bright.

POLICY RECOMMENDATIONS

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.

This chapter draws on the many helpful recommendations for regulatory modernization that are found in nuclear energy expert Katie Tubb's white paper: Needed: An Effective Nuclear Energy Policy.[13] It also draws heavily on the insightful analysis and recommendations that Adam Stein (Breakthrough Institute) and Nicholas McMurray (ClearPath) made in papers, observations, and comments to the Nuclear Regulatory Commission.

"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 should:

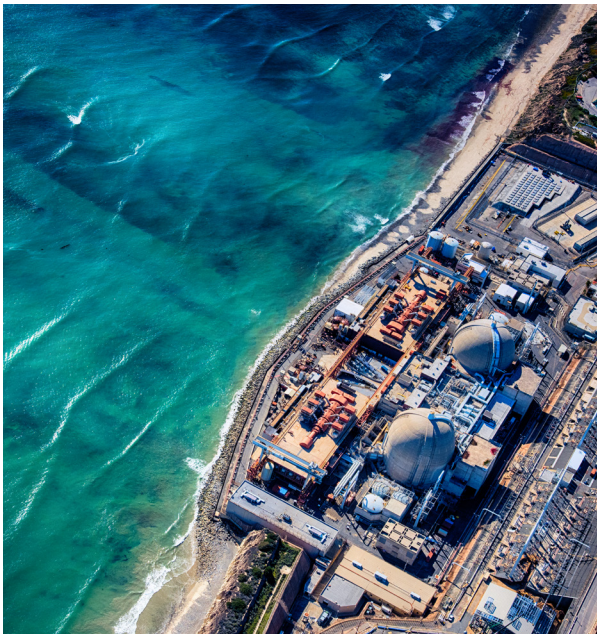
- **Streamline permitting for new reactor construction, whether for large light-water reactors, small modular reactors, or microreactors. Specifically, Congress and the administration should:**
    - Require the NRC to use prior environmental impact assessment and information "to the maximum extent possible" 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).[14]
    - 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).[15]
    - 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.
    - Authorize the DOE to provide technical assistance to states, local governments, Tribes, and private entities for commercial planning, licensing, development, and construction of new plants.

- **Keep Part 53 Regulatory Framework for Advanced Reactors on Track.** The Nuclear Energy Innovation and Modernization Act (NEIMA) of 2019 charged the NRC to develop a new licensing framework for next generation nuclear technologies. A new regulatory framework, known as Part 53, is much-needed, and its principles of being technology-neutral, risk-informed, and performance-based would be preferable compared to an overly prescriptive licensing process.[16] NRC aims to finalize the rulemaking by October 2024 (ahead of the 2027 deadline required by NEIMA).[17] The NRC has the challenging task of creating a framework that is both predictable and flexible. The NRC should adopt the recommendations of public comments[18] that will ultimately improve the final licensing process. Notable recommendations from Stein and McMurray include:
    - Prioritize a performance-based review, which will help maintain technology neutrality, and focus on adequate protection over frameworks like ALARA or linear no-dose thresholds.
    - Prioritize flexibility to be inclusive of a variety of applications. A more predictable process will develop from learn-by-doing and reviewing applications and the process of licensing.
    - Ensure a risk-informed process that includes a variety of analyses rather than explicit ones (ie., probabilistic risk assessments).

- Accommodate, but do not require, the use of the Licensing Modernization Process.[19]
- Remove Quantitative Health Objective requirements as these were tried and deemed impractical.[20]
- Provide justification for how Part 53 requirements would reduce time and cost burdens for applicants.
- Consider and, when acceptable, adopt international standards and recommendations as other countries have already licensed advanced reactors (including but not limited to quality assurance standards).
- Ensure transparency throughout the process to understand stakeholders' comments.[21]

- **Modernize radiation standards.** Radiation standards vary across federal agencies and vary from international standards. The NRC requires that nuclear companies reduce radiation "as low as is reasonably achievable."[22] 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 protect public health and safety while creating a more competitive environment for reactor technologies.
- **Appropriate funds for Low Dose Radiation Research Program.** 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.[23]
- **Appropriate funds to complete the NRC review of Yucca Mountain in Nevada.** Long-term spent fuel management will almost certainly require a geologic repository. Completing the NRC review of Yucca will not force the repository on Nevadans but would keep the option available.
- **Continue to support and appropriate funds for the Pele Program.** The Pele Program, housed in the Department of Defense's Strategic Capabilities Office, funds the development of transportable microreactors. The competitive program can enhance the military's capabilities while ushering in a new generation of commercial reactors. In September 2021, DOD released its draft Environmental Impact Statement for the selected design reactor.[24] Congress and the administration should continue to support this program so long as DOD finds the project worthwhile and believes the potential benefits outweigh the costs.
- **Produce an annual report on 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.[25]
- **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.** Tubb 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."[26]

- **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 $288 per hour per person in FY 2021) for all nuclear applicants.[27] 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, 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."[28]
    - Ensure nuclear exports meet nonproliferation standards.

6.

Renewables

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 expanding renewable energy projects and building new transmission lines.
- Measures that hinder trade, such as tariffs, drive up costs for Americans and hamstring renewable energy development in the U.S. for no meaningful economic, national security, or environmental benefit.

Currently, wind and solar make up a relatively small percentage of America's electricity generation. Wind (9.2%) and solar (2.8%) energy provided 12 percent of the nation's power generation in 2021.[1] Renewable energy has made incredible strides in cost reduction and deployment over the last 15 years. The Business Council for Sustainable Energy reports that: "[t]he injection of $105 billion in new private capital in the U.S. energy transition in 2021 is an 11 percent year-on-year increase, and a 70 percent increase over the past five years. The 2021 total included $47 billion in renewable energy (45 percent), $35 billion in electrified transport (34 percent) and a doubling of hydrogen investments to $200 million in 2021."[2] Globally, the total investment in these energy sources and technologies was $755 billion in 2021.[3]

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 would likely 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 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.[4] Roughly over that same time, renewables' share of the global electricity generation mix increased from 20 percent to 29 percent (2010-2020).[5]

"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."

In the United States, wind and solar investments are thriving. Utility-scale solar deployment for 2022 may be nearly double 2021 deployment, from 23 gigawatts to 44 gigawatts. Producers plan to build another 27 gigawatts of wind in 2022.[6] 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.** Johnnie Taul, the CEO of an engineering, procurement, and construction firm that builds utility-scale solar plants, agrees. In an April 2021 interview, Taul said that policymakers could help increase solar deployment by getting the government out of the way. Taul argues: "The economics are in our favor; technology is continuing to innovate. And that's the great thing about a free market environment—when technologies have to compete."[7]

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 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 better stewardship of taxpayer money. In a reverse auction, the utility (or energy customer) would select the project developer meeting certain criteria that 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:

"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."

- **Prohibit new tariffs on solar panels.** At the request of a petition from a domestic solar manufacturer petition, the U.S. Department of Commerce has launched an investigation as to whether China is circumventing antidumping and countervailing duties by moving manufacturing to other countries in southeast Asia.[8] As a result, new tariffs could be imposed on solar imports from Malaysia, Thailand, Cambodia and Vietnam. Even the threat of tariffs has resulted in lower projections for solar growth.[9] More efficient mechanisms exist to combat the problems associated with Chinese solar production, whether that is human rights violations, concerns over dumping, or its abysmal environmental record. For instance, the U.S. Customs and Border Protection is ramping up its efforts to block imports of products made with the forced labor of ethnic Uyghurs. Last December, President Biden signed the Uyghur Forced Labor Prevention Act into law. The World Trade Organization has a dispute-resolution body to address such issues. The administration should rely on these processes rather than imposing new tariffs.
- **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.**[10] 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.[11] 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.[12] The administration should reconsider its stance and eliminate the Section 201 tariffs.
- **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.[13] MLPs are also available for geothermal energy.[14] 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."[15] Using Jones Act ships is pricier, adds to the cost of projects, and could delay projects from coming online faster.[16] 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.[17] 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.[18] 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.[19] 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.[20] Through the years, Congress and the Federal Energy Regulatory Commission (FERC) have taken several actions to improve transmission planning, siting, and permitting.[21] In July 2021, FERC issued a Notice of Proposed Rulemaking on reforms for electric regional transmission planning, cost allocation, and generator interconnection.[22] 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."[23]

"Making transmission more transparent, holistic, and independently administered would be beneficial for consumers and emissions reductions."

Making transmission more transparent, holistic, and independently administered would be beneficial for consumers and emissions reductions. 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.[24]

POLICY RECOMMENDATIONS TO INCREASE TRANSMISSION CAPACITY

In addition to FERC's recent efforts, Hartman outlined ten legislative reforms for Congress to take up on transmission policy.[25] The reforms should build off bipartisan objectives to protect consumers, enhance competition, improve transparency, and reduce emissions. Reforms (taken directly from Hartman's post) include:

Five Areas Where Congress Could Provide a FERC Push Without Altering Statutes

1. **Redefine "good utility practice" to incorporate grid-enhancing technologies (GETs).** Technologies including power flow control, topology optimization, and dynamic line ratings can save billions and avoid millions of tons of carbon[26] annually just by enhancing the use of the existing transmission system. But unlike a competitive marketplace, cost-of-service regulation motivates utilities to use the system less efficiently. Encouragingly, FERC voted unanimously[27] across party lines last December to implement one type of GETs: temperature-adjusted line ratings. This was easy as a uniform best practice, but FERC needs more surgical tools for other GETs. Through the ANOPR and separate procedural vehicles, Congress could ask FERC to employ cost-benefit tests of GETs in areas of the grid with chronic congestion to set a higher bar for "good utility practice."

2. **Reduce artificial barriers to entry in generator interconnection.** The process for generation developers to apply for grid interconnection is "causing a massive backlog and delay"[28] in new construction. The amount of capacity backlogged equals 70 percent[29] of 2030 clean energy targets. In the ANOPR and beyond, Congress should press FERC to prioritize reducing information and procedural barriers in interconnection, while ensuring network upgrade costs adhere to the beneficiary pays principle[30] with the dispersed nature of the evolving resource mix.

3. **Bolster regional transmission planning, cost allocation, oversight and competition.** A handful of planning and cost allocation improvements[31] alone could net trillions in private investment, save consumers billions and pave the way for eliminating most industry emissions. Planning processes are notoriously short-sighted and uneconomic, requiring an overhaul to plan for long-term conditions and use of higher quality cost-benefit analyses. This is important within organized electricity markets but even more so outside of them, where transmission opacity reigns supreme. Instituting independent planning and oversight would improve planning parameters and ensure incumbents cannot stymie use of GETs and competitive solicitations, with the latter providing a 20-30 percent discount[32] for transmission expansion. Most of this falls under the scope of the ANOPR, and it is no secret that FERC leadership seeks congressional cover to overcome resistance from incumbent transmission owners.[33]
4. **Overhaul interregional transmission planning. FERC's ANOPR is heavy on regional transmission reform and overlooks most aspects of interregional planning, which is largely non-existent in practice.** Congress could add major value. On the technical side, requiring economics-based interregional transfer requirements could bolster grid resilience and build superhighways for clean energy while ensuring consumer benefits easily outweigh costs. Congress should also press FERC to overhaul the institutional design of interregional planning, such as incorporating third party expertise and community considerations about locations in an efficient planning process. For example, Congress could require FERC and the Department of Energy (DOE) to sign a memorandum of understanding[34] for DOE to convene stakeholders to help plan, provide technical input and file before FERC pursuant to Section 403[35] of the Department of Energy Organization Act.
5. **Remove barriers to electric commodity market innovation and liquidity.** Irrespective of transmission reforms, improving the tools to manage grid congestion will be crucial as the resource mix evolves. Liquid, granular markets for congestion management reduce artificial costs for clean energy development and integration while improving risk management. Regulatory rules for market pricing and congestion products vary by region and result in some areas having no granular market, while others face limitations on granularity or forward periods. Some markets still suffer from subpar credit policies.[36] Ambiguous FERC enforcement practices leave commodity markets with no clarity on what constitutes market manipulation,[37] which chills commodity innovation and decreases liquidity. Congress should direct FERC to reform market rules and enforcement practices that inhibit nodal congestion products, while ensuring tools to detect legitimate market manipulation like physical withholding[38] during tight natural gas periods.

Five Reforms That Require Altering the Federal Power Act (FPA)

1. **Make competitive generation the law of the land.** Historically,[39] the regulated monopoly generation model has stifled innovation, hurt consumers and undermined environmental[40] progress. The economic and environmental advantage[40] of competitive generation grows as capital and risk decisions become more complicated with the rise of unconventional resources. Large consumers argued for competitive power generation[41] half a century ago, culminating in national "diet" competition policy in the form of the Public Utility Regulatory Policy Act (PURPA) of 1978.[43] Consumers stepped that

up[44] in recent years, calling for an end to the "natural monopoly" model. Truly competitive policy would render PURPA obsolete, consistent with states' objectives.[45] Congress could require removal of wholesale barriers to consumer self-supply and establish a minimum threshold for competitive central plant procurement without right-of-first refusal by an incumbent utility, applicable in interstate bulk power systems.

2. **Strengthen competitive rules for affiliate transactions.** FERC uses competitive solicitations[46] criteria to mitigate affiliate abuse concerns. But this has not prevented some egregious anti-competitive conduct, such as those witnessed in Ohio and Illinois in 2020[47] where a parent company used a monopoly utility to cross-subsidize uneconomic legacy power plants owned by its competitive generation affiliate. FERC's criteria are sound, albeit limited in practice: transparency, definition, evaluation, and oversight. However, utility solicitations ostensibly satisfy these criteria but remain uncompetitive. FPA amendments could address this by requiring that solicitation criteria[48] do not narrowly define one technology to the exclusion of others and by having equitable evaluation criteria across all bids and bidders.
3. **Enable nationwide retail choice.** Recent studies[49] suggest properly designed and implemented retail competition programs send more accurate price signals, lower costs, and enable product differentiation. This includes expanding clean energy access, lowering the "green premium"[50] and ensuring any clean premium is fairly allocated based on individuals' voluntary preferences. The CLEAN Future Act[51] boldly had a "right to clean" provision, and ideally Congress would push a "right to anything" for consumers.
4. **Require granular emissions transparency.** Emissions data from the U.S. Environmental Protection Agency is severely lagged and lacks the granularity necessary to inform power consumers about their indirect emissions. The result is that the wave of voluntary corporate and retail clean energy investment—which now overwhelmingly outweighs[52] that driven by standards—is increasingly divorced from the objective of reducing emissions. Fixing this requires granular information: the emissions of the marginal power generator in a given area based on dynamic transmission congestion. Congress could require public utilities and/or balancing authorities to disclose average hourly emissions publicly for each pricing node within a specified timeline.
5. **Eliminate price controls on state policy.** FERC responded to proliferating state subsidies by imposing price controls to "fix" their price suppressive effects. The primary culprit is the "minimum offer price rule" (MOPR), which remains in litigation. A constant in economics is that when one government imposes price controls to counteract the effects of another government's subsidies, it exacerbates[53] harm to social welfare (i.e., two wrongs don't make a right[54]). MOPR is bad economic policy and even worse politics. Congress should eliminate this instrument of overreach and clarify the jurisdictional bright line, such as preempting facility-specific subsidies, not portfolio attribute subsidies that preserve a role for competitive forces.

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

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. In contrast to intermittent sources of electricity such as wind and solar, geothermal is an "always-on" renewable resource.

The potential for geothermal to supply affordable, reliable, and clean heat and electricity is enormous. Although geothermal faces technological and economic challenges, the potential for enhanced geothermal systems is about half the installed generating capacity in the United States, according to the U.S. Geological Survey.[55] In 2019, the Department of Energy (DOE) called geothermal "America's untapped energy giant."[56] Particularly promising reenhanced geothermal systems are man-made reservoirs "created where there is hot rock but insufficient or little natural permeability or fluid saturation."[57]

While the commercial use of geothermal power dates back 60 years, advancements in smart drilling and extraction technologies have increased the potential for geothermal as a greater source of clean, domestic power. Several start-ups, with backing from venture capitalists and large energy companies, are investing to improve the economic viability of closed-loop geothermal systems. In a closed-loop system, "fluids are circulated through the system and heated by high underground temperatures, forming what they call a 'massive radiator.'"[58] 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.[59]

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).[60] Several legislative reforms could improve the economic outlook for geothermal energy. The Enhancing Geothermal Production on Federal Lands Act would:

- Expedite the process by creating 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.[61]

Congress should also:

- 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.[62]
- Maintain 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.[63] 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 where 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 for energy use.[64]

"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."

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:

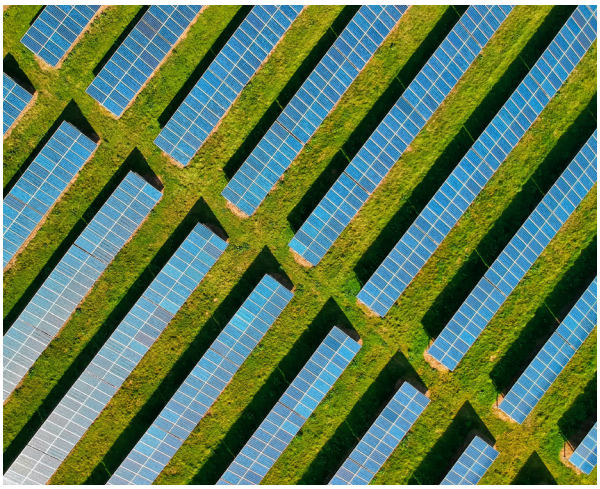
- 281 hydropower and pumped storage facilities, about 30 percent of active licenses, are set to expire by 2030.
- Relicensing takes on average 7.6 years and routinely takes more than a decade, according to the Department of Energy.
- Relicensing a hydropower plant takes longer than relicensing a nuclear plant.
- The processing of a license for a 100-megawatt hydropower facility can cost upwards of $100 million.[65]

POLICY RECOMMENDATIONS TO EXPAND HYDROPOWER

Ample opportunities exist to increase hydropower's share as a clean, reliable electricity source. They include upgrading existing infrastructure and adding generation to non-powered dams. Less than three percent of the 90,000 dams in the United States are powered. Furthermore, expanding the use of pumped storage would provide additional supply and storage, which would be particularly beneficial to accompany future wind and solar buildout.[66] 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."[67] To stretch taxpayer dollars further and incentivize investment in existing fleet upgrades and increasing new hydropower generation, deeper regulatory improvements are necessary.

For instance, the Hydropower Clean Future Act would expedite and modernize hydropower licensing while ensuring environmental protection for aquatic ecosystems. Specifically, the legislation would:

- Designate the Federal Energy Regulatory Commission as the lead agency for federal permitting and improves 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.[68]



Additional legislative reforms should:

- Require a "two-year, start-to-finish licensing process for adding generation to non-powered dams, and require the Army Corps of Engineers to develop a coordinated, consistent, and nationwide strategy to expedite the development of non-powered dams."[69]
- Allow the U.S. Army Corps of Engineers to engage in private-sector financing for the federally owned fleet of power projects.[70] 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. [71]

Other major regulatory overhauls, such as legislative fixes to the National Environmental Policy Act, would go a long way to improve the environmental review and permitting process for new and existing hydropower plants. 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.[72] 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.

MODERNIZE THE NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) requires federal agencies to conduct comprehensive environmental assessments for a wide range of projects, including many renewable energy projects.[73] The NEPA process commences when a federal agency proposes a major action that could significantly impact the environment. While well-intentioned, NEPA has caused regulatory paralysis and opened doors for litigious organizations to block projects even if the environmental assessment deems the project to be safe. New York Times columnist Ezra Klein wrote that NEPA is "part of a broader set of checks on development that have done a lot of good over the years but are doing a lot of harm now. When they were designed, these bills were radical reforms to an intolerable status quo. Now they are, too often, powerful allies of an intolerable status quo, rendering government plodding and ineffectual and making it almost impossible to build green infrastructure at the speed we need."[74]

Both the Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act) and the Building United States Infrastructure through Limited Delays and Efficient Reviews Act of 2021 (BUILDER Act) are legislative fixes that would expedite permitting timelines, increase accountability, improve efficiency, and curb excessive litigation.[75]

7.

Agriculture

EMPOWERING AMERICA'S FARMERS AND RANCHERS

Key Takeaways:

- American farmers and ranchers are essential to putting safe, secure 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 work in harmony with environmental progress.
- Public policy should protect private property rights, empower ranchers and farmers (not 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 reducing emissions and building more natural climate resiliency.

American farmers and ranchers are essential to putting safe, secure food on the table for families in the United States and around the world. The people working in the domestic agricultural sector are also among 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 their efficiency. They are 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]

For the agricultural sector, climate change represents both a challenge and an opportunity. Farmers and ranchers are on the front lines as the climate changes. Warming affects crop seasons, soil nutrition, and erosion.[2] Extreme weather such as droughts, heat waves, and floods can ruin crops. Higher levels of carbon dioxide can help crop yields by boosting photosynthesis but can also create hotter, drier climates where crops suffer. Consequently, climate change's impacts on crop yields vary by crop and region.[3]

The global food system represents 21 to 37 percent of annual emissions (as measured by 100-year Global Warming Potential).[4] Land-use changes, production, livestock management, fertilizer use, and transportation increase carbon dioxide, methane, and nitrous oxide emissions.[5]

"The global food system represents 21 to 37 percent of annual emissions (as measured by 100-year Global Warming Potential). Land-use changes, production, livestock management, fertilizer use, and transportation increase carbon dioxide, methane, and nitrous oxide emissions."

PRODUCING MORE FOOD WITH A SMALLER ENVIRONMENTAL FOOTPRINT

Continued innovation can drive efficiency, increase output, reduce emissions, and maintain American leadership in agriculture. Newer farm equipment and precision agriculture technologies improve fuel efficiency and reduce input costs. Meanwhile, innovative companies are turning waste into valuable products. For instance, Sedron Technologies processes liquid and solid wastes into useful products for soil nutrition, fertilizer, and drinking water.[6] Reducing food waste and developing alternative sources of protein will also save money, minimize environmental impacts, and provide consumers with more choices. Greater adoption of genetically engineered crops and animals will increase productivity with a smaller environmental and climate footprint.[7] Entrepreneurial startups are producing supplements for cattle to reduce methane emissions while earning farmers income in voluntary offset markets.[8]

Furthermore, natural climate solutions such as regenerative and precision agriculture provide an opportunity for farmers to diversify income and reduce the risks of climate change by sequestering more carbon dioxide. 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."[9] Similarly, data show that regenerative practices at corn farms in Iowa and almond farms in California have generated far more revenue.[10] Increased animal grazing has improved soils, biodiversity and generated climate benefits.[11] Cover crops improve soil health and reduce erosion, water pollution, and emissions.[12] Farmers are also expanding the use of renewable power, for instance, by pairing solar panels with shade crops[13] or leasing land for wind turbine developers.[14]

> ***"Continued innovation can drive efficiency, increase output, reduce emissions, and maintain American leadership in agriculture."***

POLICY RECOMMENDATIONS 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 work in harmony with environmental progress.** As policymakers deliberate how to boost the agricultural economy and address climate change, they should adhere to three fundamental principles.

1. **Protect private property rights.** Property rights incentive stewardship because property owners benefit economically and environmentally from taking care of the asset they own. Conversely, when everyone owns something, no one does. Countries with well-defined and protected private property rights also have the strongest environmental records.[15]
2. **Empower farmers and ranchers.** When it comes to agricultural innovation, American farmers and ranchers are already global leaders. Prescriptive government policy that imposes mandates and burdensome regulations will 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.
3. **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.

EXPAND OPPORTUNITIES FOR PRECISION FARMING AND SUSTAINABLE INTENSIFICATION

Precision agriculture and sustainable intensification will 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 allows for optimized seed planting while reducing inputs like fertilizers, pesticides, and fuel and water use.[16] Studies have shown 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.[17] 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.[18]

American farmers are already global leaders in precision agriculture practices.[19] 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.[20]

"Greater food supplies for American families and higher incomes for American farmers and ranchers can work in harmony with environmental progress."

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.[21] 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.[22] The Naturally Offsetting Emissions by Managing and Implementing Tillage Strategies (NO EMITs Act) would achieve several of these goals.[23] The bill:

- Establishes a Soil Health Transition Incentive Program that provides payments and technical assistance to producers who are transitioning their farms to soil health cropping systems.
- Provides longer-term contracts (5-7 years) to help mitigate risk during transition to soil health cropping systems.
- Allows the producer to choose individualized technical assistance through USDA, TSPs, commercial entities, non-profits, or state or local governments.
- Doubles funding for the Conservation Innovation Trials from $25 million to $50 million.
- Establishes State Assistance for Soil Health Programs and provides $100 million a year out of Conservation Stewardship Program (CSP) funding for matching grants to states or tribes for state soil health programs.
- Carves out 1 percent of the overall conservation title funding to provide technical assistance to producers to mitigate and adapt to the changing climate.[24]

MAXIMIZE 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. Billions of dollars have been allocated to rural communities for broadband with mixed results depending on the program and the region.[25] Further, outdated maps of internet coverage make it difficult to allocate resources efficiently. Mercatus Center research fellow Brent Skorup notes that, "Complex, conflicting subprograms are another problem. The FCC alone has 17 rural telecom subsidy subprograms. Each has unique formulas and eligibility requirements for providers."[26] With tens of billions of dollars available for rural broadband expansion, Congress and the administration 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.[27] Absent a voucher program, the Federal Communications Commission should distribute funds through a reverse auction and expand participation in the auction by eliminating the requirement that providers be eligible telecommunications carriers (ETCs).[28]
- **Improve the process to receive federal rights-of-way.** Streamlining the process to receive federal rights-of-way would improve access to broadband services in rural and tribal communities. The bipartisan Accelerating Rural Broadband Deployment Act would require agencies to review and respond to federal right-of-way requests within 60 days of receiving the request and authorize agencies to approve the licensing for all broadband equipment on a federal right-of-way.[29]
- **Leverage public-private partnerships to expand mapping.** 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.[30] The federal government should leverage private sector expertise and practices as it improves country-wide broadband mapping.

- **Prioritize unserved and truly underserved areas and ensure technology neutrality.** According to the Federal Communications Commission, 96 percent of Americans had access to broadband in 2019.[31] 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.[32]

PROVIDE ACCURATE ACCOUNTING OF THE ENVIRONMENTAL AND CLIMATE EFFECTIVENESS OF CONSERVATION PROGRAMS

Voluntary USDA conservation programs provide important assistance to farmers and ranchers, protect the environment, and can reduce emissions through carbon sequestration in soil and trees. Conservation programs help protect drinking water, preserve wildlife habitat, prevent soil erosion, and protect and restore forests and wetlands.[33] Data collection, transparency, and evaluation will maximize the efficiency of these initiatives and safeguard taxpayers from waste, fraud, and abuse. The bipartisan, bicameral Farmer-Driven Conservation Outcomes Act of 2020 would authorize the USDA to identify goals, metrics, and assessment processes to measure the effectiveness of conservation programs.[34] Developing goals, evaluation metrics, and monitoring programs and modifying the programs as necessary would provide sound scientific data to maximize conservation efforts. Data collection, monitoring, and evaluation would also better inform efforts to capture and sequester carbon.

ADDRESS INVASIVE SPECIES

Invasive species are an economic and environmental menace for private property owners, communities, and public lands and waters. USDA explains that the widespread, "economic and social impacts of invasive species include both direct effects of a species on property values, agricultural productivity, public utility operations, native fisheries, tourism, and outdoor recreation, as well as costs associated with invasive species control efforts. A 2021 study estimated that invasive species have cost North America $2 billion per year in the early 1960s to over $26 billion per year since 2010."[35] Climate change exacerbates invasive species problems and can also increase risks of wildfires and reduce the health of forestland and grassland, reducing the potential to sequester more CO2. 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.[36] To address and help eradicate invasive species, Congress and the administration should:

"Voluntary USDA conservation programs provide important assistance to farmers and ranchers, protect the environment, and can reduce emissions through carbon sequestration in soil and trees. "

- **Reform permitting for invasive species plans to efficiently utilize the $100 million invasive species prevention, early detection systems, and eradication.** The Infrastructure Investment and Jobs Act allocates $100 million each to the Department of Interior and Department of Agriculture to address invasive species.[37] PPrevention and early detection are by far the most cost-effective ways to deal with invasive species. Through public, private, and international data collection, the Fish and Wildlife Service provides Ecological Risk Screening Summaries that quickly assesses the invasiveness of a plant or animal. The federal government should continue to provide the resources necessary to constantly update risk assessment as information changes and expand its public outreach as much as possible. Funding for methods including molecular-based surveillance technologies and even sniffer dogs have been helpful in detecting invasive species early.[38] Congress should expedite permitting for any invasive species eradication projects,[39] and DOI and USDA should have the flexibility to use funds to experiment with different prevention and detection methods.
- **Expand the use of federal and state incentive programs. Federal and state governments should expand the use of incentives to reduce invasive species.** For instance, a nutria is a semi-aquatic rodent that adversely affects wetlands and vegetation in Louisiana (and several other states). Through a federal-state program, participants can trap and hunt nutria and will receive $6 per nutria delivered to a collection center.[40] Another example is a resource incentive, where

Florida's Fish and Wildlife service allowed anglers to harvest an additional spiny lobster for every 25 lionfish (the invasive species) captured. The state also had a contest to see which diver could capture the most lionfish and awarded prizes to those who captured the most. In 2021, the participants collected more than 3,400 lionfish.[41] Different types of incentive programs (bounty, contractor, community, recreation) are effective and can vary depending on the region and species.[42] Using the $200 million from the infrastructure bill, agencies should work with states to expand the use of federal-state incentive programs and follow DOI recommendations on considerations, implementations, avoiding unintended consequences, and public outreach.[43]

- **Provide consistent funding for research, development, and deployment for invasive species treatment.** USDA's Agricultural Research Service has collaborated with private landowners and states to treat and eradicate invasive species. For example, Fish and Wildlife partnered with local landowners and conservation organizations in Wyoming to test the effectiveness of chemical and biological treatments for cheatgrass, an invasive species that exacerbates the size and scope of wildfires.[44] Expanding research within USDA, at universities, nonprofits, and the private sector can expand the availability of low-cost solutions. While the infrastructure bill provides a sizable allocation to address invasive species, authorization and appropriation for research projects such as experimental forests would also help study cross-cutting environmental issues, including invasive species.
- **Explore alternative funding pathways.** Increase user fees and charge international visitors higher fees. To address invasive species at federal and state parks or waters like the Great Lakes (where 25 invasive species of fish and numerous invasive plants have entered the lakes since 1880[45]), parks should charge market rates for entrances.[46] That revenue could be used to address deferred maintenance at parks but also to address environmental concerns like invasive species. Charging international visitors to federal parks by increasing visa fees or charging out-of-state visitors to state parks (as many do) would generate additional revenue. To be clear, parks and public spaces should be available to all Americans. Higher fees should not price families out of visiting America's national treasures. Providing vouchers for low-income families would ensure all Americans have access to national and state parks.

- **Provide research, development, and demonstration for expanded biochar use.** 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.[47] 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.[48] The BIOCHAR Act of 2021 would create a biochar demonstration project and use at least 50 percent of the feedstock from forest thinning projects.[49]

EMBRACE SOUND SCIENCE ON GENETICALLY MODIFIED CROPS AND GENETICALLY ENGINEERED ANIMALS

Genetically modified (GMs) crops have been essential to feeding American households and enabling farmers to produce higher yields with fewer resources. Genetically modified crops such as golden rice have been instrumental in combating global hunger and malnutrition.[50] These crops are safe, tested, and approved by regulatory agencies in the U.S. (Food and Drug Administration) and around the world. By improving productivity on existing cropland and reducing the use of herbicides and insecticides, GMs have substantial environmental and climate benefits. The climate benefits include both emissions reductions and stronger natural climate resiliency. A June 2020 study from PG Economics Ltd found that, in 2018, GM crops raised farm income nearly $19 billion after having raised farm income $225 billion from 1996-2018. The same study found that in 2018 the

"combined GM crop-related carbon dioxide emission savings from reduced fuel use and additional soil carbon sequestration were equal to the removal from the roads of 15.3 million cars."[51] Similarly, genetically engineering animals has proven to make them healthier, more productive, and more environmentally friendly. For example, genetically engineered cows have more disease-resistant milk, which reduces the emissions per gallon of milk produced.[52] Moreover, researchers have inserted a gene into cows to produce more male offspring, which weigh more but eat less.[53] Again, the result is greater output with a smaller environmental footprint.

Recognizing the economic and environmental benefits of GMs, policies and regulations should open access to genetically modified crops and animals rather than stigmatizing them. For instance, Emma Kovak at the Breakthrough Institute writes, "Unfortunately, policies in the European Union (EU) prevent most cultivation of genetically engineered crops, thereby foregoing the potential environmental benefits. And those are substantial. In the European Union alone, growing more genetically engineered crops could avoid a yearly 33 million tonnes CO2 equivalents (Mt CO2e/yr) in emissions, largely by increasing yields and reducing cropland expansion. That's equivalent to 7.5% of total EU agricultural emissions from 2017."[54]

While consumers must have safe products, unnecessarily burdensome approval processes and timeframes delay adoption of safe GM crops in developed and developing nations. Daniel Nerero at the Alliance for Science at Cornell University writes, "Golden Rice is an example of how a technology for humanitarian purposes can be delayed for more than a decade, in part due to excessive regulation. In India alone, the cost of not commercializing Golden Rice was more than US$199 million annually and the loss of 1.4 million lives in the last decade."[55] Another example is the first genetically modified salmon, the first GM food approved in the United States. It took 20 years for the FDA to grant permission for genetically modified salmon to be sold in the U.S.[56] Encouragingly, the federal government has made improvements to expedite the regulatory process for GM crops and animals. The FDA has approved (deregulated) more than 130 crops and plants.[57] Moreover, the USDA is taking over the approval process for genetically engineered animals, which should improve approval and commercialization timeframes. Kovak at the Breakthrough Institute emphasizes that:

> *In contrast to FDA's overly cautious regulatory approach, which includes the same intensive review for every [Genetically Engineered] animal, USDA's proposed rule has two levels of safety review for potential risks to human and animal health: an expedited one for GE animals with changes that mimic naturally-occurring ones, and a full safety review for all other GE animals. Using genetic engineering to mimic naturally-occurring animal traits may sound pointless; however, it is a quicker way to combine traits from two different breeds than conventional breeding and usually achieves indistinguishable results.*[58]

Kovak makes two recommendations to further improve the process. The first is to regulate the product, not the process. Countries including Canada and Argentina take this approach and it is supported by biotechnology scientists as a more scientific approach.[59] The second is to eliminate pre-market regulatory safety checks as producers regularly breed plants and animals in a conventional manner without any safety regulation until the animal reaches the market.[60]

In addition to improving the regulatory process in the U.S., Congress and the administration should:

- **Keep GM labeling voluntary and consider building a USDA campaign around the economic and environmental benefits of GM crops and animals.** Mandatory labeling could likely create a negative stigma about genetic engineering, which would undermine the evidence that GM crops and animals are scientifically safe and beneficial for farmers, consumers, and the environment. Evidence also suggests that non-GMO labels may reveal enough information to

consumers to deem mandatory labels unnecessary.[61] Additionally, USDA should consider reinstating its GM checkoff program to convey the minimal risks and economic and environmental benefits of GM crops and animals. While the USDA should not be in the business of picking winners and losers, public perception and acceptance is key to legitimizing GMs where widespread skepticism still exists.[62]

- **Codify product-based regulations and work with other countries to adopt an efficient international standard.** USDA should adopt product-based regulations and Congress should codify those changes to prevent regulatory swings that occur with changes in administration. Furthermore, the U.S. should lead in developing transparent, efficient international standards that push back on overly risk-averse actions (such as by the European Union) that do not comport with the actual risks of GM and fail to recognize the immense benefits. Leading on international standards would also help developing countries establish standards.

BOLSTER AMERICAN LEADERSHIP IN AGRICULTURAL TRADE

American farmers and ranchers are global leaders in supplying food to the world. U.S. agricultural exports shattered records in 2021. The $177 billion in exports surpassed "the 2020 total by 18 percent and eclips[ed] the previous record, set in 2014, by 14.6 percent."[63] While these figures are not adjusted for inflation, agricultural exports as a percentage of gross domestic product increased from 10.2 percent in 2020 to 10.8 percent in 2021.[64] Because U.S. farmers are leaders in production, efficiency, and stewardship, U.S. agricultural exports are also generating global environmental and climate benefits. Many countries have higher on average emissions intensities for crop and meat production. Ted Nordhaus and Dan Blaustein-Rejto of the Breakthrough Institute astutely underscored:

> *In the contemporary environmental imagination, highly productive, globally traded agriculture is a bad thing—poisoning the land at home and undermining food sovereignty abroad. But in reality, a pound of grain or beef exported from the United States almost always displaces a pound that would have been produced with more land and greenhouse gas emissions somewhere else.*[65]

Removing barriers to trade would be beneficial to importers, exports, and American consumers' well-being.[66] Policymakers should remove policy and regulatory barriers that inhibit the growth of U.S. agricultural exports (and imports). That includes expanding free trade agreements to lower tariffs and non-tariff barriers, eliminating mandates that misallocate resources away from productive uses, and fixing outdated regulatory policies that exacerbate supply chain constraints. Specifically, policymakers should:

- **Repeal the Foreign Dredge Act.** The Foreign Dredge Act prohibits any foreign-built or chartered ships from dredging in the U.S. Consequently, some of the world's best dredgers that could deepen and widen America's ports cannot bid on contracts. Deeper, wider port channels would improve transportation efficiency, reducing emissions from unwanted congestion and light-loading. Unable to accommodate two-way traffic or larger cargo ships, port channels across the U.S. have become congested. As a result, companies move more goods via truck or rail, increasing congestion and wear-and-tear on America's highways. Repealing the Act would also be beneficial to American farmers and ranchers (as well as other manufacturers and businesses). With just an inch of additional depth, a cargo ship could transport millions of dollars more in products per trip. The National Oceanic and Atmospheric Administration estimates that an additional inch of depth would allow ships to carry about "50 more tractors, 5,000 televisions, 30,000 laptops, or 770,000 bushels of wheat."[67]
- **Repeal the Jones Act.** The Jones Act requires that shipments between two domestic ports be on U.S.-built, owned, flagged, and crewed vessels. Rather than pay competitive prices for shipping, Americans pay more for a number of goods for no meaningful economic or national security benefits.[68] The Act has resulted in missed opportunities for farmers (corn, soybean, and potato for instance) to sell their product to other American consumers, who buy instead from foreign competitors because of high shipping costs.[69]

"Removing barriers to trade would be beneficial to importers, exports, and American consumers' well-being."

- **Repeal the Renewable Fuel Standard (RFS) and waive refinery blending requirements.** The Renewable Fuel Standard requires that biofuels (primarily corn-based ethanol) be blended into America's fuel supply. The mandate has led to land use changes and crop switching, increasing food prices for households.[70] The RFS is a poor economic policy and a poor environmental policy. A 2019 Government Accountability Office 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."[71] The market, not government mandates, should determine ethanol's value in the marketplace. There is ample evidence that biofuels would play some role, as ethanol is a cost-effective gasoline oxygenate, a gasoline additive that improves efficiency and helps to meet fuel emissions requirements.
- **Eliminate tariffs, tariff rate quotas, and countervailing duties on agricultural imports.** Tariffs and retaliatory tariffs have cut off export opportunities for U.S. farmers and ranchers. For instance, exports to China dropped from $24 billion in 2014 to $9.1 billion in 2018.[72] The administration should zero out these tariffs and focus on more targeted enforcement of products made with forced labor and other blatant human rights violations. A good example is the Uyghur Forced Labor Prevention Act signed into law by President Biden with near unanimous bipartisan support.[73] Furthermore, President Biden should zero out tariffs and tariff rate quotas on agricultural imports such as feed, fertilizers, and meat and poultry preparation machinery.[74] Congress and the administration should also relieve economic burdens placed on American farmers by removing countervailing duties on imported fertilizers.[75]

> ***"With the right incentive structure and the weeding-out of fraudulent credits, voluntary carbon markets can make meaningful gains in reducing emissions and reducing risks of climate change."***

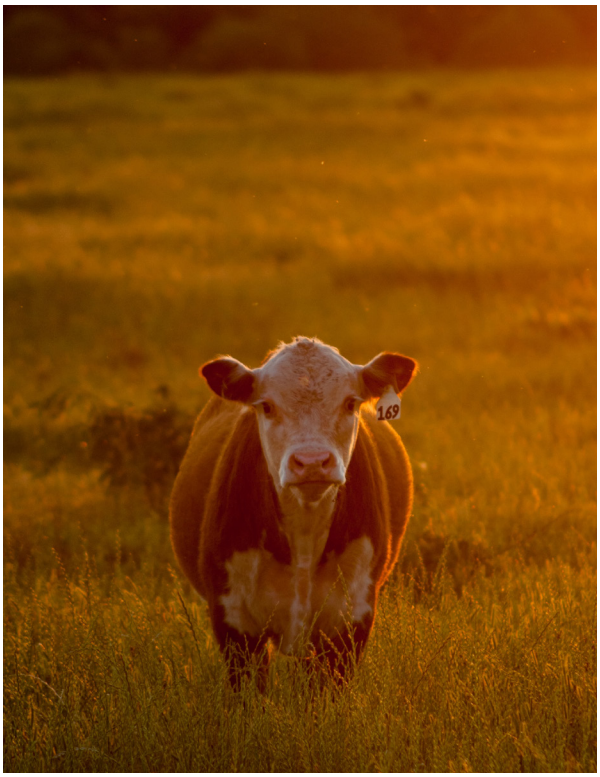
VOLUNTARY CARBON OFFSET MARKETS

Voluntary carbon markets can be a cost-effective way for companies and individuals to reduce their climate footprint. In effect, landowners would receive compensation for preventing and reducing greenhouse gas emissions or for sequestering carbon. This could include planting trees or engaging in farming and ranching practices that increase carbon sequestration. For companies that have set their own net-zero targets, especially hard-to-decarbonize sectors, offsets provide a market-based mechanism to reduce or avoid emissions at lower costs. These markets are not without challenges. In some instances, offset projects did not materialize in the ways expected. For example, satellite imagery has shown that forest preservation or reforestation projects were only covering a fraction of the land they were intended to cover.[76]

Another challenge is accurately measuring the emissions avoided or reduced. Soil samples taken to measure carbon stored can vary depending on which methods samplers use. Renewable power output can change from day-to-day. A reforestation project could be wiped out by a wildfire. The greatest challenge in verifying offsets is proving additionality. In other words, how can we be sure that farmers or businesses are not getting paid for something they were going to do anyway? For example, if a company makes an investment in a new energy-saving technology for financial reasons, but that technology also reduces emissions, those emissions reductions are not additional. For many reasons, proving or disproving that counterfactual is difficult.

These markets, however, have made dramatic improvements in collecting accurate data, improving carbon accounting methodologies, and having transparent, proper oversight. Third-party verifiers are improving methods to demonstrate the veracity of emissions reductions. For instance, one verifier tests soil at the beginning of an offset project, collects samples over the years, and then inputs the data "into an agricultural carbon model that estimates the sequestration that's taken place."[77] Other companies, like Nori, are using blockchain technology to create a voluntary, verifiable carbon removal market for buyers and sellers.[78] The Environmental Defense Fund, World Wildlife Fund, and Oeko-Institut (Germany) are setting up a carbon credit quality initiative.[79]

Jonathan Wood, research fellow at the Property and Environment Research Center, writes that carbon markets will work best when they "incentivize compliance, rather than relying on enforcement."[80] Wood writes, "If offsets are only purchased to comply with the regulation, neither the purchaser nor the seller necessarily has the incentive to ensure that the offsets provide results. Instead, those incentives depend on how closely the regulator scrutinizes transactions and monitors long-term compliance."[81] **With the right incentive structure and the weeding-out of fraudulent credits, voluntary carbon markets can make meaningful gains in reducing emissions and reducing risks of climate change.**[82] The federal government could be a hub of information, provide technical assistance,[83] and provide any necessary verification for the inclusion of carbon markets in international agreements.[84]



8.

Forest Management

ACTIVE MANAGEMENT FOR HEALTHIER FORESTS

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 and timber development 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. An ounce of prevention is worth a pound of cure.
- Through domestic remediation efforts and international cooperation, the U.S. should be a global leader in promoting afforestation and curbing deforestation. Establishing defined and legally protected property rights for landowners is essential for economic productivity and environmental stewardship.[1]

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.[2]

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.[3] Wildfires can also cancel out carbon offset projects, where companies purchase carbon dioxide credits to offset their own emissions. Decomposing trees also release carbon dioxide and methane into the atmosphere.[4]

THE IMPORTANCE OF ACTIVE FOREST MANAGEMENT

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 America's 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 is anything from grass, shrubs and small trees to dead leaves and materials on the forest floor.[5] 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 much more intense and widespread and therefore much more difficult to contain.

"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 America's forests."

Active forest management through prescribed or controlled burns[6] 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) and the Endangered Species Act (ESA). 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.

Even if a forest management plan secures the permits, litigious activists may block the project.[7] 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."[8] Wood has documented several instances where litigation has blocked a forest management project for years.[9]

REDUCING DEFORESTATION AND INCREASING AFFORESTATION

In addition to active forest management, reducing deforestation and increasing afforestation domestically and globally is a pragmatic environmental and climate policy. In fact, **fully restoring understocked, productive forestland in the U.S. could increase carbon sequestration by 20 percent.**[10] That is not to suggest a complete stop to logging, mining, building roads, or other economic reasons private property owners have for cutting down trees. Rather, policymakers should eliminate illegal deforestation, establish defined and legally protected property rights, and increase the availability of compensation for conservation.[11] Direct payments to landowners offers a solution that has proven to reduce deforestation and could be particularly helpful in developing countries. A study that examined a program to pay landowners in Uganda to conserve their respective forests found the payments curbed deforestation and found no evidence of shifting deforestation to neighboring lands.[12] Direct compensation may not be a solution everywhere, and policymakers should rightly be wary of transferring taxpayer money to governments whose interests are hostile to the United States or provide government-to-government transfers where waste, fraud and abuse is probable. Another concern is paying people to not cut down trees when they would not have done so without the payment and therefore there is no additional emissions savings. While proving the counterfactual is challenging, it is worth noting that better access to data and technology is improving the transparency and verification of these programs.

POLICY REFORMS FOR WILDFIRE PREVENTION AND HEALTHY FORESTS

"Fully restoring understocked, productive forestland in the U.S. could increase carbon sequestration by 20 percent."

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.[13] The Emergency Wildfire and Public Safety Act, a bipartisan bill to actively manage forests, also includes several prudent recommendations to reduce fire risk and protect America's forests.

The recommendations below include recommendations from PERC's report and from the Emergency Wildfire and Public Safety Act.[14] The recommendations include reforms that would streamline restoration projects, expedite judicial review, and expand opportunities for timber development. To that end, policymakers should:

- Clarify 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.
- Allow a state environmental review to satisfy all federal requirements of a federal review upon approval from a federal agency.
- Expand the acreage limit for categorical exclusions so that a prescribed burn can safely cover more ground under one restoration project.
- Allow prescribed burns to be excluded from state emissions calculations.
- Narrow 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.

- Limit Endangered Species Act consultation to projects with on-the-ground impacts on protected species.
- Fund and expedite the permit approval for wildfire detection equipment and the use of satellite data.
- Lift the export ban on unprocessed timber on 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 reauthorize the Forest Service and the Bureau of Land Management authority to be a "Good Neighbor" through longer, more flexible partnerships with states, tribes, and counties and define prescribed burns and reforestation as program objectives.
- Solve 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."[15] PERC recommends the creation of a restoration fund that would provide funding certainty and commitment toward long-term projects.

POLICY REFORMS TO REDUCE DEFORESTATION AND PROMOTE AFFORESTATION

Reducing illegal deforestation and increasing tree cover will promote healthier natural ecosystems. Improving soil health, reforestation, afforestation, and eradicating invasive species could provide greater economic opportunities, sequester more carbon dioxide, and build more natural resiliency to protect against natural disasters.[16]

Further, through domestic remediation efforts and international cooperation, the U.S. should be an international leader in afforestation efforts and curbing deforestation. **Establishing defined and legally protected property rights is essential for landowners, including indigenous populations, to reduce global deforestation.**[17] Governments, businesses and private organizations are dedicating more resources to combating international deforestation. For example, a combined $19 billion was pledged during the 2021 Glasgow climate summit.[18] Reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks (REDD+) is another international mechanism aimed at curbing deforestation and forest degradation, though with mixed results.[19] While there are demonstrable benefits from such programs, it is imperative that international programs empower developing countries to prosper and attain better standards of living. It is also important to have transparent funding, established metrics, and verifiable results. Aligning positive incentives that focus on results-based outcomes with strong transparency and verification mechanisms will deliver better economic and environmental results.[20]

Domestically, the Trillion Trees and Natural Carbon Storage Act would take important steps toward better forest management in the U.S. and around the world. Notable recommendations from the legislation include:

- Creating a matching $10 million grant program with states, tribes, local governments, nonprofits, and other private actors to plant trees.
- Empowering the Secretary of Agriculture to work with regional and local foresters to develop priority reforestation projects.
- Increasing the Reforestation Trust Fund cap from $30 million to $180 million to tackle the entirety of the Forest Service's reforestation backlog.
- Creating a matching grant program to maintain and enhance forests and trees in urban areas.
- Creating an International Forest Foundation that accepts private donations to expand tree planting globally.
- Authorizing $10 million for seed and sapling planting.
- Including carbon sequestration and forest management among the list of approved technical assistance categories for international conservation.
- Requiring the U.S. Department of Agriculture to establish objectives for increasing the net carbon stock of American forests, grasslands, wetlands, and coastal blue carbon habitats.

"Establishing defined and legally protected property rights is essential for landowners, including indigenous populations, to reduce global deforestation."

- Authorizing the Secretary of State to increase international forest management collaboration efforts.
- Establishing a biochar demonstration project and expanding funding for experimental forests.

In addition, policymakers should consider:

- Expanding the use of direct payments to curb deforestation. Use funds from the International Forest Foundation and other international programs to pay people and communities not to cut down trees, which has proven to be economically and environmentally effective.[21]
- Prioritizing funding for international deforestation and afforestation to private property owners, including indigenous populations, and condition funding to governments on transparent, results-oriented reporting metrics that demonstrate keeping forests intact or preventing wildfires.
- Ensuring that funding for international efforts to curb deforestation and plant trees is transparent and results oriented. Funding should be contingent upon annual reporting requirements.
- Integrating carbon sequestration into reclamation projects. An operator of a mine or oil and gas well on federal land must implement a full ecosystem restoration project that is self-sustaining and diverse, includes native plants, controls for erosion, and supports wildlife habitat. Consistent with these objectives, reclamation projects should also include opportunities to maximize carbon sequestration.
- Integrating afforestation into abandoned mine site clean-up on Forest Service and Bureau of Land Management property. There are hundreds of thousands of abandoned mine sites on federal lands, and policymakers should turn these environmental liabilities into opportunities. Congress should reform the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) to reduce liability for volunteers, businesses, and communities that want to clean up abandoned sites.[22] Stronger incentives for abandoned mine cleanup will turn health, safety, and environmental dangers into productive, healthier land.

ADDRESSING INVASIVE SPECIES

Invasive species are an economic and environmental menace for private property owners, communities, and public lands and waters. The U.S. Department of Agriculture (USDA) explains that the widespread "economic and social impacts of invasive species include both direct effects of a species on property values, agricultural productivity, public utility operations, native fisheries, tourism, and outdoor recreation, as well as costs associated with invasive species control efforts. A 2021 study estimated that invasive species have cost North America $2 billion per year in the early 1960s to over $26 billion per year since 2010."[23] Rising global temperatures make invasive species worse, and invasive species can also increase the threat of extreme weather. A problematic example of an invasive species worsening the size and intensity of wildfires is the spread of cheatgrass and buffelgrass.[24] Invasive species also deteriorate the health of forestland and grassland, which increases erosion and reduces opportunities to sequester more carbon dioxide.

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. Federal, state, and local government policies and regulations can further complicate coordination.[25] The Infrastructure Investment and Jobs Act allocates $100 million each to the Department of Interior and Department of Agriculture to address invasive species.[26] Prevention and early detection are the most cost-effective ways to deal with invasive species.

Furthermore, federal and state governments should consider expanding incentive programs to reduce invasive species.

For instance, the nutria is a semi-aquatic rodent that adversely affects wetlands and vegetation in Louisiana. Through a federal-state program, participants can trap and hunt nutria and will receive $6 per nutria delivered to a collection center.[27] Additionally, nonprofits are stepping up in a big way. Friends of Tonto National Forest in Arizona, for example, is removing invasive grasses from the national forest after a heavy monsoon season resulted in aggressive growth.[28] Through collaborative relationships with landowners, nonprofits, and state and local governments, the federal government should continue to prioritize invasive species prevention, early detection systems, and eradication.

PROMOTING TIMBER DEVELOPMENT AND TRADE

As the country's third largest agricultural export, forest products are a critical component of the U.S. economy, and wood products can contribute to climate mitigation.[29] For instance, timber exports could expand opportunities for mass timber. Mass timber construction uses lamination, nails, or glue and is "built using a category of engineered wood products typically made of large, solid wood panels, columns, or beams often manufactured off-site for load-bearing wall, floor, and roof construction."[30] Mass timber construction could be built faster and greener and replace more emissions intensive materials.

One way to expand the timber trade would be to remove tariffs and trade barriers, which have adversely impacted the American timber industry (and benefited the Russian timber industry), homebuilders and consumers.[31] For example, the U.S. Commerce Department doubled the tariffs on Canadian softwood lumber to 17.9 percent in November 2021. In a letter to President Biden, the National Association of Home Builders said, "that tariffs on Canadian lumber shipments into the United States fueled lumber price volatility that it said has added more than $18,600 to the price of a new home since last August."[32]

Retaliatory tariffs have exacerbated the problem and cost Americans nearly $80 billion in higher taxes even as they regressively harmed low-income families.[33] Eliminating costly tariffs would help with inflation, rising housing costs and supply chain issues.

Specifically, the Biden administration should:

- Eliminate tariffs on Canadian soft lumber.[34] The Commerce Department wisely lowered the tariff rate on Canadian soft lumber from 17.9 percent to 11.64 percent (in effect August 2022). The administration should eliminate these tariffs entirely.
- Remove Section 301 tariffs in order to permanently exclude U.S. forest products from Chinese tariffs.[35] While the Phase One trade deal increased exports from the U.S. to China, the actual amount shipped was less than committed.[36]

9.

Transportation & Infrastructure

MEETING AMERICA'S INFRASTRUCTURE NEEDS

Key Takeaways:

- Affordable, dependable transportation options are critical for Americans' way of life. By sector, transportation is also the largest source of greenhouse gas emissions in the United States.
- Reforming government-imposed barriers for infrastructure projects will stretch taxpayer dollars further, 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] 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 not because the industry has a monopoly or manipulates the market but because it is affordable and reliable. 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]

"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."

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. Based on price elasticities of demand, 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]

Regardless of efficacy, political realities cannot be discounted. When prices are high and the economy is slumping, people

tend to worry less about the environment and climate change.[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 powered by coal, 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 very likely going to be a transportation fuel source well into the future and policies that restrict development in the United States could outsource production to dirtier authoritarian regimes (For further discussion, see energy security chapter).

POLICY RECOMMENDATIONS TO REMOVE BARRIERS TO INFRASTRUCTURE

In November 2021, President Joe Biden signed the $1.2 trillion Infrastructure Investment and Jobs Act into law. The legislation included money for roads, bridges, ports, airports, transit, rail, electric buses, electric ferries, and electric vehicle charging infrastructure (among many other programs).[12] Regrettably, the law also entrenches regulations and failed to implement policy fixes that would allow these infrastructure investments to occur more resourcefully. Real dollar, per mile construction costs have tripled from the 1960s to the 1990s.[13] Reforming government-imposed barriers to infrastructure projects 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.[14] These recommendations, which are still relevant today, include:

- **Modernizing the National Environmental Policy Act.** At nearly every level of government, delays can obstruct the development of more environmentally friendly infrastructure. Excessive litigation has blocked bike paths and outdated zoning laws have stifled renewable energy projects and transmission lines.[13] The primary tool to block projects at the federal level is the National Environmental Policy Act (NEPA). President Nixon signed NEPA into law more than 50 years ago. Since then, many federal, state, and local environmental laws have been enacted, creating a confusing web of unclear, overlapping, and complex requirements. NEPA reform is not about removing environmental safeguards but improving efficiency. Both the Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act) and the Building United States Infrastructure through Limited Delays and Efficient Reviews Act of 2021 (BUILDER Act) are legislative fixes that would expedite permitting timelines, increase accountability, and curb excessive litigation.[16] (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."[17]

- **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."[18]
- **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:
    - "Ensure adequate access to Private Activity Bonds (PABs)—which puts the financing cost of privately financed infrastructure on a nearly equal level with projects financed by tax-exempt municipal bonds—by expanding the federal cap on PABs to meet demand. [In a positive reform, the Infrastructure Investment and Jobs Act increased available PAB authority from $15 billion to $30 billion].[19]
    - 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 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."[20]

POLICY RECOMMENDATIONS TO REDUCE CONGESTION

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.[21] Evidence of congestion pricing implemented in several cities worldwide has documented the benefits.[22] Congestion pricing that would reduce emissions also falls victim to bureaucratic obstacles. Infrastructure expert DJ Gribbin, founder of Madrus and former Nonresident Senior Fellow at the Brookings Institute, documented this frustration in testimony, writing:

> *A prime example of how the dysfunctional process harms environmental goals involves New York City's plan to implement congestion pricing. Congestion pricing is a market mechanism with the potential to drastically lower emissions simply by charging drivers market-clearing prices to enter congested areas. Implementing such a pricing plan requires a negligible footprint; the only new infrastructure needed is the erection of tolling "mast arms" on existing structures in Manhattan. Yet the current NEPA process may force the project to undergo the same level of analysis (an Environmental Impact Statement) as required for the construction of the new Tappan Zee Bridge, a 3.1-mile span crossing one of the East Coast's most important estuaries. Delaying a beneficial project for months to study how hanging tolling arms on Manhattan street lights affects parklands and recreational resources; topography, geology, and soils; water resources; and ecology (including that of endangered species and bald eagles) hardly makes sense from an economic or an environmental standpoint.*[23]

States and cities should expand congestion pricing where they can. At the federal level, Congress and the administration should fix antiquated laws and regulations that increase congestion. Approving oil and gas pipelines, including Keystone XL, would reduce the need for resources to be transported by rail or tanker truck.

"States and cities should expand congestion pricing where they can. At the federal level, Congress and the administration should fix antiquated laws and regulations that increase congestion. Approving oil and gas pipelines, including Keystone XL, would reduce the need for resources to be transported by rail or tanker truck."

Several other policy reforms would improve America's transportation and infrastructure needs. They include.

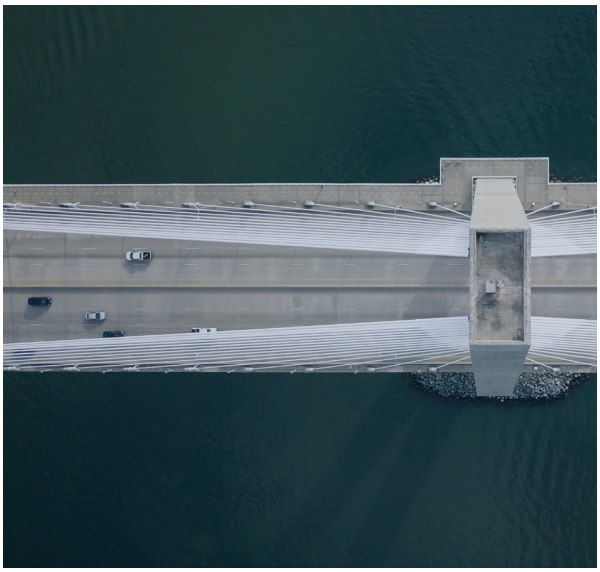
- **Repealing the Foreign Dredge Act.** More than a century old, the Act prohibits any foreign-built or chartered ships

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. Taxpayers would save money because the Army Corps of Engineers and state and local governments are the customers for dredging projects. Families and businesses would be better off because ports would be greater hubs for economic activity. 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."[24] Increasing activity at U.S. ports would provide more opportunities for American farmers, manufacturers, and businesses to export their products.[25]

Deeper, wider port channels would also improve transportation efficiency, reducing emissions from unwanted congestion and light-loading. Unable to accommodate two-way traffic or larger cargo ships, port channels across the U.S. have become congested. As a result, companies move more goods via truck or rail, increasing congestion and wear-and-tear on America's highways. Light-loading occurs when ships cannot carry a full cargo load through a channel because the channel cannot accommodate the depth; therefore, ships offload some of their cargo at a different port before making their way to a destination. Both congestion and light-loading waste time and money and generate more emissions than otherwise would occur.[26] Senator Mike Lee (R-UT) introduced four bills, any or all of which would be a marked improvement from the current law that harms taxpayers, the economy, and the environment. The bills are:

- The Dredging to Ensure the Empowerment of Ports (DEEP) Act would repeal the Foreign Dredge Act of 1906 and streamline key impediments in the Clean Water Act as well as the Army Corps' process for considering dredge projects at our ports.
- The Allied Partnership and Port Modernization Act would support more economic opportunities at our ports. It would amend the Foreign Dredge Act of 1906 to allow NATO affiliated dredging vessels to operate in the United States.
- The Port Modernization and Supply Chain Protection Act repeals the Foreign Dredge Act of 1906's cabotage requirements and allows all dredge vessels that qualify under the laws of the United States to operate in the United States.
- The Incentivizing the Expansion of U.S. Ports Act would amend the Foreign Dredge Act of 1906 to allow Americans to purchase foreign-built dredge vessels for operation in the United States so long as they are crewed by Americans and flagged under U.S. law.[27]



- **Repealing 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 gases. Rather than transporting cargo by water, a portion is instead diverted to more carbon-intensive modes, such as trucking and rail."[28] The Open America's Waters Act would repeal the Jones Act.[29]

- **Deploying smart technologies.** One should not overlook the use of technology to 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,"[30] 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."[31] Technological innovation is also making bus service more efficient by transitioning to an on-demand service rather than stopping at each bus stop.[32] With funding available, states, cities, and localities should expand the use of cutting-edge technologies to help drivers and commuters and reduce emissions.

POLICY RECOMMENDATIONS TO PHASE OUT OR IMPROVE EFFICIENCY OF SUBSIDIES

Over the last several decades, Democrats and Republicans have supported preferential treatment for various alternative fuels. To reduce dependence on foreign oil and address environmental concerns, federal and state legislators have enacted targeted tax credits for alternative fuels, electric vehicles, grant programs, fuel tax exemptions, and more.[33] Another policy, the Renewable Fuel Standard, mandates that fuel supplies mix ethanol into gasoline at blending stations. The law requires the blending of 36 billion gallons of ethanol in 2022. In 2023, the Environmental Protection Agency will set new renewable volume obligations.[34]

"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."

The concern with the subsidization of alternative fuels is not a criticism of the specific fuel or technology, but the economic and environmental inefficiencies they cause. The fundamental concern for policymakers should be the lack of environmental benefit or emissions abatement cost per dollar of taxpayer money spent. For example, a 2019 Government Accountability Office (GAO) study found the Renewable Fuel Standard was "associated with modest gas price increases in areas outside the Midwest" while providing "limited effect, if any, on greenhouse gas emissions."[35] Further, subsidies for electric vehicles and the "cash for clunkers" program to encourage the retirement of old vehicles have some of the highest abatement costs per dollar spent compared to other federal and state policies.[36] Philip Rossetti, senior fellow at the R Street Institute, estimates that the electric vehicle subsidies proposed in the Build Back Better agenda would have minimal impact on vehicle sales because the subsidies would accrue to households that are already likely to purchase an EV.[37]

Policymakers should also voice concern over the market-distorting effects of subsidies. In addition to the direct cost to taxpayers,[38] **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:

- **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[39] 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.[40]

- **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.[41]
- **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.[42]
- **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.[43] 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.

TACKLE INTERNATIONAL AIR POLLUTION

Reducing air pollution from the transportation sector will have significant public health and climate benefits. Preventing and removing black carbon, for instance, would dramatically improve air quality but also remove a short-lived climate forcer.[44] Addressing international black carbon in developing countries would reduce premature mortalities and mitigate warming.[45] The exact amount of climate mitigation derived from reducing black carbon is unknown and may be weaker than expected.[46] Nevertheless, reducing harmful pollutants presents an environmental and climate win-win. China has been the largest
emitter of black carbon, though much of the pollution is not from the transportation sector but from burning coal without the appropriate pollution controls.[47]

Much of the focus for international climate policy has centered on the Paris Agreement and to a lesser extent, the Kigali Amendment to the Montreal Protocol. However, international treaties such as the Convention on Long-Range Transboundary Air-Pollution and the Gothenburg Protocol should be instrumental in cleaning up the planet and helping to abate warming. Working with international allies, the United States should pursue aggressive efforts to bring the major polluters into these conventions and ramp up the urgency to reduce air pollution.

10.

Adaptation

ADAPTATION FOR SAFE, RESILIENT COMMUNITIES

Key Takeaways:

- Adaptation is a cost-effective climate solution, and the private sector should play a leading role in assessing climate risk. 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.
- 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 incurs warming of 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 as a result of 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. Rather, climate change should not be an excuse for ineffective policies that increase the vulnerability of communities to extreme weather events.

The reality is: with or without manmade climate change, natural disasters are going to strike in the United States and around the world, and 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. Collaboration with the scientific community, federal, state, local governments, the private sector, and other stakeholders can maximize resiliency and preparedness for extreme weather.
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.

HOW COMMUNITIES ADAPT TO CLIMATE CHANGE

Climate adaptation takes many forms. More resilient and reliable infrastructure is what may first come to mind. To be sure, constructing stronger levees, building sea walls, and installing door dams are projects that have helped save lives and protect communities. Investments in more efficient water management systems and sustainable agriculture can also help protect against droughts and floods.

Better information that more accurately communicates risk and aids in preparation is another form of climate adaptation. Early detection systems, visualization tools, up-to-date flood maps, computer modeling, satellite, and radar are several tools that scientists employ to track weather and storms. NOAA has 900 automated surface-observing stations that "report data about sky conditions, surface visibility, precipitation, temperature and wind up to 12 times an hour."[3] While there is still a great deal of complexity, uncertainty, and humility involved, technology provides tools for meteorologists and climatologists to be much better at predicting the size and scope of natural disasters to help mitigate the risk and damage.

Other preventative tools are education and warning systems. Accurately forecasting a devastating storm does little good if that risk is not quickly and accurately communicated to the public. Moreover, the information does little good if communities do not respond. Researchers at the University of Oklahoma's National Institute for Risk and Resilience, Cooperative Institute for Mesoscale Meteorological Studies, and the National Severe Storms Lab are studying the intersection of scientific data and behavior sciences.[4] They ran experiments in which weather forecasters communicated information about risks through briefings to experts, media, and Facebook posts before, during, and after a (simulated) tornado. They conducted the experiment in both Iowa and South Carolina. In building on databases and interactive platforms of effective means of communication, forecasters are better able to influence community emergency preparedness and responses.[5]

One should also not overlook the effectiveness of relatively low-cost options to reduce the risks of extreme weather. The availability of affordable and reliable air conditioning in the summer and dependable heat in the winter is climate adaptation. This is particularly true in developing countries where access to reliable electricity and clean drinking water are essential to improving their lives. For far too many people, access to dependable power, clean drinking water, and amenities we take for granted simply does not exist.

Writing in the Los Angeles Times, Shashank Bengali's story of a young man in Mumbai emphasizes the importance of a good like air conditioning:

> *Raheel Shaikh had worked his way up from a $90-a-month entry-level job in digital marketing to a position that paid 10 times as much. He remodeled the two-room apartment he shares with his parents, bought a motorbike and was planning his wedding in January. Finally, this summer, the 30-year-old Shaikh splurged on the new must-have item for the upwardly mobile Indian: an air conditioner.*
>
> *On a warm afternoon in November, Shaikh sat inside his living room and explained how the $800 Japanese appliance*

quietly exhaling overhead had made it easier for his parents to sleep in the deadening tropical heat of Mumbai, India's commercial capital, and bearable to work on his laptop late into the night. It had also pleased his fiancée to know she would move into an air-conditioned home.[6]

In the same article, Dr. Nikit Abhyankar, a scientist at Lawrence Berkeley National Laboratory called buying an air conditioner in India "a threshold good — the moment you cross into that middle-class income level, you go and buy one."[7] Having the means to afford air conditioning underscores two fundamental points. The first is to acknowledge the challenge at hand of meeting the future energy needs of the developing world and reducing the risks of climate change. More energy use and more use of coolants for air conditioning means higher levels of emissions. The solution is not to keep developing countries de-developed but to reduce the green premium and rapidly deploy cost-effective alternatives. Reducing global poverty and reducing the risks of climate change must work together. The second is that higher levels of wealth and prosperity are beneficial for environmental progress, reducing emissions, and increased resilience.[8]

STRONGER ECONOMIES EQUAL MORE RESILIENT COMMUNITIES

Our Free Economies are Clean Economies report emphasizes that wealth improves health and cleans the environment.[9] People with more wealth can afford products and technologies that make life easier, healthier, and cleaner. More wealth will give people more of the forms of climate adaptation mentioned above: comfortable settings in your home, technologies to maximize preparedness, and sturdier infrastructure. **Policies rooted in economic freedom will better help households and communities adapt to climate change.**

A striking example of how different economic and political philosophies influence climate adaptation is seen with the paths taken by the Dominican Republic and Haiti. Although there are some geographic differences, the two countries share the same island, Hispaniola. As recently as 60 years ago, the countries' gross domestic product (GDP) per capita were roughly the same.

Policies have since changed that. The Dominican Republic ranks in the "Moderately Free" category of the 2022 Index of Economic Freedom and had a gross domestic product per capita of $7,268 (in 2020).[10] Haiti ranks in the "Mostly Unfree" category and is teetering on slipping into "Repressed."[11] Out of 177 countries ranked, Haiti is 145 and has a GDP per capita of $1,272 (in 2020).[12] Regrettably, Haitians have lost more lives to natural disasters and suffer economically and environmentally. In 2016 Madison Park of CNN reported: "In 2004, Hurricane Jeanne made landfall at the eastern tip of the Dominican Republic. The flooding from Jeanne killed an estimated 3,000 people in Haiti, according to a report from the National Hurricane Center. Meanwhile, only 19 deaths were reported in the Dominican Republic."[13] Park also reports that an earthquake in 2010 impacted the entire island but no one outside of Haiti died.[14]

"Policies rooted in economic freedom will better help households and communities adapt to climate change."

Haiti lacks the resources to build more resilient infrastructure, to prepare for natural disasters, or to respond to them. Poor environmental policies, including rapid and widespread deforestation, exacerbated Haiti's environmental challenges and made its people more susceptible to flooding and soil erosion.[15] Haiti ranks 170 out of 180 countries on Yale's Environmental Performance Index.[16] To be clear, the legacy of environmental mismanagement dates back to the French colonization of Haiti where deforestation cleared the way for plantations.[17] Even so, the lack of economic freedom has undoubtedly contributed to Haiti's continuing economic plight, poor environmental record, and inability to adapt to climate change. Financial commitments to rebuild may help on the margin, but true progress will come through systemic reform.

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 when water came close to the base's runway eight years earlier.[18] 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."[19] 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 dedicates $47 billion for climate resiliency projects to improve preparedness for fires, floods, droughts, and hurricanes.[20] $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'[21] "'NOAA [will] also get $50 million to predict, model and forecast wildfires.'"[22] The bill includes 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. While the bill contains and codifies some regulatory reforms to make it easier to build and to protect forests, 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."[23] 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.[24]

- **Modernize the National Environmental Policy Act.** At nearly every level of government, delays can obstruct the development of more resilient infrastructure. The primary tool to block projects at the federal level is the National Environmental Policy Act (NEPA). President Nixon signed NEPA into law more than 50 years ago. Since then many federal, state, and local environmental laws have been enacted, creating a confusing web of unclear, overlapping, and complex requirements. Permitting reform would enable the private sector, the federal government, and state and local governments to construct more durable infrastructure on shorter timelines. Both the "Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act" (UNSHACKLE Act) and the "Building United States Infrastructure through Limited Delays and Efficient Reviews Act of 2021" (BUILDER Act) are legislative fixes that would expedite permitting timelines, increase accountability, and curb excessive litigation. [25] (For more information, see NEPA 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 long-used out-of-date flood maps and subsidized insurance premiums for homeowners living in high-risk areas (often wealthy families).[26] 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.[27]

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."[28] The reality is many households in coastal communities covered by NFIP will see premium increases. As QuoteWizard data analyst Nick VinZant bluntly said, "It doesn't matter if you don't believe in climate change--your insurance company does."[29] VinZant's point is spot on. 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, people will be safer, and developers will think more carefully about where they build. At the very least, homeowners and builders will more fully bear the cost of their decisions. 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.[30]

- **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.[31] Senator Mike Lee (R-UT) has introduced four bills, any or all of which would be a marked improvement from the current law that harms taxpayers, the economy, and the environment.[32]

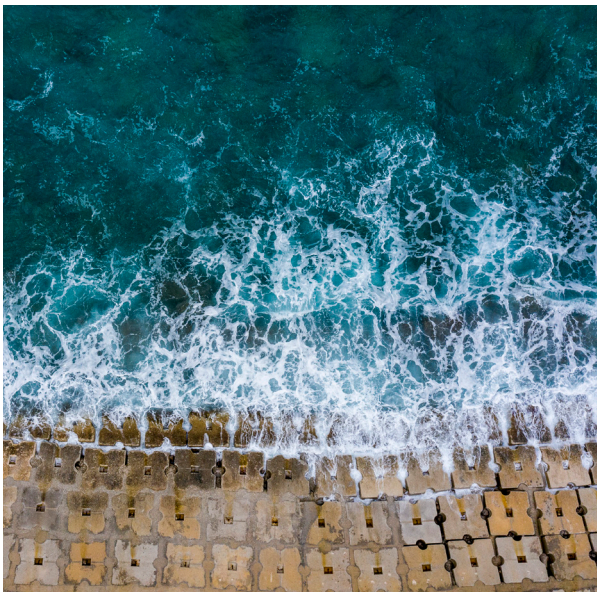
- **Eliminate steel and aluminum tariffs.** Artificially high costs threaten the construction of more resilient infrastructure. In addition to finding workers and fixing supply chain issues, contractors have expressed concern over how tariffs will adversely affect future investment. In a September 2021 survey conducted by the U.S. Chamber of Commerce, "45% of contractors say steel and aluminum tariffs will have a high to very-high degree of impact on their business in the next three years [...]."[33] Congress and the administration should scale back tariffs and tariff rate quotas that have little, if any, economic or national security rationale.[34]

- **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. In releasing the National Climate Adaptation and Resilience Strategy Act of 2022, a bipartisan group of Senators and House Members correctly noted, "Federal agencies provide essential resources and services for local climate adaptation efforts, but often operate independently of one another. The siloed nature of federal resilience operations creates inefficiencies and unnecessary burdens for non-federal partners attempting to access these resources and services."[35] The legislation aims to reduce those burdens and redundancies by creating an adaptation and resiliency implementation plan and creating a chief resilience officer and resiliency interagency working groups. Several states, such as Florida and Louisiana, have state resiliency officers that should work collaboratively with federal agencies. Identifying duplicative spending and regulatory inefficiencies should be the first step in maximizing the federal government's resiliency spending.

- **Limit emergency use spending to emergencies.** According to policies established by George H.W. Bush's Office of Management and Budget in 1991, emergency spending should be necessary (essential or vital, not merely useful or benefi-

cial); sudden (coming into being quickly, not building up over time); urgent (requiring immediate action); unforeseen; and not permanent.[36] Any emergency funding to respond to natural disasters should adhere to these criteria. Another fiscally responsible measure is the Budgeting for Disasters Act. The Act would ensure Congress dedicates funding to true emergencies, provides a strong consensus for such spending, and keeps funding in check with existing budget caps. Specifically, the legislation would:

- Eliminate the requirements to adjust annual discretionary spending limits to accommodate additional appropriations for disaster relief and wildfire suppression;
- Increase the number of votes that is required to waive the Senate point of order against emergency spending designations, which exempt spending from discretionary spending limits; and
- Require the Government Accountability Office to report on spending for emergencies and disaster relief.



- **Commit international development funds to economic growth, economic freedom, and adaptation.** Vijaya Ramachandran of the Breakthrough Institute and Arthur Baker of the University of Chicago's Development Innovation Lab argue in *Foreign Policy* that: "The shift of focus from poverty to climate is unjust, ineffective, and disastrous for the world's poor. It's unjust because rich countries are forcing the World Bank and IMF to deprioritize poverty reduction despite this mission being vital to protect developing countries from the climate shocks caused by rich countries' emissions."[37] The authors go on to say:

> *Adaptation requires investments in better housing, transportation, education, infrastructure, water management, agricultural technology, and other sectors. And it requires reducing poverty—so that more people have the resources to cope with weather-related extremes. Until now, these kinds of investments have been the bread and butter of the World Bank and other development institutions. By shifting development funding to emissions reduction, they are taking money from the poor and making them less resilient than they would otherwise be."*[38]

Ramachandran and Baker are right. The United States must take a leadership role to commit international assistance to promoting economic well-being, sustained growth through policies rooted in economic freedom, and investments in adaptation. Leadership on climate mitigation (reducing emissions) will come from driving down the cost and deploying low-carbon and emissions-free technologies where it is in the economic self-interest of developing countries to pursue those technologies.

- **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.[39]

11.

Legislative Appendix: Climate & Freedom Legislation List

PERMITTING REFORM TO MEET AMERICA'S ENERGY NEEDS AND ENVIRONMENTAL GOALS					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House CoSponsor(s)**	**Senate Cosponsors(s)**
Building United States Infrastructure Through Limited Delays and Efficient Reviews Act of 2021 (BUILDER ACT)	H.R. 2515	Graves (R-LA-6)		McCarthy (R-CA-23), Scalise (R-LA-1), Graves (R-MO-6), Westerman (R-AR-4), Cheney (R-WY-At Large), and more	
Federal Permitting Reform and Jobs Act	S. 2324		Portman R-OH)		Sullivan (R-AK), Manchin (D-WV), Sinema (D-AZ)
One Federal Decision Act	H.R. 1812	Davis (R-IL-13)		Graves (R-MO-6), Gibbs (R-OH-7), Balderson (R-OH-12), Graves (R-LA6), Gallagher (R-WI-8), and more	
Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act)	S.717 and H.R. 3814	Cheney (R-WY- At Large)	Lee (R-UT)		Cramer (R-ND), Cruz (R-TX)

CAPITALIZING ON AMERICA'S ENERGY ABUNDANCE AND IMPROVING ENERGY SECURITY

Legislation	Bill Number(s)	House Sponsor	Senate Sponsor	House Cosponsor(s)	Senate Cosponsors(s)
American Critical Minerals Independence Act	H.R.2637	Waltz (R-FL-6)		Westerman (R-AR-4), Lucas (R-OK-3), Weber (R-TX-14), Stauber (R-MN-8), Gonzalez (R-OH-16), and more	
American Energy First Act	H.R.4334	Scalice (R-LA-1)		Westerman (R-AR-4)	
Energy Security Cooperation with Allied Partners in Europe (ESCAPE Act)	S.819 and H.R. 2046	Miller (R-WV-3)	Barrasso (R-WY)	McKinley (R-WV-1), Arrington (TX-19)	Boozman (R-AR), Braun (R-IN), Capito (R-WV), Cornyn (R-TX), Cotton (R-AR), and more
Federal Land Freedom Act of 2021	S.2394		Inhofe (R-OK)		Capito (R-WV), Cruz (R-TX), Cramer (R-ND), Lummis (R-WY), Lankford (R-OK), Crapo (R-ID)
Keystone XL Pipeline Construction and Jobs Preservation Act	S.171 and H.R.684	Armstrong (R-ND-At Large)	Daines (R-MT)	McCarthy (R-CA-23), Scalise (R-LA-1), Cheney (R-WY-At Large), McMorris Rodgers (R-WA-5), Upton (R-MI-6), and more	Hoeven (R-ND), Cramer (R-ND), Barrasso (R-WY), Lummis (R-WY), Risch (R-ID), and more
Lease Now Act of 2021	S. 4228		Barrasso (R-WY)		Lummis (R-WY), Risch (R-ID), Marshall (R-KS), Hoeven (R-ND), Cruz (R-TX), Hyde-Smith (R-MS)
License Natural Gas (LNG) Now Act of 2019	S. 1155 and H.R. 2248	Higgins (R-LA)	Cassidy (R-LA)	Abraham (R-LA-5), Crenshaw (R-TX-2)	Capito (R-WV), Kennedy (R-LA)

CAPITALIZING ON AMERICA'S ENERGY ABUNDANCE AND IMPROVING ENERGY SECURITY					
ONSHORE ACT	S. 4229		Barrasso (R-WY)		Lummis (R-WY), Risch (R-ID), Marshall (R-KS), Hoeven (R-ND), Cruz (R-TX), Hyde-Smith (R-MS)
The Open America's Waters Act	S.1646 and H.R. 3205	McClintock (R-CA-4)	Lee (R-UT)		
Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act)	S.717 and H.R. 3814	Cheney (R-WY- At Large)	Lee (R-UT)		Cramer (R-ND), Cruz (R-TX)

ACCELERATING NUCLEAR ENERGY DEPLOYMENT					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Accelerating Nuclear Innovation through Fee Reform Act	H.R.6154	Gonzalez (R-OH-16)		Luria (D-VA-2)	
American Nuclear Infrastructure Act	S.2373		Capito (R-WV)		Whitehouse (D-RI), Barrasso (R-WY), Booker (D-NJ), Crapo (R-ID)
Fission for the Future Act	S.3428 and H.R.7360	Doyle (D-PA-18)	Manchin (D-WV)	Gonzalez (R-OH-16), Lamb (D-PA-17), Donalds (R-FL-19)	Barrasso (R-WY)
Modernize Nuclear Reactor Environ-mental Reviews Act	H.R. 1559	Duncan (R-SC-3)			
Nuclear Waste Policy Amendments Act of 2019	H.R. 2699	McNerney (D-CA-9)		Shimkus (R-IL-15), Peters (D-CA-52), Duncan (R-SC-3), Carbajal (D-CA-24), Lesko (R-AZ-8) and more	

ACCELERATING RENEWABLE ENERGY DEPLOYMENT					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Building United States Infrastructure Through Limited Delays and Efficient Reviews Act of 2021 (BUILDER ACT)	H.R. 2515	Graves (R-LA-6)		McCarthy (R-CA-23), Scalise (R-LA-1), Graves (R-MO-6), Westerman (R-AR-4), Cheney (R-WY-At Large), and more	
Enhancing Geothermal Production on Federal Lands Act	S.2824 and H.R. 5350	Fulcher (R-ID-1)	Risch (R-ID)	Westerman (R-AR-4), Stauber (R-MN-8)	
Hydropower Clean Future Act	H.R.1588	McMorris Rodgers (R-WA-5)		Newhouse (R-WA-4), Duncan (R-SC-3), Buschon (R-IN-8), Curtis (R-UT-3)	
Master Limited Partnership Parity Act (115th Congress)	S. 2005		Coons (D-DE)		Moran (R-KS), Stabenow (D-MI), Bennet (D-CO), Murkowski (R-AK), King (I-ME), Collins (R-ME), Heinrich (D-NM)
Promoting Hydropower Development at Existing Non-Powered Dams Act	S. 2655 and H.R. 2872	Buschon (R-IN-8)	Portman (R-OH)		McCaskill (D-MO)
The Reinvesting in America's Shoreline Economies & Ecosystems (RISEE) Act	S.2130		Whitehouse (D-RI)		Cassidy (R-LA), Coons (D-DE), Hyde-Smith (R-MS), Kaine (D-VA), King (I-ME), Schatz (D-HI), Shaheen (D-NH), Van Hollen (D-MD), Wicker (R-MS),

ACCELERATING RENEWABLE ENERGY DEPLOYMENT					
Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act)	S.717 and H.R. 3814	Cheney (R-WY- At Large)	Lee (R-UT)		Cramer (R-ND), Cruz (R-TX)
Water Quality Certification Improvement Act	S.1761 and H.R. 3422	McKinley (R-WV-1)	Barasso (R-WY)	Gibbs (R-OH-7), Stauber (R-MN-8)	Daines (R-MT), Cramer (R-ND), Capito (R-WV), Toomey (R-PA), Lummis (R-WY), Inhofe (R-OK)

MEETING AMERICA'S INFRASTRUCTURE NEEDS					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Allied Partnership and Port Modernization Act	S.3366		Lee (R-UT)		
Building United States Infrastructure Through Limited Delays and Efficient Reviews Act of 2021 (BUILDER ACT)	H.R. 2515	Graves (R-LA-6)		McCarthy (R-CA-23), Scalise (R-LA-1), Graves (R-MO-6), Westerman (R-AR-4), Cheney (R-WY-At Large), and more	
Davis-Bacon-Repeal Act	S.805 and H.R. 2218	Good (R-VA-5)	Lee (R-UT)		Scott (R-SC), Coryn (R-TX), Blackburn (R-TN), Johnson (R-WI), Inhofe (R-OK), Cruz (R-TX)
Dredging to Ensure the Empowerment of Ports (DEEP) Act	S.3355		Lee (R-UT)		
Incentivizing the Expansion of U.S. Ports Act	S.3365		Lee (R-UT)		
Port Modernization and Supply Chain Protection Act	S.3367		Lee (R-UT)		
The Open America's Waters Act	S.1646 and H.R. 3205	McClintock (R-CA-4)	Lee (R-UT)		
Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act)	S.717 and H.R. 3814	Cheney (R-WY- At Large)	Lee (R-UT)		Cramer (R-ND), Cruz (R-TX)

ADAPTATION FOR SAFE, RESILIENT COMMUNITIES					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Accelerate Long-term Investment Growth Now Act (ALIGN Act)	S.1166 and H.R.2558	Arrington (R-TX-19)	Toomey (R-PA)	Nunes (R-CA-22), Buchanan (R-FL-16), Smith (R-NE-3), Reed (R-NY-23), Kelly (R-PA-16), and more	Barrasso (R-WY), Blunt (R-MO), Braun (R-IN), Cramer (R-ND), Cruz (R-TX), and more
Allied Partnership and Port Modernization Act	S.3366		Lee (R-UT)		
Budgeting for Disasters Act (116th Congress)	S.1579 and H.R. 3217		Romney (R-UT)		Lee (R-UT), Braun (R-IN), Toomey R-PA)
Davis-Bacon-Repeal Act	S.805 and H.R. 2218	Good (R-VA-5)	Lee (R-UT)		Scott (R-SC), Coryn (R-TX), Blackburn (R-TN), Johnson (R-WI), Inhofe (R-OK), Cruz (R-TX)
Dredging to Ensure the Empowerment of Ports (DEEP) Act	S.3355		Lee (R-UT)		
Incentivizing the Expansion of U.S. Ports Act	S.3365		Lee (R-UT)		
National Climate Adaptation and Resilience Strategy Act of 2022	S.3531 and H.R. 6461	Peters (D-CA-52)	Coons (D-DE)	Salazar (R-FL-27), Curtis (R-UT-3), Blunt Rochester (D-DE-At Large)	Murkowski (R-AL), Collins (R-ME), Rosen (D-NV), Cassidy (R-LA)
Port Modernization and Supply Chain Protection Act	S.3367		Lee (R-UT)		
The Open America's Waters Act	S.1646 and H.R. 3205	McClintock (R-CA-4)	Lee (R-UT)		
Undoing NEPA's Substantial Harm by Advancing Concepts that Kickstart the Liberation of the Economy Act (UNSHACKLE Act)	S.717 and H.R. 3814	Cheney (R-WY- At Large)	Lee (R-UT)		Cramer (R-ND), Cruz (R-TX)

ACTIVE MANAGEMENT FOR HEALTHIER FORESTS					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Good Samaritan Remediation of Abandoned Hardrock Mines Act	S.3571		Heinrich (D-NM)		Risch (R-ID), Lujan (D-NM), Daines (R-MT), Tester (D-MT), Crapo (R-ID), Bennet (D-CO), Barasso (R-WY)
No Timber From Tyrants Act	H.R. 7437	Westerman (R-AR-4)		Thompson (R-PA-15), Wittman (R-VA-1), Lamborn (R-CO-5), Newhouse (R-WA-4), Gohmert (R-TX-1)	
Protecting and Restoring Our Trees by Enhancing Conservation and Treatments Act (PROTECT Act)	H.R. 4516	Garcia (R-CA-25)		Westerman (R-AR-4), LaMalfa (R-CA-1), Bentz (R-OR-2), Obernolte (R-CA-8), Newhouse (R-WA-4), and more	
Resilient Federal Forests Act	H.R. 4614	Westerman (R-AR-4)		McCarthy (R-CA-23), Cueller (D-TX-28), Amodei (R-NV-2), Babin (R-TX-36), Baird (R-IN-4), and more	
The America's Revegetation and Carbon Sequestration (ARCs) Act of 2021	S.2836		Manchin (D-WV)		Barasso (R-WY), King (I-ME), Marshall (R-KS)
The Emergency Wildfire and Public Safety Act (116th Congress)	S.4431 and H.R. 7978	Panetta (D-CA-20)	Feinstein (D-CA)	LaMalfa (R-CA-1), Costa (D-CA-16), Harder (D-CA-10), Garamendi (D-CA-3), Cox (D-CA-3), Carbajul (D-CA-21)	Daines (R-MT)
The Fire Information and Reaction Enhancement Act (FIRE Act)	S.3036 and H.R. 5010	Garcia (R-CA-25)	Rosen (D-NV)	Kim (R-CA-39), Brownley (D-CA-26), Chu (D-CA-27)	Lummis (R-WY)

ACTIVE MANAGEMENT FOR HEALTHIER FORESTS					
The Forest TECH Improvement Act	H.R.2500	Moore (R-UT-1)		Westerman (R-AR-4), Newhouse (R-WA-4), Simpson (R-ID-2), Graves (R-LA-6), Owens (R-UT-4)	
The Restoring Environments, Soils, Trees, and Operations to develop the Rural Economy (RESTORE Act)	H.R. 2612	LaMalfa (R-CA-1)		Newhouse (R-WA-4), Johnson (R-SD- At Large), McCarthy (R-CA-23), Westerman (R-AR-4), Crawford (R-AR-1)	
The Solving Our Shortages for Seedlings Act	H.R. 2562	Bentz (R-OR-2)		Westerman (R-AR-4), Newhouse (R-WA-4), Gosar (AZ-4)	
The Trillion Trees and Natural Carbon Storage Act	S. 4985 (116th) and H.R. 2639	Westerman (R-AR-4)	Braun (R-IN)	McCarthy (R-CA-23), Schrader (D-OR-5), Amodei (R-NV-2), Sanford (D-GA-2), Barr (R-KY-6), and more	Coons (D-DE), Young (R-IN), King (I-ME)
The Urban Forests Act of 2021	H.R. 2477	Malliotakis (R-NY-11)		Schrader (D-OR-5), Westerman (R-AR-4), Sanford (D-GA-2)	
Trees for Residential Energy and Economic Savings Act of 2021 (TREES Act)	S.1782 and H.R. 3522	Matsui (D-CA-6)	Booker (D-NJ)	Cleaver (D-MO-5), Sarbanes (D-MD-3), McKinley (R-WV-1), Fitzpatrick (R-PA-1), Lee (D-CA-13)	Capito (R-WV)

EMPOWERING AMERICA'S FARMERS AND RANCHERS					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Accelerate Long-term Investment Growth Now Act (ALIGN Act)	S.1166 and H.R.2558	Arrington (R-TX-19)	Toomey (R-PA)	Nunes (R-CA-22), Buchanan (R-FL-16), Smith (R-NE-3), Reed (R-NY-23), Kelly (R-PA-16), and more	Barrasso (R-WY), Blunt (R-MO), Braun (R-IN), Cramer (R-ND), Cruz (R-TX), and more
Accelerating Rural Broadband Deployment Act	S.1113 and H.R.3970	Curtis (R-UT-3)	Daines (R-MT)	Moulton (D-MA-6)	Kelly (D-AZ)
BIOCHAR Act	H.R.2581	Herrell (R-NM-2)		Westerman (R-AR-4), Newhouse (R-WA-4), Gosar (R-AZ-4)	
Farmer Driven Conservation Outcomes Act of 2020 (116th Congress)	S.3429 and H.R.6182	Fudge (D-OH-11)	Casey (D-PA)	Thompson (R-PA-15), Pingree (D-ME-1), Delgado (D-NY-19), Schrier (D-WA-8)	Capito (R-WV)
Naturally Offsetting Emissions by Managing and Implementing Tillage Strategies Act of 2021 (No EMITS Act)	H.R.2508	Davis (R-IL-13)			
Producing Responsible Energy and Conservation Incentives and Solutions for the Environment Act (PRECISE Act)	H.R. 2518	Hinson (R-IA-1)		Feenstra (R-IA-4), Miller-Meeks (R-IA-2), Fischbach (R-MN-7)	
The Open America's Waters Act	S.1646 and H.R. 3205	McClintock (R-CA-4)	Lee (R-UT)		
"The Sponsoring USDA Sustainability Targets in Agriculture to					
Incentivize Natural Solutions (SUSTAINS Act)"	H.R. 2606	Thompson (R-PA-15)		Feenstra (R-IA-4), Johnson (R-SD- At Large), Baird (R-IN-4), Crawford (R-AR-1)	

SMART TAX REFORM WILL HELP THE ECONOMY AND THE ENVIRONMENT					
Legislation	**Bill Number(s)**	**House Sponsor**	**Senate Sponsor**	**House Cosponsor(s)**	**Senate Cosponsors(s)**
Accelerate Long-term Investment Growth Now Act (ALIGN Act)	S.1166 and H.R.2558	Arrington (R-TX-19)	Toomey (R-PA)	Nunes (R-CA-22), Buchanan (R-FL-16), Smith (R-NE-3), Reed (R-NY-23), Kelly (R-PA-16), and more	Barrasso (R-WY), Blunt (R-MO), Braun (R-IN), Cramer (R-ND), Cruz (R-TX), and more
American Innovation and Competitiveness Act	H.R. 1304	Larson (D-CT-1)		Panetta (D-CA-20), DelBene (D-WA-1), Estes (R-KS-1), LaHood (R-IL-18), Arrington (R-TX-19), and more	
American Innovation and Jobs Act	S.749		Hassan (D-NH)		Young (R-IN), Cortez-Masto (D-NV), Portman (R-OH), Sasse (R-NE), Kelly (D-AZ), and more
Clean Energy for America Act	S. 2118		Wyden (D-OR)		Stabenow (D-MI), Menendez (D-NJ), Carper (D-DE), Cardin (D-MD), Brown (D-OH), and more
The Energy Sector Innovation Credit Act	S.2475 and H.R. 4720	Reed (R-NY-23)	Crapo (R-ID)	Panetta (D-CA-20), LaHood (R-IL-18), Suozzi (D-NY-3), Schweikert (R-AZ-6), Gottheimer (D-NJ-5)	Whitehouse (D-RI), Barasso (R-WY), Bennett (D-CO), Risch (R-ID), Hickenlooper (D-CO)

RESEARCH AND DEVELOPMENT DRIVES ENVIRONMENTAL, ECONOMIC PROGRESS

Legislation	Bill Number(s)	House Sponsor	Senate Sponsor	House Cosponsor(s)	Senate Cosponsors(s)
Accelerate Long-term Investment Growth Now Act (ALIGN Act)	S.1166 and H.R.2558	Arrington (R-TX-19)	Toomey (R-PA)	Nunes (R-CA-22), Buchanan (R-FL-16), Smith (R-NE-3), Reed (R-NY-23), Kelly (R-PA-16), and more	Barrasso (R-WY), Blunt (R-MO), Braun (R-IN), Cramer (R-ND), Cruz (R-TX), and more
American Innovation and Competitiveness Act	H.R. 1304	Larson (D-CT-1)		Panetta (D-CA-20), DelBene (D-WA-1), Estes (R-KS-1), LaHood (R-IL-18), Arrington (R-TX-19), and more	
American Innovation and Jobs Act	S.749		Hassan (D-NH)		Young (R-IN), Cortez-Masto (D-NV), Portman (R-OH), Sasse (R-NE), Kelly (D-AZ), and more
BIOCHAR Act	H.R.2581	Herrell (R-NM-2)		Westerman (R-AR-4), Newhouse (R-WA-4), Gosar (R-AZ-4)	
DOE Science for the Future Act	H.R. 3593	Johnson (D-TX-30)		Lucas (R-OK-3), Bowman (D-NY-16), Weber (R-TX-14)	
Energizing Technology Transfer Act	H.R. 4606	Ross (D-NC-2)		Meijer (R-MI-3)	

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