THE ENERGY, CLIMATE, & CONSERVATION TASK FORCE

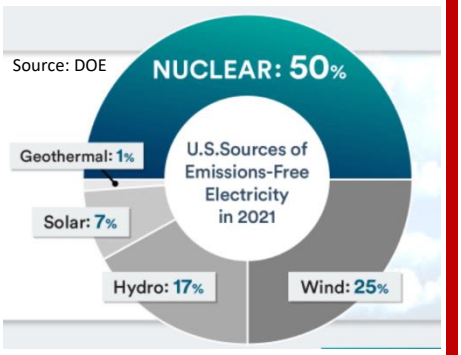
Member Lead: Rep. Garret Graves (R-LA)

AMERICAN INNOVATION

"The calculus of innovation is really quite simple: Knowledge drives innovation, innovation drives productivity, productivity drives economic growth." – Dr. William Brody, Scientist

Innovation is enhancing American competitiveness and security by using new technologies to make our energy cheaper, cleaner, and more reliable. America is among the most efficient producers in the world because of a free market economic system that rewards efficiency - incentivizing the American entrepreneurial spirit that has delivered some of the most innovative technologies in the world. Innovation should not mean higher prices or fewer energy choices. Republican policies are designed to help advance affordable innovative technology solutions across all sectors that not only help to reduce energy costs and global emissions, but also enhance American economic and energy security by prioritizing and utilizing American resources. In contrast, Democrat policies often increase energy costs and decrease American economic and energy security while also increasing reliance on adversarial nations like China and Russia – contributing to less American jobs and higher global emissions.

Federally funded research and development plays an important role in kick-starting American innovation across all sectors. For example, cheaper, cleaner, natural gas produced using hydraulic fracturing and horizontal drilling - the primary driver of America's world leading reduction in emissions – began with research conducted at a Department of Energy National Laboratory.[1] Nuclear energy and solar technology are also a result of early-stage federal research. By funding and incentivizing fundamental research, the federal government can play an important role in advancing innovative technologies without top-down mandates or distorting the market by picking winners and losers. To allow next-generation American innovation to flourish, the federal government must also avoid overly prescriptive policies and incentives that can disadvantage new, innovative technologies. The current permitting regime also hinders innovation, as delays and uncertainty can discourage private sector investment in first of a kind technologies and supporting infrastructure.



TOPLINE FACTS:

- From 2005 to 2020, the United States led the world in reducing emissions.[2] These reductions were largely due to innovation in the oil and natural gas sector.[3] This was the result of innovation in the free market built from discoveries in fundamental science—not increased taxes, federal mandates, or burdensome regulations.
- The United States has the most dynamic private sector in the world, with entrepreneurs, large and small businesses, and capital markets eager to invest in next generation technologies.
- American business is the driver of investment in research and development (R&D) spending in our country, accounting for about 70% of U.S. R&D.[4] But many critical investments in innovative energy technology – like nuclear power and fracking – are the direct result of government-funded basic research commercialized by industry.[5]
    - As early as the 1970's, the Department of Energy's (DOE) involvement in hydraulic fracturing resulted in public-private R&D partnerships with industry, enabling the U.S. to become energy dominant while decreasing emissions.[6]
    - The first nuclear reactor to produce electricity was the small Experimental Breeder reactor (EBR-1), designed and operated by Argonne National Laboratory and sited at what is now Idaho National Laboratory.[7]

[1] https://www.osti.gov/servlets/purl/1671983
[2] http://www.globalcarbonatlas.org/en/CO2-emissions
[3] https://www.reuters.com/article/shale-usa-kemp-idCNL6N0PP3A620140714
[4] https://ncses.nsf.gov/pubs/nsf21324
[5] https://www.cbo.gov/publication/54089
[6] https://www.energy.gov/sites/default/files/2016/03/f30/QTR2015-7G-Unconventional-Oil-and-Gas.pdf
[7] https://inl.gov/experimental-breeder-reactor-i/

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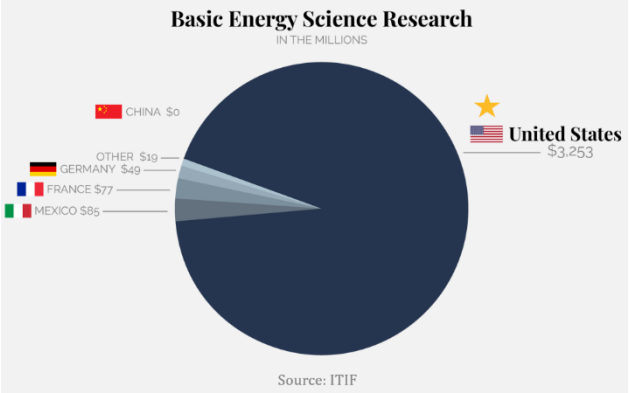
- DOE's Office of Science is the nation's largest supporter of basic research in the physical sciences[8] and has yielded over 100 Nobel prizes during the past six decades.[9] Their user facilities are utilized by over fifty Fortune 500 companies and dozens of small businesses, who purchase time on these facilities to achieve breakthroughs in areas ranging from drug discovery to the design of vehicles, aircraft, and jet engines.[10]
- The United States has led the world in basic energy science research – investing more than the rest of the world combined; the U.S. has also been a world leader in research, development, and deployment of clean energy.[11]
- Innovators in the United States are currently developing and deploying new technologies to provide affordable, reliable energy while contributing to further global emissions reductions.[12]
    - Zero-emission nuclear power is a safe, reliable baseload energy source that provides nearly 19% of the electrical generation in the U.S.[13] and accounted for 50% of all carbon-free electricity in the U.S. in 2021[14] while avoiding emissions of more than 470 million metric tons of carbon dioxide every year.[15] American companies are also working on next generation nuclear energy, including fast reactors and small modular reactors.
    - The United States is a world leader in the development of carbon capture, utilization, and storage (CCUS) technologies. CCUS projects around the world safely sequestered more than 25 million metric tons of CO2 in 2019.[16] The private sector is investing billions of dollars in carbon capture projects.[17] DOE has also invested more than $1 billion during the past two decades through its Carbon Storage Research and Development Program to develop the technologies and capabilities for widespread commercial deployment of geologic storage.[18] The U.S. is one of the most efficient producers of energy, and innovation such as carbon capture can reduce its carbon footprint even further.[19]



INNOVATION NOT ELIMINATION

According to DOE's Energy Information Administration, global demand for energy is expected to increase significantly by 2050.[20] This reality is an opportunity for America to both supply the world with the world's most carbon efficient produced fossil energy and develop next generation zero emission technologies.[21]

EXAMPLES OF COMMERCIAL & NEAR COMMERCIAL INNOVATION & TECHNOLOGY TO REDUCE EMISSIONS:

- Allam Cycle zero emissions natural gas power plants and other cost-effective carbon capture systems
    - NET Power's Allam Cycle plant in Texas burns natural gas with pure oxygen. The resulting CO2 is recycled through the power generation equipment creating lower-cost power with zero emissions.[22]
- Negative carbon emissions hydrogen for power plants and transportation
    - Wabash Valley Resources in Indiana plans to use solid waste byproducts to produce clean, sustainable hydrogen for transportation fuel and base-load electricity generation while capturing CO2 emissions for permanent underground sequestration. Once completed, the project is expected to be one of the largest carbon capture and clean hydrogen production projects in the United States. The focus is to produce zero-carbon intensity hydrogen with the potential to develop negative carbon intensity hydrogen in the future.[23]

[8] https://www.energy.gov/science/about-office-science
[9] https://science.osti.gov/About/Honors-and-Awards/DOE-Nobel-Laureates
[10] https://science.osti.gov/-/media/sc-2/pdf/presentations/fact-sheet/SC_2-pager_2019-01-31.pdf
[11] https://www2.itif.org/2019-global-energy-innovation-index.pdf?_ga=2.29579135.1577855851.1631223779-1397812139.1631223779
[12] https://www.energy.gov/sites/default/files/2021-05/doe-fy2022-budget-in-brief.pdf#:~:text=DOE%E2%80%99s%20Fiscal%20Year%20%28FY%29%202022%20Budget%20Request%20%28Request%29,World%20War%20II%20and%20Cold%20War%20nuclear%20sites.
[13] https://www.eia.gov/tools/faqs/faq.php?id=427&t=3
[14] https://www.energy.gov/ne/articles/5-fast-facts-about-nuclear-energy
[15] https://www.nei.org/advantages/climate
[16] *Ibid.*
[17] https://www.houstonchronicle.com/business/energy/article/Talos-is-planting-its-flag-in-carbon-capture-with-17010046.php
[18] https://www.netl.doe.gov/sites/default/files/Safe%20Geologic%20Storage%20of%20Captured%20Carbon%20Dioxide_April%2015%202020_FINAL.pdf
[19] https://www.c2es.org/content/carbon-capture/
[20] https://www.eia.gov/todayinenergy/detail.php?id=42342
[21] https://www.eia.gov/pressroom/releases/press496.php#:~:text=Petroleum%20and%20natural%20gas%20remain,growing%20fastest%20in%20all%20scenarios.
[22] https://netpower.com/technology/
[23] https://www.wvresc.com/nikola-invests-50-million/

- Fusion energy systems that produce zero emissions
    - Commonwealth Fusion Systems announced it has closed on more than $1.8 billion funding to commercialize fusion energy. This private sector investment will enable the company to begin work on the first commercial fusion power plant.[24]
- Extracting domestic critical minerals and rare earth elements from environmental waste streams needed for EVs and renewable energy systems
    - West Virginia University, in cooperation with DOE's National Energy Technology Laboratory (NETL), hope to turn acid mine drainage into a technological resource. This project will explore a potential nationwide supply chain, based on acid mine drainage treatment, that would produce at least 400 tons of rare earth elements and critical materials each year. The project moves the industry closer to domestically producing rare earth element technologies, which power everything from smartphones to the nation's missile guidance system.[25]
- Long term battery storage
    - Form Energy in Massachusetts is working to optimize the iron-air battery for the electric grid. The active components of the iron-air battery system are some of the safest, cheapest, and most abundant materials on the planet — low-cost iron, water, and air.[26]
- Small-scale nuclear power – such as microreactors – will allow a transformation in capabilities and meet the need for increasing energy use on the modern battlefield and in rural areas often served only by diesel generators.
    - The Department of Defense, in collaboration with DOE, has undertaken a whole-of-government effort to design, build, and demonstrate a prototype mobile nuclear reactor within five years, titled Project Pele.[27] This will be the first electricity-generating Generation IV nuclear reactor built in the United States, after China successfully demonstrated the first Gen. IV reactor, reaching criticality in September of 2021.[28]

U.S. INNOVATION IS NATIONAL SECURITY

The Chinese Communist Party's (CCP) is now the world's largest spender in research and development[29] and has made it their goal to overtake the U.S. in science and technology.

It is a national security imperative that the U.S. not cede its innovation leadership to adversarial nations like China. The "Made in China 2025" initiative outlines the Chinese Communist Party's intent to surpass the U.S. and become the global leader in areas like quantum, artificial intelligence, and biotechnology.[30] China's communist leadership is also pushing a strategy of promoting foreign acquisitions, forced technology transfer agreements, and, in many cases, commercial cyber espionage to gain cutting-edge technologies and know-how.[31] If the U.S. doesn't continue to lead in innovation and protect its intellectual property, China will surpass America as the world leader in this space, threatening American competitiveness and security.

CASE STUDY: REPUBLICANS ARE LEADING THE WAY TO A NUCLEAR ENERGY FUTURE

Congressional Republicans have been champions for the next generation of nuclear energy, passing the first nuclear legislation in decades. In September 2018, the Nuclear Energy Innovation Capabilities Act of 2017 (NEICA) was signed into law by President Trump, creating the National Reactor Innovation Center and beginning a new era of public-private partnerships to accelerate the deployment of novel reactor designs by allowing innovators and industry to harness the world-class capabilities of the U.S. National Laboratory System. NEICA also established the mission need and plan for the Versatile Test Reactor, a one-of-a-kind facility for testing fast neutron reactor technologies, which is an essential piece in both preserving today's light water reactors and developing the next generation of advanced reactors. Currently there are no such capabilities in the United States.

[24] https://cfs.energy/news-and-media/commonwealth-fusion-systems-closes-1-8-billion-series-b-round
[25] https://wvutoday.wvu.edu/stories/2021/04/21/from-pollutant-to-resource-wvu-scientists-push-rare-earth-element-technologies-closer-to-production
[26] https://formenergy.com/technology/battery-technology/
[27] https://www.defense.gov/News/Releases/Release/Article/2998460/dod-to-build-project-pele-mobile-microreactor-and-perform-demonstration-at-idah/
[28] *Ibid.*
[29] https://www.cnbc.com/2021/03/01/chinas-spending-on-rd-hits-a-record-378-billion.html
[30] https://www.cfr.org/backgrounder/made-china-2025-threat-global-trade
[31] https://www.cbsnews.com/news/chinese-hackers-took-trillions-in-intellectual-property-from-about-30-multinational-companies/

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Examples of Republican Solutions:

H.R. 2153, (Rep. Frank Lucas), *Securing American Leadership in Science and Technology Act of 2021*
Full Congress.gov summary

This legislation creates a long-term strategy for investment in basic research and infrastructure to protect the economic and national security of the United States.

H.R. 1746, (Rep. Richard Hudson), *Advanced Nuclear Deployment Act*
Full Congress.gov summary

This legislation would facilitate more efficient licensing reviews by the U.S. Nuclear Regulatory Commission (NRC) and enable long-term power purchase agreements (PPAs) to allow the federal government to procure around the clock clean electricity.

H.R. 5266, (Rep. Michael Waltz), *To establish a research security training requirement for Federal research grant personnel, and for other purposes*
Full Congress.gov summary

This legislation would increase security measures at federal research agencies.

H.R. 3747, (Rep. Brian Babin), *Securing American Research from Cyber Theft Act*
Full Congress.gov summary

This legislation will provide for a pilot project for a nationwide network of secure computing enclaves for federally funded research in universities.

H.R. 1600, (Rep. Fred Upton), *Methane Emissions Reduction Act*
Full Congress.gov summary

This legislation aims to reduce methane emissions from flaring and venting natural gas during oil and natural gas production activities; and recognizes that States are primary regulators of oil and natural gas production activities and emissions. This will result in an increase in efficiency and production.

H.R. 4819, (Rep. Anthony Gonzalez), *National Nuclear University Research Infrastructure Reinvestment Act of 2021*
Full Congress.gov summary

This legislation will enhance the educational and research capabilities of nuclear science and engineering programs, meet the workforce needs of the U.S. nuclear industry, and accelerate the development of advanced nuclear technologies in the U.S.

H.R. 8253, (Rep. Jackie Walorski), *Fostering Innovation and Research to Strengthen Tomorrow (FIRST) Act*
Full Congress.gov summary

This legislation will double the research and development tax credit and allow more small business startups to access this credit.