National Commission on Innovation & Competitiveness Frontiers

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# Competing in the Next Economy

## Innovating in the Age of Disruption and Discontinuity

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# Competing in the Next Economy

*Competing in the Next Economy: Innovation in the Age of Disruption and Discontinuity* is the next, major, private sector-led, strategic policy and action roadmap from the Council on Competitiveness flagship initiative, the National Commission on Innovation and Competitiveness Frontiers.

## National Commission on Innovation and Competitiveness Frontiers Milestones

### Phase I

**2019: Launch**

Kick-off meeting and report for the National Commission on Innovation and Competitiveness Frontiers, Washington, D.C.


**2020: Working Groups**

Arizona State University


**2020: *Competing in the Next Economy: The Age of Innovation***

The National Commission's first call to action to optimize the United States for a new, unfolding innovation reality


**2022: *Competing in the Next Economy: Adapting to a Changing World***

The framing document and structure of Phase II of the National Commission

## Phase II

### 2022: Mountain West Summit

Originating meeting to shape Phase II of the National Commission. Host: President Ed Seidel, President, University of Wyoming


### 2023: Launch Summit

Official launch of Phase II of the National Commission. Host: Chancellor Gary May, University of California Davis


### 2023–2024: Working Groups


### 2025: *Competing in the Next Economy: Innovation in the Age of Disruption and Discontinuity*

The National Commission's second call to action to secure America's position as a global leader in technology and innovation.

## Phase I of the Commission

**Creating *Competing in the Next Economy: The Age of Innovation***

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|---|---|
| **60+** | National Commissioners |
| **4** | Working Groups |
| **200+** | National Leaders across sectors and geographies |
| **4** | 10x Priorities to boost U.S. innovation |
| **50** | Recommendations to optimize the United States for a new, unfolding innovation reality |

The convergence of technologies—from artificial intelligence to quantum science and computing to advanced nuclear to robotics to and advanced biology—is accelerating innovation, reshaping traditional business models, giving rise to new industries, and no less than redefining the world order.

Observing this creative destruction within the U.S. innovation system, leaders from the Council on Competitiveness recognized the conventional innovation paradigm that evolved during World War II is insufficient to meet the demands and opportunities facing a nearly $30 trillion, 335 million person economy. To thrive in today's technology-driven global economy, America and Americans must adopt a more agile and expansive approach to innovation—one that fuels economic growth, boosts productivity, enhances national security, and creates widespread prosperity for the American people.

That is why five years ago the Council established the National Commission on Innovation and Competitiveness Frontiers, a multi-year initiative aimed at transforming innovation across the nation. As the Council's flagship initiative, the Commission assembled more than 50 National Commissioners—leading figures from industry, academia, labor, and the U.S. Department of Energy's National Laboratories—under the current leadership of six chairs:

- Brian T. Moynihan, Chair and CEO, Bank of America; Chair, Council on Competitiveness
- Joan Gabel, Chancellor, University of Pittsburgh; Academic Vice-Chair, Council on Competitiveness
- Dan Helfrich, Chair and CEO, Deloitte Consulting LLP; Business Vice-Chair, Council on Competitiveness
- Kenneth Cooper, International President, International Brotherhood of Electrical Workers; Labor Vice-Chair, Council on Competitiveness
- Thom Mason, Director, Los Alamos National Laboratory
- Deborah L. Wince-Smith, President and CEO, Council on Competitiveness

The Commission kicked off Phase 1 of its work with two major meetings in Washington, DC, August 2019, and in Tempe, January 2020. Pivoting quickly at the onset of the COVID-19 pandemic, the Commission innovated how the Council community traditionally worked; to understand the complex challenges and opportunities facing the country's innovation-driven economy, the Commission held more than 100 virtual workshops across four Phase 1 Working Groups, which focused on technology, sustainability, the innovation ecosystem, and workforce and entrepreneurship. Through these workshops, several hundred innovation leaders from nearly all major sectors of the economy and regions of the coun-

try developed hundreds of policy recommendations to accelerate innovation, and to strengthen U.S. competitiveness.

Additionally, the Commission's hyper-productive response and resiliency—coupled with that of the nation as a whole—fundamentally re-shaped perceptions of just what the U.S. innovation ecosystem could accomplish in a short period of time. The all-of-nation collaborative response plus the convergence of technologies in response to the pandemic demonstrated how transformational technologies could be deployed at unprecedented scale and on unprecedented timelines.

Insights from the Phase 1 Working Groups and this post-COVID experience shaped the Commission's first major deliverable, *Competing in the Next Economy: The New Age of Innovation*. This report outlined 50 strategic recommendations for driving a tenfold—10x—increase in U.S. innovation capacity and capability. The report issued a bold challenge to the country to achieve 10X advancements in three primary areas:

- The number of innovations developed and deployed
- The speed of innovation
- The number of Americans actively engaged in innovation

Following the report's release, the already dynamic innovation landscape accelerated further due to events such as the war in Ukraine and significant supply chain disruptions. It was clear the Commission's work was far from complete.

## Phase II of the Commission

**Creating *Competing in the Next Economy: Innovation in the Age of Disruption and Discontinuity***

| | |
|---|---|
| **50+** | National Commissioners |
| **4** | Working Groups |
| **100s** | National Leaders across sectors and geographies |
| **7** | 10x Pillars shaping the debate surrounding the country's future |
| **7** | Priority Recommendations for Immediate Action |
| **55** | Recommendations to exponentially increase U.S. innovation capacity and capability |

Launched in the Summer of 2022, Phase 2 of the Commission's efforts initiated a second series of dialogues across four policy-focused Working Groups. The Phase 2 Working Groups—building on the findings of Phase 1 and on their own investigations—focused on the future of developing and deploying technology at speed and scale, the future of sustainable communities, the future of work and the workforce, and the future of place-based innovation. Between 2022 and 2024, the National Commissioners appointed from their organizations and extended professional networks hundreds of expert leaders—reflecting a cross-section of sectors, professions, and geographic regions—to build on previous findings and dive deeper into these cross-cutting competitiveness topics. These discussions aimed to refresh collective strategies for U.S. innovation and competitiveness in an age of increasing disruption and discontinuity.

Seven pillars of innovation have emerged from these conversations, which guide the National Commission's Phase 2 focus and major findings:

1. Renewing 10x the Nation's Strategic Vision for an Age of Technological Revolution and Geo-Strategic Challenge
2. Unleashing 10x the Most Competitive Business Climate for Innovation
3. Asserting 10x U.S. Global Leadership
4. Expanding 10x the Transition to Energy Abundance, Security, and Sustainability
5. Accelerating 10x Technology Development and Deployment at Speed and Scale
6. Empowering 10x Skilled Workforce
7. Expanding 10x Place-Making Innovation and Collaborative Innovation Networks

These seven pillars are foundational to U.S. productivity growth and increasing the standard of living, shaping the debate surrounding the country's future. Through their deep conversations, debates, and engagement between 2022 and 2024—spanning two summits and dozens of Working Group meetings—the National Commission identified 55 targeted recommendations that constitute and support the pillars.

And from this incredibly robust set of 55 recommendations, the Commission has designated seven as urgent, immediate priorities for national attention and action from leaders across business, academia, labor, the U.S. national laboratory enterprise, and all levels of government to secure the country's future competitiveness. Addressing these seven priority recommendations requires focused action in 2025 and 2026.

These seven priority recommendations, alongside the complete set of 55 organized within the seven innovation pillars, form the core of *Competing in the Next Economy: Innovating in the Age of Disruption and Discontinuity.*

Given the critical nature of these seven immediate priority recommendations, this report begins with a detailed examination of each.

# Seven Priority Recommendations for Accelerating U.S. Innovation

In a new age of disruption and discontinuity, the United States cannot afford anything short of a transformative effort to boost innovation 10x. **The time to act is now.**

Within this comprehensive Call to Action of 55 recommendations across seven 10x pillars, **seven recommendations stand out as having the most transformational impact potential on American innovation.**

The Council on Competitiveness and its National Commission on Innovation and Competitiveness Frontiers urge the 119th Congress and Trump Administration to take decisive action now on these seven priority recommendations.

## Priority Recommendation 1.

### Establish a pro-growth, competitive corporate tax rate of 21 percent or lower, and reduce the federal deficit to 3.7 percent of GDP by 2027.

This competitive corporate tax rate will help ensure that U.S. companies stay cost-competitive with other nations, and that the United States continues to be a leading destination and home for businesses. At the same time, federal deficits must be reduced while investment in federal R&D, technology initiatives, and modern scientific infrastructure is increased to maintain U.S. global economic and military leadership, broaden access to innovation for underserved communities, and counter China's growing technological power.

## Priority Recommendation 2.

### Increase U.S. R&D investment to 1960s levels of two percent of U.S. GDP.

Congress should fully appropriate and implement the science provisions of the CHIPS and Science Act, while also funding the U.S. Department of Defense and non-defense federal investments in research and development at historic levels.

## Priority Recommendation 3.

## Remove barriers and create incentives to accelerate technology deployment and domestic manufacturing at scale.

Adopt a warp-speed model for streamlining and reducing regulation—fast-tracking permitting and licensing—to significantly speed up U.S. innovation and commercialization of exponential technologies here in America.

## Priority Recommendation 4.

### Launch an advanced Nuclear Energy Moonshot to achieve energy abundance, security, and sustainability.

The federal government—in partnership with states and the private sector—must launch a Nuclear Energy Moonshot to accelerate the development and deployment of next-generation nuclear energy power plants, including small modular and fusion reactors, to meet the soaring demand for clean, baseload electricity.

**Priority Recommendation 5.**

## Establish a National Bipartisan Commission on AI to lead exponential technology convergence.

Congress should immediately establish and fully fund a National Commission on Artificial Intelligence to model future scenarios of AI impacts and better understand the implications of AI for productivity, new capabilities, education, and the workforce.

## Priority Recommendation 6.

### Build regional innovative ecosystems, and expand the science and technology talent pipeline.

Establish a White House "Regional Economic Development Council" to coordinate all federal and community economic development activities to optimize goals, enable co-investment, and eliminate duplication. Congress should also expand the mandate and authorities of federal departments and agencies to fund regional innovation ecosystem building, support innovative financing models for investment, expand advanced manufacturing "Enterprise Zones," and develop a certification process for "Innovation Districts."

## Priority Recommendation 7.

## Advance U.S. technology statecraft.

To foster a supportive global environment for U.S. technology expansion and cooperation, the United States, in collaboration with allied countries, must become the global leader in technology statecraft. This includes promoting strong intellectual property (I.P.) protection and enforcing strict penalties for I.P. infringement. The United States must also exert greater leadership in global standards-setting and work to remove non-tariff barriers to trade and market access. Additionally, the Committee on Foreign Investment in the United States (CFIUS) must be expanded to review foreign investments in venture capital and startups focused on key dual-use technologies, including cybersecurity.

# **10x Call to Action** Driving American Competitiveness in an Age of Disruption and Unprecedented Opportunity for Innovation

# Introduction: The National Commission on Innovation and Competitiveness Frontier's Call to Action

Since the National Commission on Innovation and Competitiveness Frontiers released in December 2020 its first report, *Competing in the Next Economy: The New Age of Innovation*, numerous dimensions of the competitive, technological, and geopolitical landscape have radically changed:

- Rapid advances in game-changing dual-use technologies, and the sudden arrival of the Age of AI have propelled technology to the center of national security, economic security, geopolitics, and society.
- The transition to cleaner energy has encountered head winds just as the need for new sources of electricity has unexpectedly and rapidly grown, but there is also new hope for progress to bolster U.S. energy security and abundance.
- America's most formidable strategic competitor —China—has continued to deploy an aggressive and integrated geostrategy with the aim of unseating the United States as the world's leader and undermining the current world order in favor of its autocratic, state-led model.

More than anything else, winning 21st technological and competitive challenges, preserving our world leadership, and shaping a future that operates on democratic, free market principles depend on the U.S. power to innovate.

In 2020's *Competing in the Next Economy*, the Council's National Commission challenged the United States with an ambitious and audacious goal to increase innovation 10x.

Today, AI is now demonstrating its force-multiplying power in research and development, and it is likely to trigger a combination of unprecedented waves of new discoveries and technological advancements—and concomitant disruptions to the workforce. While the future remains incredibly uncertain, with this incredible possibility before us, more than ever before, 10x innovation is within our reach.

The National Commission on Innovation and Competitiveness Frontiers is setting forth new recommendations to help the United States achieve 10x by:

# Pillar 1

## Renewing 10x the Nation's Strategic Vision for an Age of Technological Revolution and Geo-Strategic Challenge

A new competitive reality demands an expanded vision for U.S. innovation capacity and capability. The federal government cannot singlehandedly drive innovation in the United States in partnership, but it can co-create with the private sector a strategic vision and prioritize key initiatives. By doing so, the United States can achieve global leadership in the platform technologies of the next economy, such as transformational computing (e.g., AI and quantum), energy (e.g., advanced nuclear), and advanced biology (e.g., bioscience, biotechnology, and biomanufacturing).

**Recommendations**

1. U.S. leaders must articulate an "all nation" strategy on the central role of advanced technology in the nation's economic strength and national security.
2. The United States must develop a ten-year strategic computational initiative, investing $100 billion in R&D and domestic manufacturing of dual-use computing platforms, including supercomputers, quantum, A.I., and semiconductors.
3. Congress should establish a bipartisan A.I. commission for U.S. global leadership in A.I. research and deployment.
4. The White House Office of Science and Technology Policy (OSTP) should develop a public-private partnership to accelerate R&D in advanced, critical materials and domestic manufacturing at scale.
5. Congress should appropriate multi-year funding to modernize aging and obsolete research infrastructure at national laboratories and universities.
6. The U.S. Department of Defense, U.S. Department of Commerce, and U.S. Department of Energy should pilot A.I. for digital twins of critical, dual-use supply chains and manufacturing.

## Develop a National Innovation and Competitiveness Strategy

The rapid advancement of multiple game-changing technologies—and the unfolding Age of AI—will shape the future of U.S. economic and national security more than anything else. They are not only creating unprecedented opportunities for innovation, they also hold solutions to global grand challenges–such as supplying food to a world approaching 9 billion humans; electrifying the developed and developing world; securing, sharing, and preserving water resources; etc. They are propelling us to the precipice of a new industrial age that could disrupt numerous industries. AI is poised to transform dramatically the relationships between humans and machines, driving a massive leap in productivity. At the same time, the biggest challenger on the world stage to our way of life seeks to leverage this age of technology revolution to fuel and extend its own geopower.

### Recommendation 1

U.S. leaders must articulate an "all nation" strategy on the central role of advanced technology in the nation's economic strength and national security.

In a new age being a defined and world order being reshaped by rapid technological advancement, winning the competitive challenge for the future, defending the current world order, and our global leadership rests on the strength of our ability to innovate with speed and at scale. To bring this to bear, the U.S. must develop an "all nation" science and technology strategy, with federal multi-year research and technology plans and roadmaps for coordination of long-term investment in infrastructure, technology, and talent to expand and strengthen the U.S. innovation ecosystem.

## Invest in the Innovation Force Multiplier—Advanced Computing

Advanced computing is central to the current and future U.S. competitive advantage in scientific discovery, technology, and innovation in a wide range of crucial societal, industrial, and environmental domains, as well as advancing dual-use technologies that undergird U.S. national security and military capabilities.

### Recommendation 2

The United States must develop a ten-year strategic computational initiative, investing $100 billion in R&D and domestic manufacturing of dual-use computing platforms, including supercomputers, quantum, A.I., and semiconductors.

The strategy should focus on the technological frontiers of transformational computing and its applications in areas such as AI, cybersecurity, energy, biotech, healthcare, agriculture, cosmology, quantum, fusion, and climate; foster a skilled and diverse workforce in advanced computing research and applications; and development of data required to feed transformational computation.

### Raise Leadership Understanding of the Age of AI

There is significant uncertainty about the future impact of AI on the economy, national security, various sectors, education, society, discovery, other technology advancements, and the workforce. There are also profound questions that policymakers will eventually face, and businesses, the workforce, and the citizenry will look to national policymakers and experts for answers and action.

#### Recommendation 3

Congress should establish a bipartisan A.I. commission for U.S. global leadership in A.I. research and deployment.

The Commission should form a multidisciplinary team—scientists and engineers from different fields, AI/ML experts, futurists, macroeconomists, educators, sociologists, industry specialists, military strategists, foreign affairs experts, financial experts, and others—to develop several future scenarios on AI's potential impacts, similar to the world energy system scenarios produced annually by the International Energy Agency or the Global Trends scenarios produced every four years by the National Intelligence Community's Strategic Futures Group. Each scenario would be based on a variable set of assumptions about the speed of AI/ML advancement and level of computational power; speed and level of penetration in the economy, society, industry, workplace, and military; level of regulation; strategic competitor actions; etc. Using modeling and simulation, plausible scenarios for different timeframes would be developed showing possible impacts on the macro-economy and productivity, risk or advantage in military capabilities, changes to the labor market, workforce knowledge and skill needs, level and speed of discovery and technological advancement in different fields and in convergence of AI with other enabling technologies, societal impacts, etc. These scenarios would provide an analytic framework for leaders and policymakers in a range of domains as they work to develop strategies and policies for an uncertain future and help them see a range of possibilities.

The Commission would also convene a multidisciplinary group to explore and gather insights on some of the big questions posed by the rapid advancement of AI/ML such as:

- How to deal with the fallout from potentially major creative-destruction?
- How will the benefits of large productivity dividends be shared?
- What will humans need to learn, know, and be able to do? Should the U.S. education system be reimagined?
- How will we absorb wave after wave of discoveries and developments?
- How will work and jobs evolve around a powerful new kind of human-machine collaboration?
- Will differences in the data on which AI is trained create different realities for different people or different nations?

### Drive a New Age of Materials

The rapid scaling of AI has created unprecedented opportunities for developing new materials at unprecedented speed—new materials for applications ranging from microelectronics to human health, materials with novel properties, materials for the clean energy transition, substitutes for critical metals and minerals for which the United States now relies on strategic competitors for supplies, and biomaterials to avoid the mining and manufacturing of raw materials that could cause environmental degradation. By coupling AI models with advanced computing, millions of potential materials and new compositions can be explored in hours rather than years.

#### Recommendation 4

The White House Office of Science and Technology Policy (OSTP) should develop a public-private partnership to accelerate R&D in advanced, critical materials and domestic manufacturing at scale.

Among priorities to consider are substitutes for minerals used in advanced technologies for which the United States is reliant on China such as rare earths and graphite, and where the United States is reliant and China is the leading producing country, such as gallium, germanium, indium, yttrium, and others; sustainable structural materials and chemicals; and novel and other materials for defense.

### Build a U.S. Science and Technology Infrastructure for the 21st Century

For decades, the focus has been on infrastructure such as roads, bridges, and broadband. The Bipartisan Infrastructure Law and its appropriations have made a huge investment in these elements of the U.S. infrastructure. Highways, rail, and other traditional infrastructure have been vital to agriculture, manufacturing, and the movement of goods across the economy. Today, everyone lives in a technology-driven economy, and infrastructure for research, technology development, and innovation and access to it is just as important.

However, there are multi-billion-dollar maintenance backlogs across multiple federal R&D laboratories and facilities. Many U.S. scientists and engineers are working to conduct 21st century R&D in facilities designed in the 1950s that cannot support modern research and current laboratory practices in health and safety. Many do not have sufficient, clean, reliable, and secure electrical power necessary to support today's instrumentation and high-performance computers. Some lack modern information technology capabilities needed to protect against data loss and cyberattacks, at a time when China is hacking these systems to obtain U.S. research results and technologies. Federal Departments and agencies have reported that the average age of their facilities exceeds their 40-50-year design life, with half rated to be in poor or critical condition. Failing infrastructure is causing interruptions in research activities.

For example:

- A 2023 survey of U.S. Department of Energy facilities at its 17 national laboratories showed that the average age of these facilities was 46 years, close to the end of the planned 40- to 50-year design life. This study further stated that nearly 40 percent of DOE facilities have been rated as substandard or inadequate to serve the department's mission.
- A survey of research facilities at the National Institute of Standards and Technology showed that 73 percent of facilities are 60 to 70 years old, and over 60 percent of the square footage is classified as in "poor to critical condition."
- Seventy-five percent of NASA facilities are beyond their designed lifetime and, as of 2022, had an estimated deferred maintenance backlog of $3 billion.
- USDA's Agricultural Research Service has approximately 3,000 facilities and structures with an average age of more than 48 years and a $1.6 billion deferred maintenance backlog.

The nation's high-performance computing resources are over-subscribed. The U.S. Department of Energy's INCITE program provides researchers from academia, government laboratories, and industry access to national high-performance computing facilities housing some of the world's most advanced supercomputers. In 2024, demand for INCITE allocations at the Leadership Computing Facilities at Oak Ridge National Laboratory and Argonne National Laboratory outpaced available resources by a factor of three, and 2023-2024 demand in the Advanced Scientific Computing Research Program's Leadership Computing Challenge outpaced resources by a factor of five. Demand is expected to increase as the department's Exascale Computing industry and interagency partners adopt exascale computing, as well as growing demand for AI resources.[1]

The scaling of AI is driving skyrocketing demand for data centers. Academics are concerned that the high cost of working with AI—in terms of computing power and data sets—is squeezing them out of the field.

In addition, new types of science, technology, and innovation infrastructure are needed such as:

- Infrastructure for research and advancing critical and emerging technologies such as quantum, engineering materials, biotechnologies, sensors, and advanced microelectronics.
- New kinds of test beds, for example, digital twins for precision medicine, and test beds for autonomous systems such as smart robots and driverless vehicles.
- Innovation infrastructure, for example, incubators and accelerators to nurture the innovations of start-ups and technologies spinning out of university research, as well as pilot manufacturing lines to get new hardware innovations over the valley of death.

1 Volume 5 Science, FY 2025 Department of Energy Budget Justification, Congressional Justification March 2024.

- There is interest in physical places where students, university researchers, and industry can engage and collaborate.
- Planning is already underway for infrastructure on and around the moon, for example, solar arrays to power charging stations, and communications to connect with robotic missions and for high-speed data transfers to scientists on Earth. The European Space Agency is engaged in a public-private partnership aiming to position satellites orbiting the moon to provide communications and navigation services to lunar explorers.

### Recommendation 5

Congress should appropriate multi-year funding to modernize aging and obsolete research infrastructure at national laboratories and universities.

Repair, modernization, and upgrading of facilities, equipment, and instrumentation at Department of Energy national laboratories, the National Institute of Standards and Technology, NASA, the National Institutes of Health, the Agricultural Research Service, and U.S. Department of Defense laboratories should be a high priority. States need to play a key role in developing and funding new infrastructure that supports their technology and innovation-based economic development initiatives.

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## Increase Critical Supply Chain Security

The COVID-19 pandemic revealed the fragility of global supply chains for critical goods, for example, personnel protective equipment and contrast media for medical imaging. The United States is dependent on metals and minerals sourced from foreign countries, including strategic competitors. Recently, the effects of Hurricane Helene in western North Carolina shut down the operations of two extremely rare mines for super-pure quartz, a crucial material used in semiconductor production. As supply chains have become more complex and more global, they are becoming more vulnerable to a broader array of disruptions.

### Recommendation 6

The U.S. Department of Defense, U.S. Department of Commerce, and U.S. Department of Energy should pilot A.I. for digital twins of critical, dual-use supply chains and manufacturing.

This could include monitoring for extreme weather, local military conflict, social unrest, the potential for company closures of supplier facilities, worker strikes, pandemics, or other actions that could disrupt a critical supply chain. With scenario modeling, the Department should explore the potential for disruptions and their duration, determine if plans of action are needed, and be prepared to identify alternative or substitute sources of supply. If the pilot matures and is successful, then catalyze industry consortia to extend the model to economic security.

# Pillar 2
## Unleashing 10x the Most Competitive Business Climate for Innovation

A robust pro-innovation policy framework drives investments to create new products and services, which creates high-value jobs and makes the United States a fierce global competitor. The United States must establish innovation friendly tax and fiscal policies in concert with reducing regulatory burdens and costs. The United States can empower business to take the lead in global innovation and effectively tackle major societal challenges by reducing investment risks, protecting intellectual property, ensuring cyber resiliency, investing in infrastructure, establishing a supportive policy and regulatory framework, optimizing for pro-growth fiscal policy, promoting research and development, and encouraging entrepreneurial activity through targeted incentives.

**Recommendations**

1. Reduce by 2027 the federal deficit of seven percent of U.S. GDP to historic, sustainable levels of 3.7 percent, while ensuring increased investment in the nation's science and technology enterprise.
2. Restore federal investments in R&D to historic highs of two percent of U.S. GDP.
3. Fully appropriate the "Science" funding authorized in the CHIPS and Science Act.
4. Establish competitive, pro-growth tax policies with a corporate tax rate of 21 percent (or lower), and by instituting a 25 percent investment tax credit for new machinery and equipment.
5. Expand the Research and Experimentation Tax credit and restore expensing.
6. Create new tax and fiscal incentives for U.S. manufacturing, including re-shoring, new Enterprise Zones (EZs), and workforce training.
7. Eliminate all double taxation of U.S. corporate profits and individual income earned overseas.
8. Establish a "National Innovation and Infrastructure Bank" to invest in scaling emerging technologies and modernizing aging infrastructure.
9. Streamline and reduce regulatory costs and burdens that impede investment and growth in U.S. businesses, entrepreneurs, and communities.
10. Invest in public data collection agencies to increase the use of hard data for policymaking and to evaluate innovation investments and pro-growth regulations.

## Cut the U.S. Federal Deficit

According to the Congressional Budget Office (CBO), the federal budget deficit in FY 2024 was $1.9 trillion or 7.0 percent of U.S. GDP. CBO projects that, by 2027, revenues will increase faster than outlays, dropping the federal deficit to 5.5 percent of GDP. Thereafter, however, outlays are projected to increase faster than revenues. By 2034, the federal budget deficit is expected to equal 6.9 percent of GDP—significantly more than the 3.7 percent that deficits have averaged over the past 50 years.

Deficits must be cut. But, at the same time, increased investment in federal research and development, technology initiatives, and 21st century science and technology infrastructure are needed to keep pace with technological change, secure future U.S. global economic and military leadership, expand the footprint of U.S. innovation ecosystems to places and people that currently do not benefit from the U.S. innovation system, and counterbalance the actions of China to seize global leadership via overmatch in the key technologies of the future, eroding U.S. economic and military superiority.

However, new studies from economists suggest that scaling AI could result in substantial output and productivity gains, which would translate into pathways for U.S. deficit reduction. For example, one study estimated that output could nearly double after 20 years from an AI-enabled productivity growth rate 44 percent higher than baseline projections of the U.S. Congressional Budget Office.[2] Goldman Sachs Research economists estimate that AI could increase U.S. GDP by 0.4 percentage points by 2034, and increase U.S. productivity growth by 1.5 percentage points annually with widespread deployment over a decade.[3]

### Recommendation 1

Reduce by 2027 the federal deficit of seven percent of U.S. GDP to historic, sustainable levels of 3.7 percent, while ensuring increased investment in the nation's science and technology enterprise.

As a part of this dual initiative, America's technonolgical advancements should be embraced in the wider effort to cut the deficit. Steps should be taken to encourage and accelerate the scaling and deployment of AI to capture more quickly economic growth and productivity gains that will offer opportunities to reduce the U.S. budget deficit.

2 Machines of the Mind, The Case for a n AI-powered Productivity Boom, Martin Neal Baily, Erik Brynjolfsson, and Anton Korinek, Brookings, May 10, 2023.

3 AI May Start to Boost U.S. GDP in 2027, Goldman Sachs, November 7, 2023.

### Nurture a Business Climate that Encourages Global Investment in R&D

The U.S. financial ecosystem has given the United States a significant global competitive and technological edge. For example, the United States invests more in R&D than any nation, with that investment dominated by the private sector. The United States accounts for a 52 percent share of global venture capital funds raised compared to China's 40 percent and the EU's 5 percent. The United States has uniform tax policies that benefit R&D.

To maintain its status as the world's leading technology superpower, the United States must retain the robustness and fidelity of its financial and investment incentives proven to drive technology development, deployment at scale, new business formation, and establishment of state-of-the-art production facilities.

## Recommendation 2

Restore federal investments in R&D to historic highs of two percent of U.S. GDP.

While the U.S. economy has continued to grow and become more technology-intensive, federal government investment in R&D as a percent of GDP has been on a steady decline for more than 50 years, from a 1964 high of 1.86 percent of GDP—during a period of great challenge, and U.S. scientific and technological ambition—to 0.62 percent of GDP in 2022.[4] Today, the United States faces threats, competitive challenges, and opportunities equal to or greater than those experienced in the 1960s, and the world is confronted with grand challenges in health, adequate food, clean water, natural resource consumption, and sustainable energy that, left unaddressed, could cause severe environmental degradation and undermine geopolitical stability. Increased federal R&D investment could be used strategically to help the United States leverage private R&D for broad economic gains, advance federal mission capabilities, and support research and technology for the public good.

## Recommendation 3

Fully appropriate the "Science" funding authorized in the CHIPS and Science Act.

This includes funding, for example, to bolster world-class science at the Department of Energy and its advancement of clean energy technology; support for advancing critical technologies and advanced manufacturing at the National Institute of Standards and Technology; increasing National Science Foundation investment in research, STEM education, and AI and cyber workforce development; and funding to advance the United States in industries of the future such as the bioeconomy, quantum, and new nuclear energy.

4 InfoBrief: U.S. R&D Increased by $72 Billion in 2021 to $789 Billion; Estimate for 2022 Indicates Further Increase to $886 Billion, National Science Foundation, January 22, 2024.

### Recommendation 4

Establish competitive pro-growth tax policies by maintaining the 21 percent corporate tax rate and instituting a 25 percent investment tax credit for new machinery and equipment.

Competitive tax policies will ensure that the nation maintains the growth necessary for our nation to prosper. Maintaining the 21 percent corporate tax rate will help ensure that U.S. companies remain cost competitive with many other nations, and that the United States remains a top location for businesses and new business formation. Furthermore the investment tax credit is crucial to encouraging a build-up of capital stock. Revitalizing manufacturing in America requires reinvestment in the machinery and capital equipment powering factories, especially for advanced manufacturing facilities.

### Recommendation 5

Expand the Research and Experimentation Tax credit and restore expensing.

The R&E tax credit helps spur private investment in R&D, as well as helping U.S. companies compete globally. Policymakers should expand the R&E tax credit by at least doubling current rates and allowing expenditures for global standards setting to qualify. They should also allow expensing of R&D expenditures for tax purposes, and expand the refundable R&E tax credit for pre-profit start-ups.

### Recommendation 6

Create new tax and fiscal incentives for U.S. manufacturing, including re-shoring, new Enterprise Zones (EZs), and workforce training.

Establishing EZs tailored to advanced research fosters localized innovation clusters, with a focus on scaling up manufacturing innovations. Regions across the nation should prioritize “curated densification,” meaning that states choose what industries to specialize in based on the region’s economic, environmental, and cultural assets.

### Recommendation 7

Eliminate all double taxation of U.S. corporate profits and individual income earned overseas.

Eliminating double taxation would free up resources for U.S.-based multinational corporations to reinvest in domestic research and development. This is particularly critical in cutting-edge sectors like artificial intelligence, biotechnology, and quantum computing. Furthermore, by removing the tax penalty on foreign earnings, U.S. firms would remain competitive with companies from other countries that already enjoy more favorable tax structures.

### Recommendation 8

Establish a "National Innovation and Infrastructure Bank" to invest in scaling emerging technologies and modernizing aging infrastructure.

Existing financial incentives are often not strong enough for private investors to move emerging technologies across the "valley of death." An innovation bank providing low-interest patient capital would bridge this gap and crowd in further private investment at multiple stages in the technology pipeline.

### Recommendation 9

Streamline and reduce regulatory costs and burdens that impede investment and growth in U.S. businesses, entrepreneurs, and communities.

Streamlined regulations would lower administrative expenses, allowing companies to allocate resources toward innovation, research, and development rather than compliance. Additionally, by reducing uncertainty associated with changing or complex regulations, businesses can make long-term investments with greater confidence, particularly in capital-intensive industries like energy, technology, and advanced manufacturing.

## Ensure Government Leaders Understand the Impact of their Expanding Role in Technology and Innovation

Federal, state, and international laws, regulations, and policies play a major role in shaping the environment for business investment in research, technology development, and commercialization, and where businesses will carry out these activities. Governments at every level are playing an increasing role in stimulating technology development, advocating for U.S. technology interests globally, nurturing entrepreneurship, and in developing state and regional innovation ecosystems. Government officials do not always fully understand the impact of these actions, and which may inadvertently support or undercut U.S. innovation and competitiveness.

In addition, leaders and a wide range of planners and program managers in numerous domains rely on data from federal statistical agencies that have faced funding challenges, even as the economy evolves, statistical series are developed, and new data series and special data studies may be needed. For example, the Commerce Department's Bureau of Economic Analysis—a data pioneer on the digital economy—has produced in the past few years data series on special topics such as the space economy, the marine economy, global value chains, and the economic contribution of outdoor recreation, arts, and culture to U.S. states. The data revolution and its tools, and collection and publishing of micro-data have been a boon to researchers in numerous fields, providing new insights to policymakers and decision-makers.

### Recommendation 10

Invest in public data collection agencies to increase the use of hard data for policymaking and to evaluate innovation investments and pro-growth regulations.

Studies and program initiatives—amplified with data—could help rationalize local priorities and monitor the local and regional impacts of federal, state, and local policies, and the development of metrics of success or negative consequences. The Commerce Department's Economic Development Administration and USDA's Rural Business Development, in partnership with State governments, could support these studies and data-driven initiatives. Federal agencies such as the Bureau of Labor Statistics and Census Bureau are instrumental in providing reliable data to inform this evidence-driven policy and economic decision-making, but funding challenges have threatened the continued reliability of their data. Policymakers should provide increased funding for these agencies in the range of $500M-$1B, and ease legal barriers preventing data sharing across agencies.

# Pillar 3
## Asserting 10x U.S. Global Leadership

Growing geostrategic competition with China demands asserting American influence on the global stage. China seeks to overtake America's leadership role—across economic, military, and social spheres—and is proactively working to define the rules of the road for the second half of the century and building the economic and strategic alliances to underpin its dominance. The United States must robustly engage on the international stage to collaborate with strategic allies to counter adversaries and secure America's leadership position at the helm of the world order.

**Recommendations**

1. Accelerate U.S. technology statecraft to enhance soft power and advance U.S. economic and security interests globally.
2. The U.S. Department of Commerce and U.S. Department of State, along with the U.S. Trade Representative, U.S. Export-Import (EXIM) Bank, and other financing agencies, must strongly advocate for U.S. interests in technology regulations, standards setting, procurement policy, and the illegality of forced technology transfer requirements.
3. Increase the number of Americans working in multilateral organizations, from the Organisation for Economic Co-operation and Development (OECD), World Intellectual Property Organization (WIPO), The World Trade Organization (WTO), International Monetary Fund (IMF), International Finance Corporation (IFC), and the World Bank to advance U.S. interests and forge deeper partnerships in the developing world.
4. Decouple from China on frontier, dual-use technology R&D activities in concert with expanding strategic, resilient partnerships with allies and emerging nations in Africa, Latin America, and Asia.
5. Globally promote the role of I.P. protection and enforcement as essential platforms for attracting Foreign Direct Investment (FDI) and technology collaboration, while vigorously enforcing strong, swift penalties for I.P. infringement of U.S. products and services.

6. Require state-of-the-art cyber security protection in all federally funded R&D programs, bilateral R&D partnerships, and multilateral large-scale research facilities, such as CERN and ITER.
7. Expand the resources and mandate of the Committee on Foreign Investment in the United States (CFIUS) to review foreign investments in VC funds, private equity, and start-ups in frontier, dual-use technology, such as A.I. quantum, advanced semiconductors, cybersecurity, biotechnology, and space.
8. Increase the number of American students, researchers, scholars, and participants in R&D educational programs with strategic allies and partner nations.

## Promote U.S. Competitiveness Interests Globally, and Counterbalance China's Aggressive and Integrated Geostrategy

The United States can promote liberal free market principles and U.S. competitiveness by exercising American soft power through international economic, scientific, and security institutions and arrangements, including those that develop rules for the 21st century global economy and standards for emerging technologies. However, China has moved aggressively to assert influence over these international institutions, and shape emerging global technology standards in its favor. Through its global development and infrastructure initiatives, China seeks to undercut U.S. influence around the world by building a cadre of allied countries friendly to its geopolitical, economic, and national security goals. China is increasing its control of ports worldwide, and locking-down supplies of minerals in other countries that are crucial for emerging technologies and the transition to clean energy. These include graphite and rare earth minerals for which the United States is 95-100 percent reliant on Chinese imports, putting U.S. technology and energy advancements at risk. China's efforts are well-resourced, state-led, and strategic, viewed as an integral part of international competition and its quest to become the leading global superpower and shaper of a new world order.

Even U.S. allies in Europe have promulgated regulations designed to disadvantage U.S. competitors and raise their costs of doing business in the EU, including regulations on data privacy, digital markets, antitrust and, most recently, on artificial intelligence. U.S. firms have been fined billions of dollars for breaching these rules, and some U.S. firms withdrew from the EU market finding it too cumbersome and too costly to comply. The United States needs to exercise a more muscular role in the international arena to promote and protect U.S. competitiveness, and counterbalance China's global ambitions.

China is the world's largest investor in other countries—providing funding to build infrastructure such as roads and railways, energy supplies, and telecommunications. Through these efforts, China has expanded its influence globally, posing significant challenges to U.S. economic, political, and security interests. Through its Belt and Road Initiative, China invested $679 billion on infrastructure projects in nearly 150 countries, between 2013 and 2022, while the United State spent $76 billion on similar global infrastructure projects.

Source: China's Foreign Investments Significantly Outpace the United States. What Does That Mean?, U.S. Government Accountability Office, October 16, 2024

### Recommendation 1

Accelerate U.S. technology statecraft to enhance soft power and advance U.S. economic and security interests globally.

The United States must take a more aggressive approach to technology statecraft, in partnership with U.S. allies, including:

- Negotiating technology and trade pacts for advancing and protecting dual-use technologies critical to national and economic security;
- Ensuring U.S. and allies' access to supply chains crucial for advanced critical technologies;
- In federal trade missions, incorporating opportunities to explore technology development partnerships with allies and like-minded nations;
- Forging a unified voice among allies in U.N. scientific organizations, international rule-making authorities, and global standards bodies;
- Using USAID and other U.S. foreign development aid to counterbalance China's Belt and Road Initiative, Digital Silk Road, Maritime Silk Road, Global Development Initiative, and Global Security Initiative. Since most U.S. foreign development assistance funding comes from six federal agencies (U.S. Agency for International Development, Department of the Treasury, Department of Health and Human Services, Department of Defense, Department of State, and the Millenium Challenge Corporation), the federal government could consider developing a national strategy to deploy a more strategic approach to foreign development assistance to help counterbalance China's influence efforts. through the use of development funding.

"It's the people of the United States who are the victims of what amounts to Chinese theft on a scale so massive that it represents one of the largest transfers of wealth in human history."

**Christopher Wray**
Director, FBI

### Recommendation 2

The U.S. Department of Commerce and U.S. Department of State, along with the U.S. Trade Representative, U.S. Export-Import (EXIM) Bank, and other financing agencies, must strongly advocate for U.S. interests in technology regulations, standards setting, procurement policy, and the illegality of forced technology transfer requirements.

This is an urgent time as other nations are developing regulations for artificial intelligence, data use and cross-border data flows, digital services, 6G, quantum, autonomous systems, biotechnology, synthetic biology, cyber security, and foreign direct investment in critical technology sectors. The Department of State should provide strong support and financial backing to enable U.S. industry standards organizations to play a robust role in international standards-setting organizations.

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### Ramp-up Protection of U.S. Intellectual Property Rights, and Enforcement of U.S. Intellectual Property Laws

As multiple technology revolutions unfold and take center stage in the global economy, the protection of U.S. intellectual property (IP) rights becomes ever more critical. Since these technologies are dual use, they will be central to national security as U.S. defense will depend on the same technologies and industries that secure U.S. economic prosperity.

Due to their prime role in economic and military leadership, these technologies are prime targets for industrial espionage and IP theft. America's most formidable strategic competitor—China—has engaged in the largest and most sophisticated theft of IP in the history, targeting IP, technology, and research from nearly every U.S. industry, from biotech and AI to aviation and agriculture. They target companies, from start-ups to the Fortunate 100, for trade secrets and IP, and universities for cutting edge research and development. The threat is in cities and rural areas all over the country.

Advanced technology is expensive to develop and takes time. So, instead of investing and taking the time to develop it, China's strategy in many cases is to steal it. In the past few years, perpetrators were caught trying to steal trade secrets from leading U.S. companies on: aircraft wing designs, a prototype microchip used in aerospace and defense applications, ground-based and aviation turbine technology, battery manufacturing processes, a process to make specialized foam used in submarines, valves used in oil and gas drilling, and genetically modified seeds.[5]

Some Chinese officials tie IP rights to Chinese market dominance. For example, the president of the Supreme People's Court wrote in a 2021 essay that the courts should serve the CCP and its industrial policy goals, while President XI stressed in a June 2022

5 United States Department of Justice, PRO IP Act Annual Report for FY 2023; Transcript: The Threat Posed by the Chinese Government and the Chinese Communist Party to the Economic and National Security of the United States, Walter Mean and Christoper Wray, Hudson Institute, July 7, 2020.

statement the need for China to allow no delays in breaking through the "chokehold" of critical core technologies.[6] The theft of U.S. IP must be an integral part of the resolution of broader trade, security, and foreign policy issues with China.

In another form of IP infringement, counterfeit products can put the health and life of Americans at risk. A counterfeit microchip malfunction in a military system could lead to system failures that could put warfighter lives and missions at risk. Counterfeit jackets manufactured in China were sold to the U.S. government to be worn or carried by Airmen in the U.S. Air Force. Some of these products lacked crucial features endangering the health and safety of the military personnel who wore them. More than 13,000 counterfeit jackets were visible to night vision goggles and nearly 16,000 of them lacked flame-resistant hoods.[7] Counterfeit pharmaceuticals could put lives at risk. In FY 2023, top countries of origin for counterfeit pharmaceuticals seized at the U.S. border in Fiscal Year 2023 were India, Singapore, and China.[8] U.S. brands are the most popular targets for counterfeiters of medical products.

A company's competitiveness, even its survival, may depend on the ability to protect its IP. IP theft costs U.S. companies hundreds of billions annually and reduces U.S. companies' returns on investment in R&D and innovation. U.S. jobs are at risk. In 2019, 33 percent of U.S. employment, or more than 47 million jobs, were directly supported by IP-intensive industries.[9] That year, IP-intensive industries accounted for $7.8 trillion in U.S. GDP.

> "We've seen Beijing hit just about every industry we have—everything from biotech to aviation, to advanced technologies like AI, to different forms of healthcare and agriculture—to steal our intellectual property, technology, and research…The PRC is engaged in the largest and most sophisticated theft of intellectual property and expertise in the history of the world, leveraging its most powerful weapons, starting with cyber."
>
> **Christopher Wray**
> Director, FBI
>
> Remarks before Vanderbilt Summit on Modern Conflict and Emerging Threats, FBI News, April 18, 2024.

6 2024 Special 301 Report, Office of the United States Trade Representative, April 2024.

7 United States Department of Justice, PRO IP Act Annual Report for FY 2023.

8 2024 Special 301 Report, Office of the United States Trade Representative, April 2024.

9 Intellectual Property and the U.S. Economy, Third Edition, U.S. Patent and Trademark Office.

### Recommendation 3

Increase the number of Americans working in multilateral organizations, from the Organisation for Economic Co-operation and Development (OECD), World Intellectual Property Organization (WIPO), The World Trade Organization (WTO), International Monetary Fund (IMF), International Finance Corporation (IFC), and the World Bank to advance U.S. interests and forge deeper partnerships in the developing world.

Institutions like the World Bank and IFC play critical roles in financing development in the Global South. Increased American representation could steer these organizations toward promoting alternatives to China's Belt and Road Initiative (BRI), emphasizing transparent governance and sustainable financing over debt-driven dependency. By increasing the American presence, the United States can build coalitions with like-minded developing countries supported by these organizations, countering China's strategy of securing influence through vote-buying and bilateral economic coercion.

### Recommendation 4

Decouple from China on frontier, dual-use technology R&D activities in concert with expanding strategic, resilient partnerships with allies and emerging nations in Africa, Latin America, and Asia.

By decoupling, the United can mitigate risks of intellectual property theft and supply chain vulnerabilities. This ensures that critical technologies, such as semiconductors and AI, remain secure from potential exploitation by China's military-industrial complex. Expanding partnerships with allies and emerging nations in Africa, Latin America, and Asia diversifies supply chains for critical minerals, rare earth elements, and manufacturing inputs. This further reduces reliance on China, which has monopolized these resources to exert geopolitical leverage. And, considering dual-use technology-related partnerships with and investments in China, encourage U.S. private companies to weigh the value of the protections and benefits they receive from U.S. national security, cyber security, and intellectual property protection.

### Recommendation 5

Globally promote the role of I.P. protection and enforcement as essential platforms for attracting Foreign Direct Investment (FDI) and technology collaboration, while vigorously enforcing strong, swift penalties for I.P. infringement of U.S. products and services.

- Elevate responsibility for IP protection to the most senior U.S. government officials.
- Develop a U.S. IP strategy to coordinate IP protection across U.S. federal economic, trade, and national security departments and agencies.

- Increase U.S. penalties for IP infringement to change the cost-benefit calculus of IP theft. This could include barring infringing products or serial IP rights violators from the U.S. market, and preventing foreign companies that repeatedly infringe on U.S IP access to the U.S. banking system.
- Increase the speed of enforcement to keep pace with accelerating technological change.

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**Counter Security Threats from China and Other Adversaries**

U.S. science, technology, and innovation infrastructure must have robust cyber security to protect research results and technology advancements from U.S. strategic competitors, particularly China, which the U.S. intelligence community assesses as the most persistent cyber threat to the United States, and its use of intellectual property theft to fast-track indigenous science and technology development.

### Recommendation 6

Require state-of-the-art cyber security protection in all federally funded R&D programs, bilateral R&D partnerships, and multilateral large-scale research facilities, such as CERN and ITER.

Federal funding for R&D represents a significant investment by the American public. Cybersecurity measures ensure that this investment is not squandered through data breaches or cyber-attacks. China has relied heavily on cyber-espionage to shortcut its technological development and compete with advanced economies. Robust cybersecurity measures deny access to sensitive research, slowing China's technological progress and preventing it from achieving dominance in key industries.

### Recommendation 7

Expand the resources and mandate of the Committee on Foreign Investment in the United States (CFIUS) to review foreign investments in VC funds, private equity, and start-ups in frontier, dual-use technology, such as A.I. quantum, advanced semiconductors, cybersecurity, biotechnology, and space.

### Adapt Successful Models from Allies and Competitors within the U.S. Innovation Ecosystem

Other nations around the world—friend and foe alike—are utilizing innovative policies, partnerships, and models to supercharge their innovation ecosystems. The United States should not seek to mimic the government-controlled models of other countries, but it should learn from successful models abroad and adapt them to U.S. contexts.

### Recommendation 8

Increase the number of American students, researchers, scholars, and participants, in R&D educational programs with strategic allies and partner nations.

Increasing the presence of American individuals in international research and educational programs fosters a deeper exchange of knowledge, strengthens collaborative ties, and enhances the nation's global leadership in innovation. Encouraging American participation in global programs provides a counterbalance to China's increasing presence in international research initiatives, reducing its ability to dominate and shape global scientific priorities.

# Pillar 4

## Expanding 10x the Transition to Energy Abundance, Security, and Sustainability

As electricity demand in the United States continues to rise—due to the push for energy independence, the proliferation of energy-intensive AI applications, the electrification of vehicles, and a revitalized manufacturing sector—it is imperative for the nation to sustainably utilize and expand its energy sources. This includes advancing cutting-edge energy technologies (e.g., fission and fusion), and enhancing U.S. energy infrastructure through innovation and accelerated commercialization (e.g., small modular reactors and Generation IV reactors).

**Recommendation**

1. Launch a Nuclear Energy Moonshot to accelerate next-generation nuclear technologies, and turbocharge the production of clean, baseload energy.
2. Use all sources of domestic energy “sustainably.”
3. Build a national transmission superhighway and smart, self-healing electric grid.
4. Accelerate and reward energy efficiency and productivity.
5. Mobilize and train a world-class energy workforce.

## Drive Next-Generation Nuclear Energy to Scale

The U.S. power sector is under mounting pressure to meet the growing demand for electricity. This includes rapidly increasing demand for electricity to scale energy-intensive AI applications and the data centers that power them, as well as increased automation, vehicle electrification, and the reshoring of critical manufacturing. At the same time, decarbonization of the power sector is a national and global priority to combat climate change, but solar and wind energy would have to grow substantially and rapidly to achieve a carbon-free electricity sector by 2035. However, because they cannot deliver base-load power, energy storage and back-up generation would be needed.

Nuclear energy offers a pathway to carbon free base-load power now, and the potential for U.S. leadership in global nuclear energy markets. Generation IV reactors could be deployed within the decade. They are economically competitive, safe, and produce minimal waste.[10] Small modular nuclear reactors are factory-built-and-assembled plug-and-play modules that we could use in a variety of configurations.

A U.S. Department of Energy analysis on a coal-to-nuclear transition—siting a nuclear reactor at the site of a recently retired coal power plant—found that hundreds of these coal sites had the basic characteristics needed to be considered able to host an advanced nuclear reactor. Based on the nuclear technology choices and sizes evaluated to replace a large coal plant of 1,200 MWe generation capacity, nuclear overnight costs of capital could decrease by 15 percent to 35 percent when compared to a greenfield construction project through the reuse of infrastructure from the coal facility. This could help restore some of the jobs and regional economic activity lost with coal plant closures.[11]

Some barriers must be overcome to expand nuclear energy in the United States. Licensing, and the scale and pace of deployment would have to ramp up substantially; costs per kilowatt would have to be reduced dramatically but scaling deployment is expected to drive substantial cost reductions; supply chains for reactor components, fuel fabrication, and high-assay low-enriched uranium would need to grow substantially; 375,000 additional technical and non-technical workers will be needed to support deployment and operations; and a solution will be needed to deal with spent nuclear fuel.

The federal government is taking steps to accelerate nuclear energy development and deployment. This includes the bipartisan Advanced Nuclear for Clean Energy Act, which calls on the Nuclear Regulatory Commission to reduce regulatory costs for companies seeking to license advanced nuclear reactors, to develop a pathway for timely licensing of microreactors and nuclear facilities at brownfield and retired fossil fuel energy

10 Pathways to Commercial Liftoff: Advanced Nuclear, U.S. Department of Energy, September 2022.

11 Investigating Benefits and Challenges of Converting Retiring Coal Plants into Nuclear Plants, U.S. Department of Energy, September 2022.

generation sites, as well as accelerating other licensing review for siting and constructing reactors, streamlining the NEPA environmental review process, and developing a regulatory framework for fusion technology. In October 2024, the U.S. Department of Energy opened applications for up to $900 million in funding to support the initial domestic deployment of Generation III+ small modular reactor technologies.

### Recommendation 1

Launch a Nuclear Energy Moonshot to accelerate next-generation nuclear technologies, and turbocharge the production of clean, baseload energy.

This includes rapid development and implementation of initiatives to:

- Establish supply chains for domestic supply and fabrication of high-assay low-enriched uranium, and required mining,
- Develop new financing models,
- Develop strategies for exporting,
- Establish and/or grow programs at universities and technical schools to train additional workers for the industry, including revitalization of nuclear engineering programs, and
- Substantially increase the speed of licensing at the Nuclear Regulatory Commission, and NEPA environmental review, as well as develop a regulatory framework for fusion energy technology

### Recommendation 2

Use all sources of domestic energy “sustainably.”

To achieve energy abundance, security, and sustainability, the United States must adopt a holistic energy strategy that incorporates all of its domestic energy sources, both traditional (like oil, natural gas, and coal) and renewable (such as wind, solar, and nuclear), while ensuring they are used in the most sustainable and environmentally responsible ways possible. This approach is vital to meeting the nation’s growing energy demands, maintaining economic competitiveness, and achieving long-term climate goals.

- While the America continues to rely on traditional energy sources like natural gas and coal, advancements in carbon capture, utilization, and storage (CCUS) technologies can dramatically reduce their environmental impact. By capturing $CO_2$ emissions at the source, these technologies allow for the continued use of fossil fuels while addressing climate change.

- Natural gas can serve as a "bridge fuel" in the transition to cleaner energy, with CCUS technology helping to reduce its carbon footprint, making it a more sustainable option for power generation and industrial use.
- American industries, power plants, and residential sectors can adopt more efficient energy technologies that reduce waste and lower the environmental impact of fossil fuel use. Implementing energy-efficient practices in the extraction, transportation, and consumption of traditional energy sources minimizes their ecological footprint.
- Upgrading power grids with smart grid technologies enhances energy distribution efficiency, reducing waste and improving the integration of renewable energy with traditional fossil fuel sources.

### Recommendation 3

Build a national transmission superhighway and smart, self-healing electric grid.

- A national transmission superhighway would provide the infrastructure needed to transmit large quantities of electricity from renewable energy sources (such as wind, solar, and geothermal) in remote, high-potential areas to urban and industrial centers where the demand is highest. By connecting renewable energy projects across the country, the national transmission system would allow for a balanced distribution of energy, minimizing the reliance on any single region for electricity supply. This diversity helps stabilize the grid and ensures consistent energy availability even during periods of low generation in one region.
- A smart grid system is more resilient to natural disasters, cyber-attacks, and other potential threats. The self-healing capability would enable the grid to quickly isolate and repair faults, reducing the time needed to restore power after outages. This could prevent widespread blackouts and minimize the economic and social impacts of energy disruptions.
- A national transmission superhighway combined with a smart, self-healing grid would make it easier to integrate high levels of intermittent renewable energy across the nation.

### Recommendation 4

Accelerate and reward energy efficiency and productivity.

By promoting energy efficiency across industries, residential sectors, and transportation, the U.S. can reduce energy consumption, lower costs, and minimize greenhouse gas emissions, all while fostering innovation and creating new job opportunities. The industrial sector, which accounts for a large portion of the U.S. energy consumption, can achieve significant savings through the adoption of energy-efficient manufacturing technologies and processes. Technologies such as advanced heat recovery, smart motors, and LED lighting can reduce energy consumption while improving productivity. Additionally, the government plays a crucial role in establishing energy efficiency standards. By rewarding companies that meet and exceed these standards with financial bonuses and tax relief, the United States can create a competitive market that accelerates energy efficiency innovation across industries.

### Recommendation 5

Mobilize and train a world-class energy workforce.

To address the energy sector's growing demand for skilled workers, the government should partner with private companies, labor unions, and educational institutions to create comprehensive training programs. These partnerships can ensure that the workforce is trained in the latest energy technologies, from renewable energy systems to advanced nuclear reactors. Collaboration between universities, trade schools, and energy companies will be key to developing a talent pipeline capable of meeting future energy demands. Additionally, throughout these training programs, there should be support for displaced workers in traditional energy industries, providing reskilling opportunities and new employment pathways in clean energy sectors.

> "When it takes billions of dollars and decades for us to get the next increment of capability out to have impact, we're just going to get outpaced…And especially when you think about domains like cyber warfare, where the period of maximum impact for these technologies is measured in months."
>
> **Rob McHenry**
> Deputy Director, DARPA

# Pillar 5

## Accelerating 10x Technology Development and Deployment at Speed and Scale

As technology advances more rapidly each year, and as global competitors develop and scale technologies at blistering speeds, the United States must accelerate innovation through the deployment of cutting-edge technologies across all sectors of the economy. Business, government, academia, and national laboratories must be empowered to move faster to test, prove, and scale innovations to ensure every sector of the U.S. economy is operating with the most advanced products, services, and technical solutions.

**Recommendations**

1. Adapt warp speed models to expedite R&D, smart regulation, permitting, and deployment of new technologies at speed and scale.
2. Expand federal and private sector partnerships, co-investment, and personnel exchanges in new and disruptive fields driven by rapid technology convergence.
3. Allocate from .05 - 1.0 percent of federal research grants to support the technology commercialization process, including I.P. protection, prototyping, and overall technology transfer services.
4. Expand the role of the U.S. Department of Energy's National Laboratories in forging strategic partnerships with U.S. industry in and commercializing Lab-generated I.P.
5. Establish a fixed portfolio of renewable funding for National Laboratories to perform long-term R&D in support of future missions.
6. Authorize federal pilot acquisition systems for frontier technologies to rapidly acquire dual-use technologies from the commercial sector for advancing government missions.
7. Preserve the Bayh-Dole Act's "march-in" rights for government agency research sponsors without using such rights to force industry price controls.
8. Create State agencies to coordinate and expedite regulatory processes and permitting, and to provide technical assistance to small and medium businesses.

## Accelerate the Regulatory Process

Advances in technology are accelerating, technology-driven opportunities for innovation are expanding, and AI is already demonstrating it can shave years off of new materials and drug development. In addition, the United States is building new microelectronics manufacturing facilities, deploying new renewable energy power generation, and seeking to repatriate critical goods manufacturing. These activities are often subject to extensive regulatory review and permitting regimes. Regulation, permitting, and licensing need to move faster with the pace of technological change and innovation.

### Recommendation 1

Adapt warp speed models to expedite R&D, smart regulation, permitting, and deployment of new technologies at speed and scale. This includes:

- Streamlining and standardizing permitting, including implementation of NEPA. The White House Council on Environmental Quality should propose changes to the NEPA rule to set firm timelines on reviews, streamline the review process, and standardize reviews across projects;
- Considering fast-tracking reviews for critical infrastructure projects such as grid expansions;
- Considering assessing potential regulatory impacts at the conclusion of key research and technology development projects; and
- Establishing a corps of Tech Reg Sherpas to help small companies with innovative technologies navigate the regulatory system.

## Leverage Convergence as a Source of Innovation

Artificial intelligence will certainly converge with other technologies and fields, such as quantum, autonomous systems and robotics, digital devices of all sorts, logistic engineering, digital health, learning systems, business management, security, and smart homes and cities. Biotechnology is converging with computing, energy, electronics, personalized medicine and precision therapies, sensors, and new materials development. AR/VR is converging with communications, entertainment, gaming, learning, and training; animal science with engineering in biomimetics; ecology and economics; and more. Fields that could converge to meet the challenges of an aging society are as diverse as gerontology, nutrition, psychology, physical therapy, architecture, and home design.

### Recommendation 2

Expand federal and private sector partnerships, co-investment, and personnel exchanges in new and disruptive fields driven by rapid technology convergence.

The opportunities for innovation at the intersection of disciplines and in the convergence of technologies and fields are almost unimaginable. Of particular promise, the convergence of AI with other fields—across the sciences and engineering—holds enormous potential for opening a new age of discovery and innovation frontiers, creating significant economic benefits, strengthening national security, and driving productivity gains.

### Recommendation 3

Allocate from .05–1.0 percent of federal research grants to support the technology commercialization process, including I.P. protection, prototyping, and overall technology transfer services.

- Many promising technologies, especially in sectors like clean energy, healthcare, and advanced manufacturing, face lengthy testing and certification processes before they can be introduced to the market. By allocating a percentage of federal research funds for prototyping, these funds can be used to streamline the development of working prototypes, reducing the time it takes to test and refine new technologies. This would accelerate the regulatory approval process by providing companies with ready-to-go, pre-tested prototypes that are more likely to pass regulatory scrutiny.
- Researchers and small businesses frequently lack the resources to navigate the complex world of patents, trademarks, and copyrights, which can delay the process of bringing new technologies to market. By setting aside a portion of research grants for IP protection, researchers and entrepreneurs can secure their innovations faster, reducing uncertainty and enabling quicker market entry.

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## Leverage the U.S. Department of Energy's National Laboratory System to Support U.S. Innovation and Competitiveness

The federal government supports a vast constellation of research, development, and testing laboratories. These span a wide range of science and technology capabilities, including basic physical science, health care, military systems, transportation, space exploration, agriculture, industrial standards, energy, the environment, and more. Prominent among these are the 17 National Laboratories of the U.S. Department of Energy, considered a distinctive U.S. competitive asset. These laboratories, including 28 user facilities, possess unique instruments and research facilities used by tens

of thousands of researchers. They address large-scale, complex research and development challenges with a multidisciplinary approach that places an emphasis on translating basic science to innovation. While these national laboratories focus on advancing their government missions, they also transfer technologies they develop to the private sector through patenting and licensing, and they partner with companies in areas of mutual interest under cooperative research and development agreements.

### Recommendation 4

Expand the role of the U.S. Department of Energy's National Laboratories in forging strategic partnerships with U.S. industry in and commercializing Lab-generated I.P.

- Congress and its relevant Congressional Committees should augment the U.S. Department of Energy mission responsibility, and authorize and appropriate resources to its national laboratories to support an overall national competitiveness and innovation agenda.
- Congress should require that the Department of Energy establish an office and management structure accountable for the effective use of its national laboratories to engage with and support the partnerships necessary to advance U.S. competitiveness and innovation.
- Congress should require the Department of Energy and national laboratory leadership to set aside a portion of federal funding at the laboratories sufficient to apply their capability through effective partnership with industry and academia to national competitiveness challenges, and deepen their expertise to advance the industrial adoption of key disruptive technologies. This includes efforts both within the laboratories, and with organizations around the United States that provide technology transfer and entrepreneurship assistance, and accelerator programs.
- Congress should provide the national laboratories with the appropriate flexibility to participate in and further invigorate collaborative laboratory, industry, and academic engagements that accelerate technology adoption and innovation.
- The U.S. Department of Energy should standardize and streamline contracting mechanisms required for national laboratory-private sector collaboration. This could include non-negotiable Cooperative Research and Development Agreements (CRADA) agreements with fair and reasonable terms, while allowing companies providing funding to negotiate more advantageous terms.

## Engage U.S. National Laboratories to Increase the Speed of U.S. Innovation

Future U.S. competitiveness will depend on the success of U.S. innovators developing, scaling, and deploying new product and process technologies at speed. However, for those products and processes to reach and compete in high technology markets, additional research and development is often needed to scale concepts from benchtop implementations to full-scale production. Providing support, both facilities and personnel, from the national laboratories to validate, scale, and advance new technologies with industry partners will help accelerate innovation in the United States. Similarly, partnerships between universities, the nation's array of manufacturing institutes, and national laboratories offer the ability to advance the Technology Readiness Levels (TRL) of and de-risk a wide variety of technologies at an accelerated pace, increasing their readiness for private sector application, development, and commercialization, and accelerating their time-to-market.

### Recommendation 5

Establish a fixed portfolio of renewable funding for National Laboratories to perform long-term R&D in support of future missions.

- Ensure that intellectual property arrangements are attractive to participating entities, and that other contractual issues are resolved rapidly before funding and projects commence.
- The federal government could give priority to projects that align to national goals and national critical technology needs.

## Accelerate the Fielding of Critical Technologies for U.S. National Security

U.S. defense capabilities are being reshaped by game-changing dual-use technologies and the new military concepts these technologies enable. However, leadership in many of these dual-use technologies is in the private sector, and the Department of Defense must reach into innovating commercial firms, small businesses, and start-ups to bring advanced technologies to military systems. But the commercial sector is moving so fast, and the investments are so big, the defense industry cannot keep up. One of the obstacles to keeping pace is the defense acquisition system. For example, for major defense acquisition programs that have delivered capabilities, the average amount of time it took to do so has increased from 8 years to 11 years.[12] The Department of Defense and its service branches have put various models in place to try to accelerate the development and fielding of new technologies, yet the department continues to struggle with delivering technology quickly and slow approaches persist.

12 Weapon Systems Annual Assessment, DOD Is Not Yet Well-Positioned to Field Systems with Speed, Government Accounting Office, June 2024.

### Recommendation 6

Authorize federal pilot acquisition systems for frontier technologies to rapidly acquire dual-use technologies from the commercial sector for advancing government missions.

This system would streamline DFARS, be more flexible, tolerate a modestly higher level of risk, give greater authority to defense system program managers, and give weight to the potential for game-changing capabilities against lowest cost and risk.

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## Maintain Incentives for Commercializing Federally-Supported Research and Inventions

To promote the use of inventions arising from federally-supported-R&D, Congress enacted the Patent and Trademark Act Amendments of 1980, commonly called the Bayh-Dole Act. Under Bayh-Dole, federal contractors or grantees, including companies and universities, may elect to retain patent rights to inventions they made with federal support, and then use the invention itself or license the patent(s) to industry partners. In exchange for retaining patent ownership, the contractor provides the federal agency with a government-use license—permission for the government to use the patented invention without paying a royalty. The provisions of the Bayh-Dole Act are considered among the most successful of American technology policies and are emulated around the world.

The federal government also retains the authority to grant compulsory licenses to third parties in certain circumstances, known as “march-in rights,” but no federal agency has ever exercised these march-in rights. In 2023, the National Institute of Standards and Technology released draft guidance treating price as an appropriate consideration in “march-in” determinations.

### Recommendation 7

Preserve the Bayh-Dole Act’s “march-in” rights for government agency research sponsors without using such rights to force industry price controls.

The threat of using “march-in” rights for price controls would severely undercut incentives for private sector investment in commercializing federal research and inventions, reduce the returns to taxpayers’ support of federal R&D, and undermine the central purpose of the 40-year highly successful Bayh-Dole Act.

### Recommendation 8

Create State agencies to coordinate and expedite regulatory processes and permitting, and to provide technical assistance to small and medium businesses.

A dedicated agency to explain and accelerate regulatory processes, including permitting, will facilitate long-term contracts and provide predictability for investors, infrastructure developers, and end users to adopt new technologies. State legislatures and agencies should also work closely with community and business stakeholders to develop a clear and navigable regulatory environment.

# Pillar 6
## Empowering 10x Skilled Workforce

People innovate, so to build a world-leading innovation economy, and secure it for generations to come, the United States must first build a world-leading innovation workforce. Yet, today, the country faces skills shortages across our economy—from the researchers making discoveries in AI, quantum, biology, and nuclear to entrepreneurs commercializing new technologies to the manufacturers and technicians needed to deploy and operate next-generation technologies and processes.

**Recommendations**

1. Establish an "all of nation talents program" and create incentives for U.S. students to enter critical technology fields to expand the U.S. science and technology talent pipeline.
2. Federal agencies (U.S. Departments of Energy, Defense, and Education; National Science Foundation; et al.) should provide financial and economic incentives for U.S. students to go into technical fields with significant shortages, offering competitive, paid scholarships and stipends.
3. U.S. Department of Defense Service branches—Army, Navy, Air Force, and Space Force—should forge new partnerships to connect civilian communities to national security assets and operations in their respective regions.
4. Academia and industry need to foster strong links and partnerships for students to attain and rapidly adapt to business-ready skills.
5. Align workforce design and preparation activities across the regional innovation ecosystem, with the active participation of workforce boards, businesses, and local economic development authorities.
6. Increase investment in polytechnic institutions and community colleges to strengthen and upskill the technical workforce.
7. Emphasize experiential learning models and support from employers.
8. Invest in lifelong learning programs, empathizing experimental learning modules with support from employers.

## Expand "People Power" to Propel Innovation

As technology and innovation take center stage in national security and the world's national, regional, and local economies, global competition for scientists, engineers, high-skilled workers, and entrepreneurs is fierce. China has aggressively sought to recruit this talent and brain power from the United States—for example, through its Thousand Talents program—to build its domestic capacity for cutting-edge technology development, raise its level of innovation, and even steal intellectual property. Many nations are working to increase the education and training pipeline to develop more of this human capital to spur innovation and new high-tech business formation.

### Recommendation 1

Establish an "all of nation talents program" and create incentives for U.S. students to enter critical technology fields to expand the U.S. science and technology talent pipeline.

- Develop pathways and financial support to enable U.S. citizens to access higher skills training without taking on a heavy debt burden, perhaps echoing the GI Bill, with some national service commitment through careers in government, national laboratories, or performing federally- funded research in academia.
- Expand high-skill immigration aimed at making the United States the destination of choice for the world's top and rising scientific researchers and engineers.
- Even as technology rapidly evolves, foundational skills remain essential to succeeding in business and innovation. Critical thinking, systems thinking, and management and leadership skills have been de-emphasized and are often lacking, especially in young students and workers. K-12 and higher education systems should re-emphasize these skills, including through hands-on learning and collaborations with industry.

### Recommendation 2

Federal agencies (Departments of Energy, Defense, and Education; National Science Foundation; et al.) should provide financial and economic incentives for U.S. students to go into technical fields with significant shortages, offering competitive, paid scholarships and stipends.

Federal agencies (incl. DOE, DoD, NSF, OSTP, and DOEd) should provide financial and economic incentives for students to go into technical fields with significant shortages. A portion of this funding should also be dedicated to building the infrastructure and curriculum to deliver training and education in these fields, especially in regions where it does not exist.

### Recommendation 3

U.S. Department of Defense Service branches—Army, Navy, Air Force, and Space Force—should forge new partnerships to connect civilian communities to national security assets and operations in their respective regions.

Many states and regions are home to large military bases, laboratories and centers, and other facilities that employ civilians in a wide range of occupations. These facilities often face recruiting challenges particularly to fill skilled engineering and technician jobs, and jobs in non-urban and rural areas. The military has the resources, facilities, and personnel to provide training in critical areas of national security and technology. Partnerships between the national security apparatus, educational institutions, and other community organizations can engage the civilian workforce and fill workforce gaps in critical national security areas.

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## Educate, Train, and Scale the Workforce at the Speed of Innovation

Amidst multiple technology revolutions, technological change is accelerating and opportunities for innovation are expanding. Artificial intelligence is already disrupting science and technology development, and promises to be the most powerful force multiplier for new discoveries and technological solutions ever imagined, likely to create waves of change. For the United States to take fullest advantage of a new age of discovery and technological possibility, our education and training system must move at the pace of change and innovation, and scale workforce skills quickly to capture these opportunities.

### Recommendation 4

Academia and industry need to foster strong links and partnerships for students to attain and rapidly adapt to business-ready skills.

This could include creating and appointing industry representatives to university advisory boards, designating a university liaison to regional employers for routine discussions, frequent employer surveys of current and future skill needs, co-location of university and private sector R&D assets, co-funding of internships and mentorships, co-funding of new curricula development, new channels to distribute labor market information, research center outreach to regional industries, etc. Higher education institutions should put in place processes that enable them to update education and training courses and programming quickly to keep pace with a reorganizing economy, and accelerating technological and labor market change.

### Recommendation 5

Align workforce design and preparation activities across the regional innovation ecosystem, with the active participation of workforce boards, businesses, and local economic development authorities.

Regions should establish fora that connect education, training, and industry skill demands, employers in the region, industry associations, education institutions, labor unions, and workforce development boards through which they can collaborate, align their efforts, and share information.

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## Leverage Non-Traditional Pathways to Build a Stronger Innovation Workforce

States and regions should explore new models of regional workforce development, and creating—from the early ages—brainpower and experiences attuned to participating in innovation.

### Recommendation 6

Increase investment in polytechnic institutions and community colleges to strengthen and upskill the technical workforce.

Polytechnics and similar institutions are critical for bolstering the workforce in skilled professional trade, which are experiencing large talent shortages. Policymakers should improve mechanisms for grant funding to hire faculty, develop curriculum, and build and improve facilities. Larger universities should engage with community colleges and other institutions to share resources, networks, and technical expertise.

### Recommendation 7

Emphasize experiential learning models and support from employers.

On-the-job experience can accelerate training and education, and complement classroom learning, particularly in technical roles. Policymakers should support more apprenticeship and business cohort models for students, entry-levels workers, and incumbent workers.

### Recommendation 8

Invest in lifelong learning programs, empathizing experimental learning modules with support from employers.

Addressing critical talent shortages will require workers of all ages to be trained to leverage new technologies and fill new roles, especially as emerging technologies like AI transform the nature of work. Policymakers should provide financial incentives and support for lifelong learning programs through industry, community organizations, and educational institutions.

# Pillar 7
## Expanding 10x Place-Making Innovation and Collaborative Innovation Networks

Innovation occurs everywhere. The nation must deepen and broaden innovation ecosystems in all parts of our country—amplifying the networks of people, places, and assets that create the basis for growth and inclusive prosperity. Regional innovation hubs that bring together businesses, universities, national laboratories, and government in hyper-connected and collaborative networks can stimulate unexpected and productive partnerships, cultivate pro-innovation regional cultures, and support the development of specialized workforce skills and expertise.

**Recommendations**

1. Establish a White House "Regional Economic Development Council" to coordinate all federal and community economic development activities to optimize goals, enable co-investment, and eliminate duplication.
2. Under the auspices of the"Regional Economic Development Council," design a strategy that leverages private sector infrastructure, R&D, and workforce investments to maximize regional benefits and local impact.
3. Expand the mandates of all federal departments and agencies—including the U.S. Department of Commerce, U.S. Department of Energy, U.S. Department of Defense, U.S. Department of Agriculture, U.S. Department of Housing and Urban Development, U.S. Small Business Administration, and the National Science Foundation—to explicitly support the development and expansion of regional innovation ecosystems across America.
4. Develop innovative new financing models to cultivate vibrant and sustainable innovation ecosystems in underserved communities, including investing in advanced manufacturing "Enterprise Zones."
5. Establish criteria and a certification process for "Innovation Districts," and provide tax and other benefits for regions achieving "Innovation District" certification.
6. To build and strengthen the Defense Industrial Base, deepen collaboration between universities, businesses, workforce boards, National Laboratories, and the U.S. Department of Defense, including access to shared secure research facilities.

7. Leverage existing national and regional cooperative extension programs in advanced manufacturing, agriculture, and health care to facilitate rapid R&D deployment and new job creation.
8. Increase the knowledge base of innovation ecosystem policy and practice, the sharing of best practices for regional models and experimental pilots that attract and grow high-value investment and job creation.
9. Build new networks of business, academia, labor, and government leaders across states and regions to join forces and leverage the existing assets and capabilities required to build next-generation capacity for the industries and jobs of the future.
10. Deepen and broaden regional access to early-stage and mezzanine financing for start-ups, business scale-up, and build-out of manufacturing operations, using tax and other targeted incentives, including in underserved communities and Enterprise Zones.

## Expand the Footprint of U.S. Innovation

Large parts of our population—including many urban youth, rural Americans, and communities without research institutions—are not part or beneficiaries of the innovation economy. Yet, there are many talented and resourceful people in these communities who are not viewed by others, and who do not view themselves as potential innovators or entrepreneurs. The United States is not engaging the full potential of our citizens to drive innovation. To raise the U.S. rate of innovation, leaders must engage more Americans and more U.S. regions in the innovation process.

Every region of the country, large or small, possesses assets that can be leveraged for economic gain. These concentrations of intellectual capital can generate inventions, discoveries, innovations, and ideas for new products and services that hold the potential for new business formation and job creation in these regions. To expand the U.S. capacity for innovation, the United States must capitalize on these geographically-diverse sources of innovation and not leave significant sources of promising creativity and innovation untapped.

U.S. leaders should focus on building capacity for innovation in places where it is weak, and capitalize on places with higher capacity and entrepreneurial potential to boost regional and national competitiveness in a range of technology fields.

### Recommendation 1

Establish a White House "Regional Economic Development Council" to coordinate all federal and community economic development activities to optimize goals, enable co-investment, and eliminate duplication.

The primary function of the Regional Economic Development Council would be to facilitate strategic coordination among federal, state, and local agencies. Currently, many economic development initiatives are fragmented, and often there are missed opportunities for collaboration, or worse, competing programs that operate in silos. By collaborating with agencies like the National Science Foundation (NSF), the Department of Energy (DOE), and the Department of Defense (DoD), the Council can help coordinate targeted research funding to regional hubs. This centralized approach would help address economic disparities, foster sustainable growth, and expand innovation and entrepreneurial ecosystems across the country.

### Recommendation 2

Under the auspices of the "Regional Economic Development Council," design a strategy that leverages private sector infrastructure, R&D, and workforce investments to maximize regional benefits and local impact.

The Regional Economic Development Council should have a strategic focus on investments to establish or strengthen foundational innovation capability and capacity rather than one-off grants not linked to building lasting capability. They should also support workforce development linked to ecosystem building in addition to providing opportunities for small communities to receive grant funding for innovation projects. Through this long-term investment, regions across the nation can develop their capabilities and capacity, capitalize on promising innovation opportunities in their community, or link to broader regional ecosystems.

### Recommendation 3

Expand the mandates of all federal departments and agencies—including the U.S. Department of Commerce, U.S. Department of Energy, U.S. Department of Defense, U.S. Department of Agriculture, U.S. Department of Housing and Urban Development, and the National Science Foundation—to explicitly support the development and expansion of regional innovation ecosystems across America.

These agencies play pivotal roles in advancing national policy, funding, and resources that are vital to fostering a thriving innovation economy. However, their current focus is often concentrated in areas with established research institutions, tech hubs, and large metropolitan areas, leaving much of the country's talent and potential innovators untapped. To address this gap and raise the U.S. rate of innovation, leaders must build a more inclusive ecosystem that engages more Americans, particularly those from rural areas, urban youth, and underrepresented communities, who have the potential to become innovators but are not typically seen as key players in the innovation process.

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**Expand the Players in Place-Based Innovation**

Companies looking to locate new facilities may examine factors beyond the business climate, for example, a location's ability to support the company and its growth. This can include whether a location is a good place to live, work, and raise a family—essential elements of attracting and retaining a workforce; the region's infrastructure; and whether the location's R&D, energy, and workforce pipeline can support growth and company supply chains.

### Recommendation 4

Develop innovative new financing models to cultivate vibrant and sustainable innovation ecosystems in underserved communities, including investing in advanced manufacturing "Enterprise Zones."

For example, States could leverage the Department of the Treasury's State Small Business Credit Initiative—which supports programs that offer funding to small businesses and entrepreneurs through equity/venture capital, loan participation, loan guarantees, collateral support, and capital access programs—as well as other models, such as impact investing, and link this support to technology incubators and accelerators.

### Recommendation 5

Establish criteria and a certification process for "Innovation Districts," and provide tax and other benefits for regions achieving "Innovation District" certification.

This would support the following objectives:

- Attract businesses to invest in R&D within designated areas, promoting regional economic development and drive job creation.
- Strengthening partnerships among universities, private industry, and government, leading to increased innovation and the effective commercialization of research findings.
- Support economically distressed regions by incentivizing the creation of high-tech jobs and encouraging infrastructure development.

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## Facilitate Broader Access to Facilities and Infrastructure that Can Accelerate Innovation

The scaling of AI is driving skyrocketing demand for data centers. Academics are concerned that the high cost of working with AI—in terms of computing power and data sets—is squeezing them out of the field. This problem is not unique to AI; across many fields, researchers, academics, and the private sector lack the necessary facilities to adequately perform innovation.

Leadership in today's emerging and critical technologies—dual-use technologies that are crucial for U.S. national security—is in commercial firms, high-tech start-ups, universities, and national laboratories. The Department of Defense and defense primes must reach into these generators of research and technology to bring advanced technologies to military systems. This requires spaces and facilities in which defense systems program managers, researchers, and technologies developers can conduct classified discussions and collaborative work with universities and commercial firms.

### Recommendation 6

To build and strengthen the Defense Industrial Base, deepen collaboration between universities, businesses, workforce boards, National Laboratories, and the U.S. Department of Defense, including access to shared secure research facilities.

In addition to federal government-supported facilities, systems integrators should explore the use of the authorities of the National Cooperative Research and Production Act to jointly fund and operate these secure facilities. Collaborating with international partners is critical to accelerating research and technology development, especially when partners have unique skills or resources. However, secure data sharing practices must be strengthened to allow collaboration without compromising national or research security.

## Prepare Places for and Support Recovery from Major Technological, Economic, Competitive, and Labor Market Disruptions

In times of rapid revolutionary technological change, high competitive pressure, and major economic transition—hallmarks of the era in which Americans currently live—the fortunes of places can change very quickly. In an historical example, under the pressure of global competition, the steel industry in Pittsburgh, Pennsylvania collapsed. In just five years, from 1979 to 1984, manufacturing employment in Pittsburgh dropped by 104,000, and its unemployment rate skyrocketed to a 1983 high of 18.2 percent.[13] Today, some communities are experiencing the tough times of major change, for example, the coal communities being impacted by the global transition to cleaner energy. With multiple technology revolutions unfolding across the globe, and AI poised to become a powerful economic, industrial, national security, and societal disruptor, more places could experience the fall-out from massive creative-destruction. These events can create losses that constitute an economic disaster with cascading effects that echo through the local economy.

### Recommendation 7

Leverage existing national and regional cooperative extension programs in advanced manufacturing, agriculture, and health care to facilitate rapid R&D deployment and new job creation.

13 Recent Trends in Manufacturing Employment, University of Pittsburgh, University Center for Social and Urban Research, Pittsburgh Economic Quarterly, June 2009.

- Many emerging technologies—particularly AI, automation, and clean energy technologies—can bring significant changes to communities, such as plant closures, job losses, or changing job opportunities. With state and federal backing, college and university cooperative extension offices should provide financial and technical support to help local communities plan and execute smooth economic transitions, while continuing to enable the dynamism of their economies to reorganize around new opportunities and major technological change. States and regions should be proactive in anticipating possible job displacement and identifying volatile sectors prone to displacement for special attention.
- High priorities could include sectors with weaker connections to research and technology pipelines such as public safety and K-12 education; highly fragmented industries such as housing, security services, accounting and bookkeeping, various home services, etc.; and among local communities. Through cooperative extensions and similar programs, universities and the broader research ecosystem should engage community partners to help collect, disseminate, and use research findings and new technology within the local community, and allow for public input on research priorities and gaps.
- Implement Economic Assistance Teams in a model similar to AmeriCorps or Peace Corps, and funded by federal and state governments, and philanthropic groups and individuals, teams of experts—in industrial planning, finance, manufacturing, technology and innovation ecosystem development, and human services—would deploy to communities experiencing serious and/or sudden economic declines and loss of economic engines such as coal, oil, gas, or mining communities; or communities where a large private employer fails or moves out.

### Increase and Share Knowledge About Developing and Leveraging Place-Based Innovation

Together, the Departments of Energy, Defense, and Commerce and the National Science Foundation were selected in 2023-2024, and prospectively funded at more than $9 billion, 37 regional technology, energy, and innovation hubs. This presents a golden opportunity to gain deeper insights into place-based innovation. In addition, while most federal agencies fund research and technology development to meet their missions needs, such as the Departments of Energy and Defense, many do not specialize in economic development, and may not consider how these investments could contribute to innovation ecosystem development.

### Recommendation 8

Increase the knowledge base of innovation ecosystem policy and practice, the sharing of best practices for regional models and experimental pilots that attract and grow high-value investment and job creation.

Greater study is needed into the development of the coalitions that ultimately won competitive funding for America's innovation hubs; before selection and on-going planning; leadership; sources of cost-sharing, if required; roles of state and local government, the private sector, universities, non-profits, and other coalitions; organizational and membership models; models for financial sustainability; physical assets and infrastructure involved; nature of workforce development activities; challenges, barriers, and how they were overcome; and results and failures.

## Develop a New National Strategy for the Federal Role in Research and Technology

The private sector's dominance of investment in the nation's overall R&D portfolio has grown to unprecedented levels, overwhelming the federal government's place. In 2022, the private sector's share was 76 percent of U.S. national R&D investment, and the federal share was 18 percent.[14] The private sector leads advancements in critical dual-use technologies for applications that underpin both U.S. economic and national security. In addition, businesses now play a significant role in U.S. basic research, funding 37 percent and performing 36 percent of it.[15] U.S. prosperity and competitiveness are now tied more than ever with our ability to leverage the private sector's R&D investment. Federal R&D and policies should strategically leverage and support private-sector research, with an emphasis on commercializing, scaling, and deploying technologies developed by the private sector.

### Recommendation 9

Build new networks of business, academia, labor, and government leaders across states and regions to join forces and leverage the existing assets and capabilities required to build next-generation capacity for the industries and jobs of the future.

Regions and sectors should not operate in silos but should regularly engage in knowledge-sharing activities, such as conferences, workshops, and collaborative research projects. Government agencies, universities, and businesses should organize roundtable discussions and innovation forums where ideas can be exchanged, successes can be shared, and failures can be used as learning opportunities. Creating a culture of radical collaboration is essential to creating a thriving innovation environment.

14 InfoBrief, U.S. R&D Increased by $72 Billion in 2021 to $789 Billion; Estimate for 2022 Indicates Further Increase to $886 Billion, National Science Foundation, January 22, 2024.

15 Analysis of Federal Funding for Research and Development in 2022: Basic Research, National Center for Science and Engineering Statistics, National Science Foundation, August 15, 2024.

- A key step in this network building would be to map out the specific needs and opportunities for technology development and workforce training across the country. The networks created would assess the assets already in place (e.g., research labs, universities, workforce capabilities) and determine gaps where additional investment and collaboration are needed. Regional innovation hubs could be established based on these assessments, ensuring that local strengths are amplified while addressing gaps in infrastructure or capacity.

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### Speed Up the Scaling of Critical Technologies

Deploying and scaling technology much more quickly would increase numerous economic and national security benefits. The United States would be better positioned to leverage waves of new technology arising from multiple technology revolutions, keep pace with technological change, and run faster in the competitive race for 21st century global technology dominance. Economic and productivity growth could be accelerated. Solutions to global grand challenges in climate, sustainability, food, energy, and water could come more quickly, as well as new medicines and medical therapies. The U.S. military could capitalize on emerging advanced technologies to quickly field more powerful capabilities and weaponry, streamline logistics, and enhance soldier lethality and safety across all military domains. Businesses could keep better pace with global market change, increase efficiency, and improve product quality and functionality. Speeding up scaling is possible—generative AI has scaled faster than any technology in history.

#### Recommendation 10

Deepen and broaden regional access to early-stage and mezzanine financing for start-ups, business scale-up, and build-out of manufacturing operations, using tax and other targeted incentives, including in underserved communities and Enterprise Zones.

- Grant funding often goes to the communities best-positioned to accelerate innovation (e.g., San Francisco, Boston, New York) due to grant selection criteria. Communities typically underutilized in innovation, including rural communities, should be offered advantages for receiving grants and other funding. Smaller communities would also benefit from a national database on funding opportunities.
- Use pilots and demonstrations to move technologies more quickly toward deployment at scale.

Testing, piloting, and demonstration facilities and resource sharing between industry, academia, and government institutions can multiply capacity, fill skills gaps, and catalyze technology deployment. The private sector should explore use of the National Cooperative Research and Production Act to co-fund and operate these facilities, with the potential of other co-funders, for example from the federal government.

- In pre-competitive consortia focused on critical technologies, engage downstream players that will ultimately be needed for commercialization and deployment at scale.

# Conclusion

*Competing in the Next Economy* is a roadmap for policymakers to follow. It marks a path to innovation leadership, growth, speed, security, and greater prosperity for all Americans.

The roadmap acknowledges key truths:

- The technology and competitive landscape has shifted radically along numerous dimensions;
- Change is accelerating at an unprecedented pace;
- The United States faces its strongest challenger ever in the competitiveness arena; and
- The nation—in fact, the world—has entered unknown territory brought about by a major technological discontinuity, creating great uncertainty about the future with implications difficult to understand.

But most important, the work of the National Commission and the report it has generated recognizes that innovation is what will grow the U.S. economy and secure America's boarders.

However, 10xing U.S. innovation can not be achieved through a single action. Simply increasing funding, launching a new initiative, or making a leadership change will not suffice. The title *Competing in the Next Economy* reflects the profound truth: **a new approach is imperative, and a unified commitment from the nation's leadership is essential.**

Previous efforts, such as tax cuts and increased government spending, have fallen short, failing to deliver the inclusive prosperity aligned with the Council's mission to elevate the standard of living for all Americans. But just as innovation drives economic growth, so too must the nation's policy framework be refreshed. Only by innovating the policy agenda can we fulfill the aspirations put forth by the Council and its Commission.

Is the ambitious goal of achieving 10x innovation attainable? Perhaps, that is not the point.

The concept of 10x innovation represents a shift in mindset from what the country has adhered to for decades. Just as the agricultural, industrial, and digital revolutions transformed entire sectors and spawned new industries and skills, this new era of innovation will be realized when job creation flourishes, wages increase, and products are sustainably manufactured here in the United States.

To continue leading the world economically and from a national security perspective, the United States must institute the necessary policies, infrastructure, and resources to empower its citizens and institutions to compete and thrive. This report is a start, but the work of the Council and its National Commission is far from complete. Many vital challenges, opportunities, and ideas remain unaddressed, and critical recommendations have only been briefly touched upon in this report.

Science and technology will continue to evolve and progress through creative destruction. As this happens, the Council on Competitiveness and its National Commission on Innovation and Competitiveness are designed to equip the country and its leaders to adapt swiftly and maintain U.S. competitive advantages.

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## About the Council on Competitiveness

For 39 years, the Council on Competitiveness (Council) has championed a competitiveness agenda for the United States to attract investment and talent, and spur the commercialization of new ideas.

While the players may have changed since its founding in 1986, the mission remains as vital as ever—to enhance U.S. productivity and raise the standard of living for all Americans.

The members of the Council—CEOs, university presidents, labor leaders and national laboratory directors—represent a powerful, nonpartisan voice that sets aside politics and seeks results. By providing real-world perspective to Washington policymakers, the Council's private sector network makes an impact on decision-making across a broad spectrum of issues—from the cutting-edge of science and technology, to the democratization of innovation, to the shift from energy weakness to strength that supports the growing renaissance in U.S. manufacturing.

The Council's leadership group firmly believes that with the right policies, the strengths and potential of the U.S. economy far outweigh the current challenges the nation faces on the path to higher growth and greater opportunity for all Americans.