



# EXECUTIVE ORDER ON AMERICA'S SUPPLY CHAINS: A YEAR OF ACTION AND PROGRESS



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# Cover Note

Mr. President:

Today marks the one-year anniversary of the signing of your Executive Order (E.O.) 14017 on *America's Supply Chains*. It is our privilege to submit this capstone report that complements the six industrial base reviews that have been published by members of your Cabinet today, pursuant to your E.O. This follows our first set of [100-day reviews](#) released in June 2021, which focused on the supply chains of four critical products: semiconductors and advanced packaging; critical minerals and materials; large-capacity batteries for vehicles and grid storage; and active pharmaceutical ingredients. Since then, your Administration has worked to implement the recommendations that came out of the 100-day reviews, addressed current supply chain disruptions, completed these six industrial base reviews, and invested in the long-term resilience of our nation's supply chains.

The reports released today include assessments of and strategies to strengthen supply chains for six key industrial sectors: [the energy industrial base](#), by the Department of Energy (DOE); [the transportation industrial base](#), by the Department of Transportation (DOT); [the production and distribution of agricultural commodities and food products](#), by the Department of Agriculture (USDA); [the public health and biological preparedness industrial base](#), by the Department of Health and Human Services (HHS); [the Information and Communications Technology \(ICT\) industrial base](#), prepared jointly by the Department of Commerce (DOC) and the Department of Homeland Security (DHS); and [the defense industrial base](#), by the Department of Defense (DOD).

These reports draw on the work of an interagency task force that convened dozens of Federal Departments and Agencies (Agencies) to create a whole-of-government approach to strengthening America's supply chains. We thank these Agencies for their work over the past year and for their continued dedication to the economic prosperity and national security of the United States.

The Administration is also rolling out new investments, tools, and other actions today to strengthen America's supply chains, building on efforts and announcements made since you signed E.O. 14017 one year ago. The reports and actions announced today are guided by extensive engagement with stakeholders – including from the private sector, workers and labor unions, think tanks and academia, and non-profit and other non-governmental organizations.

E.O. 14017 also recommends a quadrennial assessment of these same industrial bases, due in 2025, which will be part of our work moving forward. We continue to work with Agencies to institutionalize the work of monitoring our critical supply chains; rebuilding our industrial bases; and strengthening the enabling environment for strong, resilient supply chains, including infrastructure, workers, and innovation.

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# Executive Summary

## An Unprecedented Year

Over the past year, the Biden-Harris Administration navigated an unprecedented period in economic history. The COVID-19 pandemic exposed structural weaknesses in the U.S. domestic industrial base and critical supply chains – the result of decades of preferencing underinvestment, outsourcing, and offshoring over long-term security, sustainability, and resilience. From the beginning of his Administration, President Biden prioritized strengthening critical supply chains and revitalizing the U.S. industrial base. In February 2021, one month after taking office, President Biden signed E.O. 14017, *America’s Supply Chains*, which initiated an all-of-government review of the supply chains that underlie the U.S. industrial base, with an initial focus on four critical products: semiconductors and advanced packaging; high-capacity batteries, including electric-vehicle batteries; critical minerals and materials, including rare earth elements; and pharmaceuticals and active pharmaceutical ingredients (APIs).

In June 2021, the Biden-Harris Administration released a first-of-its-kind [100-day review](#) of these four sets of critical products. These reviews identified common vulnerabilities and weaknesses across U.S. supply chains: insufficient U.S. manufacturing capacity; misaligned incentives and short-termism in private markets; industrial policies adopted by allied, partner, and competitor nations; geographic concentration in global sourcing; and limited international coordination. The reviews also surfaced recommendations to strengthen supply chain resilience and mitigate future disruptions across five broad categories: (1) rebuild domestic production and innovation capabilities; (2) support the development of markets that invest in workers, sustainability, and quality; (3) leverage the Federal government’s role as a purchaser of and investor in critical goods; (4) strengthen international trade rules and trade enforcement mechanisms; and (5) work with allies and partners to decrease vulnerabilities in global supply chains.

The Administration also recognized that even as we build long-term resilience, we must act urgently to address near-term bottlenecks and disruptions that impact the price and availability of key products. In June, the Administration established the Supply Chain Disruptions Task Force (SCDTF), a rapid response effort led by the Secretaries of Commerce, Transportation, and Agriculture to address supply chain-related challenges arising from a pandemic-affected economic recovery in supply chains for transportation logistics (including ports, trucking, freight rail, and other goods movement), semiconductors, and food and agriculture.

In the nine months since the release of the 100-day reviews, the Administration has taken action across three dimensions to fortify critical supply chains and set the United States on the path toward resilience and sustainability: pivoting, adapting, and surging support to immediate and evolving supply chain challenges; making historic investments to lay the foundation for long-term supply chain resilience; and building out the breadth and depth of the Federal government’s capacity to identify, mitigate, and respond to supply chain disruptions over the long term.



## Surging Resources to Address Near-Term Challenges

The ongoing COVID-19 pandemic continues to present complex and novel challenges throughout the global economy. Since June 2021, two new viral variants – Delta and Omicron – have tested public health responses and disrupted global production and labor markets. A dramatic shift in consumption patterns from services to goods and a strong U.S. and global recovery strained already-fragile transportation and logistics networks. The global semiconductor shortage continues to take its toll on the United States’ production and economic output, and on shop-floor workers across industries. Elevated car prices stemming from semiconductor shortages contributed to nearly one-third of core inflation in 2021.

Beginning in the Summer of 2021, the SCDTF led an all-of-government effort to address these issues head on. In August, the President appointed John Porcari as Port Envoy to work with the SCDTF to bring together ocean carriers, ports, state and local leaders, and labor unions to relieve congestion at major U.S. ports, including moving toward 24/7 operations, working with USDA and DOT to establish pop-up container yards, and working with DOL and DOT to launch a trucking action plan to put more skilled, qualified truckers on the road and improve job quality across the industry.

The SCDTF and the Department of State established an early alert system to proactively monitor and minimize real-time semiconductor supply chain disruptions linked to the pandemic. The State Department subsequently expanded its monitoring of disruptions at key ports worldwide and at key trading partners during the spread of the Omicron variant. Finally, the SCDTF partnered with the White House COVID-19 Response Team to support their efforts. The work of surging resources to relieve bottlenecks and respond to unforeseen and unprecedented challenges engaged a broad coalition of intergovernmental and cross-sector stakeholders to meet the urgent needs of American households and businesses.

While near-term challenges remain, these efforts have made historic progress. The SCDTF’s whole-of-government actions have contributed to a more than 70 percent decline in long-dwelling containers cluttering the docks at our two largest ports during a record-breaking year in which the ports processed 13 percent more containers than their previous record. In addition, inflation-adjusted retail inventories excluding autos continued to surpass their 2020 levels, ending the year at a more than 5 percent increase compared to December 2020. On-shelf availability of goods at grocery and drug stores remained just below their pre-pandemic level of 91%. The end result was a record-setting holiday sales season for America’s retailers, with holiday sales [up 14 percent](#) over 2020, and the nation’s leading delivery firms posting delivery times 26 to 40 percent faster than pre-pandemic. On the global semiconductor shortage, our efforts helped reduce the impact of pandemic-related disruptions to U.S. auto production, resulting in fewer days of plant shutdowns, and led to new supply chain partnerships being formed between semiconductor companies and automakers.



## Making Historic Investments in Long-Term Supply Chain Resilience

Even as we have been addressing near-term challenges, this Administration – guided by the [Biden-Harris 21<sup>st</sup> Century American industrial strategy](#) and the recommendations outlined in the 100-day reviews – has over the past year spurred a historic recovery in domestic production and built the foundation for long-term resilience across critical supply chains. During President Biden’s first year in office, the economy [added 367,000 manufacturing jobs](#) – the most in nearly 30 years. The U.S. economy [grew at the fastest pace in nearly 40 years](#) in 2021, and manufacturing as a share of U.S. gross domestic product (GDP) has [returned to pre-pandemic levels](#).

Catalyzed by these efforts, the private sector is looking again at the United States for substantial manufacturing investment. E.O. 14017 listed semiconductors and large-capacity batteries as critical products to target for onshoring to achieve greater supply chain resilience. Since the beginning of 2021, the semiconductor industry has announced nearly \$80 billion in U.S. investments. The automobile industry has likewise committed more than \$100 billion in domestic production of batteries and electric vehicles (EVs).

Both the U.S. Senate and House of Representatives have approved more than \$50 billion of funding for domestic manufacturing of semiconductors and are actively working to reconcile this bipartisan legislation to send to President Biden’s desk. DOE will invest nearly \$7 billion in funds from the historic Bipartisan Infrastructure Law (BIL) to strengthen the end-to-end U.S. battery supply chain, including material refining and production, battery cell and pack manufacturing, and recycling. DOD has made investments to re-shore production and processing of rare earth elements, reducing dependence on China for the critical minerals necessary for advanced technologies and catalyzing more than half a billion dollars in private-sector investment.

The Administration is rebuilding markets towards resilience, revitalizing domestic production, and expanding the productive capacity of the economy. A leading example of that is the work to strengthen the resilience of the meat and poultry supply chain. In July, President Biden signed [E.O. 14036, Promoting Competition in the American Economy](#), to combat the excessive concentration of industry and abuses of market power that have led to consolidated, fragile supply chains in many industries. The COVID-19 pandemic, cyber-attacks, and extreme weather fueled by climate change exposed the vulnerabilities caused by long-term consolidation in the meat and poultry processing sector, a bottleneck that has contributed to rising prices for consumers and lower prices for farmers and ranchers. The Biden-Harris [Action Plan for a Fairer, More Competitive, and More Resilient Meat and Poultry Supply Chain](#) combines \$1 billion in American Rescue Plan Act (ARP) funding to expand processing capacity, vigorous and fair enforcement of competition laws, and investments in worker safety and training to support a competitive and resilient meat and poultry sector.

All of these efforts are guided by the President’s commitment to make more things in America. During President Biden’s first year in office, the Administration embarked on the most ambitious transformation of domestic content preference laws to date, launching a new Made in America Office within the Office of Management and Budget. The office supported the development of



an increase in the domestic content thresholds for federal procurement of manufactured goods and is creating a path for enhanced price preferences on certain critical products. The Build America, Buy America Act included in the BIL has now made the office permanent, and authorized a further expansion of the Buy America rules that govern Federally-funded infrastructure and public works projects.

The Treasury Department secured a [landmark global corporate tax agreement](#) with 136 countries that will eliminate incentives to offshore jobs and profits, while driving investment in American workers, small businesses, and the middle class, and also stood up its new \$10 billion State Small Business Credit Initiative (SSBCI). Funded under the ARP, SSBCI will catalyze more than \$70 billion in lending and investment in small businesses – including small manufacturers – over the next decade.

Across our work on supply chains, the Biden-Harris Administration has fostered cooperation with America’s allies and partners. While we must reduce our dependence on China and other geopolitical competitors for key products, a “friend-shoring” approach to supply chains both strengthens U.S. resilience and ensures the resilience of allied and partner supply chains as well. For example, many of the recently announced U.S. investments in semiconductors and new battery production involve companies and technology based in America’s allies as well as American companies. The United States has launched a supply chains working group within the United States-European Union Trade and Technology Council (TTC) to deepen supply chain cooperation and is also focused on supply chain resilience with key partners and allies through the Indo-Pacific Economic Framework. Critical minerals, which are located in different countries around the world, represent another area of focus for allied supply chain cooperation to diversify sources and promote sustainable production with strong environmental, social, and labor standards.

The Biden-Harris Administration is also putting these diplomatic efforts to work for the American people. In October 2021, the United States and the European Union (EU) reached an [arrangement](#) to address China’s global steel and aluminum excess capacity – a serious threat to both American workers and producers of these metals, but also a threat to our climate, given the carbon intensity of China’s production methods. The arrangement reduced tariffs between the United States and the EU – restoring market prices on both sides of the Atlantic. Critically, it also included a commitment from both the United States and the EU to negotiate the world’s first emissions-based sectoral arrangement on steel and aluminum trade by 2024. American-made steel and aluminum is produced with far fewer emissions than dirtier alternatives made in China and elsewhere. To date, American steel companies and workers have received no benefit for their lower-carbon production. Working together with the EU, the Biden-Harris Administration will ensure that more-sustainably produced steel across all production types – and the workers who make it – will be incentivized and rewarded going forward. The Administration reached a similar agreement with Japan in February 2022, further supporting the long-term competitiveness of the American steel industry.





## Institutionalizing Long-Term Supply Chain Resilience

Supply chain resilience must become a lasting focus for businesses and governments alike. The economic dislocation caused by the COVID-19 pandemic highlighted the long-standing vulnerabilities in our nation's supply chains, constraining the movement of goods, increasing prices, and reducing economic growth.

While the near-term efforts of the SCDTF have helped to break down silos and achieve new forms of collaboration between Agencies, enabling timely action to address supply chain disruptions, our long-term efforts require deeper and broader steps to institutionalize supply chain resilience throughout the Federal government. Earlier this month, DOE announced an internal realignment to effectively deploy more than \$60 billion in BIL funding for clean energy infrastructure and deployment, including establishing a new Manufacturing and Energy Supply Chains Office. HHS announced a new dedicated public health industrial base expansion and supply chain management office. DOT will now work with states to include supply chain resilience in their State Freight Plans, so that state-led infrastructure planning and investments bolster the resilience of the entire goods movement chain – across ports, trucking, rail, and warehousing.

The six one-year industrial base reviews, prepared and published today by DOE, DOT, USDA, HHS, DOC, DHS, and DOD, and summarized later in this report, are a crucial milestone in this long-term institutionalization effort. For the first time, the Federal government has now worked across agencies to comprehensively assess supply chain vulnerabilities and needs across critical industries and develop multi-year plans to build supply chain resilience. E.O. 14017 recommends a quadrennial review of these industrial bases, so that Agencies continue to monitor, collect, and analyze supply chain data. Taken together, these steps will put our national supply chain strategy on a long-term footing by building capacity and institutional knowledge, embedding supply chain resilience throughout the day-to-day operations of Federal agencies. Supply chain resilience is now an enduring national priority.

## Now is the Time to Act

The six industrial base reviews published today document not just vulnerabilities and fragilities in our supply chains, but also the tremendous opportunity to put our nation on a new path. The supply chain-related shocks to our economic recovery this past year have illustrated that we need more tools in order to achieve greater national supply chain resilience.

Comprehensive competitiveness legislation, such as the *America Creating Opportunities for Manufacturing, Pre-Eminence in Technology, and Economic Strength (COMPETES) Act* passed in the House of Representatives, and the *United States Innovation and Competition Act (USICA)* passed in the Senate, would provide transformational investments in our industrial base and research and development. The legislation will strengthen our world-leading research and development ecosystem, ensure that what we invent in America is made in America, bolster our critical supply chains and revitalize our domestic manufacturing base, and spur regional economic development to unlock the potential of all Americans – regardless of background – and all regions of the country to contribute to and benefit from the next generation of scientific and





technological progress. Our domestic innovation capacity is contingent upon a robust and diversified industrial base; when manufacturing moves offshore, innovation follows.

After a historic year of creating comprehensive strategies to strengthen a set of U.S. supply chains, it is clear that the Federal government needs more tools to move at greater speed and scale, given how rapidly global supply chains must adjust to accommodate climate change, geopolitical risk, and technological development. The Supply Chain Resilience and Crisis Response (SCRCR) Office included in the *COMPETES Act* will create permanent capacity to map and monitor supply chains; prepare for and respond to disruptions; support collective action across a diverse group of public and private stakeholders to promote supply chain resilience; and authorize incentives to attract private investment in domestic manufacturing – especially the small- and medium-sized businesses that sit at the convergence of all our nation’s strategic industrial bases.

As we build more resilient supply chains to align with our national and economic security imperatives, we must reinvest in and reimagine how Federal, state, local, territorial, and Tribal governments work together with business, workers, and residents. Here we can learn from our history. We know that our long-term growth potential depends on a large labor force, productive workers, renewable resources, and a stable political system. We also know that building next-generation and leading-edge industries requires networks that connect researchers and universities to businesses, as well as capital and connections for entrepreneurs, so that new businesses can thrive and expand.

As we build out these industries of the future, our north star must be economic growth that is strong, inclusive, and sustainable. To achieve that in regions and industries across our country, we must create a seat at the table for workers, residents, and those most affected by climate change, so they can help shape and spur more durable economic growth with higher labor force participation rate and productivity, and lower inequality and environmental damage.



# The Year in Review: What We Have Accomplished

Since his first day in office, President Biden has relentlessly focused on an industrial strategy to revitalize our manufacturing base, strengthen critical supply chains, and position U.S. workers and businesses to compete and lead globally in the 21<sup>st</sup> century. In June, the administration laid out its strategy for improving the resilience of U.S. supply chains for four key products: semiconductors and advanced packaging; high-capacity batteries, including electric-vehicle batteries; critical minerals and materials, including rare earth elements; and pharmaceuticals and APIs. It also established the SCDTF to tackle the near-term bottlenecks and disruptions in the supply chains for ports and trucking, semiconductors, and food and agriculture that were linked to the global pandemic. This section offers an overview of the key actions the Biden-Harris Administration has taken over the past year to reduce the vulnerability of U.S. supply chains across a range of key sectors.

## Freight Movement: Transporting Goods Efficiently Amid a Pandemic

Global supply chain disruptions due to the pandemic have created unprecedented challenges for U.S. goods movement across the entire chain and exposed long-standing problems in the country's freight movement system. Disruptions to production, as well as port closings, led to delays and the highly uneven flow of goods to American ports. Cargo owners shifted to “just-in-case” inventory strategies rather than “just-in-time,” creating more incoming freight at our ports and straining warehouse capacity. The result was a large increase in flow through the system, with America's four biggest container ports each breaking their previous records, importing about 16 percent more containers in 2021 than in 2020.

The Biden-Harris Administration has acted as an honest broker and convener to align the work of the entire goods movement chain – ports, rail, trucking, warehousing – to help workers, companies, and state and local governments work more efficiently and collaboratively. Under the leadership of Port Envoy John Porcari, appointed at the end of the summer, the Administration helped ensure a record-breaking holiday season, with sufficient retail inventories and minimal shipping delays. In the past year, the Biden-Harris Administration has:

- **Moved our nation's largest ports towards 24/7 operations.** The Ports of Los Angeles and Long Beach process 40 percent of the nation's containerized imports and have faced unprecedented strains this year, as they broke their 2018 record for annual containerized imports by 13 percent. In October, the President brought the leadership of the two ports together with organized labor to announce they would move towards 24/7 operations to move goods from ships to shelves more quickly. With the support of Port Envoy Porcari, the Ports of Los Angeles and Long Beach proposed a new congestion fee on containers that sit on the docks for over nine days; as of February 7, 2022, the number of these long-dwelling containers had fallen by more than 70 percent from November 1, 2021, levels. The effort also saw major rail companies increase 24/7 service and incentives at the ports;



major retailers and freight forwarders commit to increased use of off-peak hours; and ocean carriers take new steps to remove the empty containers clogging the docks. The end result was that America’s retailers’ shelves were fully stocked for the record-breaking holiday shopping season, with inflation-adjusted retail inventories, excluding autos, in December nearly 6 percent higher than the same month in 2020. Consumers also received 97 to 99 percent of their packages on time or with minimal delays from the U.S. Postal Service, FedEx, and UPS.

- **Reduced congestion at the Port of Savannah through support for the Georgia Port Authority pop-up container yards project.** DOT worked with the Georgia Port Authority to reallocate more than \$8 million in an existing grant award to open four pop-up container yards in both Georgia and North Carolina. Under the plan, railroads Norfolk Southern and CSX coordinate with the Port of Savannah to transfer containers via rail and truck further inland so that they can be closer to their final destination, making available valuable real estate closer to the port. The effort has provided relief to about 5,000 containers over the last eight weeks and freed up more dock space, speeding goods flow in and out of the Port of Savannah, which leads the nation in containerized agricultural exports.
- **Announced a partnership with the Port of Oakland to set up a new 25-acre “pop-up” site to make it easier for agricultural companies to fill empty shipping containers.** The new site, supported by USDA investments from Commodity Credit Corporation funds, will provide access to equipment like refrigerated containers and provide trucks faster turns without having to wait for in-terminal space. The Administration also continues to call on ocean carriers to mitigate disruptions to agricultural shippers by restoring full and fair service to the Port of Oakland. These actions build on the Administration’s efforts to support America’s farmers by upgrading critical infrastructure through the BIL, tackling unfair and anticompetitive practices in the meat and poultry processing sector, and addressing pandemic-induced supply chain challenges.
- **Launched the Trucking Action Plan to strengthen America’s trucking workforce.** The Administration is working to support and expand access to quality driving jobs now and in the years ahead. Specifically, DOT and the Department of Labor (DOL) are accelerating the expansion of Registered Apprenticeship programs for drivers that put more skilled, safe drivers on the road; taking immediate steps to address the pandemic-driven delays in getting a commercial driver’s license; curbing the proliferation of low-quality training that increases the supply of less-qualified drivers who end up in debt or being exploited; and expanding more seamless paths for veterans and underrepresented communities, including women, to access good driving jobs.
- **Increased the number of commercial vehicle licenses.** The DOT and its Federal Motor Carrier Safety Administration are supporting state departments of motor vehicles as they return to – or even exceed – pre-pandemic commercial driver’s license issuance rates, which is helping bring more truck drivers into the field. DOT announced over \$30 million in funding to help states expedite commercial driver’s licenses. DOT also sent all 50 states a toolkit detailing specific actions they can take to expedite licensing, and will



work hand-in-hand with states to address challenges they are facing. DOT has also begun closely tracking delays, identifying states that have challenges with issuing commercial driver's licenses, and communicating with all 50 governors about ways in which they can reduce delays in issuing them.

## Food and Agricultural Goods: Filling Shelves, Feeding Students, and Fostering Competition and Market Access

Agricultural production and food distribution systems have been under tremendous strain amid the pandemic, cyber-attacks, and climate change. Historical inequities and lack of competition have not created a system that can withstand these challenges. To address these problems and begin to build long-term resilience, the Biden-Harris Administration has:

- **Leveraged \$100 million in ARP funds to offer nearly \$1 billion in loan guarantees through a Food Supply Chain Guaranteed Loan Program.** The program guarantees loans of up to \$40 million for qualified lenders to finance food systems projects, specifically for the start-up or expansion of activities in the middle of the food supply chain, such as aggregation, processing, manufacturing, storage, transportation, wholesale, or distribution of food. The program makes available nearly \$1 billion in loan guarantees to back private investment in processing and food supply infrastructure that will strengthen the food supply chain for the American people.
- **Announced \$900 million more in ARP funds to support a fairer, more competitive, and more resilient meat and poultry supply chain.** In January 2022, USDA announced its [meat action plan](#) with \$375 million in grant funding to support the expansion of independent processing capacity, \$275 million to strengthen financing for independent processing, \$100 million to invest in workers, and \$50 million to support research and development and technical assistance. A further \$100 million is being used to reduce overtime inspection costs to help small processing plants keep up with unprecedented demand. In December 2021, the USDA awarded \$32 million in pandemic assistance funds to 167 meat and poultry processors to help them get federally inspected – allowing them to reach more customers.
- **Committed to stronger rules under the *Packers & Stockyards Act* to protect farmers, ranchers, and consumers, as well as promote an all-of-government approach to strengthening competition.** USDA has begun work on three proposed rules to provide greater clarity and strengthen enforcement under this Act. USDA plans to issue new rules designed to ensure consumers get what they pay for when meat is labeled “Product of USA.” The Department of Justice and USDA launched a new joint initiative to better coordinate their efforts, including a new portal for reporting concerns about potential violations of competition laws.
- **Leveled the playing field for beginning farmers and ranchers.** USDA’s National Institute of Food and Agriculture (NIFA) provided more than [\\$50 million to 140 organizations and institutions](#) that teach and train beginning farmers and ranchers. NIFA invested more than [\\$30 million for 33 grants](#), as part of NIFA’s Organic Agriculture



Program, to support farmers and ranchers who grow and market high-quality organic food, fiber, and other organic products.

- **Committed \$1.5 billion to help schools address disruptions in school food related supply chains.** The funds, announced last month, allow schools to make direct food purchases and also access food purchased by USDA, and will also invest in cooperative agreements with state and Tribal governments to purchase foods from local underserved producers. Additionally, USDA announced an adjustment in school meal reimbursements which will make an estimated \$750 million more available to school meal programs across the nation.
- **Deployed resources to protect U.S. livestock and poultry from emerging threats.** In 2021, USDA's Animal and Plant Health Inspection Service (APHIS) confirmed African Swine Flu in the Dominican Republic and Haiti, and acted quickly to engage international partners and increase domestic preparedness. APHIS staff is providing advisory services, sample testing, and staff training in the Dominican Republic and is working with Haitian authorities for improved surveillance. APHIS deployed additional resources to the region, including a major outreach campaign in Puerto Rico and the U.S. Virgin Islands, to ensure the public knows what actions to take to keep from unknowingly introducing the virus. Additionally, research and development by USDA's Agricultural Research Service has resulted in a new vaccine that shows promise for prevention and slowing spread of the currently circulating virus strain.
- **Finalized a framework for SARS-CoV-2 zoonotic surveillance.** When the pandemic struck, it caused significant shifts in agricultural markets and presented special challenges for essential food and agriculture workers. This new \$300 million ARP-funded effort will help USDA conduct zoonotic surveillance to better understand, identify, and control diseases of concern, and to improve human and animal health outcomes related to SARS-CoV-2 and other zoonotic diseases.
- **Fought to make sure trade rules work for American farmers, ranchers and producers.** One significant result was that the United States [prevailed](#) in the first dispute settlement panel proceeding under the U.S.-Mexico-Canada Agreement (USMCA), bringing the U.S. dairy sector one step closer to realizing the full benefits of the USMCA. The Administration scored another trade policy win when Vice President Kamala Harris traveled to Hanoi in August, securing a [commitment](#) from the Vietnamese government to reduce tariffs on U.S. agricultural products. This will give U.S. corn, wheat, and pork producers greater access to our seventh-largest agricultural export market, in line with competitors from countries that have free trade agreements with Vietnam.



## Semiconductors: Addressing the Shortage and Bringing Manufacturing Home

Since Day 1, the Biden-Harris Administration has been working around the clock with Congress, our international allies and partners, and the private sector to expand available supplies of the microelectronics, or semiconductor chips, that go into cars, smart phones, medical equipment, and our broadband and power infrastructure. In the past year, the Administration has:

- **Worked with allies and partners to ensure that existing manufacturing facilities are making as many chips as possible to blunt the effects of the shortage.** Given that it takes 2-3 years to construct a semiconductor manufacturing facility – known as a fab – it is important that the United States and our allies and partners maximize all available fab capacity immediately.
- **Created an early alert system to get ahead of manufacturing disruptions abroad due to COVID-19.** This enhanced government coordination across DOC and the State Department allows the U.S. government to identify potential plant shutdowns and, if possible, work with allies and partners to alleviate them. This system is a combination of monitoring of key facilities by staff at our Embassies abroad, communication channels with industry, and review of available data sources. The early alert system has resulted in fewer and less-disruptive plant shutdowns.
- **Promoted transparency across chip and manufacturing supply chains.** In the past year, the Biden-Harris Administration, under DOC’s leadership, has held several roundtables to highlight the importance of increasing communication and information-sharing between semiconductor producers and original equipment manufacturers, who are often separated by many tiers of intermediate suppliers. DOC also conducted and published a Request for Information to survey the extent of the chip shortage. The request found that demand for semiconductors was as much as 17 percent higher in 2021 than it was in 2019, and consuming firms are not seeing commensurate increases in the available supply despite fabs operating at or above 90 percent utilization. The result of this work has been an increase in collaboration between the semiconductor industry and its end users, including improved communication about demand and supply of chips. This enhanced communication helps fabs to plan their multi-year production cycles and allows original equipment manufacturers to better adjust production schedules in case of part or equipment delays.
- **Issued a Presidential Determination for use of the Defense Production Act (DPA) for Radiation-Hardened Microelectronics.** DOD and many commercial industries require radiation-hardened microelectronics to support missions in high-radiation environments such as ambient space and in proximity to nuclear detonations. They need to withstand short bursts of intense radiation, high temperatures, and, in some cases, extreme shock and vibration in order to meet mission requirements. This year, DOD will use this Determination to expand capability to produce these specialized chips.





In the long run, the most important goal must be to grow semiconductor manufacturing capabilities here at home. In the past year, the Biden-Harris Administration has:

- **Worked with the private sector to secure nearly \$80 billion in semiconductor investment for new fabs or expansion of fabs in the United States through 2025.** Not only does this mean that we will be making more chips in the United States – and therefore becoming less reliant on third countries – it also means more high-quality and good-paying manufacturing jobs for Americans.
- **Secured separate Senate and House approval to fully fund the *Creating Helpful Incentives for Production of Semiconductors (CHIPS) for America Act* by appropriating at least \$50 billion, putting the funds on a path to passage.** However, the funds are not yet finalized since the Senate and House have approved different bills containing CHIPS funding. These incentives would support thousands of jobs; expand production capacity in the United States; diversify away from single- or sole-sources, which create fragile supply chains; and reinvest in America’s research and development prowess.

## Health Supply Chains: Fighting COVID-19 and Preparing for Future Pandemics

Building resilient supply chains and a diverse industrial base for health and bio-preparedness is essential for the health of Americans, our national security, and the economic prosperity of the United States – whether in emergencies like the COVID-19 pandemic or for the provision of day-to-day health care. Since President Biden’s inauguration, the Administration has:

- **Supported production of vaccines to support a historic vaccination campaign.** Under President Biden, the United States invested \$950 million to manufacture COVID-19 vaccines, supporting over 675 million doses and contributing to 64 percent of the population now being fully vaccinated. HHS’ industrial base expansion effort also issued nine awards of over \$1 billion to support the materials needed to manufacture vaccines – including vial manufacturing, raw materials, and fill-finish capacity.
- **Expanded American production and distribution of personal protective equipment and test kits.** In addition to leading an unprecedented vaccination effort that has led to more than 210 million Americans getting fully vaccinated, the Biden-Harris Administration invested in manufacturing capacity to domestically produce tens of millions of N95 masks per month. The Administration also increased testing supply, availability, and affordability, shipping 200 million free tests to 50 million households through COVIDTests.gov. And, HHS has partnered with industry to increase available tests by procuring more than 500 million tests and is in the process of contracting for another 500 million tests. To meet future surges in demand, our combined national and international monthly test-production capacity will be over one billion tests per month.



- **Built the foundations for our nation’s capacity to manufacture supplies needed for future pandemics.** HHS’ Supply Chain Control Tower is providing visibility on inventory levels, manufacturer capacity, distribution flows, and point-of-care consumption to inform decision-making in preparedness and response. HHS’ Program Office for Innovation and Industrial Base Expansion and forthcoming DPA Title III Program Office will further strengthen the public health supply chain through support of American innovation and production. HHS also developed and began implementing the National Strategy for a Resilient Public Health Supply Chain. This report focuses on developing the nation’s long-term capacity to manufacture supplies for future pandemics and biological threats. Implementation of the nine pillars of the National Strategy continues across the Federal government, and later this year HHS will publish its first annual resilience report detailing progress.
- **Made progress on manufacturing APIs.** In partnership with the Defense Advanced Research Projects Agency and the U.S. Air Force, two efforts are underway to advance technologies and processes for drug substance and final dosage form production. These projects encompass the advanced continuous synthesis of APIs, reducing the footprint of production facilities, and enabling the capability of modular and distributive drug manufacturing. HHS investments of more than \$105 million have driven significant advancements in the chemistries and process development for continuous production of APIs including dexmedetomidine, rocuronium, and fentanyl. Construction of a new current good manufacturing practice facility was completed, and will support manufacture of sterile injectable analgesics and sedative medications, including midazolam, propofol, and cisatracurium.

## Critical Minerals: Securing Sources for Next-Generation Technologies

Securing the critical minerals that the United States will need to make a clean energy transition, build next-generation defense systems, and fuel our manufacturing economy will be the work of decades. This Administration’s plan is three-fold: (1) secure and expand sustainable critical mineral mining and processing capacity in the United States; (2) expand options for recycling and recapture of minerals from waste or mine tailings; and (3) work with allies and partners to develop and diversify mining and processing of critical minerals. This will be a long-term effort, but the Biden-Harris Administration has made significant progress over the past year:

- **Invested in rare earth element processing capacity.** This month, DOD awarded \$35 million to support separation and processing of rare earth elements at the nation’s only operation rare earth mine in Mountain Pass, California. This builds on previous DOD investments in rare earth element processing, which now total more than \$100 million. This funding has spurred more than \$700 million in announced private-sector investment to secure a fully-domestic end-to-end supply chain for rare earth magnets used in electric-vehicle motors, wind turbines, and defense systems.



- **Updated and prioritized the Federal list of critical minerals.** Pursuant to the Energy Act of 2020, the Department of the Interior (DOI) updated its Federal list of critical minerals, listing minerals essential to economic or national security and vulnerable to disruption. To focus the work of Federal agencies on sourcing critical minerals, the Administration directed Agencies to prioritize the production and processing of minerals necessary to produce key products like batteries, semiconductors, and permanent magnets, consistent with our strong environmental, social, and labor principles.
- **Updating outdated mining laws and regulations.** This year, the Mining Law of 1872 turns 150. This law still governs mining of most critical minerals on federal public lands. This week, DOI established an Interagency Working Group (IWG) that will lead an Administration effort on legislative and regulatory reform of mine permitting and oversight. The IWG released a list of Biden-Harris Administration fundamental principles for mining reform to promote responsible mining under strong social, environmental, and labor standards that avoids the historic injustice that too many mining operations have left behind. The IWG will deliver recommendations to Congress by November. It will also host extensive public input and comment sessions to ensure an inclusive process, and will work with the relevant agencies to initiate updates to mining regulations by the end of the calendar year.
- **Strengthened critical mineral stockpiling.** DOE, DOD, and the Department of State signed a memorandum of agreement to better coordinate stockpiling activities to support the U.S. transition to clean energy and national security needs. In October, President Biden streamlined the National Defense Stockpile by signing [E.O. 14051](#) to delegate authority release of strategic and critical materials to the Under Secretary of Defense for Acquisition and Sustainment.
- **Launched the American-made Geothermal Lithium Extraction Prize for \$4 million.** With need for lithium set to increase by 500 percent by 2050, the Biden-Harris Administration is positioning the United States to be a net-exporter of lithium by launching a search for new technologies for the extraction of minerals like lithium from saltwater brine. This prize is currently funding 24 teams.
- **Expanded efforts to recover critical minerals from mine waste.** In February, DOE released a Request for Information for a BIL-funded \$140 million demonstration project to extract rare earths from mine waste material. The BIL also includes funding for a mapping initiative at the U.S. Geological Survey to support recovery of minerals from mine waste.
- **Advanced sustainability standards for minerals used in electronics.** Federal government experts are participating in an update to critical materials criteria for the Electronic Product Environmental Assessment Tool (EPEAT). Federal purchasers are required to procure EPEAT-registered electronic products, including computers and displays, imaging equipment, mobile phones, photovoltaic modules and inverters, televisions, and servers. In early 2022, the Environmental Protection Agency (EPA) and DOE will survey other private-sector standards, prioritizing those for mining and



processing, such as the Initiative for Responsible Mining Assurance, to expand sustainability standards outside of electronics.

## Large-Capacity Batteries: Powering our Cars and Electrical Grid

DOE has a long history of investing in innovation for large-capacity batteries, and has had a strong role in driving down costs and increasing performance for lithium-ion batteries over the past 15 years. However, the upstream section of the supply chain – materials, battery components, and cells – have mostly been built outside of the United States. The BIL includes more than \$7 billion in funding to accelerate innovations and facilities across the battery supply chain, from battery materials refining, processing and manufacturing; to battery manufacturing, including components; to battery recycling and reuse. These investments will catalyze the development of a North American battery supply chain, help expand manufacturing and recycling facilities in the United States, and substantially advance battery recycling through research, development, and demonstration projects in collaboration with retailers as well as state, local, territorial, and Tribal governments. These resources, combined with the historic investments in EV charging and grid upgrades, represent major steps towards building a domestic infrastructure backbone to undergird a modern supply chain.

- **Enacted a \$3 billion battery material processing grant program.** Based on the BIL, in February, DOE published a Notice of Intent to provide nearly \$3 billion to boost production of advanced batteries, including battery materials refining and production plants, battery cell and pack manufacturing facilities, and recycling facilities. DOE is working to launch this program by May 2022.
- **New laboratory investments.** In October 2021, DOE invested \$209 million in funding for 26 new laboratory projects focusing on EVs, advanced batteries, and connected vehicles. Continued and enhanced research investments by DOE will also continue to drive down costs, improve performance, reduce the requirements for critical materials, and also support development of innovative new chemistries.
- **Doubling-down on domestic supplies.** In the coming weeks, DOE will release more information on additional new funds from the BIL, including up to \$3 billion to catalyze investment in domestic supply for battery materials and a new program to drive second-use and recycling of lithium-ion batteries.
- **A historic investment in EV charging infrastructure.** In December, DOE and DOT announced the creation of a Joint Office of Energy and Transportation to deploy the BIL's \$7.5 billion in funding to build out the first-ever nationwide public EV charging network. Creating a convenient, reliable, affordable, and equitable charging experience is critical to spurring consumer EV adoption and meeting the Administration's goal of reaching 50 percent EV share of new vehicle sales by 2030.



## Working with Allies and Partners

The United States cannot make, mine, or manufacture everything ourselves. We must cooperate with our allies and partners to foster and promote collective supply chain resilience. That has been true in fighting the pandemic, with some key vaccine technology developed in Europe. It is true in securing access to key minerals for the clean energy transition, where the United States must work with allies and partners to ensure abundant and resilient sources of supply – both by securing supplies overseas and working with allied companies to expand sustainable mining here in the United States. It is true with semiconductors, where the United States and our allies and partners need to coordinate our respective domestic investments to ensure adequate global supply and to maintain our technological edge over our competitors. The past year has seen significant engagement between the United States and our international allies and partners on building supply chain resilience, through both multilateral and bilateral engagements. In 2022, the Biden-Harris Administration will deepen this work and expand upon it. Key multilateral efforts over the past year have included:

- **Global Summit on Supply Chain Resilience:** In October 2021, President Biden brought together over a dozen world leaders to foster greater international cooperation on near-term supply chain disruptions, and chart a course to strengthen and diversify the entire supply chain ecosystem over the long term. The Secretaries of State and Commerce will be holding a follow-on dialogue with more stakeholders this year. The President also published a [Chair’s Statement on Principles for Supply Chain Resilience](#), which emphasized four pillars of global supply chain resilience: transparency, diversity, security, and sustainability:
  - **Transparency:** Transparency in supply chains promotes awareness of risks, identifies bottlenecks, and assists organizations in determining whether alternative sources of critical inputs are needed. Transparency also empowers consumers to make informed purchasing decisions and businesses to manage their suppliers and serve their customers. Improving transparency and information-sharing between countries will help all countries mitigate and respond to global supply chain shocks. Similarly, improving transparency between stakeholders in a supply chain helps strengthen their ability to adapt in the face of shocks and stressors.
  - **Diversity:** Diversity of supply strengthens the global marketplace, fostering interconnectedness and shared prosperity. This diversity extends across raw materials, intermediate goods, and finished goods.
  - **Security:** Security is a high priority for all players within supply chains, especially in technology supply chains, at critical infrastructure nodes, and other points within the supply chain that must not fail. Addressing security vulnerabilities can prevent damage or disruptions that interfere with critical systems or infrastructure, or contribute to unnecessary costs, inefficient delivery schedules, loss of intellectual property and goods, or delivery of unauthorized or compromised products.
  - **Sustainability:** Creating fair, sustainable labor conditions strengthens our supply chains, leading to more innovative, productive industry and greater shared prosperity. Similarly, investing in and mainstreaming climate and environmental



sustainability helps reduce a key source of supply chain risks. Governments, industry, and civil society should work together to promote and accelerate global sustainability goals.

- **High-Level Economic Dialogue with Mexico:** In September 2021, the United States and Mexico held the first High-Level Economic Dialogue. The countries affirmed the need to build back together in an environment informed by the pandemic by improving the regional business environment and strengthening the resilience of U.S.-Mexico supply chains. Work is focused on how to best facilitate economic recovery and strengthen infrastructure, trade facilitation, and innovation.
- **Indo-Pacific Economic Framework:** As President Biden announced at the October 2021 East Asia Summit, the United States will work with countries in the Indo-Pacific to deepen economic relations in the region and coordinate approaches on economic challenges. Among these economic areas will be a focus on developing resilient and secure supply chains.
- **The Quad:** Australia, India, Japan, and the United States are committed to promoting the free, open, rules-based order, rooted in international law and undaunted by coercion, to bolster security and prosperity in the Indo-Pacific and beyond. This group is working together on building open and secure supply chains for vaccine production, establishing responsible and resilient clean-energy supply chains and launching a green shipping network, and focusing on critical and emerging technology – including a joint semiconductor supply chain mapping initiative.
- **Trade and Technology Council (TTC):** In June 2021, President Biden, European Commission President Ursula von der Leyen, and European Council President Charles Michel announced the formation of the TTC, which promotes U.S. and EU competitiveness and prosperity and the spread of democratic, market-oriented values by increasing transatlantic trade and investment in products and services of emerging technology, strengthening our technological and industrial leadership, boosting innovation, and protecting and promoting critical and emerging technologies and infrastructure. Of the ten working groups, one will focus on secure supply chains. This working group focuses on the following sectors: semiconductors, solar photovoltaics, critical minerals and materials, and pharmaceuticals. In connection with these sectors, the working group is tasked with increasing transparency of supply and demand, mapping respective existing sectoral capabilities, exchanging information on policy measures and research and development priorities, and cooperating on strategies to promote supply chain resilience and diversification.
- **Investing with allies and partners:** Under the Biden-Harris Administration, the U.S. Development Finance Corporation (DFC) is actively pursuing investments overseas that will strengthen key U.S. and international supply chains, such as the DFC’s December 2021 announcement that it would provide up to \$500 million in financing for a U.S. company to expand solar manufacturing in India. This builds on domestic investments to expand solar manufacturing in the United States.





## Strengthening America's Workforce and Supporting Workers

The United States is in the midst of a historic labor market recovery. During President Biden's first year in office, the economy added 6.6 million jobs – more jobs than in any other year in American history – the unemployment rate fell by its fastest rate on record, and millions of Americans entered and reentered the labor force. Despite this historic progress, the pandemic also resulted in new preferences and needs from workers, including fear of health risks in high-contact jobs, preferences for remote work, an increase in early retirements, and an interest in bargaining for higher wages and improved work conditions. It also exposed long-standing challenges in attracting, training, and retraining the skilled workforce needed to power our supply chains, including access to childcare. About fifty million workers, or one-third of the U.S. workforce, live with children under the age of 14. Industry surveys indicated that two-thirds of working parents faced child-care instability due to COVID-19, and businesses saw large numbers of workers leave due to care disruptions. The Biden-Harris Administration is laser-focused on eliminating barriers to full participation in the labor market for working families everywhere, and increasing access to high-quality jobs available in critical industries. To strengthen our workforce and begin to build long-term resilience, the Biden-Harris Administration has:

- **Supported a well-trained workforce through high-quality training.** Through the Administration's ARP, DOC has launched the Good Jobs Challenge that will allocate \$500 million to build and strengthen systems and partnerships that bring together employers who have hiring needs with other key entities, including unions and community colleges, to train workers with in-demand skills that lead to good-paying jobs. In 2021, DOL announced and awarded \$439 million in grants to provide opportunities for underserved and underemployed individuals, as well as to promote equity across training programs. Finally, the Administration also critically expanded Registered Apprenticeships as an equitable pathway into good jobs. DOL plans to continue to build on these workforce development investments, especially through investments in pre-apprenticeship programs, to ensure more underserved and underrepresented communities, including women and people of color, can access quality training to move into good-paying, union jobs.
- **Boosted job quality.** DOL launched a Good Jobs Initiative to provide critical information to workers, employers, and government agencies as they work to improve job quality and create access to good jobs free from discrimination and harassment for all working people. The Biden-Harris Administration has also taken a number of critical steps to improve worker protections, including raising the minimum wage for Federal contractors to \$15 an hour and rescinding harmful regulations adopted under the previous administration which would have made it easier to misclassify workers as independent contractors and deny them vital labor protections such as minimum wage and overtime.
- **Supported K-12 education.** The historic investment of \$122 billion in elementary and secondary education through the ARP's Elementary and Secondary Education Emergency Relief Fund is not only helping schools stay safely open, but addressing the



impact of lost instructional time on students. These resources are helping states and school districts launch tutoring programs, hire more instructional staff, re-engage students who became disconnected from their education during the pandemic, and hire counselors.

- **Invested in child- and long-term care.** President Biden secured \$39 billion in ARP funds for child-care – the largest investment in child-care in history – and expanded support for Medicaid home- and community-based services. States have already provided relief to about 150,000 child-care providers to help many of them keep their doors open at this critical time. This relief is helping these very small businesses cover the costs of decreased revenues and increased costs so they can safely stay open and recruit and retain early educators. If providers need to close temporarily, the stabilization funds provide them with a financial cushion so that they do not need to permanently close. And, nearly every state has opted to use ARP funding for Medicaid home- and community-based services to make investments in the home care workforce, including temporary wage increases, retention bonuses, and additional training and career advancement opportunities.

## Addressing the Climate Crisis and Leading the Clean Energy Future

Transforming our industrial supply base to address climate change means creating jobs, innovation, improving efficiency and resiliency, and building our productive capacity to have a competitive edge in key, rapidly growing markets. For too long, America has underinvested in our industrial base and lacked ambitious action on climate change. We have invented clean energy technologies that have been outsourced for workers in other countries to build and re-export back to us and other countries. This is why the Biden-Harris Administration has made historic commitments to build our manufacturing sector and address climate change. Clean energy equipment and services are among the fastest growing markets globally, and investments today in domestic clean energy and equipment industries will determine what share of that global market we win—which means more good jobs here at home. Specifically, the Biden-Harris Administration has:

- **Strengthened EV supply chains, created new clean energy technologies, and invested in new energy technologies such as clean hydrogen.** The BIL includes more than \$70 billion to transform the U.S. energy sector, including investments such as \$19 billion to support electric grid modernization and reliability; \$21 billion for the demonstration of innovative clean energy technologies and processes; \$2 billion for energy efficiency upgrades; \$7 billion to support supply chain and manufacturing of batteries for EVs; \$1.5 billion for clean hydrogen manufacturing and advancing recycling research and development; and \$8 billion for clean hydrogen hubs to support the production, processing, delivery, storage, and end-use of clean hydrogen. American workers and companies benefit from scaling domestic manufacturing to support the supply chain for clean technology. In addition to the historic BIL investments, as part of building supply chain resilience, DOE is creating a new Manufacturing and Energy Supply Chains Office and launching *America's Strategy to Secure the Supply Chain for a Robust Clean Energy*



*Transition*, a comprehensive plan that includes more than 60 actions for both the Federal government and Congress to take to strengthen and secure energy supply chains needed to modernize the nation’s energy infrastructure and support the clean energy transition.

Extreme weather, driven by climate change, continues to be a source of ongoing disruptions to the U.S. economy. In 2021, extreme weather affected one in three Americans and destabilized international supply chains. Impacts of extreme weather extend to almost every part of our economy, but perhaps most acutely on our energy, transport, and agricultural systems. Agriculture and fisheries are highly vulnerable to severe weather events and climate change, including droughts, floods, severe storms, heat waves, pests and disease, and disruption of harvest patterns. Shortages of water for irrigation in western states especially threaten vegetable, fruit, and dairy production. USDA has acted to secure supply chains from climate change and to incentivize climate-friendly practices in agriculture and agricultural markets. Specifically, the Biden-Harris Administration has:

- **Created markets for climate-smart agricultural products.** In January, USDA launched a \$1 billion investment in partnerships to support America’s climate-smart farmers, ranchers, and forest landowners. The new [Partnerships for Climate-Smart Commodities](#) opportunity will finance pilot projects that create market opportunities for U.S. agricultural and forestry products that use climate-smart practices and include innovative, cost-effective ways to measure and verify greenhouse gas benefits.
- **Expanded equitable access to conservation practices.** USDA has also invested \$50 million in 118 partnerships to expand access to conservation assistance for climate-smart agriculture and forestry. The Equity Conservation Cooperative Agreements, administered by USDA’s Natural Resource Conservation Service, will fund two-year projects to expand the delivery of conservation assistance to farmers who are new to farming, low-income, socially disadvantaged, or military veterans.
- **Improved water management practices.** The USDA is also prioritizing financial and technical assistance for irrigation water supply augmentation and improved management, including on-farm and off-farm water retention ponds and storage/regulating reservoirs supported under the Environmental Quality Incentives Program and the National Resource Conservation Service’s Small Watershed Program, as well as managed aquifer recharge.



# A Deeper Review: Overview of the Six Sectoral Reports

E.O. 14017 directed seven agencies to conduct six industrial base reviews within one year. The reports, developed over the course of the year, are the result of broad stakeholder outreach, interagency consultation, and careful review of data and academic literature. Their findings reinforce the strategy we laid out in June to strengthen supply chain resilience and mitigate future disruptions by focusing on five broad areas of policy: (1) rebuilding domestic production and innovation capabilities; (2) supporting the development of markets that invest in workers, sustainability, and quality; (3) leveraging the Federal government’s role as a purchaser of and investor in critical goods; (4) strengthening international trade rules and trade enforcement mechanisms; and (5) working with allies and partners to decrease vulnerabilities in global supply chains.

## Energy Industrial Base

DOE’s one-year report launches a comprehensive plan – *America’s Strategy to Secure the Supply Chain for a Robust Clean Energy Transition* (Strategy) – for the Energy Sector Industrial Base that can help meet our goals to reduce net greenhouse gas emissions 50-52 percent below 2005 levels by 2030, create a carbon pollution-free power sector by 2035, and achieve net-zero emissions economy-wide by no later than 2050, while creating resilient supply chains and quality clean energy jobs.

This Strategy outlines more than 60 actions for both the Federal government and Congress to take. The strategies DOE will pursue are informed by 13 corresponding deep-dive supply chain assessments – in subjects ranging from solar to semiconductors to clean hydrogen. The risks and vulnerabilities identified in these reports vary by technology. For example, about 75 percent of the silicon solar cells incorporated into modules installed in the United States are made by Chinese subsidiaries located in just three southeast Asian countries: Vietnam, Malaysia, and Thailand. The United States has no operating capacity for making silicon solar cells. There is only one manufacturer of the steel used to produce these transformers in the United States and this company is unable to meet domestic demand with highest quality and comparable prices with imported steel.

The Strategy identifies seven main opportunities for action: (1) increasing raw-material access; (2) expanding domestic manufacturing capabilities; (3) supporting formation of and investing in diverse, secure, and socially responsible foreign supply chains; (4) sending clear demand signals for widespread deployment of clean energy; (5) improving end-of-life energy-related waste management; (6) attracting and supporting a skilled workforce across both manufacturing and deployment in the clean energy transition; and (7) enhancing supply chain knowledge and decision-making.



## Transportation Industrial Base

DOT's freight and logistics supply chain assessment focuses on the longer-term strength and resilience of the American transportation industrial base, which supports all of our nation's commerce through supporting the nation's goods movement chain. The report draws upon the lessons of the Administration's near-term efforts, including the SCDF, new resources made available through the historic BIL, and additional public and private outreach and analysis. It also recognizes the need to mitigate long-standing pollution and economic issues that negatively impact communities of color, and low-income and indigenous communities.

In the past year, a number of trends have emerged that are fundamentally changing the demands on our country's goods movement supply chain. These include growing freight demand overall as durable goods consumption rose [27 percent](#) above pre-pandemic levels. Consumer preferences have also changed, including demand for rapid at-home delivery. In 2020, e-commerce sales increased by more than 30 percent and comprised 14 percent of all retail sales, increasing the number of short-haul and last-mile truck trips and spurring increased demand for warehousing. The need to attract, train, and retain a qualified workforce became apparent across all modes of transportation, as did the importance of adapting to new technologies.

The report divides its recommendations into five areas of actions to support a resilient 21<sup>st</sup> century freight and logistics supply chain for America: (1) investing in freight infrastructure, such as ports, bridges, and railroads, to enhance capacity and connectivity; (2) providing technical assistance to support the planning and coordination of freight investments and operations; (3) improving data and research into supply chain performance; (4) strengthening and streamlining governance to improve efficiency, build the workforce, increase competitiveness, and reduce safety and environmental risks; and (5) partnering with stakeholders across the supply chain, including coordination with both the public and private sectors. The report offers specific recommendations in each of these categories that provide a roadmap for rebuilding a resilient freight and logistics supply chain for the 21<sup>st</sup> century.

## Agricultural Commodities and Food Products

The USDA report assesses the supply chains to produce agricultural commodities and food products. This agri-food supply chain analysis covers an integrated system from "farm to fork," including food production, processing, distribution, and consumption, including the inputs needed at each of these steps. Agriculture, food, and related industries contributed \$1.109 trillion to U.S. GDP in 2019, a 5.2-percent share, and America's farmers and ranchers produce an abundant supply of food to feed our country. However, the impact of even temporary disruptions in food supply chains can affect every American household, due to the need for daily food consumption.

Food and agriculture supply chains face challenges common in other sectors, such as transportation bottlenecks and barriers to employment, but also have some unique vulnerabilities due to the nature of food production, which is seasonal and susceptible to environmental stress. Many products are also highly perishable, so transportation needs are time-sensitive. Climate change and the increased frequency of extreme weather events in the United States pose



significant threats – a frost in Florida can threaten the nation’s supply of citrus fruit given that that state alone accounts for nearly 58 percent of citrus fruit acreage. Food supply chains are also complex, and exist in interconnected networks for inputs, production, and access to markets, while at the same time containing some narrow bottlenecks and heavy consolidation, particularly in processing and distribution, which result in vulnerability. One example is in the meat and poultry processing sector, where a May 2021 cyber-attack on the second largest meat processing firm in the United States forced a three-day closure, amounting to 25 percent of beef and 20 percent of pork processing capacity nationally.

The COVID-19 pandemic exposed vulnerabilities as well as areas of resilience in U.S. agri-food supply chains. In some instances, these chains adapted successfully to changing circumstances, including significant workforce strains and a shift almost overnight from foodservice and restaurant sales toward grocery delivery and “eat at home” consumption. The pandemic also made visible consolidation and concentration in agri-food systems that increase risk for producers and consumers. Addressing these requires near- and long-term strategies that include investment in diversification, along with technical assistance for historically disadvantaged producers, underserved communities, and those seeking to enter markets, while also improving and partnering to strengthen antitrust oversight and enforcement relating to unfair business practices.

To target investments and actions to build resilience where most needed, USDA’s report identifies the following six key vulnerabilities: (1) consolidation and concentration in production, manufacturing, and distribution increase risk for producers and consumers, (2) workforce health and pre-pandemic labor supply challenges facing farms and food industries, (3) impacts of climate change and ecological risks on crops, farm production and resources, (4) animal disease outbreaks that affect supply, (5) the risks posed by the nation’s outdated transportation infrastructure, and (6) trade-related disruptions. Under each vulnerability, the report proposes a series of recommended Federal government actions (some of which are in progress) to infuse stability, improve equity, and diversify the supply chain. The report also details the range of existing USDA supply chain tools that they can and do rely on, often in partnership with other Federal agencies, to support agri-food systems, from production and marketing, to nutrition and data/research.

## **Public Health and Biological Preparedness Industrial Base**

HHS’s supply chain assessment analyzes the public health and biological preparedness industrial base’s vulnerabilities and HHS’s activities to strengthen this critical supply chain, including an update on the progress to date implementing the [National Strategy for a Resilient Public Health Supply Chain](#) (the National Strategy). The assessment addresses personal protective equipment and durable medical equipment, testing and diagnostics, and pharmaceuticals – including therapeutics and APIs – and vaccines. The COVID-19 pandemic demonstrated the national importance of these supply chains for both the nation’s public health and economic well-being.

Factors that contribute to the lack of security in public health supply chains include reliance on foreign sources for components of public health supplies, focus on lowest-cost reducing diversity across the supply chain, workforce shortages, financial barriers to entry and expansion, and lack





of visibility and coordination across the supply chain. These challenges existed prior to the COVID-19 pandemic, but were brought to the fore when the United States faced challenges in procuring enough supply and effective distribution of personal protective equipment early in the pandemic response. U.S. Government investments in key domestic manufacturing capabilities have improved the U.S. posture significantly. Similarly, regarding COVID-19 testing and diagnostics, American innovation, combined with U.S. Government investment, have brought us from a situation where no tests existed for COVID-19 in March 2020, to a projected capacity to produce over 1 billion tests a month starting March 2022.

Recommendations to build long-term resilience, as laid out in the National Strategy, cover nine themes: (1) manufacturing and industrial base investments; (2) stockpiling, allocation, and coordination; (3) innovation; (4) trade policy and Buy American/federal procurement; (5) regulations, policy, and standards; (6) workforce development; (7) global partnerships and standards; (8) governance; and (9) external stakeholder engagement and coordination. Later this year, HHS will issue its first annual report under the National Strategy, which will provide an update on the challenges, developments, and opportunities for the public health supply chain.

## **Information Communications Technology**

DOC and DHS assessed the supply chains of critical sectors and subsectors of the ICT industrial base. From hospitals to small businesses, all facets of the economy are dependent on ICT devices to operate: in 2018, it was estimated that 84 percent of U.S. households owned a smartphone and 78 percent owned a desktop or laptop computer. Yet – as the global semiconductor shortage demonstrates – the U.S. economy is vulnerable to disruptions in this critical supply chain. These vulnerabilities have grown over the past several decades, due to a combination of increased reliance on ICT devices and decreased U.S. share of global electronics manufacturing, from 30 percent to five percent over the past 25 years.

The assessment focuses on communications equipment, data storage, and end-user devices, as well as critical software with direct dependencies on one or more of the enabling hardware including firmware and open-source software. It evaluates current supply chain conditions and identifies key risks that threaten to disrupt these supply chains, including: the increasing concentration of hardware manufacturing overseas, including of critical ICT components and downstream products, such as printed circuit boards, routers, and servers; security risks pertaining to open-source software and firmware; difficulties matching skilled workers to available jobs in both hardware manufacturing and software development; the overreliance on single-source and single-region suppliers; challenges to maintaining product integrity; and exposure to external risks stemming from intellectual property theft, economic dependencies, weak labor standards, and climate concerns.

To develop a resilient ICT industrial base, DOC and DHS issue the following recommendations: (1) revitalize the U.S. ICT manufacturing base; (2) build resilience through secure and transparent supply chains; (3) collaborate with international partners to improve U.S. and ally/partner supply chain resiliency and enhance participation in international standards development; (4) invest in future ICT research and development; (5) strengthen the ICT workforce pipeline; (6) promote enhanced labor and environmental standards; (7) increase



engagement with industry stakeholders; and (8) continue to study the ICT industrial base to monitor industry developments and guide long-term policy planning.

## **Defense Industrial Base**

DOD's supply chain assessment examines how to strengthen the defense industrial base to ensure that our armed forces have reliable access to every machine, vehicle, arsenal, factory, and technology for manufacturing defense materials, and supply the force to defend the nation and deter America's adversaries. The report also outlines the progress made by DOD on strengthening supply chains in critical minerals and materials since the 100-day reviews. The risks of disruption have grown in tandem with the increasing complexity of the U.S. defense supply chains. The average American aerospace company, for example, has roughly 200 Tier 1 suppliers and there can be more than 12,000 companies at the second and third tiers.

Similarly, reliance on single-source and foreign sources presents risks to the U.S. defense industrial base. China's metal casting production is four times that of the United States, which is cited by the Armed Forces as a critical vulnerability. Similarly, vehicle electrification is projected to accelerate dramatically by 2030, but China currently dominates the global advanced battery supply chain—producing 94 percent of lithium hydroxide batteries for example—and is projected to continue to dominate this critical market.

DOD prioritized four supply chains with critical vulnerabilities that pose pressing threats to national security: kinetic capabilities; energy storage and batteries; castings and forgings; and microelectronics. Underpinning the four focus areas are strategic enablers that are required for mission success: workforce, cyber posture, manufacturing capabilities, and small businesses. Making the supply chains that undergird the nation's defense industrial base more resilient will renew America's enduring advantages and revitalize the country's domestic manufacturing to meet the challenges posed by adversaries.

To continue building long-term resilience, DOD recommends focusing efforts on four areas: (1) internal practices, such as better understanding DOD aggregate demand and updating supply chain and sourcing policies; (2) working with the interagency to better coordinate across economic sectors and develop whole-of-government solutions where DOD does not drive demand; (3) international efforts like increasing opportunities for co-development and co-production; and (4) working with industry, including to explore greater standardization of requirements. This report complements DOD's extensive annual report to Congress, the annual Industrial Capabilities Report, which assesses the health of the defense industrial base, and its recent State of Competition within the Defense Industrial Base report.



## Conclusion

For decades, supply chains and the growth of industrial bases have largely been considered the domain of the private sector. But as these supply chains and industrial bases become ever more fragile – whether through old forces like under-investment or newer forces like climate change and cyber-attack – it is now clear that the U.S. government must work to address these threats to our economic resilience and national security. In making supply chains an enduring focus of the government, we can rebuild our manufacturing capacity, reinvest in our critical infrastructure – roads and bridges, but also cybersecurity – develop new leading-edge technologies in partnership with our world-class universities, and build the workforce of the future. In doing so, we can also create fairer conditions for workers around the world, give consumers more choice in terms of the goods that they buy, as well as drive stronger, more-inclusive growth in communities across America.



# Acronyms

|              |  |
|--------------|--|
| COMPETES Act | <i>America Creating Opportunities for Manufacturing, Pre-Eminence in Technology, and Economic Strength Act</i> |
| APIs         | Active pharmaceutical ingredients  |
| ARP          | <i>American Rescue Plan Act</i>  |
| BIL          | Bipartisan Infrastructure Law, also known as <i>Infrastructure Investment and Jobs Act</i>                     |
| CHIPS        | <i>Creating Helpful Incentives for Production of Semiconductors for America Act</i>                            |
| DFC          | U.S. Development Finance Corporation   |
| DHS          | Department of Homeland Security  |
| DOC          | Department of Commerce   |
| DOD          | Department of Defense  |
| DOE          | Department of Energy   |
| DOL          | Department of Labor  |
| DOT          | Department of Transportation   |
| DPA          | Defense Production Act   |
| E.O.         | Executive Order  |
| EPA          | Environmental Protection Agency  |
| EU           | European Union   |
| EVs          | Electric vehicles  |
| GDP          | Gross Domestic Product   |
| HHS          | Department of Health and Human Services  |
| ICT          | Information and communications technology  |
| SCDTF        | Supply Chain Disruptions Task Force  |
| SCRCR        | Supply Chain Resilience and Crisis Response Office   |
| SSBCI        | State Small Business Credit Initiative   |
| TTC          | United States-European Union Trade and Technology Council  |
| USDA         | Department of Agriculture  |
| USICA        | <i>United States Innovation and Competition Act</i>  |
| USMCA        | U.S.-Mexico-Canada Agreement   |

