



Principal to Principal's Global Supply Chain Task Force: Reimagining Global Supply Chains Post-COVID-19

Phase II: Establishing a More Resilient Global Supply Chain for Semiconductors and their Components

Semiconductors, or “chips,” are an indispensable technology supporting nearly every aspect of the global economy and security infrastructure, from smartphones to electric vehicles to satellites. Despite their ubiquity across consumer, government, and defense applications, the bulk of global manufacturing is not in the United States; over 75% of chip fabrication capacity is in East Asia, while the US share has fallen to 12%. Over the next decade, China is projected to bring online 40% of new semiconductor manufacturing.

This did not occur overnight; there are no quick fixes and money alone will not solve this problem. Our national and economic security are at stake. This problem is an urgent one and requires policy solutions and government support.

Over the past three decades the United States has grown increasingly uncompetitive in manufacturing. Our tax system is inconsistent, uncompetitive, and not structured to compete globally. Our regulatory system (environmental, infrastructure approval process) is in many ways overly burdensome and unreasonable without achieving its intended result. Our escalating input/factor costs are not globally competitive, including but not limited to regulations, labor, environmental permitting, skilled workforce, and energy. These factors, combined with comparatively large foreign government incentives and other discriminatory and non-market practices by foreign adversaries, pushed US manufacturing overseas. **Consequently, today the United States relies on a handful of foreign countries (in many cases adversarial nations) to produce critical goods and/or their components.**

The COVID-19 pandemic illuminated the current systemic weaknesses and vulnerabilities in global supply chains. This created a window of opportunity for the United States. With concerted, appropriate **action now**, the United States can improve its competitive advantage and economic security while dramatically improving manufacturing’s sustainability, resiliency, and environmental footprint.

The solutions must not be focused on simply a short-term fix. Most experts agree that while the current semiconductor shortage is likely to abate, it has unveiled national security and economic vulnerabilities that must be addressed for the long-term. Congress and the Administration should

continue to focus on action to strengthen supply chain resiliency, spur innovation, and incentivize more production capacity at home and with allies.

The current conference process to reconcile the Senate’s US Innovation and Competition Act (USICA) and the House’s America Competes Act (COMPETES) is an opportunity to invest in the tools needed to sustain long-term global competitiveness.

The Global Supply Chain Task Force (GSCTF), through its combined experiences and industry stakeholders’ relationships, developed the below recommendations to strengthen current legislation and ensure maximum effectiveness.

These recommendations provide policymakers with a roadmap for a long-term national and economic security strategy to establish a resilient and strong semiconductor industry and ecosystem. Further, these recommendations seek to streamline the many existing and proposed semiconductor initiatives to allow for better coordination and efficiency across Congress and the Administration.

#1 Pass Chips Act Funding and Ensure Projects Meet a “Strategic Benefits” Test

CHIPS Act funding will help to incentivize more semiconductor manufacturing at home, ensure more resilient supply chains, tilt the competitiveness scales in the US’ favor, and level the playing field in terms of government incentives offered to this sector by other countries. GSCTF endorses the appropriation of funding for the CHIPS for America Act and recommends its passage.

GSCTF is encouraged by the inclusion of funding eligibility factors in the 2021 National Defense Authorization Act (NDAA), and the relevant appropriations language in USICA and America Competes and **recommends maintaining** the following:

- A ban on funding to foreign adversaries or foreign entities of concern
- A requirement that funding recipients make investments in training and in local communities
- Require projects have a plan to be self-sustaining

The authorizing legislation also requires Commerce to determine if the application is in the “interest” of the United States. **GSCTF recommends Congress elaborate** further on how Commerce should make this determination since, as written, nearly everything could fall into being in the “interest” of the United States, and yet the funding is finite.

Specifically, Congress should add detail to Section 1002 that directs the Department of Commerce to **develop and apply a “strategic benefits test”** when making decisions about which projects to fund. This type of analytical framework would allow Commerce to prioritize investments in manufacturing capabilities that the United States must have domestically, either as a matter of ensuring global competitiveness and innovation leadership, or because there are use cases where production of some or all a particular type of chip must be done in the US to

ensure security of supply. The test should consider where other allied or partner sources of supply would be sufficient. Ideally, this test would be informed by the mapping exercises and research conducted by the Supply Chain Resiliency Program (see recommendation below).

Suggested language follows:

Section 1002(a)(4): No later than 30 days following enactment of this law the Secretary of Commerce shall develop and publish an analytical framework for assessing eligibility for Chips Act Funding based on whether a proposed project is in the strategic best interests of the United States. The framework shall: (1) be based on objective and transparent data on semiconductor production, capacity, forecasted demand as informed by industry and government sources; and (2) consider factors including: (a) what capabilities are critical to national security and must be under the control solely of the United States; (b) what capabilities the United States could reasonably rely upon allies to provide; and (c) whether provision of the funding may result in technology leakage to foreign adversaries and whether the recipient of the funding has sufficient safeguards in place to prevent that leakage.

GSCTF understands there are proposals under consideration for a disclosure requirement for recipients of CHIPS Act funding with respect to their operations in or dealings with China. Individual members would be happy to discuss their views on this topic.

#2 Strengthen and Fund the Proposed Supply Chain Resiliency Program for Critical Industries

With each passing day, the United States' ability to anticipate, prevent, and mitigate supply chain disruptions and vulnerabilities for critical goods is impeded by the lack of ONE body that can be a single coordination point across all government agencies, a partner with academia and the private sector, a clearinghouse for information, and a data-driven entity that has both national and international focus.

Modern supply chains are highly complex and interact in ways that even industry experts find difficult to predict. The fragmented and siloed approach within the US government to supply chain problems often causes as much harm as good and puts the US at a disadvantage to competitors (China) and allies (Japan) that have evolved a more holistic approach over time.

Current supply chain vulnerabilities include lack of transparency, vast amounts of production located in non-allied nations, and weaknesses in supply and demand signaling. These vulnerabilities are national and economic security threats, costing time, wasting resources, and leading to the unnecessary loss of life.

Supply chains with increased visibility, transparency, modernization, and improved resiliency are imperative for national and economic security. We refer to this as *supply chain illumination*.

Section 2505 of the pending Bipartisan Innovation Act includes a proposal for a *Supply Chain Resiliency Program (SCRP)*. This program would be housed within the Department of Commerce and focus on promoting US leadership and supply chain resiliency in critical industries. The creation of additional bureaucracy is **not** the intended goal; instead, this body would fill a current void that is placing the United States at risk, including in areas of bipartisan focus such as supply chain resiliency for semiconductors and critical minerals. While the Department of Commerce would be the home of the SCRП, its mandate and work would necessarily require extensive collaboration with a range of stakeholders, including other agencies, Congress, the private sector, academia, and the broader scientific community.

The proposed SCRП includes many of the features our Task Force recommended in its [first report](#) documented in Annex 2 and titled *Supply Chain Institute*. While not specific to semiconductors, the semiconductor industry (inclusive of producers and consuming companies) would be one of the key industries of focus in the SCRП. The SCRП should enable support for the semiconductor industry in addressing its own supply chain issues while collaborating with other industries to address chips as an input to downstream products and components.

Our Global Supply Chain Task Force applauds inclusion of a Supply Chain Resiliency Program in both the House and Senate legislation. Key areas for clarifying and strengthening the SCRП include:

1. **Fund Establishment and Operations of the Program**: Congress should not wait to fund this program. An authorization without an appropriation will further delay establishment and operation of this critical entity. While there is a proposal to fund this program with \$500,000,000, the GSCTF is agnostic as to the specific amount of funding, as long the funding amount allows the program to fulfill its mission. Indeed, there may also be existing programs that are obsolete, and the funding could be reappropriated to the SCRП. For greater certainty, this program is separate and distinct from the \$46 billion supply chain fund that includes loan guarantees and other grants.
2. **Include long-term planning and prevention of supply chain shocks as part of the mission**: How to anticipate and plan for the prevention of supply shocks is as important as responding to them. The SCRП mission should be explicitly broadened to include “anticipating and preventing critical industry supply chain shocks” as part of its mission in Section 2505(c).
3. **Enhance Mapping and Monitoring**:
 - a. Clarify in Section 2505(d)(1)(A) that mapping and monitoring of critical supply chains should include a domestic and global assessment of current and forecasted supply and demand trends for critical industries.

- b. Include an end-to-end supply chain mapping exercise that looks at upstream and downstream capacity for critical industries and differentiates that from capability. This type of assessment could then help to inform policy decisions about where government funding or other intervention is necessary to achieve the goals of the SCRP.
 - c. For semiconductors, the assessment should look at each type of chip— analog, logic, memory— and include supply and demand forecasts that cover at least a five-year time horizon.
 - d. NOTE: Industry and relevant industry associations may have the data and similar reports. It is recommended that the government leverage as much of this data as possible to save time and money, but it is also critical that the government corroborate and supplement this with publicly available data, to the extent possible.
- 4. Pursue Technological Solutions:
 - a. Add a provision in Section 2505(d)(1)(A) and (B) that directs Commerce to work with the private sector on technology solutions to supply chain mapping and risk management to allow for cooperation and broader situational awareness.
- 5. Share Information with Allies and Key Partners:
 - a. Add in Section 2505(d) a directive for the US government to work with allies and key partners to share information, as appropriate, on mapping tools, data assessments, and technology solutions to prevent and address future supply shocks.
- 6. Pursue Supply Chain Agreements with Allies and Key Partners:
 - a. Include language in Section 2505(e)(4) calling for the Department of Commerce, in coordination with the US Trade Representative, to prepare a report within 90 days recommending specific areas of focus for supply chain agreements with allies and key partners, as well as potential priority partners and critical industries. At a minimum, supply chain agreements should include:
 - i. Mechanisms to enhance trade facilitation among partners in critical goods to prevent and mitigate future supply chain disruptions;
 - ii. Priority access to supply of critical goods among partners; and,
 - iii. Coordination to combat unfair and illegal practices that undermine efforts to build resilient supply chains.
- 7. Conduct Assessment of Comparative Government Incentives in Critical Industries:
 - a. In Section 2505(e), direct the Department of Commerce to analyze US incentives

in critical industries compared to foreign incentives to understand how and to what extent government incentives have led to or exacerbated supply chain shocks and how government incentives could be used as a prevention and mitigation tool going forward.

- b. Request a report that conducts a stem-to-stern analysis of input costs beginning with the semiconductor industry. It may be necessary for an outside organization to conduct.
8. Formalize Government- Business Relationships:
- a. Include language in Section 2505(e) directing the Department of Commerce to provide information to Congress within 60 days on how it intends to build technical expertise in government, including through establishment of formal government-business relationships.
 - i. An example would be to facilitate and support multi-year exchanges or liaison positions from industry.

#3 Incentivize Semiconductor Hubs in the US and Allied Nations

It is not enough to just incentivize new production capacity to come back to the US and to allies and partners; there must be a broader objective of building the foundation for semiconductor hubs to ensure that new production capacity has the inputs, equipment, and support (chemicals and rare gas suppliers, assembly, testing, packaging) to be successful. With many foundries currently in East Asia, suppliers have built their operations nearby. American foundries will be in a more competitive position if they are not reliant on, for example, supplies being shipped from Japan, built in America, then assembled in China. Therefore, additional incentives will be needed to support key foundry suppliers to set up operations in the United States.

In addition to building the upstream capabilities, long-term investments in the downstream ecosystem of related hardware and components are required to create additional resilience in the ICT supply chain. The GSCTF recommends the following measures be taken to grow and incentivize semiconductor hubs in the United States:

- Passage of the FABS Act: this tax credit incentivizes both production AND design of semiconductors in the United States.
- Expand the scope of entities eligible to receive government incentives to include upstream suppliers for materials and semiconductor manufacturing equipment. This is already included in the America Competes Act in sections 10002(a)(1) and 10002(b)(1). Because the Chips Act funding is limited to \$52,000,000,000, however, the GSCTF recommends that expanded coverage should be supported through funding that is in addition to the Chips Act funding (which is already largely focused on manufacturing and



should not be further diluted).

Additional incentives should be explored to bring both the upstream and downstream ecosystems that support the semiconductor industry (materials suppliers, packaging, testing, assembly, printed circuit boards, other components, LCDs, etc.) to the United States and neighboring/allied countries. This area is ripe for the SCRP to study and make recommendations.

ANNEX I

INVENTORY OF EXISTING AND PROPOSED GOVERNMENT SEMICONDUCTOR INITIATIVES				
Initiative	Existing or Proposed	Vehicle	Objective	Implementer
Supply Chain Resiliency Program	Proposed	Section 2505, Conference Legislation <i>[Note: this is trimmed down from America Competes Version, which also included \$500m in funding]</i>	Promote US leadership, supply chain resiliency in critical industries, respond to critical supply shocks	Department of Commerce
National Advanced Packaging Manufacturing Program	Proposed	Section 9906 of 2021 NDAA	Promote research and collaboration as related to advanced packaging of bleeding edge architectures	Department of Commerce
Microelectronics Research at NIST	Proposed	Section 9906 of 2021 NDAA	Focus on advances to accelerate underlying R&D for metrology of next generation chips	Department of Commerce/NIST
Office of Manufacturing and Innovation Policy	Proposed	Section 2508, Conference Legislation	Rebuild domestic manufacturing and industrial innovation. Support domestic supply chains and	Executive Branch

INVENTORY OF EXISTING AND PROPOSED GOVERNMENT SEMICONDUCTOR INITIATIVES				
			manufacturing of the future	
Facilitating Trade in Essential Supplies	Proposed	Section 72001, Conference Legislation	Examine US trade flows and supply chains for essential supplies, ensure access to essential supplies, work with private sector	USTR
Manufacturing USA Initiative	Authorized; not yet funded	Section 9906 of 2021 NDAA	R&D for automation of chips machinery; advanced packaging, testing capabilities	Department of Commerce/NIST
National Semiconductor Technology Center	Authorized; not yet funded	Section 9906 of 2021 NDAA	Conduct R&D; partner with private sector on prototyping of advanced chips technology	Department of Commerce
Supply Chain Disruptions Task Force	Existing	Executive Order 14017 and White House Supply Chain Announcement (June 8, 2021)	Provide a whole-of-government response to address near-term supply chain challenges to the economic recovery	Departments of Commerce, Transportation and Agriculture
Microelectronics Subcommittee	Existing	Section 9906 of 2021 NDAA	Develop a “National Strategy on Microelectronics Research”	White House Office of Science and Technology Policy (OSTP)

INVENTORY OF EXISTING AND PROPOSED GOVERNMENT SEMICONDUCTOR INITIATIVES				
Supply Chain "Strike" Force	Existing	White House Supply Chain Announcement (June 8, 2021)	Coordinate on actions against countries that are eroding supply chains; identify opportunities to use trade agreements to strengthen supply chain resilience	USTR
Microelectronics Industrial Advisory Committee	Existing	Section 9906 of 2021 NDAA	Industry, academia, federal labs to provide advice on chips to government agencies	Department of Commerce

ANNEX 2

Below is an excerpt from the Principal to Principal’s Global Supply Chain Task Force Report, “Reimagining the Global Supply Chain Post COVID”. This report specifically looked at the supply chains of pharmaceuticals, medical equipment, and PPE.

#2 THE DEPARTMENT OF COMMERCE TO RESEARCH, SUPPORT, AND ESTABLISH A NATIONAL SUPPLY CHAIN INSTITUTE (SCI) WITHIN COORDINATE DIRECTLY WITH THE NPCRC (*other government agencies*) AND INDUSTRY.

The Supply Chain Institute (SCI) would provide research and evaluation of supply chain strategies and support the NPCRC, other appropriate agencies (Department of Health and Human Services, etc.), and the private sector. Its purpose is to increase the visibility of our supply chains (primarily of critical goods), provide background data on supply chains, and sponsor research on techniques needed for developing resilient supply chains to support the public and private sectors. The Department of Commerce has several complimentary agencies from which the SCI could draw, including the Bureau of Industry and Security, Manufacturing Enterprise Partnership, Economic Development Administration, and the Census Bureau. Importantly, the SCI would:

1. Map industry supply chains (domestic and international), beginning with critical goods.
2. Perform current-state supply chain resiliency analysis at the global and national levels.
3. Work with researchers in academia and industry to develop and diffuse methods for selecting and managing suppliers, to include resilience as well as low short- term cost as a criterion.
4. Lead analysis to better understand demand drivers for critical goods and services on the local, state, and federal levels.
5. Coordinate with other entities to identify, recommend, and encourage advanced manufacturing methods that increase the resilience of firms and supply chains (such as continuous/modular manufacturing, digital twins, 3- D printing, AI, etc...).
6. Convene industry and sponsor research on ways to redesign products to take advantage of US capabilities in things like automation and software to encourage re-shoring and/or allied regional diversification where appropriate (currently, products are often designed to take advantage of cost structures overseas e.g., cheap labor, weak environmental laws).