

Supply Chain Innovation: Securing Vital Links in the U.S. Energy System

August 2026 | Claire C. Cody and David M. Hart

The power plants, factories, vehicles, and grid equipment at the core of a modern energy system are assembled from thousands of components and materials.

Recent years have shown how vulnerable the links in those supply chains are to natural disasters, to war and cyber-attack, and to deliberate market manipulation — China's 2025 export controls on rare earth elements being the clearest recent example. One way to look at those vulnerabilities and what is at stake is through *Re-Energizing America's* four policy imperatives: energy security, affordability, economic opportunity, and decarbonization.¹ The United States is less secure, more expensive, and more volatile when we are dependent on supply chains controlled by foreign adversaries.

Stockpiles, domestic substitution, trade barriers, and alliances are conventional responses to these risks. **Technological innovation is a compelling complementary strategy.** New technologies can expand and diversify resource supplies, reduce the use of vulnerable inputs, substitute abundant materials for scarce ones, recover value from waste streams through recycling, and apply artificial intelligence to discovery, production, and product design.

The challenges are distinctive and stubborn. Supply chain relationships are socially embedded — built on repeated, large-scale transactions among parties who know one another and are slow to switch inputs. The many actors along a chain are interdependent, so an innovation at one link often requires costly adjustments at others. Innovative entrants face high upfront costs and risk against incumbents with scale, infrastructure, and experience. And information gaps are pervasive: a recent review found that the U.S. Department of War (DOW) had country-of-origin data on fewer than 10 percent of suppliers for the 40,000 parts in an F-35.²

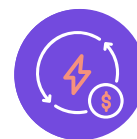
Federal supply chain policy has grown since the COVID-19 pandemic but remains fragmented, inconsistent, and insufficiently focused on innovation. The U.S. Departments of Commerce (Commerce), Energy (DOE) and War (DOW) have been developing supply chain strategies and roadmaps for critical minerals and materials. Use-inspired research is emerging at DOE's Office of Science, the



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¹ Clean Tomorrow, "Re-Energizing America: Reclaiming American Leadership in Energy Innovation," November 2025. <https://cleantomorrow.org/wp-content/uploads/2025/11/Re-Energizing-America-Report-Clean-Tomorrow.pdf>

² U.S. Government Accountability Office, "Defense Industrial Base: Actions Needed to Address Risks Posed by Dependence on Foreign Suppliers," GAO-25-107283, July 2025. <https://files.gao.gov/reports/GAO-25-107283/index.html>

National Science Foundation (NSF), and the U.S. Geological Survey (USGS), while DOE's applied offices, the Critical Materials Innovation Hub, and Manufacturing USA institutes carry innovations to the next stage. Larger sums sit downstream — nearly \$1 billion announced in August 2025 for rare earth recovery and critical materials demonstrations, and \$17.5 billion from the Office of Energy Dominance Financing to coordinate long lead-time nuclear reactor component purchases — alongside 45X tax credits, Defense Production Act authorities, and new procurement models. At the same time, roughly \$718 million in manufacturing and supply chain awards has been canceled, and the office administering them has never been authorized by Congress.



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To accelerate innovation across all stages of supply chains, Congress and the Administration should adopt five broad strategies:



1 Strengthen federal supply chain analytical and strategy development capabilities and center innovation in federal strategies.



2 Provide tax incentives to enable early commercial-scale producers of emerging supply chain technologies.



3 Emphasize federal investment in supply chain-oriented, use-inspired, applied RD&D.



4 Empower early adopters of supply chain innovations with demand-side incentives.



5 Collaborate with allies and partners to foster knowledge exchange and build market scale.

Taken together, these steps would knit together fragmented federal efforts and place innovation at the center of U.S. supply chain policy, unlocking new opportunities for an energy sector built on more resilient supply chains in an increasingly volatile world.