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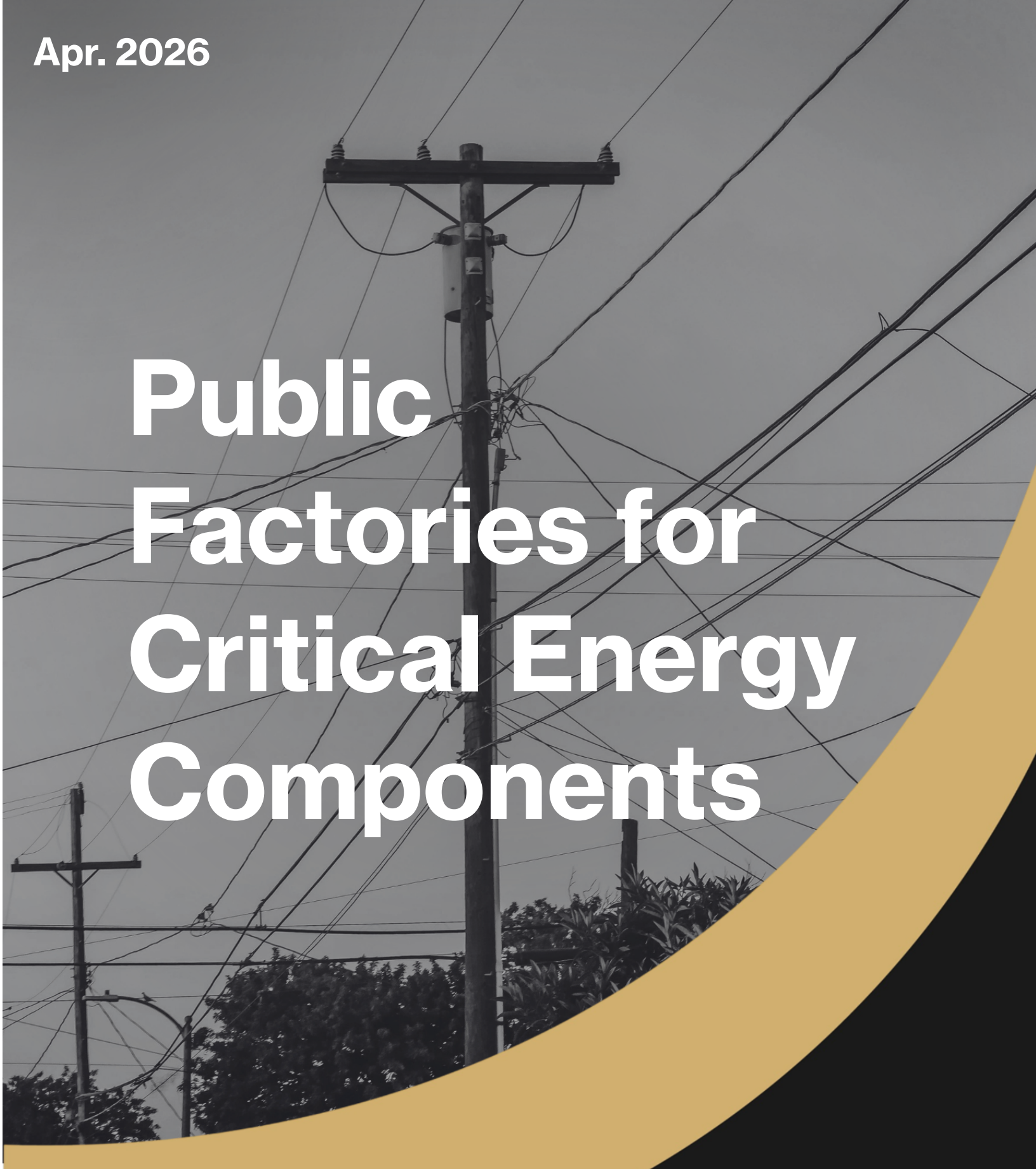
Public Factories for Critical Energy Components



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Introduction

The American electricity system is facing a series of significant challenges. Electricity prices have surged due to grid upgrades, natural disasters, structural increases in demand, and weak regulation, driving up household utility bills.[1] Batteries and renewable sources offer clean and, increasingly, low-cost generation options, but China dominates many of these supply chains.[2] Meanwhile, chronic shortages of transformers are imposing bottlenecks on expanding the grid and completing development projects.[3]

Addressing these challenges will require the United States to rapidly secure and increase its domestic supply of critical energy components, particularly next-generation batteries for energy storage and electrical transformers for distribution. To do that, the U.S. should consider reviving a venerable but largely forgotten policy tool: public manufacturing. As Ganesh Sitaraman and I explore at length in a new paper, policymakers have deployed government-owned production facilities throughout American history to provide or expand critical supplies of important goods.[4] All levels of government have regularly turned to public factories to produce important goods across defense, steel, agriculture, healthcare, and other sectors. Since the American Revolution, public factories have been used to mobilize for emergencies, secure supply abundance, counter monopoly power, promote innovation, and advance economic development. These public factories can be (and indeed, have been) government-owned and government-operated ("GOGO" factories) or leased out for operation by

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[1] *See* Robinson Meyer, *How Electricity Got So Expensive*, HEATMAP (Aug. 20, 2025), https://heatmap.news/energy/why-is-electricity-so-expensive; *see also* Nick Bowlin, *Power Brokers: What's really behind your soaring utility bills*, HARPER'S MAG. (Jan. 2026), https://harpers.org/archive/2026/01/power-brokers-nick-bowlin-utility-bills/.

[2] *Clean energy supply chains vulnerabilities*, INT'L ENERGY AGENCY (2023). https://www.iea.org/reports/energy-technology-perspectives-2023/clean-energy-supply-chains-vulnerabilities.

[3] Ashkat Rathi, Naureen Malik, & Tiffany Tsoi, *The Device Throttling the World's Electrified Future*, BLOOMBERG (Mar. 25, 2025), https://www.bloomberg.com/features/2025-bottlenecks-transformers/?embedded-checkout=true.

[4] *See* Joel Dodge & Ganesh Sitaraman, *Public Factories*, VAND. POL'Y ACCELERATOR (Apr. 2026), https://cdn.vanderbilt.edu/vu-URL/wp-content/uploads/sites/412/2026/04/15143308/Public-Factories.pdf.

private manufacturers as contractors (government-owned, contractor-operated "GOCO" factories).[5]

Public factories could once again be an effective industrial policy tool to increase the domestic supply of batteries, transformers, and other critical energy components.[6] Batteries and transformers both currently have acute supply-chain vulnerabilities. Each has grown increasingly central to the American energy system and broader economy. Yet both entail risky dependencies and production constraints, including China's control of battery supply chains, monopolized production for essential transformer inputs, and risk-averse private manufacturers for transformers themselves.

This paper proposes creating public factories to expand production of these critical energy components. Public factories that develop and mass produce next-generation energy storage technologies such as solid-state batteries could help the United States protect its energy security while outcompeting China for control of a cutting-edge strategic technology. Meanwhile, public factories for critical energy components could help update and expand the grid by alleviating the bottleneck for electrical transformers caused by monopolization and producer reluctance to expand capacity. The paper explores key design decisions for these public factories and then assesses pathways for action across all levels of government. It concludes by discussing the prospect of the United States using public factories for critical energy components to reprise its past role as a global arsenal for the mass production needed to meet strategic challenges.

I. Critical Energy Supply Chain Vulnerabilities

The United States has supply chain vulnerabilities for critical energy components, including batteries and transformers. As discussed in detail below, the sources of these vulnerabilities can be traced to China's control of critical supply chains, producer risk aversion, and monopolized production of key inputs.

[5] For a discussion of the benefits and drawbacks of each approach, see *id*. at Section II.B.1.

[6] For instance, public factories could produce solar panels to reduce U.S. dependence on China for that energy infrastructure. Beyond transformers, other grid components, such as cables and switchgear, have experienced shortages and could benefit from public production.

A. Batteries

Batteries are increasingly important energy resources. They are necessary inputs for several strategic and defense-related technologies, including electric vehicles, drones, robotics, computers, data centers, medical devices, and the electrical grid.[7] For instance, data centers powering artificial intelligence development rely on batteries as intermediary backup power sources to minimize power outages and disruptions that can corrupt AI models.[8] Batteries are also essential to modern weaponry, including lasers, hand-held radios, night-vision goggles, satellites, and drones, with the average Army rifleman carrying as much as twenty-five pounds of batteries to power the technology needed for a 72-hour patrol.[9] Batteries are increasingly critical to the electrical grid, with 28 percent of new U.S. electricity generating capacity this year coming from utility-scale batteries—double the amount from wind, and four times the amount from natural gas.[10] Battery storage "generates" energy through load-shifting by storing energy during times of overproduction (such as during peak sun hours) and releasing it during periods of underproduction (such as the nighttime).[11] As analysts at the International Energy Agency put it, "batteries are evolving into a foundational component of modern economies."[12]

China dominates production of today's conventional lithium-ion batteries.[13] In 2001, recognizing that it was unlikely to successfully compete with the United States and

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[7] *See* MICHAEL ALAN HAVLIN, CONG. RSCH. SERV., R48538, ADVANCED LITHIUM-ION ENERGY STORAGE BATTERY MANUFACTURING IN THE UNITED STATES 2 (Nov. 26, 2025), https://www.congress.gov/crs-product/R48538; *see also* Breaking It Down: Next-Generation Batteries, U.S. DEP'T OF ENERGY, https://www.energy.gov/eere/ammto/breaking-it-down-next-generation-batteries (last visited Apr. 8, 2026).

[8] Hiroko Tabuchi & Brad Plumer et al., *The Pentagon and A.I. Giants Have a Weakness. Both Need China's Batteries, Badly.*, N.Y. TIMES (Dec. 24, 2025), https://www.nytimes.com/2025/12/23/climate/pentagon-weapons-ai-artificial-intelligence-china-batteries.html.

[9] Id.; *see also* David Vergun, *Army researchers hope to lighten Soldiers' battery load*, U.S. ARMY (Sept. 5, 2018), https://www.army.mil/article/210673/army_researchers_hope_to_lighten_soldiers_battery_load.

[10] *New U.S. electric generating capacity expected to reach a record high in 2026*, U.S. ENERGY INFO. ADMIN. (Feb. 20, 2026), https://www.eia.gov/todayinenergy/detail.php?id=67205.

[11] *See Batteries are a fast-growing secondary electricity source for the grid*, U.S. ENERGY INFO. ADMIN. (Sept. 5, 2024), https://www.eia.gov/todayinenergy/detail.php?id=63025.

[12] Teo Lombardo et al., *Global battery markets are growing strongly – and so are the supply risks*, INT'L ENERGY AGENCY (Feb. 13, 2026), https://www.iea.org/commentaries/global-battery-markets-are-growing-strongly-and-so-are-the-supply-risks.

[13] HAVLIN, *supra* note 7, at 3.

Japan in the market for internal combustion engine vehicles, China began making strategic long-term investments to develop a domestic industry for electric vehicles and their subcomponents, including batteries.[14] After twenty-five years of cultivating a full-scale EV supply chain through upstream and downstream industrial policy, China now produces 85 percent of all global active materials for cathodes (the positive end of a battery) and 90 percent of active materials for anodes (the negative end), particularly graphite.[15] All told, China now controls 70 to 90 percent of the lithium-ion battery supply chain.[16]

The United States has sought to reshore domestic battery production through laws like the Infrastructure Investment and Jobs Act of 2021 and the Inflation Reduction Act of 2022.[17] That effort has seen significant success, as the United States now produces enough grid batteries to meet its own demand.[18] However, even when finished lithium-ion batteries are produced in the United States, manufacturers are still relying on essential minerals and active materials imported from China.[19] Virtually all utility-scale batteries rely on components sourced from China, as do 70 percent of non-Chinese electric vehicles.[20] The U.S. military's weapons programs rely on 6,000 battery components sourced from China.[21] This creates another national and economic security vulnerability like those seen in similarly Chinese-dominated markets for rare earth minerals and active pharmaceutical ingredients.[22] Indeed, in October 2025, in response to trade tensions with the United States, China threatened to exploit this

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[14] Zeyi Yang, *How did China come to dominate the world of electric cars?*, MIT TECH. REV. (Feb. 21, 2023), https://www.technologyreview.com/2023/02/21/1068880/how-did-china-dominate-electric-cars-policy/.

[15] INT'L ENERGY AGENCY, GLOBAL EV OUTLOOK 2024 146 (2024), https://iea.blob.core.windows.net/assets/a9e3544b-0b12-4e15-b407-65f5c8ce1b5f/GlobalEVOutlook2024.pdf.

[16] HAVLIN, *supra* note 7, at 3.

[17] *Id.* at 1.

[18] Julian Spector, *Suddenly, the US manufactures a ton of grid batteries*, CANARY MEDIA (Mar. 23, 2026), https://www.canarymedia.com/articles/clean-energy-manufacturing/us-capacity-storage-cell-factories.

[19] Lombardo et al., *supra* note 12.

[20] *Id.*

[21] Tabuchi & Plumber et al., *supra* note 8.

[22] Keith Bradsher, *Inside China's Six-Decade Campaign to Dominate Rare Earths*, N.Y. TIMES (Dec. 31, 2025), https://www.nytimes.com/2025/12/31/business/china-rare-earths-history.html; *China's Pharma Leverage Is 'Nuclear Option' in US Trade Talks*, BLOOMBERG (Oct. 24, 2025), https://www.bloomberg.com/news/articles/2025-10-24/china-s-pharma-leverage-is-nuclear-option-in-us-trade-talks.

vulnerability by imposing export controls on lithium-ion batteries and their subcomponents.[23]

U.S. battery policy has focused on increasing domestic production of mature lithium-ion technology to reduce dependence on Chinese productions, and on investing in longer-horizon innovation at research institutions and universities. In between these two poles, however, is a "missing middle" of support for scaling up near-term next-generation battery technology.[24] Next-generation battery technologies—such as solid-state batteries, called the "holy grail" of batteries, and sodium-ion batteries, which Chinese companies have started producing—provide key performance improvements and strategic advantages, such as longer charge duration and better safety.[25] While lithium-ion batteries generally only provide a few hours of charge time, next-generation batteries can last significantly longer: an American start-up company developing iron-air battery technology recently signed a deal to power a Google data center using the "largest battery in the world" that can provide 100 hours of continuous power.[26] Next-generation batteries are also less flammable and less prone to damage from leakage or heat.[27] Deployment of next-generation batteries would also eliminate dependence on Chinese-controlled graphite.[28] Despite these benefits, less than 1 percent of federal

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[23] Lili Pike, Coco Liu, & Tope Alake, *China's New Weapon in US Trade Talks: Batteries*, BLOOMBERG (Oct. 11, 2025), https://www.bloomberg.com/news/articles/2025-10-11/us-china-trade-talks-battery-export-controls-provide-new-leverage.

[24] Varun Sivaram, Noah Gordon & Daniel Helmeci, *Winning the Battery Race: How the United States Can Leapfrog China to Dominate Next-Generation Battery Technologies*, CARNEGIE ENDOW. FOR INT'L PEACE (Oct. 21, 2024), https://carnegieendowment.org/research/2024/10/winning-the-battery-race-how-the-united-states-can-leapfrog-china-to-dominate-next-generation-battery-technologies.

[25] Breaking it Down, *supra* note 7; You Xiaoying, *In China, battery makers bet big on sodium in move away from critical minerals*, REUTERS (Mar. 16, 2026), https://www.reuters.com/sustainability/climate-energy/china-battery-makers-bet-big-sodium-move-away-critical-minerals--ecmii-2026-03-16/; Leah Burrows, *Solid state battery design charges in minutes, lasts for thousands of cycles*, HARVARD OFFICE OF TECH. DEV. (Jan. 15, 2024), https://otd.harvard.edu/news/solid-state-battery-design-charges-in-minutes-lasts-for-thousands-of-cycles.

[26] Katie Brigham, *Inside Form Energy's Big Google Data Center Deal*, HEATMAP (Feb. 24, 2026), https://heatmap.news/climate-tech/form-energy-google-deal.

[27] Breaking it Down, *supra* note 7. The flammability of lithium-ion batteries creates supply-chain risks, as these batteries have caused destructive fires aboard shipping carriers. *See* Alice Hancock & Kana Inagaki, *Lithium-ion battery blazes imperil fragile supply chains, warns Los Angeles port chief*, FIN. TIMES (Mar. 15, 2026), https://www.ft.com/content/50dc8767-0d37-4a92-b83b-ba76bd0da09c?syn-25a6b1a6=1.

[28] Sivaram, Gordon, & Helmeci, *supra* note 24.

battery funding in the United States has gone toward next-generation solid-state batteries.[29]

The U.S. has a technological lead due to its research and development investments, but China is racing to beat the U.S. to mass commercialization of next-generation batteries.[30] In 2024, China invested more than $800 million for research and development into next generation solid-state batteries through a consortium of six of the country's leading battery and electric-vehicle companies.[31] Indeed, Chinese automakers are beginning to test solid-state batteries in their vehicles.[32] The U.S. has made no comparable investment, with commentators warning that it is "squandering its best opportunity to compete in the global battery race."[33]

B. Transformers

The U.S. has also experienced severe shortages of grid equipment needed to transmit electricity. Electrical transformers, which increase electricity voltage for efficient transmission from generation and decrease it for safe use in homes, businesses, and factories, have faced shortages for years, causing order wait times to spike from 50 weeks in 2021 to upwards of 120 weeks today.[34] Large power transformers—which connect large generation stations to high-voltage transmission—have faced the worst shortages, and now have a lead time of two to three years for new orders.[35] These transformers are expensive to produce, difficult to transport, and highly customized,

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[29] *Id.*

[30] *Id.*

[31] *After Chips, China to Pour Millions Into Solid-State Batteries*, ASIA FIN. (May 30, 2024), https://www.asiafinancial.com/after-chips-china-to-pour-millions-into-solid-state-batteries.

[32] Peter Johnson, *A solid-state EV battery that can achieve 800 miles of driving range — It's becoming a reality,* ELECTREK (Mar. 18, 2026), https://electrek.co/2026/03/18/solid-state-ev-batteries-with-800-miles-range-become-reality/.

[33] Varun Sivaram & Noah Gordon, *How the United States Can Win the Battery Race*, FOREIGN POL'Y (Oct. 21, 2024), https://foreignpolicy.com/2024/10/21/us-china-competition-battery-production-ev-minerals-solid-state/.

[34] Sagar Chopra & Benjamin Boucher, *Supply shortages and an inflexible market give rise to high power transformer lead times*, WOOD MACKENZIE (Apr. 2, 2024), https://www.woodmac.com/news/opinion/supply-shortages-and-an-inflexible-market-give-rise-to-high-power-transformer-lead-times/.

[35] WOOD MACKENZIE, MAKING THE CONNECTION: MEETING THE ELECTRIC T&D SUPPLY CHAIN CHALLENGE 2 (Sept. 2025), https://www.woodmac.com/products/supply-chain-analytics/multi-client-study-meeting-electric-td-industry-challenges/.

with many utilities require bespoke transformer designs that necessitate highly individualized and specific manufacturing processes.[36] Transformer prices have increased by more than 80 percent since 2020.[37]

Transformer shortages are the result of a combination of demand-side and supply-side causes. Demand for transformers has increased due to several factors, including the need to replace existing transformers that have reached the end of their lifespan or have been damaged by extreme weather; surging electricity demand from data centers, electric vehicles, and home electrification; and the addition of new generation sources to the grid.[38] However, supply has not kept up with demand. Transformer producers have been reluctant to significantly scale up production because transformers are historically a cyclical industry correlated with the housing market. Many increased their capacity during the housing boom in the early 2000s and were significantly harmed by the ensuing market crash and financial crisis.[39] Producers have planned some modest capacity expansions, but these are not expected to be sufficient to balance the market.[40] Market analysts project an ongoing 30 percent shortfall for power transformers.[41]

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[36] U.S. DEP'T OF ENERGY, LARGE POWER TRANSFORMER RESILIENCE: REPORT TO CONGRESS 12 (July 2024), https://www.energy.gov/sites/default/files/2024-10/EXEC-2022-001242%20-%20Large%20Power%20Transformer%20Resilience%20Report%20signed%20by%20Secretary%20Granholm%20on%207-10-24.pdf; NAT'L INFRASTRUCTURE ADVISORY COUNCIL, ADDRESSING THE CRITICAL SHORTAGE OF POWER TRANSFORMERS TO ENSURE RELIABILITY OF THE U.S. GRID 13 (Jun. 2024), https://www.cisa.gov/sites/default/files/2024-09/NIAC_Addressing%20the%20Critical%20Shortage%20of%20Power%20Transformers%20to%20Ensure%20Reliability%20of%20the%20U.S.%20Grid_Report_06112024_508c_pdf_0.pdf (hereinafter "NIAC REPORT"). Recognizing standardization constraints in transformer production, in 2024, the Department of Energy invested $18 million to promote more flexible transformer designs. Office of Electricity, ***Updated** U.S. Department of Energy Announces $18 Million for Flexible, Innovative Transformers*, U.S. DEPT. OF ENERGY (Mar. 24, 2025), https://www.energy.gov/oe/articles/updated-us-department-energy-announces-18-million-flexible-innovative-transformers.

[37] NIAC REPORT at 3-4.

[38] Office of Electricity, *DOE and Industry Team Up to Keep the Lights On for America*, U.S. DEP'T OF ENERGY (Feb. 22, 2024), https://www.energy.gov/oe/articles/doe-and-industry-team-keep-lights-america.

[39] NIAC REPORT at 5, 12-13; *see also* Rathi, Malik, & Tsoi, *supra* note 3.

[40] Press Release, Wood Mackenzie, Power transformers and distribution transformers will face supply deficits of 30% and 10% in 2025, (Aug. 14, 2025), http://woodmac.com/press-releases/power-transformers-and-distribution-transformers-will-face-supply-deficits-of-30-and-10-in-2025/.

[41] Devin Thomas & Benjamin Boucher et al., *Transformer troubles: manufacturing and policy constraints hit US transformer supply*, WOOD MACKENZIE (Aug. 13, 2025),

Transformer supply has also been constrained by input bottlenecks. The key material used to produce transformers is grain-oriented electrical steel (GOES). There is only one domestic producer of GOES: the steelmaker Cleveland Cliffs produces GOES among many steel products, but does not produce it at sufficient volumes to meet transformer-related demand from domestic manufacturers.[42] Broader steel industry dynamics—such as global steel oversupply, tariffs on inputs, and economic cyclicality—make it unlikely that Cleveland Cliffs will expand GOES production capacity in the near future.[43] Two other firms—ATI and U.S. Steel (in which the United States government now holds a golden share)—have capacity to produce GOES but currently do not; ATI shut down its production line in 2016 due to unprofitability.[44] Steel companies have instead focused on producing a different type of electrical steel for the more-profitable auto market.[45] Moreover, the same boom-and-bust cycles that deter capacity-expansion investment for transformers themselves also deter new investment and new market entrants for inputs like GOES.[46]

This has left transformer producers dependent on importing 80 percent of their electrical steel (primarily from Mexico, Canada, South Korea, and China), which puts them at risk of global trade disruptions.[47] The Trump administration has also imposed tariffs on foreign steel imports, further increasing costs and limiting supply.[48]

Transformer production lags have created bottlenecks across the economy. They have caused delays and increased costs for new housing construction and infrastructure

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https://www.woodmac.com/news/opinion/transformer-troubles-manufacturing-and-policy-constraints-hit-us-transformer-supply/.

[42] Megan Husted & Alice Wu, *The Little Monopoly Holding Back the Clean Energy Transition*, Nat'l Interest (Oct. 14, 2025), https://nationalinterest.org/blog/energy-world/the-little-monopoly-holding-back-the-clean-energy-transition.

[43] *Id.*

[44] U.S. Dep't of Energy, *supra* note 36, at 15.

[45] *Id.* at 14-16.

[46] Husted & Wu, *supra* note 42.

[47] *Id.*; *see also* Husted & Wu, *supra* note 42.

[48] Press Release, White House, *Fact Sheet: President Donald J. Trump Increases Section 232 Tariffs on Steel and Aluminum*, (June 3, 2025), https://www.whitehouse.gov/fact-sheets/2025/06/fact-sheet-president-donald-j-trump-increases-section-232-tariffs-on-steel-and-aluminum/.

projects.[49] They have also hindered renewable energy projects[50] and slowed disaster recovery efforts: industrial sites in Eastern Tennessee hit by Hurricane Helene in 2024 took seven months to fully restore power.[51]

New technologies on the horizon have long-term potential to help alleviate the transformer shortage. To replace GOES, amorphous steel technology can make transformers more efficient, but that variety is only produced in small volumes by a single domestic producer.[52] Solid-state transformers also promote standardization, energy efficiency, and "smart grid" communication.[53] Both technologies, however, are just reaching commercial viability.

II. Recommendations: Strengthening Energy Supply Chains with Public Factories

To address supply chain vulnerabilities for critical energy components, the United States could create public factories for batteries and transformers. Public factories could help move the market for each, increasing the speed and scale of production relative to what the market can currently provide.[54] This in turn would strengthen the country's strategic resilience, boost its competitiveness and economic security, promote energy abundance, and improve affordability.

There is a long American tradition of creating public factories, particularly to ramp up production of critical goods beyond what the private sector is willing or able to generate.[55] For example, in the 1940s, the federal government built and owned nearly

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[49] *See NAHB and Other Groups Seek $1.2 Billion to Boost Transformer Production*, NAT'L ASSOC. HOMEBUILDERS (Jan. 5, 2024), https://www.nahb.org/blog/2024/01/boosting-transformer-production; *see also* Rathi, Malik, & Tsoi, *supra* note 3.

[50] Nicole Jao, *U.S. renewable, grid battery projects battle transformer shortage*, REUTERS (Nov. 15, 2023), https://www.reuters.com/business/energy/us-renewable-grid-battery-projects-battle-transformer-shortage-2023-11-15/.

[51] Rathi, Malik, & Tsoi, *supra* note 3.

[52] Husted & Wu, *supra* note 42.

[53] Katie Brigham, *Funding Friday: Transforming the Game*, HEATMAP (Feb. 20, 2026), https://heatmap.news/climate-tech/heron-power-transformers.

[54] Dodge & Sitaraman, *supra* note 4, at 60-61.

[55] For a detailed discussion of this history, see *id.* at Section I.

two-thirds of all new factories constructed for the World War II mobilization effort, constructing 2,300 plants and coming to own more than 10 percent of the country's total industrial stock.[56] By 1945, the federal government had become the country's leading manufacturer in aircraft, shipbuilding, synthetic rubber, and aluminum.[57]

In 1949, President Truman contemplated creating government-owned steel mills to expand the country's steel capacity based on his belief that steelmakers were refusing to sufficiently increase production to meet consumer demands for post-war abundance.[58] Truman called for Congress to authorize public steel mills in his "Fair Deal" State of the Union address, and Congress quickly developed legislation to do just that, but the steel issue dissipated when the economy fell into recession shortly thereafter.[59]

Today, the United States could create one or more public factories for next-generation battery production. This would help achieve rapid scale in this emerging sector to beat China to a strategic technology and give the United States a domestic production base of batteries. Just as China leapfrogged the U.S. to current-generation battery technology earlier this century, a warp-speed mobilization backed by public factories could help the U.S. leapfrog China to the next generation.[60] Because a small number of American companies are already working on developing and manufacturing next-generation batteries,[61] leasing a government-owned, contractor-operated factory could offer them a low-risk pathway to leveraging and turbocharging existing work toward expanding commercial production of these technologies. While this could be a single "gigafactory" with separate production lines—and potentially separate contractor operators—for batteries for drones, vehicles, utilities, and other customers, it could

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[56] *See* Gerald T. White, *Financing Industrial Expansion for War: The Origin of the Defense Plant Corporation Leases*, 9 J. ECON. HIST. 156, 158 (1949); *see also* JAMES STUART OLSON, SAVING CAPITALISM: THE RECONSTRUCTION FINANCE CORPORATION AND THE NEW DEAL, 1933-1940 219 (1988).

[57] MARK R. WILSON, DESTRUCTIVE CREATION: AMERICAN BUSINESS AND THE WINNING OF WORLD WAR II 68 (2016).

[58] Dodge & Sitaraman, *supra* note 4, at 24-27.

[59] Harry S. Truman, *Annual Message to Congress on the State of the Union,* AM. PRESIDENCY PROJ. (Jan. 5, 1949), https://www.presidency.ucsb.edu/documents/annual-message-the-congress-the-state-the-union-21; *see also* Dodge & Sitaraman, *supra* note 4, at 27.

[60] *See* Bentley Allan, Milo McBride & Noah Gordon et al., *How the U.S. Can Stop Losing the Race for Clean Energy*, CARNEGIE ENDOW. FOR INT'L PEACE (Feb. 26, 2025), https://carnegieendowment.org/research/2025/02/how-the-us-can-stop-losing-the-race-for-clean-energy?lang=en.

[61] *See* Sivaram, Gordon & Helmeci, *supra* note 24.

also take the form of multiple smaller individual factories with individual customizations.

While other industrial policy tools could help the United States expand production of next-generation batteries, public factories are a uniquely powerful tool to achieve a *rapid* and *dominant* position in scaling this technology. Subsidies have proven effective at reshoring incumbent battery technology manufacturing in the United States, but have not been able to dislodge Chinese supply-chain dominance over the underlying inputs. Absent exceptionally strong and urgent demand signals, subsidies alone may not "crowd in" private investment to mass produce next-generation batteries at the rate and pace needed to both rapidly decarbonize and beat China to scaling these new technologies. Historically, public factories have been particularly useful tools when time-sensitive production is needed to win a "race": they were crucial to rapid World War II industrial mobilization, and were even authorized by Congress in 2021 in the race to develop and mass produce a COVID-19 vaccine.[62]

Public factories can also be supercharged de-risking tools.[63] Where private investment may be hampered by concerns about expensive capital costs and uncertain offtake, public factories can overcome these barriers to allow critical manufacturers to rapidly increase production. Leasing public factories may also entail less friction for manufacturers than relying on de-risking subsidization schemes that require them to raise and front capital for production expansions.[64] By leasing a GOCO factory, a company can offload all of its capital investment risk. Public factories can thus serve as incubator labs for innovative small firms, and can provide pilot testing lines for battery producers to validate and optimize new technologies.[65]

The United States could also create public factories to help increase the supply of transformers. These factories could focus on producing large power transformers,

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[62] *See* American Rescue Plan Act of 2021, Pub. L. No. 117-2, § 3101(b)(1), 135 Stat. 4, 54 (2021); *see also* Dodge & Sitaraman, *supra* note 4, at 38-39.

[63] When the government is subsidizing nearly all of the capital cost of a new battery plant, it has a strong claim to ownership rights based on principles of dessert, taxpayer protection, and public asset preservation. As the architect of the World War II public factories program put it, "[I]f the Government put up the money, it should own the plants." JOHN A. SALMOND, THE CONSCIENCE OF A LAWYER: CLIFFORD J. DURR AND AMERICAN CIVIL LIBERTIES, 1899-1975 62-63 (1990).

[64] *See* Dodge & Sitaraman, *supra* note 4, at 19 (discussing how during World War II companies preferred leasing public factories to relying on subsidy reimbursement).

[65] *See id.* at Section II.A.2.

which are experiencing the worst shortages. The government could work with utilities to identify a common set of transformer designs they could use for new distribution lines in order to promote greater standardization. Public factories could overcome cyclicality concerns that hold back private sector investment and could thereby narrow the gap between expected demand and planned productive capacity. Such public factories can be supply-side interventions to alleviate scarcity and promote abundance—both of transformers themselves, and of the numerous other goods and projects bottlenecked by their current supply constraints.[66]

Public factories have also historically been effective means of promoting innovation. For example, to generate under-provided innovation, policymakers have used public factories for products like synthetic rubber, novel vaccines, and experimental fertilizers.[67] Accordingly, some of these factories could help steer the grid toward advanced amorphous steel-based transformers and solid-state transformers, and could promote long-term component standardization to better enable mass production and seamless installation.[68]

Public factories also promote antimonopoly values by providing a public option alternative to production that is currently subject to industrial concentration.[69] For example, beyond producing completed transformers, public factories could also produce the core electrical steel used in transformers to expand domestic capacity and curb monopoly power in the U.S. market. These steel factories could be GOCOs if either existing potential competitor firms or new startup firms agreed to enter the GOES market. Otherwise, they could be operated directly by the government.

Public factories for critical energy components would be a long-term public investment. These factories require substantial initial capital expenditures: new battery plants can cost private firms between $4 billion to over $10 billion,[70] and transformer

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[66] *See id.* at Section II.A.2.

[67] *See id.* at Section II.A.2.

[68] U.S. DEP'T OF ENERGY, *supra* note 36, at 13, 19-20.

[69] *See* Dodge & Sitaraman, *supra* note 4, at Section II.A.3.

[70] *See* Felecia Stratton, *Panasonic's $4 Billion Battery Factory Set to Transform U.S. EV Supply Chain*, INBOUND LOGISTICS (Aug. 2025), https://www.inboundlogistics.com/articles/panasonics-4-billion-battery-factory-set-to-transform-u-s-ev-supply-chain; Hannah Schoenbaum, *Toyota more than doubles investment and job creation at North Carolina battery plant*, ASSOC. PRESS (Oct. 31, 2023), https://apnews.com/article/toyota-electric-vehicle-battery-north-carolina-e7e632750bbca5a0b244021c1213aa66.

plants cost around $450 million.[71] This level of upfront investment deters the private sector from voluntarily initiating capacity expansions in these sectors. However, these estimates based on private sector figures overstate the costs that public factories would face. Because the government can borrow at lower interest rates than most private firms, the total cost of building a public factory using debt financing will likely be less than a similar private one.[72] Moreover, after the initial capital investment, public factories will go on to generate revenue for the government through a combination of lease payments, royalties, and direct sales.[73] This flow of revenue can therefore be used to offset the initial capital expenditure, or can be recycled to make additional strategic economic investments.

These public factories can also be designed to advance second-order public policy goals. First, they could double as place-based policy: policymakers could prioritize locating public factories in under- or dis-invested communities. For instance, one candidate could be Weirton, West Virginia, where Cleveland Cliffs last year reneged on a plan to build a new transformer plant that would have employed nearly a thousand steelworkers.[74] The government could also purchase and re-tool private factories facing closure to stabilize local economies while promoting strategic production priorities.[75]

Second, these public factories could advance secondary industrial policy goals through their supply chains by prioritizing domestic sourcing or supporting upstream innovation. For example, next-generation battery factories could adopt "buy American" preferences to procure lithium from domestic sources like California's Salton Sea deposits, or could catalyze mining innovations by seeking to purchase lithium processed using emerging direct lithium extraction technologies.[76]

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[71] Robert Walton, *Hitachi unveils $1B grid manufacturing investment, including Virginia transformer factory*, UTILITY DIVE (Sept. 4, 2025), https://www.utilitydive.com/news/hitachi-unveils-1b-grid-manufacturing-investment-including-virginia-trans/759219/.

[72] Dodge & Sitaraman, *supra* note 4, at 55.

[73] *Id.* at 53.

[74] *See* Aaron Parker, *Cleveland-Cliffs pulling the plug on development of transformers production plant at Weirton facility*, MetroNews (May 7, 2025), https://wvmetronews.com/2025/05/07/cleveland-cliffs-pulling-the-plug-on-development-of-transformers-production-plant-at-weirton-facility/.

[75] *See* Dodge & Sitaraman, *supra* note 4, at Section III.D.

[76] *Lithium Valley Vision*, CALIF. ENERGY COMM'N, https://www.energy.ca.gov/programs-and-topics/programs/lithium-valley-vision (last visited Apr. 8, 2026); *see also* Milo McBride & Tom Moerenhout

In the long run, policymakers must decide whether to retain ownership of public factories, or whether to privatize them. Long-term public ownership maintains a public asset, while promoting security and resilience interests.[77] Privatization, on the other hand, may make sense when temporary public ownership was intended to jumpstart an industry or respond to an emergency.[78] If policymakers elect to privatize public factories, they should ensure that the buyer offers fair compensation to the public, will increase the productivity of the factory, and will not exacerbate industry consolidation.[79]

III. Pathways for Action

Public factories for critical energy components have several different pathways to implementation. The federal government could implement public factories through either executive action or new legislation. States and localities could create public factories as well.

A. Federal – Executive

At the federal level, the executive branch has a number of different mechanisms to create public factories for critical energy components. First, the president could incorporate public factories into new and novel trade deal investment funds. In recent trade agreements, Japan agreed to create a $550 billion fund to invest in strategic projects in the United States, and South Korea committed to a similar $350 billion fund, to make strategic investments in the United States in consultation with the federal government.[80] According to a White House fact sheet, the terms of the Japan

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et al., *Assessing the Policy Ecosystems and Scaling Pathways of Direct Lithium Extraction*, COLUM. CTR. ON GLOBAL ENERGY POL'Y (May 19, 2025), https://www.energypolicy.columbia.edu/publications/assessing-the-policy-ecosystems-and-scaling-pathways-of-direct-lithium-extraction/.

[77] *See* Dodge & Sitaraman, *supra* note 4, at Section II.B.5.

[78] *Id.*

[79] *Id.*

[80] Press Release, White House, Fact Sheet: President Donald J. Trump Drives Forward Billions in Investments from Japan (Oct. 28, 2025), https://www.whitehouse.gov/fact-sheets/2025/10/28195/ (hereinafter *"Japan Fact Sheet"*); Press Release, U.S. Dep't of State, United States and Republic of Korea Deepen Alliance at Senior Economic Dialogue (Dec. 10, 2025), https://www.state.gov/releases/office-of-

agreement include "critical energy infrastructure investments" among the deal's priority sectors.[81] The United States and Japan have subsequently announced several energy projects among the deal's early investments.[82] Similarly, a State Department readout stated that the Korea agreement will prioritize investments in "energy security" and "emerging and critical technologies."[83]

These funds are unprecedented and would benefit from public accountability and democratic guardrails. Nevertheless, investments in the production of energy materials like batteries and transformers fit squarely within the scope of these deals. Moreover, major energy materials producers like Hitachi, Mitsubishi, and Samsung are Japanese or Korean companies. The investment funds could be used to establish factories owned by the U.S. government that could be leased to these firms to produce next-generation batteries and transformers. Indeed, Trump administration officials have already contemplated using funding secured through trade deals with foreign governments to create GOCO production facilities.[84] By retaining ownership over the investment's physical factory assets, the United States would gain security against the risk that firms could eventually offshore production: if one firm exits the domestic production market, the U.S. can lease out its factory to another one. Public factories developed in concert with Japan and Korea could even form the basis of a counterweight to China's battery consortium by establishing a new coalition of allied-country leading battery producers and consumers to join forces in supporting the mass commercialization of next-generation batteries.

Second, the executive branch could use the military's statutory authorities to establish public factories for critical energy components for defense-related uses. The Department of Defense has broad authority to "have supplies needed for the

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the-spokesperson/2025/12/united-states-and-republic-of-korea-deepen-alliance-at-senior-economic-dialogue (hereinafter "*Korea Readout*"). *See also* Peter E. Harrell, *The Global Industrial Development Toolkit: Unpacking Trump's Investment Deals with Japan and South Korea*, AM. AFFS. (Spring 2026), https://americanaffairsjournal.org/2026/02/the-global-industrial-development-toolkit-unpacking-trumps-investment-deals-with-japan-and-south-korea/.

[81] *Japan Fact Sheet*, *supra* note 80.

[82] *See* Press Release, U.S. Dept. of Commerce, Joint Announcement on the Japan-U.S. Strategic Investment, (Mar. 19, 2026), https://www.commerce.gov/news/press-releases/2026/03/joint-announcement-japan-us-strategic-investment.

[83] *Korea Readout*, *supra* note 80.

[84] Gavin Bade, Corre Driebusch, & Peter Rudegeair, *Trump's Quest for His Own Sovereign Fund Gets $550 Billion Boost From Japan*, WALL ST. J. (Jul. 25, 2025), https://www.wsj.com/politics/policy/sovereign-wealth-fund-japan-trade-deal-b0fadb1a?st=72hXCp&reflink=article_copyURL_share.

Department of the Army made in factories or arsenals owned by the United States."[85] The Department is also required to "maintain a core logistics capability that is Government-owned and Government-operated[.]"[86] The Defense Logistics Agency has already identified batteries as mission critical.[87] The Department of Defense could accordingly use statutory authority to establish its own factories to produce batteries for military use and transformers to power military base electrical grids. A public battery plant could produce long-lasting next-generation batteries to power the Army's SkyFoundry program, which aims to produce thousands of military drones in-house.[88] This could have secondary benefits for the non-military market as well, such as by freeing up other production for private purposes, and by creating innovation and skill building spillovers for general production.

Third, the executive branch could explore whether existing funding streams could be used to promote public factories for critical energy components. For example, the Infrastructure Investment and Jobs Act of 2021 authorized the Department of Energy to make $6 billion in grants to support battery manufacturing, available through fiscal year 2026.[89] The Department of Energy's Loan Programs Office has authority to make loan guarantees for innovative technologies, including energy storage and efficient electrical generation, transmission, and distribution technologies, and may do so "on such terms and conditions as the Secretary [of Energy] determines[.]"[90] The Department of Defense's Office of Strategic Capital is authorized to make investments in covered technologies, including battery storage, and has broad authority to "establish criteria for selecting among eligible investments[.]"[91] Whole or partial government factory ownership could be established as a condition, selection criteria, or priority consideration for these grant and financing facilities.

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[85] 10 U.S.C. § 7532.

[86] 10 U.S.C. § 2464.

[87] Kristin Molinaro, *White paper: War reserves should include tactical energy storage, batteries*, Defense Logistics Agency (Mar. 21, 2025), https://www.dla.mil/About-DLA/News/News-Article-View/Article/4130676/white-paper-war-reserves-should-include-tactical-energy-storage-batteries/&sa=D&source=docs&ust=1772488494528513&usg=AOvVaw0Wz8ZrdFk1By768jmRkaZ-.

[88] Mikayla Easley, *Army aims to manufacture 10,000 drones per month by 2026*, Defense Scoop (Oct. 14, 2025), https://defensescoop.com/2025/10/14/army-small-drones-skyfoundry/.

[89] 42 U.S.C. § 18741.

[90] 42 U.S.C. §§ 16512(a), 16513(b).

[91] 10 U.S.C. § 149.

And fourth, the executive branch could use the Defense Production Act (DPA) of 1950 to build public factories for critical energy components. Title III of the DPA states: "To create, maintain, protect, expand, or restore domestic industrial base capabilities essential for the national defense, the President may make provision . . . for the development of production capabilities[.]"[92] The law's definition of "national defense" includes "energy production or construction."[93] Drawing on the $1 billion appropriated for the DPA under the One Big Beautiful Bill Act of 2025,[94] the government could use this authority to create public factories for critical energy components.[95] Indeed, a 2022 presidential determination identified transformers and electrical grid components as eligible for investment under the DPA.[96] The government could also support public factories for critical energy components by using priorities and allocations authorities under Title I of the DPA to secure plant equipment and construction materials, which can currently slow new projects.[97] For example, transformer factories take 1-3 years to build, including 1-2 years to source specialty equipment.[98] DPA authority could expedite these timelines.

B. Federal – Legislative

Congress could also enact new legislation authorizing public factories for critical energy components. Congress could, for example, enact a new Public Ownership for World-Class Energy Resilience Act (the "POWER Act") to authorize the Department of Energy to create public factories. (See model legislation in the Appendix.) Any such legislation should include several core design features, including:

- Authorizing the Secretary of Energy to create public factories—either GOGOs or GOCOs—for the purpose of manufacturing critical energy components like next-generation batteries and transformers.
- Specifying guidelines for important GOCO factory lease terms, such as fair rental payments and promotion of competition.

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[92] 50 U.S.C. § 4533(a)(1)(C).

[93] 50 U.S.C. § 4552(14).

[94] Pub. L. No. 119-21, § 30004 (2025).

[95] *See* Dodge & Sitaraman, *supra* note 4, at 88.

[96] Presidential Determination Pursuant to Section 303 of the Defense Production Act of 1950, as Amended, on Transformers and Electric Power Grid Components, 87 Fed. Reg. 35,079 (Jun. 6, 2022), https://www.federalregister.gov/documents/2022/06/09/2022-12587/presidential-determination-pursuant-to-section-303-of-the-defense-production-act-of-1950-as-amended.

[97] *See* 50 U.S.C. § 4511(a).

[98] U.S. DEP'T OF ENERGY, *supra* note 36, at 14-15.

- Providing criteria for the geographic locations of the public factories, such as favoring economically distressed regions, geographically strategic regions, and regions resilient against foreseeable risks and hazards.
- Addressing any modifications to federal environmental review and permitting regimes needed to streamline the construction of the public factories (such as the modification granted to semiconductor plants under the Building Chips in America Act of 2023[99]).
- Determining any priorities for supply procurement at the public factories, such as to support domestic industry or innovation.
- Establishing broad production, pricing and revenue goals for the public factories, such as producing a sufficient supply of batteries and transformers to significantly increase domestic production and to earn revenue to cover a plant's expenses.
- Prohibiting the executive branch from unilaterally closing public factories, reducing their operations, or selling them off.
- Authorizing sufficient funding to create public factories.
- Specifying how revenue generated from public factories may be used.

Alternatively, Congress could amend existing Department of Energy authority to allow it to create public factories. Under 42 U.S.C. § 7257, the Secretary of Energy may "acquire (by purchase, lease, condemnation, or otherwise), construct, improve, repair, operate, and maintain laboratories, research and testing sites and facilities, . . . as the Secretary deems necessary." This authority could be expanded to additionally allow the Secretary to create "public factories for critical energy components." Such authority could be used in part to support scaling emerging energy technologies from development—including by universities and national labs—toward commercialization by providing Department-owned factory space for pilot production and larger-scale production.

Third, Congress could appropriate additional funding for public factories for critical energy components. Current legislation proposed in Congress would authorize an additional $2.1 billion to use the DPA for transformers and grid components, including electrical steel.[100] This is a good start, but Congress should appropriate funding of at least $10 billion for the creation of an initial series of public factories across the critical nodes of the energy supply chain, including for batteries, transformers, and electrical steel.

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[99] Codified at 15 U.S.C. § 4652(h)(1).

[100] Energy Bills Relief Act, H.R. 7977, 119th Cong. § 303 (a) (2026).

C. States and Localities

Finally, state and local governments could also build public factories for critical energy components. State and local legislation could be modeled on the proposed federal legislation in the Appendix and would incorporate the same design features detailed above.

While advancing industrial policy goals for strategic technologies, states and localities could also use public factories to promote economic development by emulating past effective efforts by states like Mississippi and Alabama, which built GOCO factories to draw new industrial recruits to in-state low-cost manufacturing spaces.[101] If these public factories were leased to private operators, they would generate revenue through lease payments, sales royalties, and tax base increases. They could also be structured to set aside some production allocation to prioritize local demand, such as meeting in-state needs for transformers and batteries.[102]

While states and localities lack the fiscal flexibility of the federal government, interstate coordination could support subnational deployment of public factories for critical energy components. For instance, a multistate coalition could coordinate such that one state finances the creation of a public factory for next-generation batteries, another state creates a public factory for transformers, a third creates a public factory for electrical steel, and so on. State creation of public factories for critical energy components could build upon existing coordinating bodies, such as the National Governors Association, the U.S. Climate Alliance, the Regional Greenhouse Gas Initiative, and the Western Climate Initiative. The initial capital expenditure of these public factories could be financed by a mix of bonds, general revenue, and federal funding.

Conclusion: A New Arsenal of Democracy?

In May 1940, as the federal government mobilized military production to support the allied war effort in Europe, President Franklin Roosevelt used a fireside chat to recognize the limits of the private sector to meet the moment. “I know that private

[101] *See* Dodge & Sitaraman, *supra* note 4, at 88-89.

[102] State and local governments seeking to establish public factories may of course need to secure legislative or referendum approval before seeking debt financing through the municipal bond market.

business cannot be expected to make all of the capital investment required for expansions of plants and factories … which this program calls for at once," he told the nation. "It would be unfair to expect industrial corporations …to do this, when there is a chance that a change in international affairs may stop or curtail future orders a year or two hence."[103] With those limitations in mind, he said, "the Government of the United States stands ready to advance the necessary money to help provide for the enlargement of factories, [and] the establishment of new plants[.]"[104]

Weeks after Roosevelt's May 1940 fireside chat, Congress passed legislation authorizing the administration (through the Reconstruction Finance Corporation) to create public factories needed for the war effort.[105] In December 1940, with the industrial mobilization underway, Roosevelt told the country that it would be "the great arsenal of democracy" to arm the Allies to win World War II.[106] That American arsenal was to be heavily powered by public factories.

Today's energy challenges may similarly call for production at a speed and scale exceeding what the private sector on its own can fairly be expected to yield. Outpacing China for advanced energy technologies, rapidly recalibrating energy supply to meet a new paradigm shift in demand, overcoming private-sector bottlenecks constraining abundance and affordability, and decarbonizing domestic and global energy systems—these challenges all call for the type of government-led manufacturing mobilization that Roosevelt launched during World War II.

At their greatest potential, these public factories could even form the foundation of a new arsenal of democracy—this time, supplying the globe with critical energy components. If it develops mass production capabilities for technologies like next-generation batteries, the United States could export its surpluses to advance strategic and foreign policy priorities, such as supplying countries where American-made batteries can displace Chinese-sourced ones, and where they have the strongest

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[103] *See* Franklin D. Roosevelt, Fireside Chat, AM. PRESIDENCY PROJ. (May 26, 1940), https://www.presidency.ucsb.edu/documents/fireside-chat-10.

[104] *Id.*

[105] Pub. L. No. 427-664, 54 Stat. 572, 573 (1940); *see also* Dodge & Sitaraman, *supra* note 4, at 17.

[106] *See* Franklin D. Roosevelt, Fireside Chat, AM. PRESIDENCY PROJ. (Dec. 29, 1940), https://www.presidency.ucsb.edu/documents/fireside-chat-9.

potential to support renewable energy adoption.[107] Moreover, if public factories produce for export markets, they could draw on financing from the Export-Import Bank.[108]

Pursuing a public factory-powered global energy arsenal wouldn't just be an act of international goodwill by the United States, but would help strengthen its geopolitical interests and better position it for long-term "energy dominance." Both decarbonization imperatives and geopolitical conflict will likely prompt more and more countries to take steps to reduce their reliance on imported fossil fuels and increase domestic generation from localized clean energy sources.[109] Because it controls much of the current-generation clean energy supply chain, that shift currently redounds to China's benefit.[110] For instance, after Pakistan experienced natural gas shortages and blackouts in 2022 caused by Russia's invasion of Ukraine, it began rapidly purchasing and installing Chinese solar panels.[111] The flight to energy safety spurred by the war on

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[107] *See* MILO MCBRIDE, CARNEGIE ENDOW. FOR INT'L PEACE, CATCHING UP OR LEAPING AHEAD? HOW ENERGY INNOVATION CAN SECURE U.S. INDUSTRIAL STATURE IN A NET-ZERO WORLD 15-16 (Sept. 19 2024), https://carnegieendowment.org/russia-eurasia/research/2024/09/energy-innovation-us-industrial-stature.

[108] The Export-Import Bank (EXIM) has lending, loan guarantee, and insurance authority to promote American exports, and is not prohibited from financing public entities. *See* 12 U.S.C. § 635. In practice, EXIM routinely finances public entities abroad—such as governments, utilities, and state-owned enterprises—to purchase U.S. exports. Moreover, EXIM's "Make More in America Initiative" aims to "make available the agency's existing medium- and long-term loans, loan guarantees, and insurance to export-oriented domestic manufacturing projects." *Make More in America Initiative*, EXPORT-IMPORT BANK OF THE UNITED STATES, https://www.exim.gov/about/special-initiatives/make-more-in-america-initiative . Under the initiative, EXIM has made investments in domestic manufacturing firms, such as a long-duration battery storage plant in Oregon. *See* Press Release, Export-Import Bank of the United States, Export-Import Bank of the U.S. Board of Directors Approves Fourth Make More in America Deal, (June 27, 2024), https://www.exim.gov/news/export-import-bank-board-directors-approves-fourth-make-more-america-deal. EXIM has thus used its existing authority to finance public entities and domestic manufacturing projects. It therefore could use its lending authority to finance state, local, and federal public factories in the United States that generate exports.

[109] *See* Jason Bordoff & Erica Downs, *How the Iran War Could Consolidate China's Energy Dominance*, FOREIGN POL'Y (Mar. 6, 2026), https://foreignpolicy.com/2026/03/06/iran-china-green-energy-oil-gas-hormuz-solar-electricity/.

[110] *Id.*

[111] *See* Akshat Rathi, *How Fossil Fuel Disruptions Lead to Booms in Solar and Batteries*, BLOOMBERG (Mar. 5, 2026), https://www.bloomberg.com/news/articles/2026-03-05/iran-war-could-push-countries-to-adopt-more-solar-and-batteries; *How China sparked a rooftop solar revolution in Pakistan*, ECONOMIST (Nov. 3, 2025), https://www.economist.com/special-report/2025/11/03/how-china-sparked-a-rooftop-solar-revolution-in-pakistan.

Iran is likewise leading countries to Chinese-produced technologies.[112] If the United States used public factories to win the market for next-generation batteries, it could erode China's leverage over the energy supply chains of the future, while diversifying the U.S.'s export portfolio as a global transition away from fossil fuels risks leaving the country with a stranded asset of diminishing long-term geopolitical value.[113] Healthy leapfrog competition between the U.S. and China in this sector—whereby each country jockeys for geopolitical advantage over the other by developing, deploying, and diffusing innovations in energy technology—could also create a race-to-the-top dynamic that promotes more powerful and efficient clean energy sources across the globe.

The United States needs a resilient and rapidly-scaled supply of critical energy components to meet a variety of current challenges. Officials should look to the American tradition of public factories as one powerful tool to produce them.

[112] *See, e.g.,* Ed Ballard & Yusuf Khan et al., An Iran War Winner: China's Green Industrial Complex, Wall St. J. (Apr. 12, 2026), https://www.wsj.com/business/energy-oil/an-iran-war-winner-chinas-green-industrial-complex-1ef8a2bc; Joe Weisenthal & Tracy Alloway, *China Has Already Notched its First Major Win From the Iran War*, BLOOMBERG (Mar. 20, 2026), https://www.bloomberg.com/news/newsletters/2026-03-20/china-has-already-notched-its-first-major-win-from-the-iran-war; *see also* Bordoff & Downs, *supra* note 109.

[113] *See* Rana Foroohar, *America is becoming a petrostate*, FIN. TIMES (Feb. 22, 2026), https://www.ft.com/content/4d2559d2-04e7-4254-a44a-40d7c7b344f6.

Appendix: Model Legislation

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Sec. 1. *Short Title.* This Act may be cited as the "Public Ownership for World-Class Energy Resilience Act" (the "POWER Act").

Sec. 2. *Findings*. Congress finds that—

a) Maintaining a resilient energy system is critical to the national and economic security of the United States.
b) Securing a reliable domestic supply of batteries, transformers, and related energy resources is essential to maintaining a resilient energy system.
c) Developing and mass commercializing next-generation energy technologies is in the geopolitical strategic interests of the United States and will advance its global economic competitiveness.
d) Bottlenecks for critical energy components have impaired economic growth and affordability in the United States.
e) A system of public factories for critical energy components will improve the United States' national and economic security, advance its geopolitical interests, and strengthen growth and affordability.

Sec. 3. *Definitions*. For purposes of this section:

a) "Critical energy components" means next-generation batteries, electrical transformers, and their components and inputs.
b) "Next-generation batteries" means advanced electrochemical energy storage devices that significantly exceed the performance of commercially available lithium-ion technologies, including but not limited to energy storage devices that use lithium-metal anodes and enable solid-state architectures.
c) "Economically distressed regions" means any county or census tract that meets one or more of the following criteria:
    i) *Elevated unemployment*. The area has an unemployment rate that is, for the most recent 24-month period for which data are available, at least 1 percent greater than the national average unemployment rate.
    ii) *Manufacturing disinvestment.* The area has experienced a significant decline in manufacturing employment as a percentage of the total workforce over the preceding 10-year period.

iii) *Persistent poverty.* The area is an area of persistent poverty, as defined by 49 U.S.C. § 6702(a)(1).

d) "The Secretary" means the Secretary of the Department of Energy.
e) "Qualified entity" means a nonprofit entity, a private entity, a consortium of private entities, or a consortium of nonprofit, public, and private entities with a demonstrated ability to produce critical energy components.

Sec. 4. *Priority Energy Materials Manufacturing*. The Secretary shall establish a series of production facilities for the purpose of manufacturing critical energy components. The Secretary may (a) purchase and lease land; (b) purchase, lease, build, and expand plants; (c) purchase and produce equipment, supplies, and machinery; (d) lease plants to qualified entities to engage in such manufacture; or (e) authorize the Department of Energy to engage in such manufacture itself.

Sec. 5. *Lease Terms.* When leasing a plant under this section, the Secretary shall:
a) Lease such plant to a qualified entity so as to promote industry competition and decrease monopolization, to the greatest extent practicable.
b) Prescribe lease terms that provide a fair and reasonable compensation to the government, including through rental payments, royalties on sales, and other financial instruments.

Sec. 6. *Location*. The Secretary shall prioritize siting plants created under this section in (i) economically distressed regions, (ii) regions located in proximity to strategic logistics and transportation systems, and (iii) regions at a reduced risk of disruption from enemy attack, energy outages, extreme weather, workforce constraints, housing shortages, biohazards, or other risks to the resilience of the domestic industrial base.

Sec. 7. *Procurement.* Plants created under this section shall, to the greatest extent practicable, conduct input procurement to (i) prioritize sourcing from domestic producers, and (ii) support emerging technologies and advanced methods of production.

Sec. 8. *Production.*
a) Plants established under this section shall set production goals to substantially increase the overall domestic supply of critical energy components.
b) Plants established under this section shall sell products at prices sufficient to receive fair market value such that expected revenue covers the operating costs

of the plant.

Sec. 9 *Operations and Ownership.*

a) No plant established under this section shall terminate or substantially reduce operations or production levels without an act of Congress, except in temporary cases of emergency.
b) No plant established under this section shall be transferred to private ownership without an act of Congress. In order to request the transfer ownership of a plant established under this section, the Secretary shall submit to Congress for approval a proposal including (i) documentary evidence that the government shall receive fair market value in the proposed transaction; and (ii) an evaluation by the Department of Justice and Federal Trade Commission concerning the effects on industry competition under the proposed transfer.

Sec. 10. *Authorization of Appropriations.* There is authorized to be appropriated to the Secretary $15,000,000,000, to remain available until expended, to exercise the authorities under this section.

Sec. 11. *Program Revenue*. Revenue generated from direct sales, lease payments, royalties, or otherwise under this section may be used by the Secretary to make additional investments under this section.

Sec. 12. *Incidental Authority.* The Secretary shall have all lawful incidental authority deemed necessary to carry out the provisions of this section, including but not limited to authority to delegate to managers, hire staff, and procure operational resources.

Sec. 13. *Prohibition on Use of Funds.* No funds made available under this section may be used to construct, modify, or improve a facility outside of the United States.