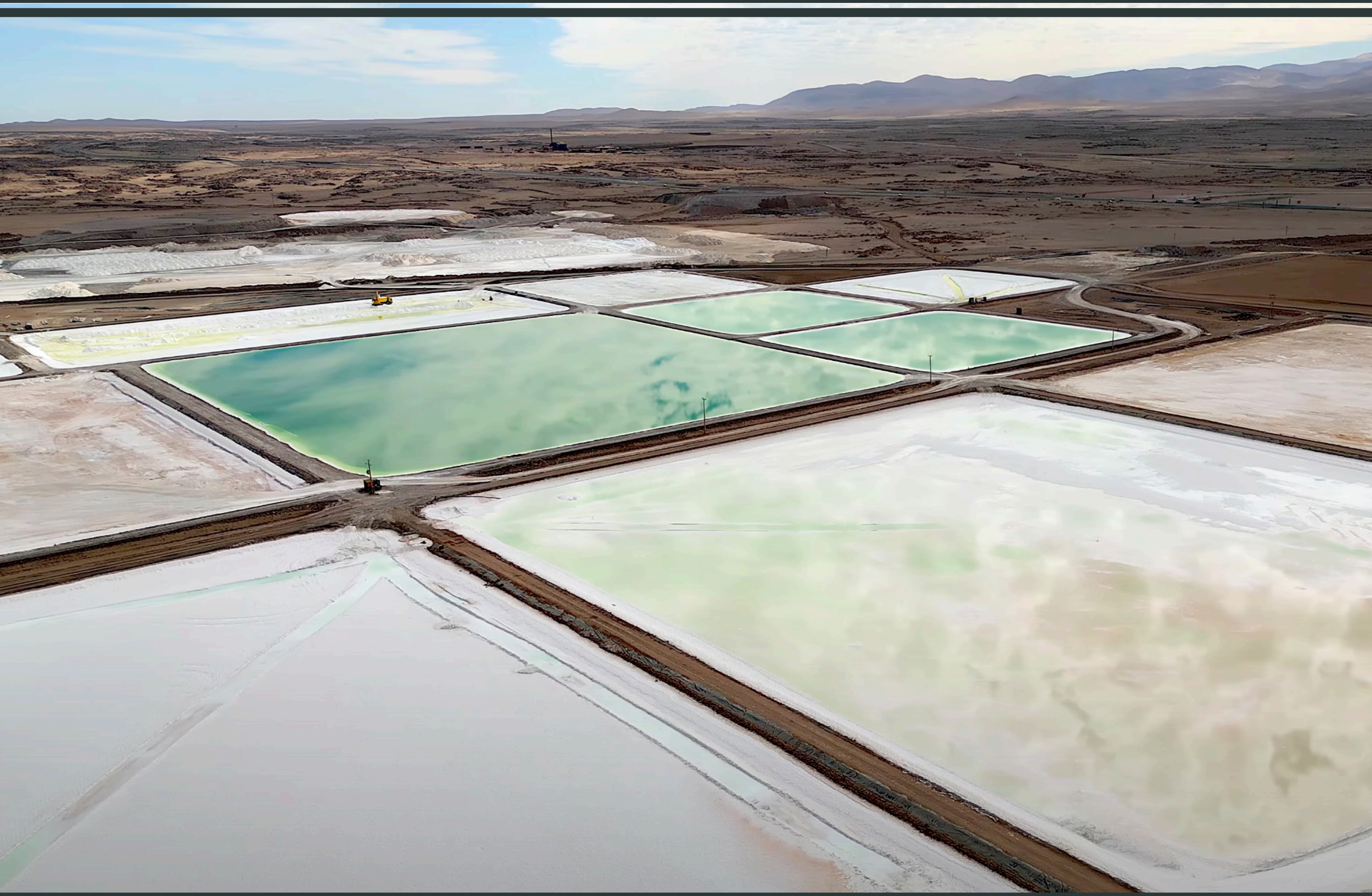
Building Resilience: Securing U.S. Lithium Supply Chains Through Strategic Policy and Recycling Innovation



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FROM OIL DIPLOMACY TO LITHIUM SECURITY: AMERICA'S NEXT STRATEGIC IMPERATIVE

In 1945, President Franklin D. Roosevelt and King Abdul Aziz Ibn Saud met aboard the USS Quincy, forging an oil-based alliance that would shape global power dynamics for decades (Bruce Riedel, 2020). Today, the United States faces a similar inflection point—this time with lithium, an indispensable resource driving the 21st century's cutting-edge technologies. Just as oil once dictated global leadership, securing a stable lithium supply is now crucial in an era propelled by artificial intelligence, autonomous systems, and clean energy.

This historical parallel underscores the strategic importance of lithium beyond civilian uses. For example, the Russo-Ukrainian war highlights how battery-powered drones and AI-driven systems are transforming modern warfare, much like mechanized forces did in the past (Schingh, 2025). However, today's digital battlefield demands unprecedented energy security and resilient supply chains to sustain AI-driven operations.

Indeed, Lithium-ion batteries form the backbone of America's next-generation defense capabilities, powering AI-driven systems and extending drone operations in high-risk environments (National Mining Association, 2021). As a result, the Department of Defense leans more heavily on autonomous systems—particularly in scenarios where conventional fuel lines are at risk—and lithium's role in national security becomes ever more critical. Meanwhile, the same advanced battery technology is simultaneously revolutionizing civilian innovations, from large-scale energy storage to electric vehicles, further underscoring the need for a stable lithium supply.

However, unlike the robust oil-centered alliances of the past, America's position in the global lithium chain has weakened (Lithium Harvest, 2025). While leading in areas like solid-state batteries and AI, the nation's reliance on foreign processing—particularly in China—creates strategic vulnerabilities (Varun Saviram et al., 2024). Securing and processing lithium resources is not just a matter of energy independence; rather, it is central to maintaining America's technological edge in an era dominated by autonomous warfare and AI-driven defense systems. Therefore, addressing these challenges should be elevated to a national priority, requiring a comprehensive policy framework to safeguard America's lithium future.

AMERICA'S STRATEGIC VULNERABILITIES IN LITHIUM SUPPLY CHAINS

Over the past two decades, the United States has gradually ceded its lead in raw material processing, allowing lithium refining and production capacities to shift overseas (Lithium Harvest, 2025). Despite significant untapped deposits, such as those in Nevada's Thacker Pass, domestic lithium production remains limited, with only one commercial mine operating today—and even its output often requires overseas refining (Lithium Americas, 2024). Meanwhile, excessive permitting obstacles and limited public incentives have long discouraged private investment in new extraction and conversion facilities, preventing the nation from fully harnessing its resources (Scot Anderson, 2024). This dynamic stands in stark contrast to the billions of dollars and streamlined approvals fueling China's rapid ascent in lithium refining, battery manufacturing, and advanced materials research.

Such structural imbalances now pose a threat to America's clean energy goals and national defense capabilities.

Disruptions in the global lithium trade—whether prompted by diplomatic frictions or economic competition—could stifle domestic electric vehicle production and undermine the lithium-ion batteries essential for AI-driven reconnaissance, autonomous drone fleets, and next-generation combat platforms. These vulnerabilities echo the stark lessons of the 1973 oil embargo, when energy shortages exposed the profound fragility of U.S. supply chains and spurred sweeping policy reforms (U.S. Department of State, n.d.). Today, military planners worry that an overreliance on external lithium sources leaves critical defense systems vulnerable to sudden embargoes or price manipulation.

Compounding this precarious situation is China's dominance in midstream processing, which effectively grants it leverage to shape the global lithium market (Lucy Tang & Litian Wang, 2024). Even resource-rich allies like Australia depend on Chinese facilities for downstream processing, creating interdependencies outside Washington's control (Alex Turnbull, 2024). This raises concerns that shifts in international policy or export regulations could undermine America's industrial and military goals.

Although the Defense Production Act and new Department of Energy initiatives signal growing awareness, experts warn these measures must expand in scale and pace (Julie Steinberg & David Uberti, 2024). Without more streamlined regulations, robust federal investment in R&D, and stronger alliances, the U.S. risks lagging further behind in the race to secure its lithium future—jeopardizing not only energy independence but also its technological and military edge in an era defined by AI and autonomous systems.

SECURING AMERICA'S LITHIUM FUTURE: A THREE-TIERED STRATEGIC FRAMEWORK

Building on the challenges and opportunities outlined above—from the historical echoes of oil diplomacy to the growing reliance on lithium-ion technology in modern warfare—this final section proposes a tripartite strategy to safeguard America's lithium supply chains. Each of the following pillars is designed to address specific gaps in current U.S. capabilities and policies, ensuring that both civilian industries and defense platforms are insulated from future disruptions.

A. Immediate Action: Leveraging Allied Capabilities

In the near term, the U.S. can substantially reduce its vulnerability in lithium supply by intensifying cooperation with two longstanding partners—Australia and Japan—whose comparative advantages align seamlessly with American requirements. Australia, endowed with some of the world's richest lithium deposits and a regulatory environment conducive to mining expansions, can swiftly scale up extraction under supportive policy measures. Japan, through entities such as the Japan Organization for Metals and Energy Security (JOGMEC), brings deep expertise in battery research, processing technologies, and targeted investments (JOGMEC, n.d.). Together with U.S. financial capacity—especially funding facilitated by instruments like the Defense Production Act—this trilateral arrangement can address immediate supply gaps before global competition further tightens lithium markets.

An instructive precedent is Japan's response to the 2010 rare earths crisis. After China's export restrictions disrupted essential industries, Tokyo collaborated with the U.S. and Australia to develop alternative supply routes. Diplomatic backing and targeted funding, including JOGMEC's support, enabled projects like those by

Australian rare earth mine Lynas. Within years, Japan reduced its reliance on Chinese rare earths from nearly 90% to below 60%, highlighting the power of coordinated diplomacy and targeted capital infusion in advanced materials sectors (CRS, 2019; The Japan Times, 2024).

Several frameworks already point toward replicating this model for lithium. The U.S.-Japan Critical Minerals Agreement provides a platform for co-financing extraction and refining projects, while ongoing U.S.-Australia dialogues support more streamlined licensing and improved infrastructure planning (Alex Turnbull, 2024; Congressional Research Service, 2025). These efforts could be amplified through a specialized trilateral task force dedicated to lithium, charged with aligning investments toward "shovel-ready" sites, expediting cross-border permitting, and accelerating technology transfer for battery-grade refinement. Such a mechanism would offer a unified clearinghouse for intelligence and R&D, fostering a swift path from raw ore to high-purity materials crucial for both electric vehicles and emergent defense platforms.

B. Building Long-Term Coalition Strength: The Strategic Resource Alliance

Even as the United States advances bilateral and trilateral efforts to secure lithium, a broader multilateral framework remains essential for long-term stability. Drawing inspiration from the International Energy Agency (IEA)—which successfully coordinated oil stockpiles among its members—the establishment of a "Strategic Resource Alliance" (SRA) would help prevent any single supplier from exerting undue influence over global lithium markets. This alliance could encompass nations across North America, Europe, and the Indo-Pacific that share an interest in transparent, resilient supply chains, including countries such as Canada, South Korea, and EU member states already engaging in critical minerals cooperation.

Recent events have underscored the vulnerability of uncoordinated resource dependence. The ongoing Russo-Ukrainian conflict, for instance, demonstrates how quickly strategic commodities can become pressure points in international relations, with direct implications for defense planners who anticipate disrupted logistics and contested sea lanes. In the lithium context, an SRA could reinforce collective preparedness by pooling investment capital—potentially through a shared fund analogous to the Minerals Security Partnership—and coordinating technology transfers so that each member's capacity in mining, refining, or recycling is effectively leveraged. Critically, the SRA would also establish an early-warning mechanism for looming supply shortfalls and maintain a strategic lithium reserve, mirroring the IEA's approach to oil.

Additionally, a strong commitment to high environmental and labor standards is likely to bolster public and political support among participating countries. Rigorous protocols for land stewardship, water usage, and emissions controls can forestall local opposition to new mining projects and reinforce the SRA's credibility as a steward of sustainable industrial practices. By requiring verifiable compliance, the alliance helps ensure that scaling up lithium extraction does not come at an unacceptable ecological or social cost—an outcome increasingly demanded by stakeholders ranging from community activists to institutional investors.

Finally, an integrated trading environment would allow alliance members to expedite shipments of raw materials, processed lithium compounds, and finished batteries. Harmonized tariffs, standardized certifications, and streamlined customs procedures could collectively reduce frictions that often delay critical deliveries. For both policymakers and military strategists, such cohesion echoes the mid-20th-century pacts that undergirded stable energy supplies—only now applied to the resources powering autonomous systems, AI-driven platforms, and next-generation clean technologies.

C. Domestic Resilience: Urban Mining and Advanced Recycling

Developing a robust domestic ecosystem for lithium recycling—often called “urban mining”—is pivotal if the United States hopes to keep pace in a global market increasingly defined by the electrification of transport and defense systems (Andy Home, 2024). While international alliances help diversify near-term raw material sources, U.S.-based recycling addresses the strategic reality that end-of-life batteries, manufacturing scrap, and electronic waste are valuable reservoirs of lithium and other critical metals.

Several emerging case studies illustrate the potential and growing momentum of U.S. recycling ventures. Redwood Materials, for example, has developed closed-loop processing to convert spent batteries and manufacturing scrap into refined lithium, nickel, and cobalt for new cell production. Their partnership with Ford integrates recycling directly into the EV production cycle, reducing waste and raw material dependence (DEARBORN, Mich., 2021). Similarly, Li-Cycle is building a major recycling hub in Rochester, New York, backed by DOE loans, aiming to produce thousands of tons of lithium carbonate annually from spent batteries (Li-Cycle, 2024). These efforts could significantly reduce the need for virgin material imports.

Yet America is hardly alone in recognizing the strategic value of recycling. China has already made substantial inroads, enforcing battery recycling regulations as early as 2012 and establishing a network of large-scale recyclers capable of recovering high percentages of valuable metals (Maria Virginia Olano, 2022). Chinese firms benefit from vertically integrated supply chains that tie recycling facilities to both battery manufacturers and EV producers, creating efficient loops that keep costs competitive. If the U.S. lags in scaling up its own recycling capacity and innovating in advanced material reclamation, it risks ceding technological and market dominance in a sector poised for exponential growth.

To bridge this gap, recent U.S. policies provide financial and regulatory support. The Bipartisan Infrastructure Law funds direct-cathode recycling projects, which could reduce energy use and accelerate manufacturing (Li Industries, 2024). Additionally, the Inflation Reduction Act incentivizes domestic recycling by classifying reclaimed minerals as “American-made,” making EVs with recycled lithium eligible for federal tax credits (M. Moaz Uddin, 2022).

Still, two key hurdles remain. First, collecting and transporting spent batteries is expensive due to hazardous material regulations and a patchwork of state-level rules. Streamlining logistics —without compromising safety—would give recycling facilities a more consistent input stream. Second, workforce capacity must expand to include chemical engineers, process technicians, and logistics specialists. Collaborations like the DOE’s ReCell Center, which unites national labs, universities, and private firms, illustrate how targeted R&D and coordinated education programs can address both technical and labor-market deficits.

In the long run, a vigorous U.S. recycling sector could unlock multiple dividends. It would fortify critical supply chains against geopolitical shocks, offer a lower-emissions alternative to virgin mining, and create a competitive edge for American battery manufacturers—thus drawing global investment in advanced clean technologies. Improving the Chinese model of integrated supply chains can demonstrate a distinct path for sustainable industrial growth. For policymakers and military strategists alike, the message is clear: by scaling up urban mining and refining these emerging technologies, the United States can shape the future of lithium supply on its own terms, rather than simply reacting to overseas developments.

CONCLUSION

The next USS Quincy moment is here—not on a warship, but in the mines, labs, and alliances that will power tomorrow's frontiers. Standing on the threshold of a new era defined by lithium-powered technologies—from AI-driven military platforms to the electric vehicle revolution—the stakes for American leadership have rarely been higher. History shows that securing critical supply chains and strengthening domestic industries are essential for national sovereignty. Today, this means leveraging domestic lithium resources and mastering the entire value chain, from mining to advanced recycling, to reduce reliance on foreign powers.

This effort does not require disengagement from key allies. By strengthening partnerships with strategic allies such as Australia and Japan, following a model of forthright and interest-driven diplomacy, a united front can be established against supply chain manipulation. Coupled with streamlined permits, targeted R&D investments, and robust recycling initiatives, these partnerships can create a self-sustaining lithium ecosystem that supports both economic growth and national defense. Success in this domain requires viewing lithium security not merely as a commodity issue but as a foundational element of 21st-century U.S. strength.

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