APRIL 2025
VOL. 25-4

PRATT'S

ENERGY LAW REPORT

LexisNexis

Pratt's Energy Law Report

VOLUME 25 **NUMBER 4** **April 2025**

LexisNexis®

QUESTIONS ABOUT THIS PUBLICATION?

For questions about the **Editorial Content** appearing in these volumes or reprint permission, please call or email:
Raeesa Hoosen, LLB. at ..... (1908) 673-3323
Email: ..... raeesa.hoosen@lexisnexis.co.za
For assistance with replacement pages, shipments, billing or other customer service matters, please call:

Customer Services Department at . . . . . (800) 833-9844
Outside the United States and Canada, please call . . . . . (518) 487-3385
Fax Number . . . . . (800) 828-8341
LexisNexis® Support Center . . . . . https://supportcenter.lexisnexis.com/app/home/
For information on other Matthew Bender publications, please call

Your account manager or . . . . . (800) 223-1940
Outside the United States and Canada, please call . . . . . (518) 487-3385

ISBN: 978-1-6328-0836-3 (print)
ISBN: 978-1-6328-0837-0 (ebook)
ISSN: 2374-3395 (print)
ISSN: 2374-3409 (online)

Cite this publication as:

[author name], [*article title*], [vol. no.] Pratt's Energy Law Report [page number] (LexisNexis A.S. Pratt);
Ian Coles, *Rare Earth Elements: Deep Sea Mining and the Law of the Sea*, 14 Pratt's Energy Law Report 4 (LexisNexis A.S. Pratt)

Editorial Office
230 Park Ave., 7th Floor, New York, NY 10169 (800) 543-6862
www.lexisnexis.com

MATTHEW BENDER

(2025–Pub.1898)

Editor-in-Chief, Editor & Board of Editors

Hydraulic Fracturing Developments
Eric Rothenberg
Partner, O'Melveny & Myers LLP

Pratt's Energy Law Report is published 10 times a year by Matthew Bender & Company, Inc.

POSTMASTER: Send address changes to *Pratt's Energy Law Report*, LexisNexis Matthew Bender, 230 Park Ave. 7th Floor, New York NY 10169.

Understanding Current Battery and BESS Supply Chain Risks

By Eric Pogue, S. Kris Agarwal, David Mortlock, Archie Fallon, Dale Smith, Noah Pollak, Christopher T. Demet, Sidney Nunez, Niko Letsos and Jacob Bell*

This article offers an overview of the risks inherent in battery energy storage systems (BESS) supply chains to which U.S.-based BESS project developers are subject. While much of the analysis applies to the commodity trading behind many types of batteries, the focus is on components used in utility-scale battery projects of five megawatts or more in the United States.

Battery energy storage systems (BESS) are already significant and of growing importance to America's energy grids. Due to heavy U.S. reliance on imports for BESS components, particularly from China, America's BESS progress is wrapped into international issues and relies on new and developing approaches to mitigating exposure.

This article offers an overview of the risks inherent in BESS supply chains to which U.S.-based BESS project developers are subject. While much of the analysis below applies to the commodity trading behind many types of batteries, the focus is on components used in utility-scale battery projects of five megawatts or more in the United States.

WHAT SETS BATTERIES APART

As anyone with a smartphone knows, batteries degrade with use and BESS components are no different. Such degradation often leads to the augmentation of BESS assets, which involves adding new components to keep batteries functioning, in some cases as often as every other year. Augmentation requires continuous monitoring of the battery supply chain. Solar or wind generation does not require replacing many parts as a matter of course over the first decade or more of use. The continual need for more battery materials puts pressure on BESS projects' budget forecasts, including forecasts on the impacts of changes in augmentation costs and related performance guarantees.

Developers can decrease augmentation requirements by opting for an overbuild path. Overbuilding requires a developer to launch BESS projects with enough capacity to withstand battery degradation while meeting their contractual obligations for capacity and availability. The overbuild path removes some

* The authors, attorneys at Willkie Farr & Gallagher LLP, may be contacted at epogue@willkie.com, kagarwal@willkie.com, dmortlock@willkie.com, afallon@willkie.com, dsmith@willkie.com, npollak@willkie.com, cdemet@willkie.com, snunez@willkie.com, nletsos@willkie.com and jbell@willkie.com, respectively.

of the hazards associated with changing prices, prospective tariffs, and additional obstacles. A degradation curve, as prepared by an independent engineer or similar party, projects augmentation needs over the useful life of a BESS. It is typical for a battery project to launch with some overbuild based on projections.

As most BESS projects in the United States are in the early stages of their anticipated life cycles, it is unknown how accurate these models will be. Usage patterns, quality of the components, and environmental factors like humidity can all interact in unpredictable ways to make one installation different from another.[1] Even well-stocked overbuild developers may have to return to the global supply chain to add more battery components to their projects.

Battery production is a complex process, involving a vast network of suppliers across the globe. From the extraction of critical minerals to the manufacturing of battery packs, each stage presents vulnerabilities. Supply chain disruptions, whether caused by geopolitical tensions, natural disasters, port closures, or economic fluctuations, can have far-reaching consequences for battery manufacturers and renewable energy industries.

The rapid growth of the electric vehicle (EV) market has transformed battery manufacturing capacity. The average EV requires about eight kilograms of lithium as compared to one gram in a smartphone battery.[2] Even with BESS installations requiring far more lithium than other uses, EV producers will continue to dominate the demand for battery minerals due to the massive size of that market. The recent slowing growth of EV sales has caused a decline in lithium prices.

Supply challenges are spurring innovation in battery technology, along with improving battery recycling and reuse capabilities. Companies are investing in research to develop battery chemistries that rely on less scarce and on less environmentally harmful materials. The exploration of alternative combinations of inputs, such as iron-phosphate and sodium-ion batteries in place of lithium, is ongoing, but the timeline to come to market is uncertain. The risks currently present in the upstream, midstream, and downstream supply chain appear to be certain for American producers in the foreseeable future.

UPSTREAM SUPPLY CHAIN ISSUES

Mining and sourcing the critical minerals of lithium, cobalt, and nickel – common materials needed in many types of batteries – comprise upstream

---

[1] https://www.sciencedirect.com/science/article/abs/pii/S095042302200208X.

[2] https://www.atlanticcouncil.org/blogs/new-atlanticist/the-us-wants-to-end-its-reliance-on-chinese-lithium-its-policies-are-doing-the-opposite/.

BESS issues. Resource scarcity, geopolitical uncertainty, and environmental concerns are the chief barriers to availability.

Lithium, an anode, is the most in-demand battery material, with the global demand expected to surpass 2.4 million metric tons of lithium carbonate in 2030, double the projection for 2025.[3] Lithium is found in hard rock deposits and in salt flats. Economically viable lithium extraction is concentrated in a few areas. Australia is home to roughly half of the world's proven lithium deposits.[4] Chile, Argentina, and Bolivia make up the "Lithium Triangle" in Latin America, accounting for about a quarter of the world's lithium. China is another large producer.[5] Countries are in a race to find sources closer to home. Germany is spearheading the development of the excavation of lithium in Serbia.[6] Environmental regulations and land use policies have slowed the development of lithium mines in the United States, underlining a global concern.

Cobalt is an essential component of contemporary batteries, enhancing battery performance, safety, and longevity. The Democratic Republic of Congo (DRC) accounts for over 70% of the world's cobalt, with no other country over 5%.[7] The DRC has struggled with weak governance and been the site of numerous human rights violations. The U.S. government is involved in trying to eliminate child labor in the DRC's cobalt extraction.[8] The current and previous presidential administrations have prioritized domestic cobalt stockpiling, recycling, and refining domestically.[9]

Nickel, used to increase battery density and storage, had been spread out more evenly but is becoming more concentrated. Indonesia is the world's leading producer with 43% of the world's nickel supply, up from 16% in 2019.[10] Although Russia, Australia, Canada, and New Caledonia are also top

---

[3] https://carboncredits.com/why-lithium-prices-are-plunging-and-what-to-expect/.

[4] https://www.nytimes.com/2023/05/23/business/australia-lithium-refining.html.

[5] https://investingnews.com/daily/resource-investing/battery-metals-investing/lithium-investing/lithium-production-by-country/.

[6] https://apnews.com/article/germany-serbia-lithium-scholz-vucic-114befbdab762c829b98616e94b99a0d.

[7] https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-cobalt.pdf.

[8] https://www.dol.gov/agencies/ilab/combatting-child-labor-democratic-republic-congos-cobalt-industry-cotecco.

[9] https://www.reuters.com/world/us/trump-seeks-minerals-refining-pentagon-bases-boost-us-output-sources-say-2025-03-10/.

[10] https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/indonesian-nickel-production-dominates-commodity-market-80242322.

suppliers with large reserves, Indonesia is expected to keep its market share over the coming years. Indonesia is the primary source for high-grade nickel used for high-energy density batteries like those in BESS. Like all upstream suppliers, Indonesia has seen local communities and environmental groups contesting the habitat destruction, water pollution, deforestation, and greenhouse gas emissions associated with mining. To combat these environmental consequences, the U.S. Department of Energy (DOE) and international organizations are trying to put guidelines in place for sustainable battery production and supply chain transparency.[11]

MIDSTREAM SUPPLY CHAIN ISSUES

The midstream stage involves refining and processing raw materials into usable components and then manufacturing battery cells and modules. Indonesia was partly able to rocket up the charts in nickel by banning the export of that raw mineral and requiring the processing to happen in the country. By focusing the upstream and midstream processes in the same place, Indonesia attracted more investment.

Indonesia's case with nickel is atypical. Almost all mined battery material is exported to be processed elsewhere and China dominates the processing of many critical minerals. A recent report estimated that China processes about two-thirds of the world's mined lithium and has similarly high proportions for processing other battery minerals.[12] Moreover, when processing occurs elsewhere, China features prominently in the supply chain for processing equipment.

China began a push to concentrate processing within its borders in 2009 and boosted that effort with the Made in China 2025 policy commitments in 2015. A U.S. government report totaled Chinese government battery subsidies at $100 billion between 2009 and 2019, an expenditure that created the world's leading lithium-refining industry.[13] Being home to the world's largest EV market and over half of the world's utility-scale solar and wind power keeps China central to demand and supply side forces. In 2024, with four of the world's five biggest battery manufacturers located in China with significant research budgets, China's lead doesn't look likely to diminish. From September 2024 to the end of 2025, China's lithium producers expect to add 5.8

---

[11] https://www.nrdc.org/resources/exhausted-how-we-can-stop-lithium-mining-depleting-water-resources-draining-wetlands-and.

[12] https://www.economist.com/asia/2023/07/17/a-battery-supply-chain-that-excludes-china-looks-impossible.

[13] https://bidenwhitehouse.archives.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf.

terawatt-hours (TWh) of capacity, double the current global capacity of 2.6TWh.[14]

Scaling up battery production requires investment in infrastructure and technology, as well as streamlined regulation. Building new manufacturing capacity is time-consuming. From 77% of global battery manufacturing in 2022, China's share is expected to see a modest decline to 69% in 2027 while the United States will rise from 6% to 10% over that period.[15] China is expected to dominate the next generation of battery materials, and to supply and ship many of the batteries the world needs over the rest of the 2020s. Tariff worries have been a constant when it comes to Americans importing battery materials from China, and are likely to persist for years to come.

DOWNSTREAM SUPPLY CHAIN ISSUES

After navigating the many upstream and midstream challenges, coordinating the supply of components and materials across supply chains, and dealing with the numerous bottlenecks that could pop up in those stages, downstream issues may also arise. The final stage of the supply chain includes the assembly of batteries and their integration into end-use products like BESS. Labor shortages could be an obstacle in setting up BESS. Companies are investing in workforce development initiatives to increase the availability of a skilled workforce.

With so much growth in the market, battery components' standardization could be inadequate. Material impurity or manufacturing errors can lead to defects or reduced battery lifespan. In the case of BESS, battery modules are expected to last about 20 years. Even after installation, the first round of augmentation could be when defects are discovered, underlining the importance of warranties. Furthermore, engineers will have to check compliance with national or local regulations for batteries once the batteries are operational.

There is also a regulatory approach to encourage recycling battery materials to nearshore more of the supply line. Once out of use, EVs may possess recoverable valuable materials. Manufacturers may need to develop and implement robust end-of-life management strategies, the last downstream issue.

U.S. GOVERNMENT POLICIES

The U.S. government has recently looked to attract investment to expand its domestic manufacturing base. The Inflation Reduction Act (IRA) has provisions to support the battery industry, including tax incentives for investments

---

[14] https://www.economist.com/business/2024/09/01/clean-energys-next-trillion-dollar-business.

[15] https://www.visualcapitalist.com/chinas-dominance-in-battery-manufacturing/#google_vignette.

in domestic battery production and mineral processing. The IRA also earmarked funds for research and development in advanced battery technologies in order to decrease dependence on imports.[16] The IRA's Advanced Manufacturing Production Credit grants tax credits to boost domestic production of battery components.[17]

The Department of Defense (DOD) possesses the authority to increase domestic mining and processing of critical minerals for large-capacity battery supply chains and for other materials if these supply chains become a matter of national security. In April 2022, the U.S. government invoked the Defense Production Act (DPA) in response to concerns about the vulnerability of the U.S. battery supply chain and the need to reduce dependence on foreign suppliers. The DPA empowers the Defense Department to become directly involved in increasing the production of battery components.[18] Complementing these efforts, the DOE has put forward the National Blueprint for Lithium Batteries, a strategy for developing a domestic supply chain for lithium.[19]

In addition to these domestic-focused actions, the U.S. government has also moved forward together with its allies. To increase supply chain resiliency for critical minerals, the U.S. has agreements with Canada and Australia.[20] The Minerals Security Partnership includes 14 countries and aims "to accelerate the development of diverse and sustainable critical energy minerals supply chains through working with host governments and industry to facilitate targeted financial and diplomatic support for strategic projects along the value chain," according to the State Department.[21]

---

[16] https://www.cbsnews.com/news/electric-car-batteries-inflation-reduction-act-us-manufacturing/.

[17] https://www.federalregister.gov/documents/2023/12/15/2023-27498/section-45x-advanced-manufacturing-production-credit.

[18] https://www.defense.gov/News/Releases/Release/Article/2989973/defense-production-act-title-iii-presidential-determination-for-critical-materi/.

[19] https://www.energy.gov/eere/vehicles/articles/national-blueprint-lithium-batteries.

[20] https://www.usgs.gov/news/technical-announcement/australia-canada-and-us-unify-critical-minerals-data.

[21] https://www.state.gov/minerals-security-partnership/.