AL Intel

Powering the Future:

Positioning Alabama in the Evolving Battery Supply Chain

Global Context, U.S. Position, and Industry Evolution

Batteries are no longer peripheral to the energy system — they are central to the global energy transition. The **International Energy Agency (IEA)** forecasts global battery demand to increase **20-fold by 2040**, driven by electric vehicles (EVs), grid modernization, and industrial electrification[1]. This rapid growth is transforming batteries into a **strategic industry**, comparable in national importance to oil, semiconductors, and steel.

The United States, once a latecomer in battery manufacturing, is now repositioning itself through a powerful combination of **federal investment, reshoring mandates, and clean energy policy**. According to the **U.S. Department of Energy (DOE)**, building a secure and scalable battery industry is essential for U.S. competitiveness, grid resilience, and energy sovereignty[2].

The **Alabama Mobility and Power (AMP) Center** estimates that global capital investment in the battery value chain could exceed **$3.7 trillion by 2040**, spanning not only EVs but also grid storage, defense, and aerospace sectors[3]. While AMP does not provide a 2024 baseline, the International Energy Agency (IEA) estimates **that global investment in clean energy will exceed $2 trillion in 2024, with battery-related investment—spanning EV batteries, grid storage, and manufacturing—likely totaling between $100 billion and $200 billion**. This figure offers a credible foundation from which to interpolate AMP's long-term projection, assuming continued growth driven by industrial policy, localization, and electrification trends[4]. This figure complements IEA **projections that the United States will have approximately 35–36 million electric vehicles on the road by 2030, up from a baseline of roughly 1.7 million in 2020 — a more than 20-fold increase over a decade**[5]**.** This growth reflects the IEA's *Stated Policies Scenario (STEPS)* and includes both battery electric and plug-in hybrid vehicles.

Throughout this report, references to the "Abundant by 2035" scenario refer to a user-selected assumption in AMP's Tableau-based EV adoption model. It reflects the expectation that electric vehicle charging networks will become widely available across the U.S. by 2035, eliminating infrastructure as a primary barrier to EV uptake. Under the AMP Center's *Abundant* scenario, Alabama will have approximately **100,874 EVs on the road by 2030**, growing to **over 534,000 by 2035** – up from just **14,669 EVs registered in 2024**[6]. The International Energy Agency (IEA) projects **over 35 million EVs nationwide by 2030 (**up from approximately, making Alabama's forecast roughly proportional to its population share — but regionally significant given its infrastructure and manufacturing potential[7]. Compared to slower-growth scenarios in other Southern states, AMP's projections suggest Alabama is positioned to lead Southeastern EV adoption. *(See Appendix E for full data and benchmarks.)*

But this transformation is no longer just about mobility — it's about **infrastructure, national security, and economic leadership**. Batteries now underpin a wide range of critical systems: from EV fleets and renewable energy storage to defense platforms and industrial automation[8].

Battery energy storage systems (BESS) are becoming a core enabler of U.S. energy dominance, providing operational flexibility across a range of generation sources and geographic environments. BESS enhances system resilience through **peak shaving**, **frequency regulation**, and the **integration of variable generation sources**—including solar, wind, and distributed fossil assets. In remote or constrained settings such as military installations, rural utilities, and industrial zones, battery storage supports **localized, off-grid, and hybrid energy architectures** that minimize reliance on long transmission lines or fuel logistics.

BESS is also increasingly critical to meeting the **high-load demands of data centers**, especially those serving AI and cloud computing workloads. According to McKinsey & Company, global data center power demand is expected to grow significantly, requiring **reliable, modular, and on-site energy storage solutions** capable of maintaining power quality and uptime[9]. This expanding market underscores the growing importance of **both grid-connected and behind-the-meter battery systems**. As highlighted in the IEA's *Global EV Outlook 2024*, the rise of electrified infrastructure broadly reinforces the role of battery storage in balancing grids and enabling strategic energy deployment across sectors.

The **National Renewable Energy Laboratory (NREL)** monitors domestic storage deployment trends through its Storage Futures Study. As of 2025, **Lithium Iron Phosphate (LFP)** chemistry represents over 70% of utility-scale installations, driven by its superior thermal safety and long cycle life. Beyond traditional applications, new deployment opportunities are emerging in data centers, cold storage facilities, and rural substations. Continued declines in capital costs, combined with the 30% storage **Investment Tax Credit (ITC)** introduced under the Inflation Reduction Act (IRA), have made many projects financially viable—even in the absence of utility mandates.

NREL projects that by 2035, battery storage will represent more than **15% of total capacity additions** in the U.S., surpassing peaker plants and some natural gas investments.

Within this emerging ecosystem, Alabama stands out. Positioned at the center of the Southeast Battery Belt, the state combines a globally recognized **automotive manufacturing base**, access to strategic materials like **graphite** (Alabama Graphite Products - Westwater Resources), a trained and growing **advanced manufacturing workforce**, and logistical advantages that connect OEMs and suppliers across the region.

These assets position Alabama to play a **foundational role in shaping the U.S. battery economy**. The challenge now is not just to host EV-adjacent projects, but to **build out a complete battery ecosystem** — one that includes **recycling, grid-scale storage, component manufacturing, and next-generation R&D**. This report tells the story of a rapidly transforming battery supply chain—and how Alabama can anchor itself within it. Through sections on the industry's evolution, federal policy shifts, supply chain vulnerabilities, circularity and recycling strategies, and Alabama's strategic readiness, we build a picture of how the state can become a pivotal hub in the Southeast Battery Belt.

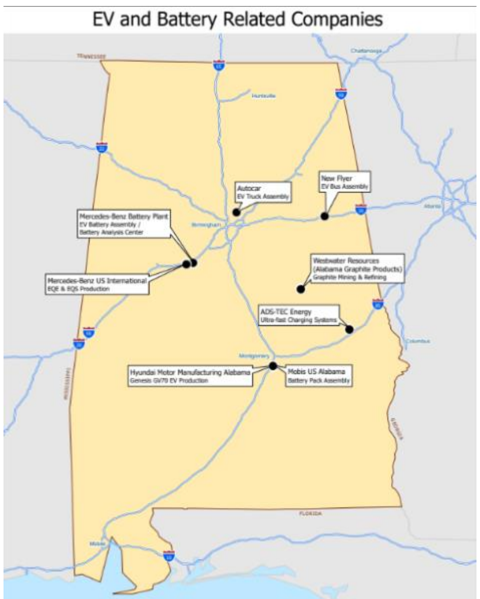

Figure 1: AL Intel. *Alabama EV and Battery Related Companies*.

From Lead to Lithium: The Early Battery Supply Chain

Lead Batteries: A Model of Circularity

While today's attention centers on lithium-ion, lead batteries remain a foundational energy storage technology in the U.S. — powering cars, data centers, hospitals, and telecom infrastructure. Most notably, the lead battery sector has achieved near-total circularity.

According to **Battery Council International (BCI)**:

- More than 130 million lead batteries are recycled annually

- The industry supports over 25,000 jobs across 38 states
- The sector operates at a 99% domestic recycling rate, the highest of any consumer product[10]

This model of closed-loop infrastructure offers a blueprint for lithium-ion recycling systems under development today *(For a glossary of technical terms and chemistries, see Appendix A)*.

Lithium-Ion Batteries: From Consumer Devices to Critical Infrastructure

First commercialized in the 1990s, lithium-ion batteries now dominate EV and stationary storage markets. According to **DOE** and **IEA**, this technology's rapid cost decline — over 80% in the past decade — unlocked mass-market EV adoption and grid-scale storage deployment[11].

However, this dominance has introduced new vulnerabilities:

- Heavy reliance on imported critical minerals like lithium, cobalt, and nickel (*see Figure 2 & 3*)
- Foreign control of midstream processing — especially in China
- Complex end-of-life management without unified recovery systems

These risks have prompted a nationwide push for domestic capacity across the full battery lifecycle, from raw material processing to recycling.

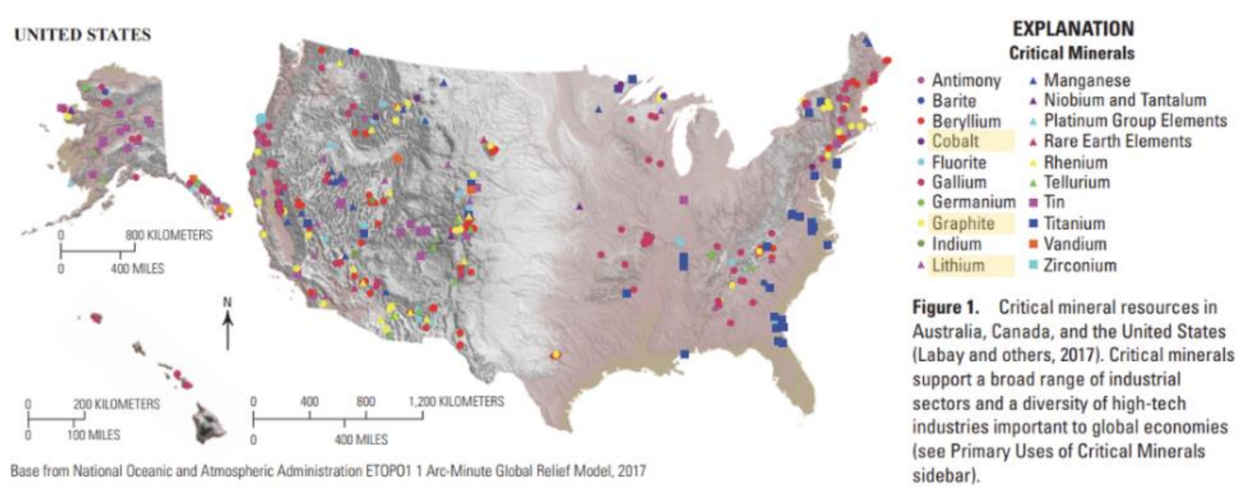

Figure 2: U.S. Geological Survey. 2023. *United States Critical Minerals Locations* [Map]. Reston, VA: U.S. Department of the Interior. https://www.usgs.gov/media/images/united-states-critical-minerals-locations.

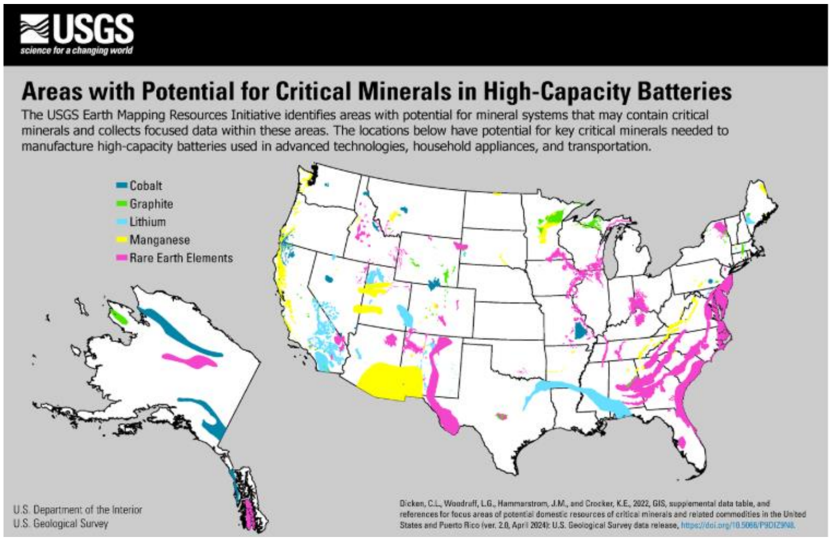

Figure 3: U.S. Geological Survey. 2023. *Areas of Potential for Key Critical Minerals in High-Capacity Batteries* [Map]. Reston, VA: U.S. Department of the Interior. https://www.usgs.gov/media/images/areas-potential-key-critical-minerals-high-capacity-batteries.

The U.S. Supply Chain Challenge

The rapid evolution of battery technologies and manufacturing—from lead-acid cells to advanced lithium-ion systems—has transformed global markets but also revealed weaknesses in domestic supply chains that threaten long-term U.S. competitiveness. The **2021–2024 DOE Supply Chain Review** highlights three core gaps:

- Insufficient midstream production (e.g., cathode/anode materials)
- Lack of large-scale domestic processing of battery-grade lithium and graphite
- Underdeveloped recycling and second-life battery infrastructure[12]

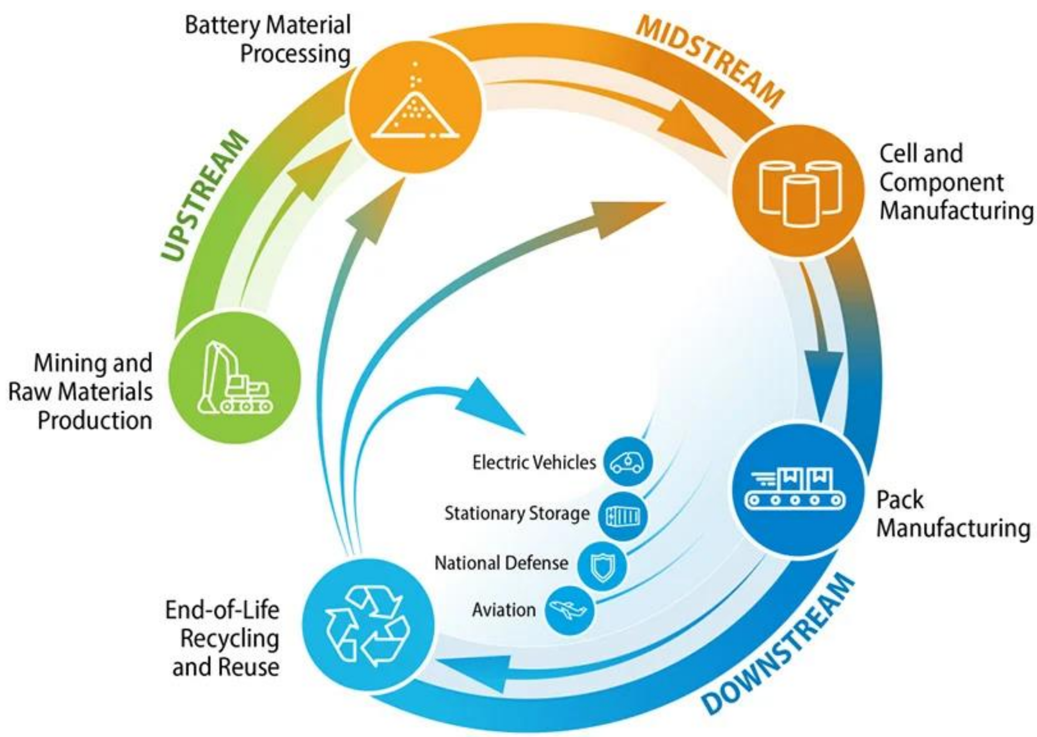

Figure 4: The Lithium-Ion Battery Supply Chain Database highlights companies at various points in the supply chain, ranging from mining and raw materials production to end-of-life recycling. *Graphic by Joelynn Schroeder, NREL.* https://www.nrel.gov/news/detail/program/2024/nrel-battery-supply-chain-database-maps-out-the-state-of-north-americas-manufacturing-base

The **Li-Bridge initiative**, led by the U.S. Department of Energy and Argonne National Laboratory, underscores the persistent vulnerability of the U.S. battery industry to **foreign-controlled supply chains**. Its 2024 roadmap reveals that **less than 30% of battery material inputs** are currently produced domestically—placing both **FEOC compliance** and long-term **industrial independence** at risk[13]. The 2023 Li-Bridge Industry Report further warns that U.S. battery manufacturing is especially dependent on **Chinese-sourced cathodes, anodes, precursors, and separators**.

To address these gaps, the report recommends prioritizing **domestic midstream production**—even if critical minerals are imported—as well as **expanding recycling infrastructure** and **diversifying imports** through **Free Trade Agreement (FTA) partners**. These steps, supported by the Li-Bridge 2024 Recycling Forum and echoed by NAATBatt[14] and Columbia CGEP[15], are seen as critical to reducing exposure to FEOC jurisdictions while building a more **resilient, U.S.-anchored battery value chain** *(See Appendix D for AMP vs. national supply chain prioriti*es).

Alabama maintains a unique position as a domestic source of FEOC-compliant battery materials. **Alabama Graphite Products' (Westwater Resources) graphite processing facility in Coosa County** — the first battery-grade natural graphite plant in the United States — anchors a critical link in the domestic battery supply chain. By mining, processing, and refining within Alabama, Alabama Graphite Products (Westwater Resources) offers an alternative to imported graphite refined in China, directly supporting both IRA eligibility and FEOC compliance for downstream battery manufacturers. This **vertically integrated model** positions Alabama as a natural hub for future investments in critical materials, particularly in graphite, lithium, and nickel processing — areas where U.S. capacity remains underdeveloped.

The region's strategic opportunity extends beyond graphite. In 2025, **Standard Lithium**, in partnership with **Equinor**, secured a **$225 million DOE grant**[A] to advance lithium extraction in the **Smackover Formation** — a vast subsurface brine resource stretching from Arkansas through Louisiana into **South Alabama**. This project establishes a key regional supply corridor for battery-grade lithium hydroxide, reinforcing the Southeast's emerging role in critical minerals supply chains. When combined with investments like **South Star Battery Metals' graphite operations in the Alabama-Tennessee corridor**, Alabama stands at the intersection of multiple FEOC-compliant mineral supply chains — strengthening its case as a strategic hub for battery manufacturing, materials processing, and industrial resilience.

Recent legislative developments—particularly the passage of the **One Big Beautiful Bill (OBBB) Act**—further complicate this landscape by **scaling back key federal incentives** for battery manufacturing and recycling. This shift may **slow domestic investment** and **increase the compliance burden** for developers operating under tightening FEOC enforcement regimes. For additional detail on these regulatory changes and their impact on **Section 45X eligibility**, see the "*FEOC Compliance: Before and After OBBB*" section below.

On **August 13, 2025**, the U.S. Department of Energy announced nearly **$1 billion in new funding opportunities** to secure the domestic supply of critical minerals and materials, spanning extraction, refining, processing, manufacturing, and recycling[16]. The initiative explicitly bars reliance on, or exports to, Foreign Entities of Concern (FEOCs) and prioritizes reshoring critical capabilities that support both clean energy development and national defense supply chains. Unlike Biden-era programs under the Bipartisan Infrastructure Law and Inflation Reduction Act—which prioritized decarbonization, equity (via Justice40), and broad industrial scaling—this new effort highlights energy dominance and national security as the central drivers. Its timing is particularly notable following passage of the OBBB Act. With private-sector incentives

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[A] See article: https://www.standardlithium.com/investors/news-events/press-releases/detail/183/standard-lithium-and-equinor-finalize-225-million-grant.

narrowed, DOE's direct funding streams now become one of the most important policy levers to advance critical minerals projects, especially in midstream processing, cathode/anode manufacturing, and large-scale recycling. Beyond EVs and grid storage, the DOE frames critical minerals as strategic assets for aerospace, defense, and industrial resilience For Alabama, the message is clear: economic developers should position the state not only as an EV hub but as a **secure, FEOC-free corridor for processing, manufacturing, and recycling**, aligned with DOE's reshoring push and the defense-industrial base.

Closing the Loop: Recycling and Circular Supply Chains

Closing domestic battery supply chain gaps will require more than new extraction and processing; it depends on a resilient midstream sector supported by recycling and circular supply chains—areas where Alabama can develop a competitive advantage. Battery material recycling is not only an environmental necessity but also a critical lever for strengthening supply chain resilience.

AMP emphasizes that **full-lifecycle battery recovery systems** — including collection, disassembly, reuse, and hydrometallurgical recycling — are essential to a sustainable domestic supply chain. These insights reinforce DOE's BIL-funded push to replicate lead battery circularity in lithium-ion systems[17].

Domestic Material Recovery: Current State

According to **Battery Council International (BCI),** the U.S. lead battery industry recycles **130 million batteries annually**, supporting over **25,000 jobs nationwide.** Recycling plants recover **99% of lead**, showing a proven closed-loop system[18].

The **DOE's circularity strategy** aims to replicate this model in lithium-ion recycling. With IRA and BIL support, the department is scaling **hydrometallurgical processing** for cobalt, lithium, and nickel recovery — essential for EV battery circularity[19].

According to Li-Bridge's 2024 forum report[20], with the right infrastructure, recycled materials could meet **45% of U.S. lithium demand, 55% of cobalt demand, and 35% of nickel demand by 2040**. However, key bottlenecks remain, including limited access to end-of-life EV batteries, underbuilt black mass processing infrastructure, and a lack of standardized diagnostic and disassembly protocols. Unlike the lead battery industry—where battery form factors and recycling processes are standardized—lithium-ion batteries vary widely in chemistry, form, size, and configuration. This complicates safe diagnosis, dismantling, and material recovery, ultimately increasing costs and risks for recyclers.

Early efforts to build lithium-ion recycling infrastructure in the Southeast illustrate both the financial risks and long-term potential of this emerging sector — as shown by contrasting examples in Alabama and Georgia:

- **Case Study — Li-Cycle Tuscaloosa ("Spoke")**[B]
  Opened in 2022 near Mercedes-Benz's battery plant in Tuscaloosa, Li-Cycle's 100,000 sq ft recycling facility initially created local jobs and capacity. After entering creditor protection in 2024, the company's assets were acquired by Glencore[C] in August 2025. This transition underscores both the financial risks of early-stage recycling ventures and the strategic interest of established mining firms in securing U.S. recycling capacity[21].
- **Successful Southeast Example — Ascend Elements, Covington, Georgia**[D]
  Ascend Elements launched its $50 million Base 1 lithium-ion battery recycling facility in Covington in March 2023, with operations starting in August 2022. The facility has processed up to 30,000 tonnes of batteries annually—roughly 70,000 EV packs—and employs around 100 staff, with plans to grow to 185 by 2024. It also recovers over 98% of critical materials using its Hydro-to-Cathode™ process[22]

(See Appendix B for a full list of battery recycling projects in the U.S. South.)

Giving Batteries a Second Life

Before they are recycled, lithium-ion batteries can often be repurposed for **less demanding energy applications**. Once EV batteries fall to around 70–80% of their original capacity, they may no longer be optimal for transportation — but they remain viable for **backup storage and stationary services**.

According to the **National Renewable Energy Laboratory (NREL), t**he U.S. could access more than **20 GWh per year** of second-life battery capacity by 2030. Reused batteries are ideal for microgrids, rural co-ops, and community resilience centers and offer up to **30% cost savings** compared to new battery assets[23]

[B] Opening: https://li-cycle.com/press-releases/li-cycle-opens-lithium-ion-battery-recycling-facility-in-alabama/
Bankruptcy: https://investors.li-cycle.com/news/news-details/2025/Li-Cycle-Obtains-Creditor-Protection-Under-CCAA-and-Chapter-15/default.aspx

[C] See article: https://www.esgdive.com/news/glencore-completes-takeover-of-li-cycle-battery-recycling-assets/757412/
[D] See article: https://ascendelements.com/ascend-elements-base-1-grand-opening/

Battery Chemistry Trends

According to **NREL** and **DOE** market reports, lithium-ion remains dominant but is evolving into distinct classes:

- **Lithium Iron Phosphate (LFP)**[E]: Cobalt-free, safer, and ideal for stationary storage and affordable EVs
- **Nickel Manganese Cobalt (NMC)**: Higher energy density for long-range vehicles, but more expensive and reliant on constrained minerals

LFP now makes up over 50% of new grid-scale storage deployments in the U.S.[24]. This growth is supported by **robust domestic investment in cathode material production** (see Table 1), as companies like Redwood Materials, Sparkz, and LG Chem expand U.S.-based manufacturing to meet IRA-driven demand and application-specific market segmentation.

Table 1: Selected U.S. Cathode Material Production Investments

See Appendix B for Recent Battery Supply Chain & Recycling projects in the U.S. Southeast

Company	Technology Focus	Capital Expenditure & Plans	Facilities & Location
Wildcat Discovery Technologies	Nickel- and cobalt-free cathode materials (LFP, LMFP, DRX)	Plans to build a U.S. plant to produce LFP by late 2026, LMFP in 2027, and DRX in 2028	San Diego, CA; U.S. plant location TBD
Redwood Materials	Recycled cathode active materials (Ni, Mn, Co, Li)	Investing $3.5B in a facility in Berkeley County, SC; aims to produce 100 GWh of cathode and anode components annually	Carson City & McCarran, NV; Berkeley County, SC

[E] **Example:** LG Energy Solution is expanding U.S.-based LFP production with dual facilities in Michigan and Arizona, representing a ₩2 trillion+ (~$1.5B USD) investment focused on stationary storage. Recent earnings calls indicate a strategy to develop advanced LFP chemistries to compete with Chinese producers while maintaining NMC production for EVs. Production starting in H2 2024 aligns with projected utility-scale storage demand growth and Inflation Reduction Act incentives, reflecting a broader market split between premium EV chemistries and storage-focused LFP solutions.

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Sparkz Inc.	Nickel- and cobalt-free cathode materials (LFP)	Awarded $12.9M under Section 48C(e) to boost U.S. production of lithium battery cathode materials	Livermore, CA; facilities in Sacramento, CA; Bridgeport, WV; Knoxville, TN
LG Chem	NCMA cathode materials for EV batteries	Investing $3.2B in a cathode manufacturing facility in Clarksville, TN; expected to produce 60,000 tons annually by 2027	Clarksville, TN
Lithium Werks	LFP cathode powders and Nanophosphate® materials	Announced plans to build the largest North American-based cathode powder and electrode production facility	Offices in Austin, TX; current production in China; North American facility location TBD
Ascend Elements	Hydro-to-Cathode® recycled pCAM materials	Raised $704M in equity investments to construct a $1B manufacturing facility in Hopkinsville, KY; expected to begin operation at the end of 2025	Hopkinsville, KY
NEI Corporation	Cathode materials including LMFP and graphene-enhanced	Expanded facilities by 9,200 sq ft in Summer 2023 to enhance production capabilities	Somerset, NJ; business office in Piscataway, NJ
American Battery Technology Company (ABTC)	Recycling and extraction of cathode-grade lithium hydroxide	Received a $144M grant from the U.S. DOE to construct a second lithium-ion battery recycling facility	Reno, NV; additional U.S. facilities planned

Federal Investment in R&D and Innovation

To maintain **global competitiveness**, the U.S. must lead in chemistry, processing, and manufacturing innovation across the battery lifecycle.

The **U.S. Department of Energy (DOE)** and its national lab partners are advancing:

- **Dry electrode processing** to reduce energy use and improve manufacturing speed
- **Silicon-dominant anodes**, with the potential for 20–30% improved energy density
- **Sodium-ion chemistries** as a lithium-free, scalable solution
- **Solid-state batteries** offering safer, longer-range EV performance

The **Battery500 Consortium**, coordinated by DOE, Argonne, and Pacific Northwest National Laboratories, aims to **double lithium-ion energy density by 2030**, focusing on lithium-metal anodes and advanced electrolyte systems[25].

Established by the DOE and led by **Argonne National Laboratory**, **Li-Bridge** was created to address the commercialization gap in battery innovation. According to its 2024 roadmap, the U.S. faces two major bottlenecks:

- A lack of **pilot-scale domestic manufacturing**, which prevents lab breakthroughs from scaling
- Chronic underinvestment in component-specific R&D — especially for **separators, coatings, and electrolytes**[26]

Li-Bridge recommends establishing **regional pilot hubs** that collocate innovation centers with manufacturers — enabling faster scale-up, better workforce integration, and **early-mover adoption of next-gen materials**. Alabama is already positioned to meet this need through the **AMP Center**, which connects industry partners with applied research in electrification, battery systems, and supply chain innovation. By serving as both a technology accelerator and a workforce development collaborator, AMP offers a regional platform that supports pilot-scale manufacturing, industry-led R&D, and practical commercialization pathways.

Federal policy interventions have emerged as the key mechanism to accelerate recycling, midstream production, and domestic supply chain security. The **International Energy Agency (IEA)** warns that the U.S. risks falling behind without faster midstream innovation and chemistry diversification. Nations like China and South Korea have already achieved significant **cost and performance advantages** in cathode and electrolyte manufacturing[27].

While the IEA ranks the U.S. highly in basic research, it scores lower in **commercial scalability** — a gap that new programs like **Li-Bridge** and the **DOE's Energy Storage Grand Challenge** are working to close through targeted funding and industry coordination[28]. Understanding these federal policy drivers and market signals is essential for Alabama to chart a strategic response. These policy efforts and their evolution under IRA, BIL, and OBBB are examined in the following section.

Federal Battery Policy Retrospective: IRA, BIL, and the Road Ahead After OBBB

1. The 2022–2025 Policy Push: IRA and BIL

From 2022 to mid-2025, the *Inflation Reduction Act (IRA)*[29] and *Bipartisan Infrastructure Law (BIL)*[30] together catalyzed over $100 billion in announced U.S. battery investments across cells, modules, cathodes, anodes, electrolytes, and lithium-ion recycling. These efforts aimed to build domestic capacity and reduce reliance on Foreign Entities of Concern (FEOCs), bolstering both economic and energy security.

Key Federal Tools:

- **Section 45X Advanced Manufacturing Production Credit** (IRA Sec. 13502):
  - $35/kWh for U.S.-produced battery cells
  - $10/kWh for modules
  - Bonus credits for cathode/anode/electrolyte production
  - Additional 10% for critical minerals sourced from non-FEOC countries
  - Fully available through 2029; phased down by 2033
- **BIL Battery Supply Chain Grants (2022–2026)**:
  - $6B for materials processing and cell manufacturing (Sec. 40207)
  - $200M for battery recycling and reuse (Sec. 40208)
  - ~$860M for long-duration grid storage (Sec. 41001/41004)

2. The 2025 Shift: OBBB Act Impacts[31]

Signed July 4, 2025, the *One Big Beautiful Bill (OBBB) Act*[32] introduced major changes to clean energy policy while **preserving the battery-specific provisions of IRA/BIL**:

What Stayed the Same:

- **45X tax credits**: Not repealed; original phaseout schedule remains intact
- **FEOC eligibility rules**: Statutory definitions unchanged, but enforcement is expected to intensify starting FY 2026 through IRS/Treasury rulemaking
- **BIL Section 40207/40208 grants**: Still active and authorized through FY 2026; no rescissions in H.R. 1

What Was Rolled Back:

- **Clean energy and EV credits**:
  - EV tax credits (30D) end Sept 2025
  - EV charger credits expire June 2026
  - Wind/solar PTC/ITC terminate for projects placed in service after Dec 31, 2027
  - Hydrogen, residential, and building efficiency credits phased out starting 2026
- **DOE loan programs rescinded**:
  - $3.6B: Title 17 Loan Guarantee Program
  - $3B: ATVM Loan Program
  - $5B: Energy Infrastructure Reinvestment (Sec. 1706)
  - Tribal Energy Loan Program zeroed out
- **Federal land-use policy**:
  - New annual acreage rents and 3.9% gross sales fees on renewables
  - Mandated fossil lease sales in Gulf and Alaska basins

3. FEOC Compliance: Before and After OBBB

Aspect	IRA/BIL (2022–2025)	Post-OBBB (2025–)
Definition	Set by IRA/BIL statutes	Legal definition unchanged; final guidance issued May 2024 (DOE)
Enforcement	Relied on DOE/IRS interpretation and self-certification	Tighter Treasury/IRS documentation and audit standards expected by FY 2026
Access to Credits	Required for 45X, 30D, 45V eligibility	Still required, but developers must prepare for third-party validation and traceability

4. Domestic Content & Strategic Advantage

While domestic content bonus credits technically remain, **FEOC compliance now serves as the practical gatekeeper** to accessing most clean energy tax benefits. As broader clean energy credits phase out, the remaining incentives for FEOC-compliant production will increasingly derive from:

- **45X credits** (still in place)
- **DOD programs and procurement rules**, especially for dual-use and secure supply chain projects

DOD-aligned battery innovation (e.g., for grid resilience, military-grade cells) is further supported by $25.4B for national security-related supply chains and $1B in Defense Production Act (DPA) battery funding

5. What Federal Incentives Still Exist?

Mechanism	Status Post-OBBB
Section 45X tax credit	Remains; 100% through 2029, phases out by 2033
BIL battery grants	Still authorized through FY 2026 (Sections 40207/40208)
EV and charging credits	End by Sept 2025 and June 2026, respectively
DOE loan authority	Over $11B rescinded across Title 17, ATVM, and Section 1706
DOD/DPA battery funding	$26.4B in appropriated resilience and national security battery funds

(Appendix E compares these federal policy changes to regional EV and battery demand projections.)

Together, IRA, BIL, and the OBBB Act have reshaped the battery manufacturing landscape. To succeed in this evolving environment, Alabama must anticipate and respond strategically to shifting federal policy priorities and evolving battery market dynamics, positioning itself to capture long-term supply chain advantages.

Alabama's Value Proposition: A Strategic Hub for Battery Supply Chains

Having explored the broader policy landscape and supply chain challenges, this section turns to Alabama's strategic readiness — showing how the state can translate national battery market dynamics into long-term competitive advantage. **Alabama's value proposition — industrial readiness, regional integration, and trained workforce — transcends any single policy cycle.** With a flexible, policy-aware approach, developers can secure investment and reinforce the state's leadership in a rapidly evolving battery economy.

Alabama is more than a competitor in the U.S. battery race—it's shaping the future of the domestic battery economy. With a vertically integrated industrial base and strong regional integration, Alabama is aligned with the next era of federal priorities: **defense readiness**, **energy dominance**, and **domestic supply chain security**.

The state's competitive edge stems from its:

- **Critical minerals infrastructure** (e.g., Alabama Graphite Products' [Westwater Resources] battery-grade graphite plant in Coosa County—fully FEOC-compliant and IRA-eligible)
- **OEM-led manufacturing base** (Hyundai and Mercedes-Benz EV platforms anchored by battery pack plants)
- **Strategic location** within the Southeast Battery Belt, offering port access, logistics, and regional workforce mobility
- **SEEDS program and AMP & AIDT workforce pipeline**, preparing shovel-ready sites and trained talent for high-capacity manufacturing projects

Alabama is home to dual-use infrastructure serving **automotive, aerospace, and defense** applications—key for federal procurement under DOD priorities. The state's industrial assets lower capital risk and accelerate time-to-market for both commercial and military-grade battery platforms. This dual-use foundation gives Alabama an edge in marketing to multiple sectors. Battery-related investment can be drawn not only from automotive and EV producers but also from aerospace manufacturers, defense contractors, and grid-scale energy storage developers seeking secure, FEOC-compliant manufacturing bases.

A Sector That's Defining the Next Industrial Era

This value proposition is not just about attracting projects today—it is tied to the larger transformation of the battery economy itself. Battery manufacturing is no longer just a clean energy story — it is now central to U.S. **national security**, **industrial strategy**, and **global competitiveness**. The International Energy Agency (IEA) places batteries alongside semiconductors and oil as technologies that shape geopolitical power[33]. While oil remains influential, batteries are emerging as a defining force in energy and defense infrastructure.

The United States has responded with historic levels of federal action. According to Columbia University's Center on Global Energy Policy, the Inflation Reduction Act (IRA) and Bipartisan Infrastructure Law (BIL) have fundamentally transformed battery supply chain planning, foreign investment, and project siting — with long-term effects expected regardless of short-term political shifts[34]. As batteries become integral to industrial strategy and national security, Alabama's manufacturing ecosystem is evolving to meet this new era of competition.

Alabama's Role in the Battery Economy

Alabama is not just competing for battery investment — it is helping define the emerging U.S. battery economy. With the right infrastructure, strategic partnerships, and messaging, the state is positioned to lead across the value chain, from **critical mineral processing** to **pack assembly**, **grid storage**, **recycling**, and **next-generation R&D**.

Alabama has made measurable progress across the battery value chain:

- **Upstream**: Alabama Graphite Products' (Westwater Resources) graphite facility (first U.S. battery-grade plant, fully FEOC-compliant)
- **Midstream**: Mercedes-Benz battery pack assembly in Bibb County
- **Downstream**: EV production by Hyundai and Mercedes-Benz in Montgomery and Tuscaloosa
- **Enablers**: AIDT and AMP Center workforce development, SEEDS site readiness, multimodal logistics and port access

This vertically integrated foundation positions Alabama as a core player in the **Southeast Battery Belt**, aligned with DOE, Li-Bridge, and IEA guidance on regional clustering[35].

Thanks to the AMP Center, MAGNET Consortium, and coordination among state and utility partners, Alabama has begun securing high-value projects across sectors. This leadership is reinforced by Alabama's role within the broader Southeast Battery Belt—a regional corridor that enhances supply chain efficiency and investment appeal.

To date, the state is in the running for over $15 billion and has secured $3.75 billion in battery- and EV-related investment:

Year	New & Expanding	Company	Jobs	CapEx
2025	E	ArcelorMittal	200	$1,200,000,000.00
2023	N	INICS Battery Solutions Corporation	30	$14,000,000.00
2023	N	Samkee Corporation	170	$128,000,000.00
2023	E	Shinwha Auto USA	50	$114,000,000.00
2023	N	Viridi RNG	7	$11,052,085.00
2022	N	ADS-Tec Energy Inc.	177	$8,095,000.00
2022	E	Hyundai Mobis	200	$300,000,000.00
2022	E	Hyundai Mobis	400	$205,000,000.00
2022	E	Shinwha Auto USA	42	$78,000,000.00
2022	E	Toray Composite Materials America	0	$15,000,000.00
2021	N	Alabama Graphite Products LLC	100	$202,000,000.00
2021	N	Alleo Energy	20	$20,000,000.00
2021	N	Li-Cycle Corp.	78	$18,700,000.00
2020	N	DURA Automotive Systems	279	$59,000,000.00
2019	E	MacLean Power Systems	0	$10,000,000.00

2019	E	RePower South Montgomery	0	$4,200,000.00
2018	E	Birmingham Control Systems	40	$1,950,000.00
2018	N	Mercedes-Benz U.S. International	325	$268,000,000.00
2018	E	New Flyer	0	$25,000,000.00
2018	N	RePower South Montgomery	67	$7,800,000.00
2017	E	Mercedes-Benz U.S. International	600	$1,000,000,000.00
2015	E	New Flyer	0	$20,000,000.00
2013	N	Infinitus Energy	110	$35,000,000.00
2010	E	Birmingham Control Systems	6	$0.00
2010	E	Thermal Corporation	5	$400,000.00
2009	N	Team Green Recycling Inc.	60	$6,000,000.00
2007	E	Materials Recovery Corporation	0	$80,000.00
2005	E	Materials Recovery Corporation	5	$800,000.00
2004	E	Thermal Corporation	4	$250,000.00
2002	E	Materials Recovery Corporation	0	$150,000.00

For full details of recent battery recycling and supply chain projects Southeast, see Appendix B.

For an EV Battery market snapshot of Alabama and the broader Southeast, see Appendix C.

According to AMP simulation data, Alabama, Georgia, and Mississippi are projected to require approximately 129 GWh of battery capacity by 2028, rising to nearly 191 GWh by 2033 *(Full GWh demand projections and methodology can be found in Appendix E)*. This growth reflects accelerating electrification trends and supports strategic supplier colocation, workforce planning, and permitting alignment across the region[36].

Regional Integration in the Southeast

The broader Southeast — including Georgia, Tennessee, Kentucky, and South Carolina — forms the backbone of U.S. battery manufacturing and logistics.

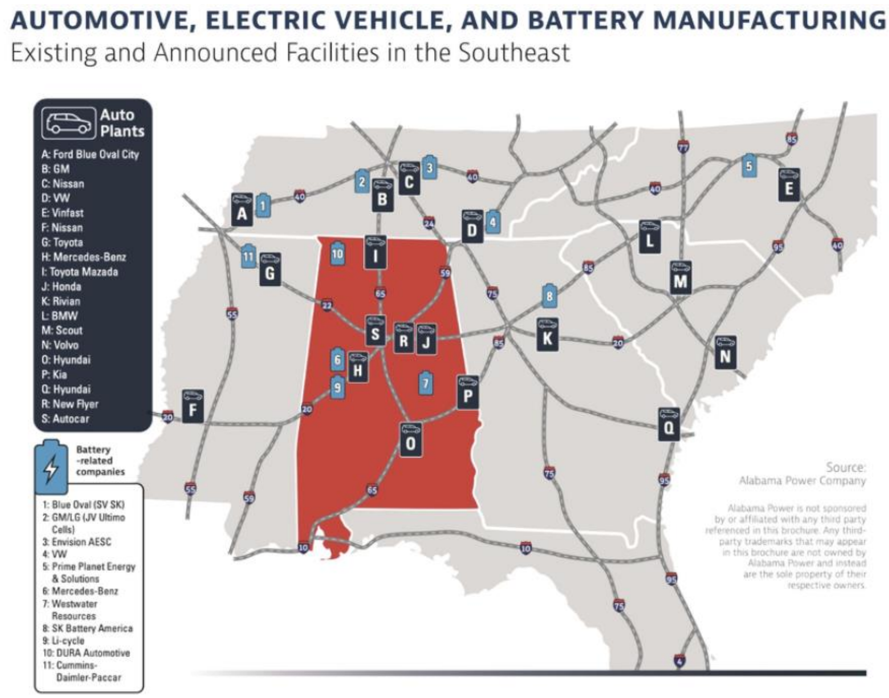

Figure 5: Alabama Power Company.

According to S&P Global and IEA:

- The region co-locates cathode, anode, and separator plants
- Hosts top EV platforms (Hyundai, Rivian, BMW, Ford, VW, Mercedes)
- Offers access to key ports (Mobile, Savannah, Charleston)
- Supports workforce mobility across borders[37]

Alabama's integration into this corridor reduces logistical costs and strengthens compliance with domestic sourcing and FEOC standards. Additionally, Alabama's established metals, chemicals, and industrial machinery sectors can be leveraged to diversify into battery component manufacturing. Repurposing these legacy assets allows the state to broaden its supplier base and attract investments spanning cathodes, anodes, separators, and electrolytes. While regional integration strengthens logistics and supplier clustering, sustaining this advantage ultimately depends on the availability of skilled workers to meet rapidly growing demand.

Workforce: The Limiting Factor in Battery Growth

Workforce capacity is one of the sector's greatest constraints. DOE estimates over **100,000 skilled battery workers** will be needed by 2030, including roles in cell/pack assembly, critical material processing, as well as in engineering, automation, and safety[38].

Li-Bridge finds few states offer dedicated battery credentials or apprenticeships, creating labor bottlenecks in project ramp-up[39].

Alabama offers a clear response:

- **AIDT** delivers custom workforce training to Hyundai, Mercedes, and component suppliers
- **Bevill State**'s EVSE diagnostic[F] program supports charging infrastructure readiness
- **AMP** is building a K–PhD pipeline linked to EV, storage, and recycling sectors

By 2028, the Southeast region will require approximately **18,922 skilled battery workers**, growing to **26,392 by 2033**—driven by EV adoption, grid storage, and circular supply chain growth[40]. This pipeline supports eligibility for DOE programs and is weighted in federal grant scoring *(For detailed AMP workforce modeling and national labor benchmarks, see Appendix E)*.

Site Readiness, Workforce Strength, and Industrial Pivot: Alabama's Competitive Edge

Federal selection criteria increasingly prioritize demonstrated workforce capacity, permitting readiness, access to grid and industrial utilities, and regional coordination (Li-Bridge 2024a; DOE 2024a)

Alabama meets these standards through:

- **SEEDS** ($23.2M for site prep and evaluation)
- **MAGNET and AMP** (state-university-industry partnerships)
- **EV Technology Center (AIDT, Huntsville)** — a national leader in EV and battery training

[F] See article: https://skillfusion.com/insights/skillfusion-supports-the-new-alabama-energy-infrastructure-training-center-and-network-with-first-of-its-kind-evse-skill-enhancement-program/

AMP and MAGNET also recommend **“dual-sector diversification”**: repositioning legacy manufacturers (e.g., metal, plastics, chemicals) to enter battery component production. Early adopters include:

- **Innovative Machine Solutions (Birmingham, AL):** A specialty manufacturer of industrial machinery and automation systems, IMS exemplifies how Alabama’s precision manufacturing base can adapt to battery pack assembly and cell production equipment needs (innovativemach.com).
- **Jagenberg Converting Solutions:** Originally a printing and packaging equipment company, Jagenberg successfully transitioned into manufacturing **battery cell coating and drying equipment**, demonstrating how legacy industrial technologies can be retooled for the battery market (https://www.jagenberg-converting.com/).
- **Capchem USA (Louisiana)[G]:** A chemical producer expanding into **battery-grade electrolyte production** for lithium-ion batteries — illustrating how Gulf Coast chemical producers are moving into battery component markets.

These examples show how Alabama’s manufacturing base is pivoting into new battery markets — reinforcing the state’s industrial flexibility and long-term supply chain resilience. Meeting these workforce and industrial requirements is critical for securing future investment, particularly as federal policy and procurement priorities shift. By leveraging cross-sectoral strengths—spanning automotive, aerospace, defense, and precision manufacturing—Alabama can position itself as a versatile hub for emerging battery opportunities, including electrolyte production, recycling facilities, and second-life battery applications. The following recommendations outline how economic developers can act strategically in this post-OBBB environment.

Recommendations for Economic Developers: Positioning in the Post-OBBB Era

Federal policy has entered a new phase. The **One Big Beautiful Bill (OBBB)** Act significantly scales back consumer-facing clean energy incentives—phasing out most IRA tax credits by 2027. Yet critical industrial provisions remain in effect, including:

- **Section 45X** production credits for battery components through 2032
- **BIL grants for cell manufacturing and recycling** through FY 2026

[G] See article: https://en.capchem.com/News_detail/23.html

- **Defense Production Act (DPA)** funding and DOD procurement channels emphasizing critical mineral security, grid resilience, and energy dominance[41]

In the evolving battery policy environment, developers can no longer rely solely on broad clean energy incentives. With tax credits phasing out and FEOC compliance tightening, Alabama must now compete by demonstrating **infrastructure readiness**, **federal policy fluency**, and alignment with emerging **national security and supply chain priorities**.

To support this shift, economic developers should adopt the following strategy:

1. Move Quickly on Remaining Federal Incentives

The Section 45X production tax credit phases down beginning in 2030, and most DOE BIL battery grants sunset after FY 2026. Economic developers should help companies navigate final rounds of funding — aligning with active FOAs while they remain open. Early-stage execution will be critical to secure eligibility for these diminishing supports.

2. Emphasize FEOC-Ready, Domestic Supply Chain Projects

Although OBBB did not redefine FEOC status, **enforcement is expected to intensify** starting in 2026. Companies can strengthen their project pitch by supporting supplier traceability, documentation readiness, and alignment with U.S.-based or FTA-aligned vendors. These practices are especially critical for maintaining 45X eligibility and accessing future DOD procurement pathways.

3. Prioritize Site Readiness Through SEEDS

With federal support narrowing, SEEDS-backed sites offer a decisive advantage. Economic developers should target SEEDS funding to prepare sites with:

- Completed environmental and utility evaluations
- Load forecasts and grid access
- Industrial zoning and permitting readiness

These factors mirror DOE scoring frameworks and will help position Alabama sites competitively for private investment and strategic federal attention *(Appendices C and D provide complementary context on regional investments and AMP's strategic workforce planning)*.

4. Engage in Defense-Driven Battery Projects

Federal investment is now flowing primarily through **DOD and national security channels**, including:

- Electrified weapons platforms
- Stationary storage for bases
- Dual-use grid resilience and microgrid applications

Alabama's aerospace and defense infrastructure — including secure logistics, certified suppliers, and military-adjacent labor pools — makes it a natural home for these projects.

5. Advance Workforce for Circularity and Scale

According to AMP, Alabama will require over **18,922 skilled battery workers**, rising to **26,392 by 2033.** Economic developers should support:

- Battery diagnostics and second-life training (e.g., Bevill State, AIDT)
- Grid storage and recycling certifications
- Upskilling workers from adjacent sectors (plastics, metal, chemical processing)

These areas are consistently flagged by DOE and Li-Bridge as bottlenecks to scaling domestic production *(For detailed AMP and national workforce modeling, see Appendix E)*.

6. Tell a Regional Story

Alabama doesn't stand alone — it sits at the heart of the **Southeast Battery Belt**, flanked by cathode plants in Tennessee, BlueOval SK in Kentucky, and EV clusters in Georgia. Economic developers should frame the state as part of a broader ecosystem with integrated supply chains, mobile workforces, and shared infrastructure — helping de-risk site selection for investors and federal partners alike.

Final Takeaways

- **Battery demand will grow 20x by 2040**, driven by EVs, grid storage, and electrification of industry[42]

- **Recycling, second-life use, and recovery** are now critical elements of supply security and tax credit eligibility[43]
- **Workforce is the constraint that defines competitiveness** — and Alabama is better prepared than most, thanks to AIDT, the AMP Center, the Alabama Community College System, Alabama colleges and universities, and OEM investment
- **Policy fluency is now an investment criterion**, as federal selection policy increasingly reward regions that can demonstrate workforce capacity, permitting readiness, grid and utilities access, and cross-sector coordination — advantages Alabama is leveraging through SEEDS, MAGNET, AMP, and its EV Technology Center to reposition legacy industries into battery markets and secure long-term supply chain resilience.
- **Alabama's value proposition** — centered on **industrial readiness, FEOC-compliant supply chain development, and strategic workforce alignment** — remains resilient amid shifting federal incentives. By leveraging cross-sector integration and aligning with evolving federal procurement and compliance standards, the state is well positioned to sustain battery investment momentum in the post-OBBB landscape.

Appendix A

Key Battery Industry Terms for Economic Developers

This appendix defines common terms, acronyms, and concepts relevant to the U.S. battery industry. It is designed to support economic developers and policymakers in understanding technical and regulatory language used throughout the report.

Battery Technologies and Components

Battery Cell – The basic energy storage unit of a battery system. Multiple cells are combined into modules and packs.

Battery Module / Pack – Assemblies of battery cells integrated with thermal management, housing, and safety systems.

Cathode – The battery's positive electrode. Typically made from lithium, cobalt, nickel, or manganese and key to energy density.

Anode – The battery's negative electrode. Most commonly made of graphite, though silicon blends are emerging.

Electrolyte – A conductive medium (liquid or solid) that enables ion flow between the anode and cathode.

Battery Management System (BMS) – Hardware and software that monitors temperature, voltage, and current; ensures safety and prolongs battery life.

Battery Chemistries

Lithium Iron Phosphate (LFP) – A cobalt- and nickel-free chemistry known for thermal stability and affordability. Widely used in stationary storage and entry-level EVs.

Nickel Manganese Cobalt (NMC) – A high-energy-density chemistry used in long-range electric vehicles. More expensive and mineral-intensive.

Nickel Cobalt Aluminum (NCA) – Similar to NMC but optimized for high power and fast charging. Common in Tesla battery platforms.

Solid-State – An emerging class of batteries using solid electrolytes. Offers potential for greater safety and energy density.

Sodium-Ion – A lithium-free alternative with abundant materials and lower costs. Promising for grid storage and commercial applications.

Lead-Acid – A mature and recyclable battery chemistry used in traditional vehicles and backup power systems.

Circular Economy and Second-Life Applications

Second-Life Batteries – Retired EV batteries repurposed for lower-demand uses such as grid storage, commercial backup, and microgrids.

Recycling (Li-ion) – Processes that recover lithium, cobalt, nickel, and other materials from spent lithium-ion batteries.

Black Mass – A shredded, mixed-material output from battery recycling containing valuable metals ready for chemical extraction.

Hydrometallurgy – A wet-chemical process used to separate and recover critical minerals from black mass.

Federal Policy, Incentives, and Regulation

One Big Beautiful Bill (OBBB) Act – 2025 budget reconciliation law that accelerates the sunset of several IRA/BIL clean energy incentives and tightens FEOC compliance requirements, reshaping project economics.

Inflation Reduction Act (IRA) – 2022 legislation providing tax credits for domestic battery production and EV adoption.

Bipartisan Infrastructure Law (BIL) – 2021 legislation funding battery recycling, grid storage, and critical materials processing.

Section 45X Credit – A production tax credit under IRA that incentivizes domestic manufacturing of battery cells, modules, and materials.

Section 30D Credit – A consumer EV tax credit that requires domestic or allied-sourced battery components and critical minerals.

Foreign Entity of Concern (FEOC) – Entities (e.g., Chinese-owned firms) that disqualify a battery project from receiving certain IRA credits.

Funding Opportunity Announcement (FOA) – A formal solicitation from the DOE for grant or loan applications tied to IRA or BIL programs.

Section 40207 / 40208 – BIL sections funding (40207) critical mineral processing and (40208) battery recycling and second-life applications.

Workforce, Site Development, and Industrial Infrastructure

AIDT – Alabama's workforce development agency, offering advanced manufacturing and battery training programs.

Advantage Alabama – A statewide industrial site selection and marketing platform administered by the Economic Development Partnership of Alabama (EDPA).

Gigafactory – A large-scale battery manufacturing facility capable of producing cells or packs at multi-GWh capacity.

Battery Energy Storage System (BESS) – Grid-connected battery installations used for renewable energy integration, load balancing, and grid reliability.

Key Agencies and Organizations

AMP (Alabama Mobility and Power Center) – A public-private partnership between The University of Alabama, Alabama Power Company, and Mercedes-Benz U.S. International. AMP supports research, innovation, and workforce development in EV systems, charging infrastructure, and power delivery technologies critical to the electrification of mobility.

- **Abundant by 2035 Scenario (AMP)** – A user-selected assumption from the Alabama Mobility and Power (AMP) Consortium's Tableau-based EV adoption model. This scenario assumes that electric vehicle charging networks will be *abundantly deployed across the United States by 2035*, removing public charging availability as a primary constraint on EV adoption. It serves as a long-term planning benchmark for high-growth infrastructure environments.

U.S. Department of Energy (DOE) – Lead federal agency for battery supply chain strategy, research, and funding.

National Renewable Energy Laboratory (NREL) – DOE-funded lab specializing in grid storage, techno-economic modeling, and cost forecasting.

International Energy Agency (IEA) – An intergovernmental organization that provides energy system forecasts and global policy recommendations.

Battery Council International (BCI) – Industry organization representing U.S. lead and lithium-ion battery manufacturers and recyclers.

Li-Bridge – A DOE and Argonne National Laboratory-led initiative convening public and private stakeholders to build a resilient U.S. lithium battery supply chain.

Center on Global Energy Policy, Columbia University – Academic policy institute providing analysis on IRA/BIL implementation, FEOC guidance, and industrial competitiveness.

Appendix B

Battery Recycling Projects in the U.S. South

(*Announced or Funded Since 2021*)

Company	Location	Announcement / Operation	Investment / Jobs	Project Description
Li-Cycle	Tuscaloosa, AL	Sep 2021 / 2022	$18.7M / 78 jobs	Lithium-ion recycling facility (Tuscaloosa, AL). Originally operated by Li-Cycle, which entered bankruptcy in 2024. Assets were acquired by Glencore in August 2025, with operations transitioning under Glencore's ownership.
Redwood Materials	Berkeley Co., SC	Dec 2022 / 2025 (expected)	$3.5B / 1,500+ jobs	100 GWh/year facility for battery materials via recycling, refining, and manufacturing.
Ascend Elements	Covington, GA	Jan 2022 / Mar 2023	$50M / 150 jobs	Recycles EV batteries and lithium-ion scrap.
Princeton NuEnergy	Chester Co., SC	Jun 2024 / Q3 2024 (expected)	$11M / 41 jobs	25,000-sq-ft recycling facility for EV and lithium-ion scrap.

Dongwha Electrolyte	Clarksville, TN	Feb 2023 / 2025 (expected)	$70M / 68 jobs	Lithium-ion battery electrolyte plant (86,000 tons/year).
Cirba Solutions	Richland Co., SC	Oct 2023 / 2026 (expected)	$300M / 300 jobs	Li-ion recycling and recovery (50,000 tons/year capacity).
American Battery Tech Co.	U.S. South (TBA)	DOE Award: Mar 2024	$60M DOE grant	National lithium hydroxide processing hub.

Battery Supply Chain Projects in the U.S. South

(*Announced or Funded Since 2021*)

Company	Location	Announcement / Operation	Investment / Jobs	Project Description
Dura Automotive	Muscle Shoals, AL	2021 / Jan 2022	$59M / 270 jobs	Manufactures EV battery enclosures for Mercedes-Benz.
Canadian Solar	Shelbyville, KY	Nov 2024 / Late 2025 (expected)	$712M / 1,572 jobs	Battery storage production plant (6 GWh capacity).
Alabama Graphite Products (Westwater Resources)	Coosa Co., AL	2021 / 2024 (expected)	$202M / 100 jobs	First U.S. graphite processing plant (7,500–15,000 tons/year capacity).
Sicona Battery Technologies	Southeast U.S. (TBA)	Feb 2024 / TBA	Investment TBA / ~6,700 tons/year output	First U.S. silicon-carbon anode materials facility.
LG Chem	Clarksville, TN	Nov 2022 / 2025 (expected)	$3.2B / ~860 jobs	Cathode manufacturing plant (120,000 tons/year).
Capchem Technology USA	Ascension Parish, LA	Nov 2023 / 2026 (construction start)	$350M / 95 direct + 475 indirect jobs	U.S. largest carbonate solvent and electrolyte production facility (proposed).
Microporous	Pittsylvania Co., VA	Nov 2024 / TBA	$1.35B / ~2,015 jobs	Lithium-ion separator plant (1M sq ft across two phases).
Equinor & Standard Lithium	Magnolia, AR	Jan 2025	$225M DOE grant	Direct lithium extraction from Southern Arkansas brine.

Element 25	Ascension Parish, LA	May 2023 / TBA	$289M / ~220 jobs	HPMSM production for EV batteries using Australian feedstock.
Albemarle	U.S. South (TBA)	Oct 2022	$149.7M DOE grant	Lithium hydroxide processing plant to support EV supply chain.
Anovion Technologies	Southwest GA	Mar 2023 / TBA	$800M / Jobs TBA	Synthetic graphite anode material facility.
Terravolta Resources	Texarkana Region, AR	Jan 2025	$225M DOE grant (pending)	Lithium extraction from unconventional brine sources. Sold all equity interests in two subsidiaries—encompassing approximately 100,000 net acres in the Smackover Formation—to Chevron U.S.A. Inc.
Syrah Technologies	Vidalia, LA	DOE Loan Issued 2022	$102M DOE loan / ~150 jobs	First vertically integrated natural graphite anode facility in the U.S.
Ultium Cells (GM & LGES JV)	Spring Hill, TN	Apr 2021 / TBA	$2.6B / 1,700 jobs	Battery cells for 600,000 EVs/year.
Envision AESC Gigafactory	Bowling Green, KY	Apr 2022 / 2025 (expected)	$2B / 2,000 jobs	30–40 GWh capacity, next-gen EV cells/modules.
Envision AESC Expansion	Florence, SC	Oct 2022 / TBA	$1.5B / 1,080 jobs	Second battery facility adjacent to initial SC site.
BMW–Envision JV (Plant Woodruff)	Woodruff, SC	Oct 2022 / TBA	$1.7B / 300 jobs	Round cells for BMW's Neue Klasse EVs.
Amplify Cell Technologies (Accelera JV)	Marshall Co., MS	Sep 2023 / TBA	$2–3B / 2,000+ jobs	LFP cells for commercial EVs (Accelera, Daimler, PACCAR).
SK Battery America	Commerce, GA	2018 / 2022	$1.67B / 3,000 jobs	High-volume EV battery production.
Toyota Battery Manufacturing	Liberty, NC	2021 / TBA	$13.9B / 5,100 jobs	Multi-chemistry battery plant (HEV, BEV, PHEV).
BlueOval SK (Ford & SK On JV)	Stanton, TN & Glendale,KY	Jul 2022 / TBA	$11B+ / 11,000 jobs	Three 4M-sq-ft facilities with 120 GWh capacity.

Hyundai–LGES JV	Bryan Co., GA	2023 / Late 2025	$4.3B+ / 400 jobs	30 GWh/year capacity for Hyundai EVs.
Hyundai–SK On JV	Bartow Co., GA	Dec 2022 / TBA	$4–5B / 3,500+ jobs	Supplies Hyundai's U.S. EV platforms.
Mercedes-Benz Battery Plant	Woodstock, AL	Mar 2022	$1B / 600 jobs	Supplies EQS and EQE EVs from Tuscaloosa.
Hyundai Mobis Battery Module Plant	Montgomery, AL	Oct 2022 / 2025 (expected)	$205M / 400 jobs	Produces 200,000+ EV batteries/year.
StarPlus Energy (Stellantis–Samsung SDI JV)	Kokomo, IN	Oct 2023 / 2027 (expected)	$3.2B / 1,400 jobs	Joint venture gigafactory.
EnerSys	U.S. South (TBA)	Apr 2024 / TBA	$199M DOE award	Lithium-ion cell facility supporting energy storage.
INICS Battery Solutions Corp.	Auburn, AL	Aug 2023/ 2024	$14M/ 30 jobs	Produces components for the secondary or rechargeable battery packs used in EVs
ADS-TEC Energy	Auburn, AL	Dec 2022/ 2024	$8M/ 177 jobs	Battery-powered energy storage and management platforms

Appendix C

Market Snapshot: Battery Investment in Alabama and the Southeast U.S.

Overview

The Southeastern U.S. is rapidly emerging as the **industrial backbone of the American battery economy**. Since 2021, the region has secured more than 30 major battery-related projects, spanning upstream processing, cell and pack manufacturing, and lithium-ion battery recycling. These investments are defining a multi-state **Battery Belt**, with Alabama positioned as a critical node in the supply chain.

Alabama's Battery Cluster

Recent anchor investments in Alabama reflect the full battery lifecycle:

- **Alabama Graphite Products, LLC (Westwater Resources) (Coosa County):** First U.S. graphite processing facility ($202M – 7,500–15,000 tons/year capacity)
- **Mercedes-Benz (Woodstock):** $1B pack plant co-located with EV assembly
- **Hyundai Mobis (Montgomery):** $205M EV battery module plant to supply Hyundai and Kia
- **Dura Automotive (Muscle Shoals):** $59M battery enclosure supplier for Mercedes-Benz

These facilities alone represent **$1.4B+ in capital investment and nearly 1,400 jobs**, reinforcing Alabama's vertically integrated value chain.

Southeast Battery Corridor Highlights

Surrounding states are hosting complementary facilities that expand Alabama's value proposition:

State	Key Investments
Georgia	SK Battery America, Hyundai–SK On JV, Anovion graphite plant, Ascend Elements recycling facility
Tennessee	LG Chem cathode plant, Dongwha electrolyte facility, Ultium Cells JV with GM; BlueOval SK (Ford/SK On)
South Carolina	Redwood Materials, BMW battery JV with Envision AESC, Cirba Solutions recycling hub
Kentucky	BlueOval SK (Ford/SK On), Canadian Solar grid storage gigafactory
Arkansas	Direct lithium extraction project by Equinor & Standard Lithium, supported by $225M DOE grant

Investment Trends and Opportunities

- **Diversification beyond EVs:** Projects increasingly support grid storage, defense, and aerospace sectors
- **Recycling surge:** Redwood and Ascend are scaling regional recovery infrastructure
- **Materials localization:** DOE-backed investments in lithium, graphite, manganese, and electrolytes are reshoring key midstream segments
- **Job creation:** New facilities range from 40 to 11,000 jobs each, with an average of 1,395 jobs per project

Appendix D

Strategic Comparison: AMP's Battery Value Chain Assessment vs. National and Global Perspectives

This appendix summarizes how the Alabama Mobility and Power Center (AMP), in collaboration with Fraunhofer USA, defines key opportunities and gaps in the U.S. battery industry — and how those insights align with the priorities identified by federal agencies and international research groups.

Table: AMP vs. National Battery Strategy Focus Areas

Focus Area	AMP View	National and Global Perspectives
Market Scale	$3.7 trillion in global battery value chain CapEx by 2040, spanning EVs, grid storage, and defense.	IEA forecasts 20x global demand by 2040 (IEA 2024c)
Supply Chain Priorities	Near-term focus on module/pack assembly, synthetic graphite, and midstream critical materials.	Li-Bridge: U.S. must scale cathodes, precursors, and anodes (Li-Bridge 2024a); DOE identifies midstream bottlenecks.
Workforce Needs	Integrated K–12 to PhD training model supported by research labs and technical training centers.	DOE projects >100,000 workers needed (DOE 2024a); NREL recommends stackable battery-specific credentials (NREL 2023).
Second-Life / Recycling	Full life cycle model: collection → disassembly → remanufacturing → hydrometallurgical recycling.	DOE: BIL Section 40208 supports recovery tech (DOE 2024b); BCI advocates lead battery model as best-in-class (BCI 2024b).
Site Development Strategy	Target diversification of existing industrial base (e.g., metalworking, plastics) into battery component production.	DOE and Li-Bridge prioritize siting near OEMs, logistics hubs, and industrial clusters for supply chain resilience.

Interpretation

AMP's assessment reinforces federal and international views while offering region-specific insights for Alabama:

- It recognizes Alabama's **existing auto and manufacturing base** as a springboard for growth in midstream and downstream battery segments.
- It emphasizes **workforce integration with research**, which aligns with both DOE's and NREL's push for industry-embedded training.
- It calls for **more localized battery infrastructure** — including recycling, repurposing, and separator manufacturing — to close regional value chain gaps.

Reference

Alabama Mobility and Power Center and Fraunhofer USA. 2025. *The Battery Value Chain: Workshop Summary and Strategic Assessment*. Presented February 25, 2025, University of Alabama.

Appendix E

2030 and 2035 Outlook – AMP vs. National Benchmarks

This appendix compares projections from the Alabama Mobility and Power (AMP) Center with leading national and international sources, including the U.S. Department of Energy (DOE), National Renewable Energy Laboratory (NREL), International Energy Agency (IEA), Li-Bridge/Argonne National Laboratory, and Battery Council International (BCI). Metrics include EV adoption, battery demand (in GWh), and workforce projections for both 2030 and 2035. In some instances, AMP data is only provided for 2028 and 2033. This is clearly noted.

1. EV Adoption – Vehicle Stock Projections

Region / Source	2030 EV Stock	2035 EV Stock	Assumptions
Alabama (AMP)	~100,874	~534,191	"Abundant by 2035" scenario; light-duty EVs only; figures pulled from Tableau
AL–GA–MS (AMP)	~1.79 million	~4.70 million	Regional EV registration totals; "Abundant by 2035" scenario from AMP Tableau
U.S. (IEA 2024c)	~35 million[2]	~85 million[2]	STEPS scenario: current policies only

U.S. (DOE / BCI)	~33–36 million[2]	~80+ million[2]	IRA-supported deployment; assumes continued federal and state-level incentives

2. Battery Demand – Total GWh Required

Region / Source	2028 Demand	2030 Demand	2033 Demand	2035 Demand	Assumptions
Southeast (AMP)	129.3 GWh[1]	–	190.9 GWh[1]	–	EV-driven only; published AMP Tableau values
U.S. (IEA 2024b)	–	~1,200 GWh[2]	–	~3,500 GWh[2]	Includes EV, grid, and industrial storage demand
U.S. (DOE 2024b)	–	~1,000–1,200 GWh[2]	–	~3,000–3,500 GWh[2]	DOE Storage Grand Challenge; total system demand

Notes:

[1] AMP data reflect Southeast EV-driven battery demand estimates only. 2028 and 2033 values are sourced directly from the AMP Tableau EV Battery Demand model. Data for 2030 and 2035 is not explicitly published by AMP and therefore excluded from this table to avoid assumptions.

[2] IEA and DOE estimates include stationary storage and industrial battery demand in addition to EV usage.

3. Workforce Needs – Battery Sector Employment

Region / Source	2028 Jobs	2030 Jobs	2033 Jobs	2035 Jobs	Assumptions
Southeast (AMP)	~43,436[1]	—	~60,582[1]	—	Southeast total workforce required across chemistries and skill levels. 2030, 2035 values not reported in AMP Tableau tool.
U.S. (Li-Bridge)	—	~100K–150K[2]	—	~250K–300K[2]	Includes upstream, cell, pack, and recycling labor projections.
U.S. (DOE 2025)	—	~125K[2]	—	~300K+[2]	Full domestic capacity buildout assumptions.

4. Strategic Deployment Themes

Category	AMP Findings	National Comparison
EV Clustering	Growth along I-20 and I-65 corridors	IEA: EV growth in urban and coastal hubs; state policies drive regional disparities (IEA 2024c) IEA: Urban and coastal hubs
Grid Storage	Not modeled in AMP Tableau tool	NREL: LFP expected to comprise ~70% of U.S. utility-scale BESS by 2030 (NREL 2024); Columbia: curtailed by OBBB risk to IRA implementation (Columbia 2025)
Material Strategy	Alabama graphite supply (Alabama Graphite Products –Westwater Resources), SE lithium corridor (Smackover), regional input sourcing	DOE: FEOC-compliant sourcing, domestic anode/cathode buildup; NAATBatt: OBBB weakens domestic incentive certainty, impacting midstream investment timelines (NAATBatt 2025)
Workforce Model	Chemistry-specific training demand, AMP forecasts skill mix (HS, 2-yr, 4-yr)	Li-Bridge: Modular training hubs recommended
Policy Layering	IRA-aligned "Abundant by 2035" scenario; 2030/2035 forecasts layered over charging assumptions; **AMP scenario modeling does not account for changes introduced by the One Big Beautiful Bill Act (OBBB), which may significantly impact the value and structure of federal tax incentives beginning in 2026.**	DOE: 45X, 30D, 45V layered with FEOC rules and BIL funding; Columbia/NAATBatt: OBBB introduces tax credit uncertainty and alters incentive value across project types

Notes & Assumptions

- [1] **AMP Data**: Derived from AMP's interactive Tableau tool (2024), using the "Abundant by 2035" scenario, which assumes public charging constraints are eliminated. 2028 and 2033 values are sourced directly from the AMP Tableau EV Battery Demand model. Data for 2030 and 2035 is not explicitly published by AMP and therefore excluded from this table to avoid assumptions.
- [2] **National Benchmarks**: Sources include IEA Global EV Outlook 2024, DOE Energy Storage Grand Challenge Reports (2024), BCI Supply Chain Fact Sheet (2025), and Li-Bridge Roadmaps. Some 2035 values are interpolated or derived from scenario documentation (STEPS, IRA-aligned).

- **Important Methodology Clarification**: AMP's projections are vehicle-based and do not include grid-scale storage demand. National data generally includes both mobility and stationary storage, so comparisons focus on relative scale, not exact totals. For source-specific methodology, see Appendix A.

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