Advanced Automotive Battery Conference 2025

Conference Track Summary – Global Battery Manufacturing Production

AABC, a Cambridge EnerTech Event

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Executive Overview

The 2025 Advanced Automotive Battery Conference (AABC) Global Battery Manufacturing Production track highlighted how battery manufacturers, technology developers, and market analysts are navigating a rapidly evolving landscape shaped by policy shifts, supply chain constraints, and accelerating technological innovation. Across sessions, speakers focused on efficiency, cost reduction, and next-generation battery architectures as critical enablers of industry growth. Rather than incremental improvements, the emphasis was on rethinking battery design, localizing supply chains, and leveraging new chemistries and processes to address challenges.

Most Frequently Covered Issues

1. **Cost pressure and manufacturing efficiency**
   Battery cost remains a central challenge, with overcapacity, regional cost disparities, and material dependencies driving the need for more efficient production methods and simplified designs.

2. **Supply chain concentration and localization challenges**
   Heavy reliance on China for cells, materials, and components continues to shape global dynamics, while regulatory requirements are pushing companies toward regionalized supply chains.

3. **Policy uncertainty and shifting incentives**
   Changes to subsidies, tariffs, and regulatory frameworks are creating volatility in demand forecasts and investment decisions, requiring companies to adapt strategies in real time.

4. **Emerging manufacturing technologies and process innovation**
   Advancements such as dry electrode processing and semi-solid-state battery manufacturing introduce new pathways for cost reduction and performance improvement.

5. **Technology evolution and next-generation battery architectures**
   New chemistries and designs, including sodium-ion and anode-free configurations, are being explored to improve energy density, safety, and cost.

Recurring Takeaways

- Cost reduction is increasingly driven by design simplification and process innovation rather than material substitution alone.
- Supply chain resilience and regulatory compliance are becoming critical competitive differentiators.
- Overcapacity and price pressure are accelerating consolidation and reshaping market dynamics.
- Technological innovation continues to unlock new applications, even as near-term demand fluctuates.
- Strategic flexibility, in both manufacturing and sourcing, is essential to navigating uncertainty and sustaining growth.

Battery Manufacturing Strategy in a Post-IRA Landscape: Challenges and Opportunities for U.S. Players

Full Video Here

John Warner, American Battery Solutions

The presentation explored how evolving policy frameworks and market dynamics are reshaping battery manufacturing strategies in the United States. As the industry moves beyond the initial momentum of the Inflation Reduction Act (IRA), companies must navigate shifting incentives, supply chain constraints, and increasing global competition. While demand for electrification continues to grow, particularly in commercial and off-highway segments, the path forward requires more deliberate and strategic approaches to manufacturing and sourcing. (00:00:48–00:01:53)

A key challenge highlighted was the limited access to domestic cell supply, particularly for smaller manufacturers not vertically integrated with OEM-backed joint ventures. Despite significant investment in U.S.-based cell production, much of this capacity remains tied to specific partnerships, forcing independent players to rely on international suppliers. At the same time, critical materials such as graphite and cathode components remain heavily concentrated in China, creating additional constraints for companies seeking to meet regulatory requirements. (00:09:38–00:11:47)

The discussion emphasized the growing importance of localization strategies and compliance with evolving regulations, including Foreign Entity of Concern (FEOC) requirements. Companies must balance the need to secure compliant supply chains with the realities of global material dependencies, often requiring new partnerships, alternative sourcing strategies, and greater flexibility in product design. These dynamics are driving a shift from globalization toward more regionalized manufacturing models. (00:11:16–00:12:53)

Looking ahead, the speaker identified battery pack and module manufacturing as key growth areas, particularly as cell production capacity expands globally. Companies that focus on niche markets, leverage flexible architectures, and optimize capital investment are better positioned to navigate uncertainty and maintain competitiveness. Continued innovation in chemistry, system design, and supply chain strategy will be essential to sustaining growth in a rapidly evolving industry. (00:17:46–00:20:08)

Key Takeaways

- Policy changes are reshaping battery manufacturing strategies and supply chains.
- Limited access to domestic cell supply remains a challenge for smaller manufacturers.
- Localization and FEOC compliance are becoming critical requirements.
- Flexibility in design, sourcing, and partnerships is key to maintaining competitiveness.

Global Battery Market Dynamics: Navigating Demand Growth, Overcapacity, and Policy Shifts

Full Video Here

Evelina Stoikou, Bloomberg New Energy Finance

The presentation examined key trends shaping the global battery industry, highlighting the interplay between growing demand, supply chain dynamics, and shifting policy environments. While battery demand continues to expand, driven primarily by electric vehicles and supported by emerging sectors such as stationary storage, recent policy changes in major markets have tempered growth expectations, particularly in the transport sector. (00:01:18–00:02:41)

A central theme was the growing imbalance between supply and demand, with significant overcapacity emerging across battery manufacturing, particularly in China. Despite increasing capacity in the U.S. and Europe, China continues to dominate both cell production and upstream component manufacturing, creating pricing pressure and influencing global market dynamics. This overcapacity has contributed to declining battery prices, accelerating cost reductions across multiple applications. (00:02:41–00:04:00)

The discussion also highlighted the impact of tariffs and policy changes, which have introduced uncertainty and increased costs across the battery value chain. Trade restrictions, evolving incentives, and regulatory shifts have affected both domestic manufacturing strategies and global supply chains, forcing companies to balance localization efforts with continued reliance on international suppliers. (00:05:24–00:08:09)

From an economic perspective, declining battery prices remain a key driver of adoption, supported by technological improvements and economies of scale. However, regional disparities persist, with higher production costs in North America and Europe compared to China. As a result, achieving price parity for electric vehicles varies by market, with some regions still facing barriers despite overall cost reductions. (00:09:35–00:13:49)

Key Takeaways

- Battery demand continues to grow, though policy changes are moderating near-term projections.
- Overcapacity, particularly in China, is driving significant price reductions.
- Tariffs and regulatory shifts are increasing uncertainty across global supply chains.
- Declining costs and technological advances continue to support long-term adoption.

Dry Electrode Manufacturing: Advancing Cost, Efficiency, and Scalability in Battery Production

Full Video Here

Hieu Duong, AM Batteries

The presentation examined advancements in dry electrode manufacturing as an alternative to traditional wet coating processes, with a focus on improving cost efficiency, simplifying production, and enabling scalable battery manufacturing. By eliminating solvents and reducing process steps, dry coating technologies offer significant advantages in footprint, energy consumption, and overall cost of goods. The approach reflects a broader industry push toward more sustainable and efficient manufacturing methods. (00:01:36–00:03:16)

A key distinction highlighted was between first-generation dry processes, which rely on forming freestanding films, and newer approaches that directly deposit dry powder onto current collectors. This direct deposition method increases process flexibility, allowing independent control of electrode thickness and density while enabling features such as gradient coatings and higher active material loading. These capabilities support improved performance and greater adaptability across different battery designs. (00:03:16–00:11:19)

Operational efficiency gains were also emphasized, including reduced material waste and simplified recycling. Unlike traditional processes that require reprocessing out-of-spec material, dry coating systems can recapture and reuse powder without additional mixing steps. Faster wetting characteristics and reduced downstream processing requirements further contribute to lower operational costs and improved manufacturing efficiency. (00:12:38–00:13:51)

Scaling the technology remains a central focus, with ongoing efforts to increase production speeds and expand manufacturing capacity. Pilot-scale systems have demonstrated competitive electrochemical performance relative to wet-coated electrodes, and continued development is aimed at achieving industrial-scale throughput while maintaining quality and uniformity. These advancements position dry electrode manufacturing as a promising pathway for next-generation battery production. (00:19:07–00:20:21)

Key Takeaways

- Dry electrode manufacturing reduces process complexity and cost by eliminating solvents.
- Direct powder deposition enables greater flexibility in electrode design and performance.
- Material reuse and simplified workflows improve operational efficiency.
- Scaling dry coating technology is key to enabling widespread industrial adoption.

Anode-Free Sodium Batteries: Reducing Cost and Simplifying Battery Design

Full Video Here

Sam Jaffe, Mana Battery

The presentation explored a novel approach to battery design focused on reducing complexity and cost by eliminating key components. Inspired by engineering principles that emphasize simplification, the concept of “the best part is no part” was applied to battery chemistry, with the goal of removing the anode manufacturing step entirely. This approach reflects broader industry efforts to streamline production processes while improving performance and cost efficiency. (00:01:24–00:05:32)

The core innovation discussed was an anode-free sodium-ion battery architecture, in which the anode forms during initial charging rather than being manufactured separately. By eliminating the need for graphite or hard carbon anodes, the design reduces material costs and simplifies manufacturing, removing entire production steps such as coating and drying. This results in lower capital expenditure and operational costs, as well as reduced complexity in battery production. (00:06:52–00:08:18)

From a techno-economic perspective, the model demonstrated significant cost advantages compared to traditional lithium iron phosphate (LFP) batteries, driven primarily by the elimination of the anode material and associated processes. While sodium itself offers only modest cost savings compared to lithium, the structural simplification of the battery design enables substantial reductions in overall cost of goods. (00:09:50–00:12:26)

Performance characteristics were also highlighted, including competitive energy density, strong cycle life improvements in newer iterations, and notable advantages in cold-temperature performance. The technology showed the ability to maintain capacity at low temperatures and support fast charging rates, addressing key limitations of existing battery chemistries. Safety testing further suggested reduced risk of thermal runaway, indicating potential benefits for reliability and system design. (00:14:07–00:21:51)

Key Takeaways

- Simplifying battery design can significantly reduce manufacturing cost and complexity.
- Anode-free architectures eliminate key materials and process steps.
- Cost advantages are driven more by design changes than raw material differences.
- Performance improvements include cold-temperature operation, fast charging, and safety.

Semi-Solid-State Batteries: Manufacturing Pathways and Emerging Industry Trends

Full Video Here

Mark HL Lu, Industrial Technology Research Institute (ITRI)

The presentation explored the rapid development of semi-solid-state battery technologies, with a focus on manufacturing approaches and recent progress in China. As the industry seeks to improve safety and energy density beyond conventional lithium-ion batteries, semi-solid-state designs have emerged as a transitional solution, enabling incremental performance gains while leveraging existing manufacturing frameworks. (00:01:24–00:03:12)

A key theme was the coordinated push within China to accelerate solid-state battery development through government-led initiatives and industry collaboration. Significant funding and alignment across major battery manufacturers and research institutions have enabled early deployment of semi-solid-state batteries in electric vehicles, marking an important step toward commercialization despite relatively small market share to date. (00:03:12–00:04:47)

The presentation detailed manufacturing processes unique to semi-solid-state batteries, including material preparation, electrode treatment, and integration of solid electrolyte components. Approaches such as dry electrode processing, in-situ solidification, and advanced coating techniques are being explored to improve performance and scalability. These methods introduce new challenges in process control, material consistency, and equipment requirements compared to traditional liquid-based systems. (00:06:24–00:09:19)

Stacking and pressure-based assembly processes were highlighted as critical elements in semi-solid-state battery production. Unlike conventional prismatic cell manufacturing, semi-solid-state designs require precise control of pressure, alignment, and material interfaces to maintain structural integrity and performance. Techniques such as isostatic pressing are increasingly used to ensure uniformity and stability across the cell structure. (00:18:48–00:22:17)

Key Takeaways

- Semi-solid-state batteries offer a transitional path toward higher energy density and improved safety.
- Government and industry collaboration are accelerating development and early commercialization.
- New manufacturing processes introduce complexity in materials handling and process control.
- Advanced assembly techniques are required to ensure performance and structural stability.