C2ES CENTER FOR CLIMATE AND ENERGY SOLUTIONS

SECURING THE SUPPLY CHAIN FOR SOUTH CAROLINA'S BATTERY AND EV INDUSTRY

November 19, 2024

Draft Roundtable Takeaways

Note: *Takeaways represent statements made in the roundtable discussion and do not necessarily reflect C2ES positions or opinions, nor do they represent consensus among participants in the event.*

Overall Takeaways

- Political transition in all branches of the federal government will bring changes to the battery and EV industries. It is important for policymakers to act measuredly and to consider the economic importance of various existing incentive structures and policies.
- Among participants, there was debate over what the role of government should be in supporting innovation. Ultimately, participants generally agreed that government funding spanning new technology research, development, demonstration, and deployment is critical for the global competitiveness of the state's industries.
- Participants discussed the importance of and need to develop approaches to insulating technology innovation from political volatility.
- American companies and policymakers should consider strategies to stabilize rare earth metal pricing and promote domestic demand growth for recycled metals to increase U.S. competitiveness in the critical mineral market.
- Reducing the environmental impact of batteries and increasing the reuse of critical minerals requires better recycling practices, including standardized labeling and collection mechanisms, and consumer engagement and public education.
- As South Carolina continues to develop new energy industries including battery and EV design, manufacturing, and maintenance, the availability and skill set of workers will need to evolve alongside it.
- In addition to the topics discussed below, participants were interested in exploring issues related to safety in the battery and electric vehicle industries in future conversations.

Securing Critical Mineral Supply Chains

- Critical mineral markets are still considered immature, mostly consisting of opaque transactions conducted privately between buyers and sellers. This leads to difficulties in determining accurate prices and often creates price volatility for battery-grade critical minerals.
- The critical mineral market includes steep competition from foreign actors, particularly China, whose companies benefit from more than a decade of Chinese government policies

providing low-cost financing and subsidies. This has allowed Chinese market actors to trade lower profit margins to gain and maintain market dominance.

- Since 2023, prices of critical minerals have fallen significantly, impacting the financial viability of domestic mining and processing projects, leading to plant delays and closures. This situation presents challenges mainly for American project developers, who face higher minimum operating costs compared to Chinese suppliers who benefit from subsidies and can operate at a loss.
- Today's battery supply chain can span up to 50,000 miles. While critical minerals are mined across the world in Latin America, Africa, and Australia, the vast majority are processed and refined in China, and turned into cathode materials across Asia. This concentration of critical minerals processing and refining into battery-grade materials creates potential bottlenecks and risks for the market and final assemblers in the U.S. and abroad.
- Bringing more battery material production, refining, and recycling to the United States will reduce transport costs, strengthen local economies, and help ensure higher environmental standards all while bolstering the security of battery supply chains.
- The United States is making good progress in expanding domestic lithium production capacity, which is expected to align well with domestic battery manufacturing capacity by 2030. For other critical minerals essential to batteries, such as cobalt, nickel, and graphite, there remains a considerable gap that needs to be addressed.
- Participants emphasized that there needs to be increased education and awareness regarding the current state of critical mineral supply chains and how to secure them through international partnerships and domestic mining, refining, and recycling.
- Recent tax credits including 45X and 30D serve as the main drivers for encouraging domestic vehicle production and critical mineral mining and processing in the United States, due to the demand-pull these credits create for batteries and the critical minerals that comprise them.
- Participants highlighted the importance of making data about raw materials in products available for producers and consumers to create transparency for the sustainability of mining practices. This will be especially important for exported products to markets like Europe, where reporting and transparency requirements are more stringent.
- Batteries, specifically the cathode active materials they contain, are a significant cost factor in stationary energy storage and electric vehicles (EVs). Stabilizing prices through price discovery and transparency mechanisms and reducing costs through domestic supply chain development will ultimately make battery materials and the corresponding stationary and EV batteries more affordable.

Community Engagement in Project Development

- Large-scale projects are often kept secret until publicly announced, surprising the communities that host them and creating major challenges with authentic engagement and planning.

- Earlier engagement, including through the development of community benefits plans, can help resolve downstream impacts of new projects, such as siting, housing, transportation, and energy and water availability.
- Increased engagement and education with communities hosting projects related to battery supply chains is necessary, including safety professionals and first responders who will face new challenges with these technologies.
- Developers should speak to the local benefits that a new project will offer communities that host them, including job creation and tax revenue for community infrastructure development. While hosting clean energy projects offer positive national and global climate, environmental, and public health outcomes, these incentives may not resonate with certain communities as strongly as the local economic development benefits.
- Workers are not only vital to manufacturing processes but also key to community development. They are trusted figures within their communities and can act as ambassadors, encouraging others to enter the workforce and supporting them as they integrate into new settings.

Creating Circularity in the Battery Industry

- To help encourage the growth of the battery recycling industry, government incentives should more equally encourage the purchase of recycled materials and newly mined and manufactured materials.
- The battery industry is continuously changing and outpacing codes, standards, and policy development. Participants were concerned about the ability of policy to keep pace with constant innovation and rising demand.
- Proper end-of-life management for batteries requires innovative solutions to collect, recycle, and reuse materials, keeping them out of landfills and reintegrating them into the supply chain.
- To create circularity in the battery industry, all sectors must work together, from government to private industry and education, to cooperatively tackle the challenges of battery management and recycling.
- Participants were interested in the possibility of core swapping methods for EV batteries to optimize recycling, much like the functionality of lead-acid batteries in internal combustion engine vehicles.
- The battery industry needs consistency in labeling practices, recognizing the significant differences in battery sizes and functions, to help with end-of-life collection and dismantling.
- Disposal of batteries needs to be made easy for consumers through education and outreach, clear labeling and disposal instructions, and investment in local collection infrastructure to help make safe disposal straightforward and convenient.
- Participants suggested creating economic incentives similar to those in programs like Cash for Clunkers, where consumers could receive a rebate for recycling batteries.

- Policies like extended producer responsibility are effective in increasing the collection of batteries, but do not address the whole end-of-life cycle. Challenges remain after collection, including safely storing, transporting, and finally dismantling batteries.
- There is a clear role for public-private partnerships to facilitate battery recycling, where companies could collaborate with local governments to set up and fund recycling programs.
- Entrepreneurs will help drive crucial innovation in battery design that may improve the recyclability of batteries for stationary storage and electric vehicles. South Carolina includes a test bed for this innovation through the SC Nexus program.
- There is a need for battery producers, recyclers, and other industry stakeholders to engage with policymakers by providing them with information about the importance of enacting policies for battery recycling now, to avoid major costs in the future.

Developing the Workforce for South Carolina's Advanced Energy Future

- Participants emphasized the strength of South Carolina's two-year college system. However, there are currently more job openings for workers with two-year degrees than graduates with those qualifications, while there are more workers with four-year and master's degrees than jobs available requiring those qualifications. South Carolina must invest in growing its knowledge economy to increase student enrollment in two-year programs, while also offering more jobs that require advanced degrees.
- Some of the biggest gaps between available workers and demand from employers in the electric vehicle space include technicians to service vehicles, software developers, logisticians, and industrial engineers.
- Creating models that connect local educational and training institutions with employers is important, such as the collaboration between technical colleges and employers looking to hire locally, to ensure they can bring in local workers with the specific skills they need for the job.
- The development of new training programs should be moderated and intentional to ensure training at the academic and vocational levels can expand at the necessary pace to meet the expected needs of employers while remaining adaptable to changes or delays in industry demand for new workers and skill sets.
- Obstacles such as housing, childcare, and transportation continue to prevent many residents from participating in the labor market. Addressing these systemic issues is critical for policymakers and companies looking to grow workforce participation, especially in a tight labor market.
- Educators are working to develop curricula to attract talent, including developing engaging coursework that motivates young people to enter the EV space, such as augmented/virtual reality devices to make technical education more interactive and appealing. This also includes partnering with K-12 schools to introduce STEM concepts through hands-on, tech-enabled learning earlier in a student's educational career.

- For the long-term strength of the workforce, curriculum development should integrate supply gap and skill needs analysis to provide an educational base for students to be able to find work immediately after graduation and adapt as technology changes.
- Paying workers a higher salary can increase the state's competitiveness relative to other states in the region and country. If paying workers more isn't an option, student debt relief programs could incentivize workers to enter sectors of need, akin to current public service loan forgiveness programs.
- There is an opportunity for more collaboration among government, business, educational institutions, and training providers across the state to build out infrastructure for workforce development.