

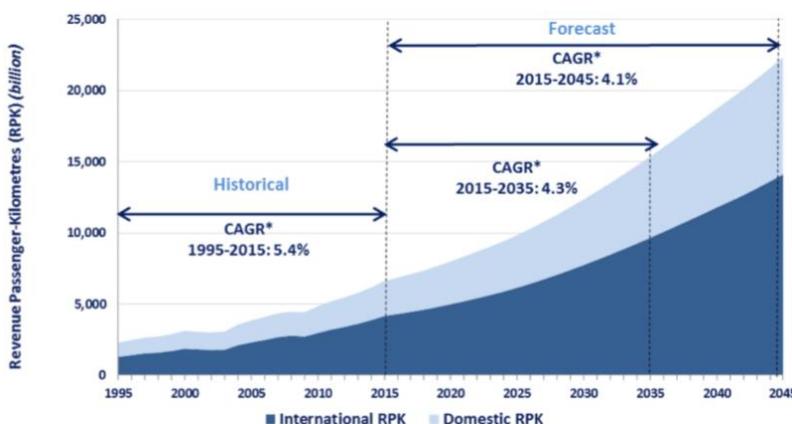


SUSTAINABLE AVIATION FUEL (SAF) ADOPTION IS ON THE RISE AND HAS A LONG GROWTH RUNWAY AHEAD. LNZA, GEVO, AND FULCRUM BIOENERGY ARE AMONG THE NAMES BEST PLACED TO BENEFIT.

Key takeaway: There is a growing consensus among industry participants and governments about the need for higher Sustainable Aviation Fuel (SAF) penetration in commercial aviation. Several initiatives and collaborations are taking shape at various levels to drive innovation, scale, and adoption of SAFs, which have a long growth runway ahead. We believe investors should keep a tab on companies that are manufacturing SAFs and advancing the SAF processing technology. LNZA, GEVO, and Fulcrum Bioenergy are some of the names best placed to benefit.

Sustainable Aviation Fuel (SAF) can be an answer to the significant environmental footprint of the aviation industry, which threatens to increase along with the rapid growth in air traffic. Sustainable Aviation Fuels (SAF) are produced from renewable resources and waste materials, offering a way to significantly reduce aviation's carbon footprint without altering existing aircraft engines. They are pivotal in the transition towards a more sustainable and lower-carbon aviation sector. With air travel expected to double over the next two decades, the industry faces immense pressure to reduce its carbon emissions and mitigate its impact on climate change. Given this context, sustainable aviation fuel is emerging as a crucial solution, as it offers a path toward greener skies without compromising global air connectivity. The aviation industry contributes approximately 2-3% of global CO₂ emissions, a figure that belies its larger environmental impact due to other greenhouse gas emissions and the high-altitude release of pollutants. Moreover, the sector's rapid growth trajectory threatens to substantially increase its carbon footprint, making sustainability initiatives critical. SAF represents a viable option for decarbonizing air travel, capable of reducing lifecycle carbon emissions by up to 80% compared to conventional jet fuel, according to the International Air Transport Association (IATA).

Chart 1: World Total Passenger Traffic: History and Forecasts



Source: Intro-act, ICAO, EESI

Recent efforts of the industry and governments indicate that increased SAF adoption is on the way. Our research indicates an accelerating momentum toward decarbonizing aviation, highlighting the growing consensus on SAF's critical role in achieving net-zero carbon emissions goals.

- **The U.S. government has launched several initiatives to promote the development and use of Sustainable Aviation Fuel** as part of its broader strategy to reduce carbon emissions in the aviation sector and transition toward

a more sustainable and environment friendly aviation system by 2050. One of the key efforts is the introduction of the SAF credit by the Treasury Department and the Internal Revenue Service, established under the Inflation Reduction Act of 2022. This initiative aims to incentivize the production and use of SAF by offering financial benefits to producers, thereby accelerating the adoption of cleaner fuel alternatives within the aviation industry.

- **Boeing (BA) has significantly expanded its global efforts to scale up the production of sustainable aviation fuels.** The company is actively participating in projects like the Sustainable Bioenergy Research Consortium (SBRC) in Abu Dhabi, exploring innovative feedstocks such as halophytes, plants that can be irrigated with seawater, for SAF production. Further, Boeing's collaboration with Zero at the 2023 Dubai Air Show and its formation of the Air-CRAFT consortium in the UAE aim to enhance research, production, and adoption of SAF across the region and globally.
- **The European Union's ReFuelEU Aviation initiative is part of the broader "Fit for 55" package, aiming to reduce greenhouse gas emissions by at least 55% by 2030.** This regulation mandates fuel suppliers to blend increasing amounts of SAF into jet fuel, demonstrating a legislative approach to foster the SAF market and ensure the aviation sector's contribution to the EU's climate goals. The initiative is a compelling example of how regulatory frameworks can drive the adoption of SAF and stimulate market demand.
- **The New Zealand government, in collaboration with Air New Zealand, has recently taken significant strides toward the development of SAF** as part of its broader environmental and energy transition goals. In 2023, the government co-funded two crucial feasibility studies with a \$765,000 investment to assess the potential for local SAF production. These studies aim to explore the technical, economic, and environmental feasibility of establishing a SAF production facility in New Zealand, leveraging the country's unique natural resources and waste materials.

Chart 2: SAFs Reduce up to 80% Life Cycle Emissions for Aviation Industry



Source: Intro-act, Action Renewables

We believe that SAF penetration will continue to increase and therefore companies involved in manufacturing SAFs should be on investor's radar. Despite its promise, SAF currently accounts for a mere 0.2% of global jet fuel use, highlighting a significant growth opportunity. The disparity between the potential impact of SAF and its current production levels suggests a substantial market waiting to be tapped as the industry seeks to meet ambitious environmental targets. The International Air Transport Association (IATA) forecasts a tripling of SAF production in 2024 to approximately 1.875 billion liters, up from 600 million liters in 2023. This growth, while impressive, will still only satisfy 0.53% of the aviation industry's fuel needs, underscoring the vast demand potential for SAF. With at least 43 airlines committed to using 16.25 billion liters of SAF by 2030, the demand is firmly established. The challenge lies in scaling supply to meet this demand, a hurdle that can present a lucrative opportunity for investors as governments and industry rally to support SAF production. We believe that some companies have gained traction in the last few months – these include Lanzatech (LNZA) and Fulcrum Bioenergy, as well as large manufacturers such as Neste Energy (HEL: NESTE) and Gevo (GEVO). We discuss some of these names below:

- LanzaTech Global, Inc., (LNZA)** headquartered in Skokie, Illinois, has established itself as a leader in the field of carbon capture and transformation (CCT), with a significant focus on SAF and other carbon-recycled products. The company's innovative technology platform is designed to convert waste carbon into valuable materials such as sustainable fuels, fabrics, packaging, and more, emphasizing a future where dependence on virgin fossil feedstocks is reduced. LNZA's SAF focus can be underlined by a slew of important partnerships and initiatives that the company has taken in recent months.

In January 2024, LNZA launched the world's first ethanol to SAF facility in Soperton, Georgia, marking a significant advance in sustainable aviation fuel technology. The LanzaJet Freedom Pines Fuels plant, producing 10 million gallons of SAF and renewable diesel annually, uses certified ethanol to meet decarbonization goals, including the White House's SAF Grand Challenge. This facility represents a major step in combatting climate change, leveraging a novel process for converting ethanol into SAF, aiming to significantly reduce aviation emissions. LNZA partnered with Tadweer in UAE to convert waste to SAF. Their technology can turn 385,700 tons of waste into 132,240 tons of SAF annually, reducing CO2 emissions and supporting the UAE's green goals. The company is also playing a key role in the Ensyn-Linde alliance, leveraging its gas fermentation technology to convert syngas from waste biomass into ethanol, a vital step in producing SAF. This unlocks cheaper feedstocks like wood residues compared to expensive plant oils, potentially leading to significantly lower SAF costs and a major boost for the bioeconomy. It is also playing a key role in New Zealand's SAF study, using its gas fermentation tech to convert domestic waste like forestry scraps into low-carbon ethanol, the first step in producing sustainable aviation fuel. This collaboration with LanzaJet and the government aims for cleaner skies, energy independence, and economic growth.

LNZA delivered strong 3Q23 results, driven by a 143% y/y revenue growth, resulting in a quarterly revenue of \$19.6 million vs. \$8.3 million a year ago. Better pricing also resulted in gross margin expansion by 10.5 percentage points. However, the net loss of the company increased from \$22.3 million to \$25.3 million during the quarter.

Chart 3: LNZA Reported Solid y/y Growth in Disaggregated Revenue in 3Q23



Source: Intro-act, LNZA Investor Presentation

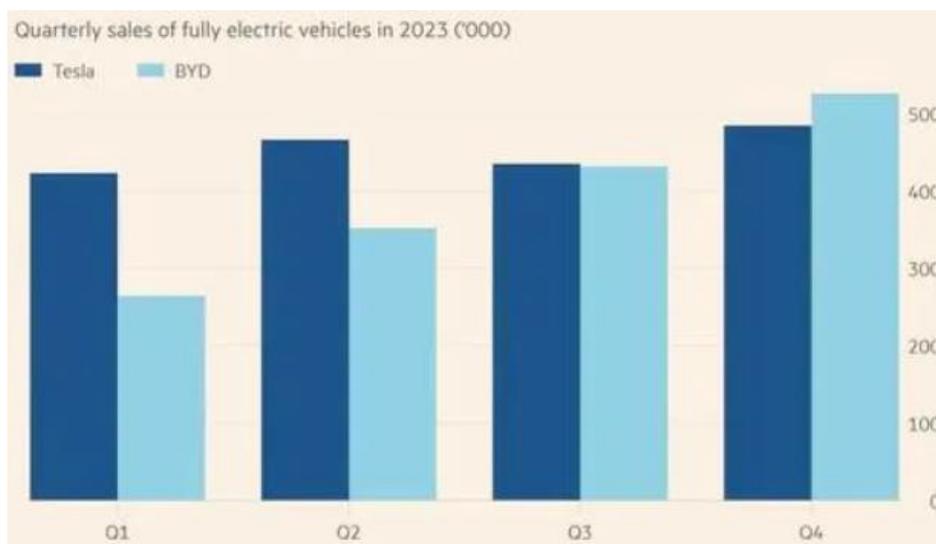
- Fulcrum BioEnergy, Inc.,** based in Pleasanton, California, is at the forefront of the sustainable aviation fuel industry, leveraging its pioneering technology to transform household garbage and other waste products into low-carbon transportation fuels. The company's innovative approach not only supports the aviation industry's carbon reduction goals but also contributes significantly to the global push towards net-zero emissions. Fulcrum BioEnergy's patented process is designed to produce renewable fuels that significantly reduce greenhouse gas emissions compared to traditional fossil fuels, with the company's facilities aiming to supply approximately 400 million gallons of net-zero carbon waste-to-fuels annually across North America and select international markets. Fulcrum's dominance in the SAF industry is underscored by its strategic initiatives and partnerships over the past year. One of its significant projects is the Fulcrum NorthPoint facility in the United Kingdom, which has been awarded a £16.8 million grant from the UK Department for Transport Advanced Fuels Fund. This facility is expected to transform non-recyclable household waste into sustainable aviation fuel, significantly reducing net carbon emissions for the aviation sector. According to Dealroom, the company has raised \$303 million so far. It closed its last funding in February 2023, which was a grant of \$16.8 million.

MOBILITY NEWS

INDUSTRY TRENDS

BYD's record-breaking quarter challenges Tesla's EV dominance. BYD has surpassed Tesla as the leading electric vehicle (EV) producer globally, marking the second consecutive year. Tesla reported producing approximately 495,000 vehicles in Q4 and a yearly delivery increase of 38% to 1.81 million. However, BYD's annual production of over 3 million new energy vehicles edged out Tesla. In the first half of 2023, BYD alone sold nearly 1.2 million plug-in electric vehicles, doubling BMW, Volkswagen, and Mercedes combined. Meanwhile, several EV startups, including Nikola and Fisker, face financial challenges, with some already declaring bankruptcy. [Read More](#) (Yahoo Finance)

Chart 4: BYD Surpasses Tesla in Quarterly Deliveries



Source: Intro-act, Financial Times, Yahoo Finance

Hertz to sell one-third of its EV fleet amid high repair costs, Tesla price cuts. Hertz is selling around 20,000 electric vehicles (EVs) due to a \$245 million cost and declining EV prices, particularly Tesla's, which forms 80% of Hertz's EV fleet. Tesla's 30% price cut in 2023 affected resale values. Hertz cited lower-than-expected EV rental demand, increased maintenance costs, and more accidents with EVs as reasons. Tesla's refusal of volume discounts on replacement parts added to expenses. Despite divesting, Hertz reaffirms commitment to EVs, including purchasing more Teslas and electrifying 70-90% of its European fleet by 2030. [Read More](#) (Straight Arrow News)

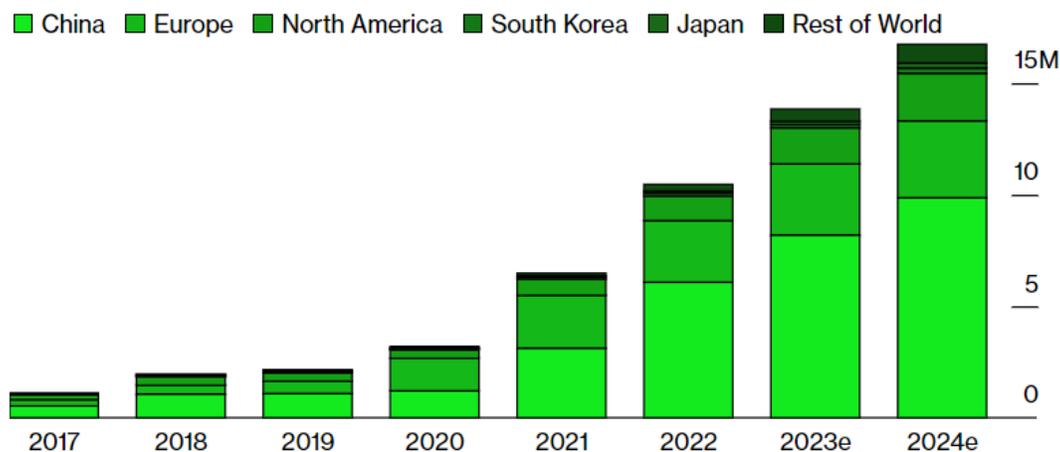
Using real-time data to assess & improve cold-weather EV charging. CerebrumX, based in Princeton, New Jersey, utilizes AI and data collection to enhance battery and charging efficiencies in electric vehicles (EVs). The company, focused on passenger and light commercial fleet vehicles, analyzes real-time data from charging stations to optimize energy outputs. Their EVConnect tool aids EV users in selecting optimal charging locations and times, contributing to better-functioning batteries and smart-city data infrastructure platforms. [Read More](#) (Battery Technology)

AI analyses of battery tech call graphene batteries 'disruptive'. The "State of Charge" report by Focus, an AI-powered technology forecasting company, analyzes the future of battery technologies. While solid-state lithium batteries, often considered promising, show a 31% YoY improvement, they fall short of disruptive potential. In contrast, graphene batteries exhibit a remarkable 49% YoY improvement, positioning them as a disruptive force. However, the report emphasizes the need for a significant decrease in graphene production costs for widespread adoption. [Read More](#) (Battery Technology)

What EV sales slump? commercial EV deployments are soaring! Despite skepticism about electric vehicles (EVs), recent data from CALSTART reveals a remarkable 250% growth in the zero-emission heavy truck market. California leads in ZET deployments, but the surprising fact is that ZETs have been deployed in every state. Commercial van adoption outpaces electric semis, with a staggering 461% increase in battery-electric cargo vans in the first half of 2023. The overall zero-emission commercial truck market is rapidly growing, with more than 160 models available, reflecting a strong momentum despite challenges like the pandemic and supply chain issues. Fleet managers prioritize EVs for their cost-effectiveness. [Read More](#) (Electrek)

Electric vehicle market looks headed for 22% growth this year. The electric vehicle (EV) market is predicted to experience 22% growth in 2024, with global passenger EV sales expected to reach 16.7 million, a 21% increase. China is projected to account for nearly 10 million EV sales, representing 38% of the market share in the country. While European EV sales are anticipated to be around 3.4 million, the U.S. market remains uncertain. Commercial EV sales are set to double to 1 million in 2024. Despite a slowdown in growth, advancements in battery tech and infrastructure development suggest continued growth in 2025 and 2026. [Read More](#) (Bloomberg)

Chart 5: Sales of Passenger EVs

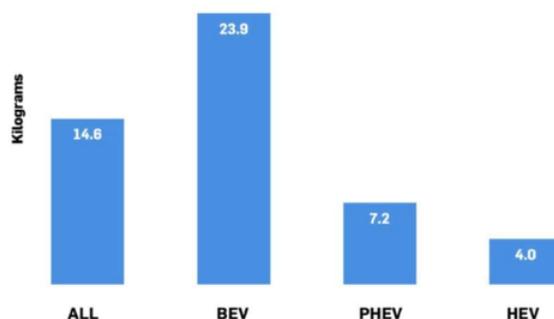


Note: Includes Battery-Electric and Plug-in Hybrid Vehicles. Excludes Commercial vehicles and Two-and-Three Wheelers. December 2023 Data Estimated for Some Countries. 2024 is BNEF's Forecast
Source: Intro-act, BloombergNEF

BYD further solidifies its EV dominance with the development of sodium-ion batteries. Chinese automaker BYD is driving a transformative shift in the electric vehicle (EV) battery landscape by pioneering sodium-ion battery technology in Xuzhou, China. The move seeks to address challenges posed by lithium-ion batteries, such as resource concentration, ethical mining concerns, and safety risks. BYD, originally a mobile phone battery producer since 1995, has diversified into EVs, battery production, and renewable energy solutions. Sodium-ion batteries, with abundant and sustainable sodium resources, offer safety advantages over lithium-ion but face hurdles like lower energy density, impacting driving range and weight. Ongoing research is crucial for optimizing performance and ensuring long-term viability. [Read More](#) (Top Speed)

Nickel use in average EV continues to rise. In October 2023, global passenger electric vehicles (BEV, PHEV, HEV) contained an average of 14.6 kilograms of nickel, reflecting a 5% increase from October 2022. The data from Adamas Intelligence reveals a 4% YoY rise in BEV nickel content, a 44% YoY increase in PHEVs, and a 1% YoY decrease in HEVs. The total nickel deployed in newly sold passenger EVs reached 25,504 tonnes globally, marking a 40% YoY surge. The report suggests a slowdown in LFP's impact on NCM's market share in late 2023, but potential challenges for NCM and nickel in 2024 due to LFP's incorporation in new mid-market EV models in China. [Read More](#) (Adamas Intelligence)

Chart 6: Sales Weighted Average Nickle Deployed by EV Type (October 2023)



Source: Intro-act, Adamas Intelligence EV Battery Capacity and Battery Metals Tracker

What the Red Sea crisis could mean for the electric vehicle industry and the planet. Tesla and Volvo have temporarily halted electric vehicle (EV) production in Europe due to global supply chain disruptions. Houthi rebel attacks in the Red Sea are impeding ship routes, delaying parts delivery, and increasing shipping costs. Challenges include reliance on Chinese factories for EV components and geopolitical tensions affecting routes. The disruptions lead to production pauses, impacting profits and causing delays for consumers. [Read More](#) (The Conversation)

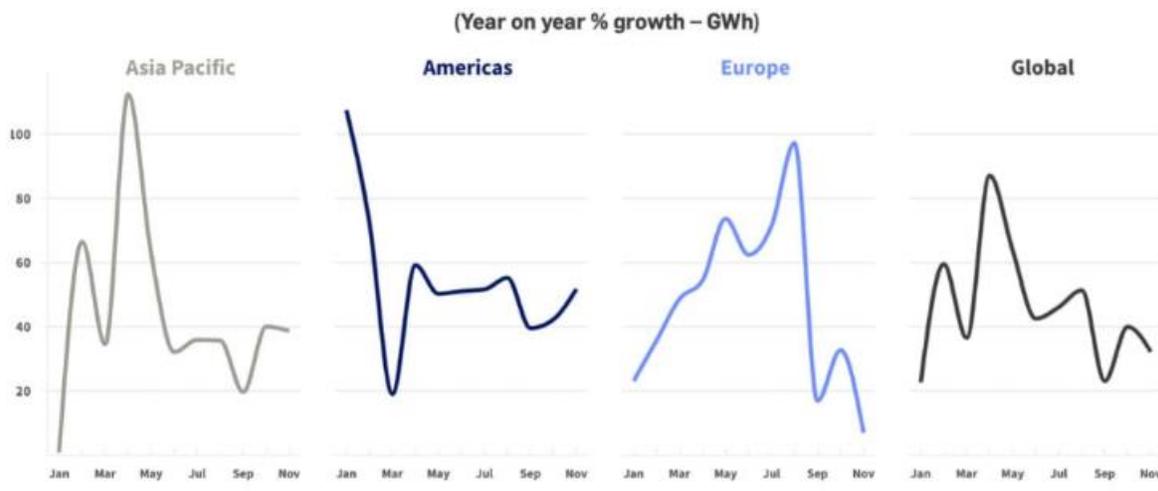
Cold-weather charging is chilling EV acceptance. Extreme cold temperatures in the Midwestern US have resulted in frustrated electric vehicle (EV) owners facing long lines at charging stations. The chemical reactions in EV batteries slow down in freezing conditions, affecting charging and discharging. Media coverage highlights concerns about EV ownership, including reduced range in cold weather. Efforts are underway to address the issue, with a focus on improving charging infrastructure, adopting a standardized connector, and developing technologies like fluorine-containing electrolytes and fast-charging batteries to mitigate cold-weather challenges. [Read More](#) (Battery Technology)

Ford cuts F-150 Lightning production as EV demand softens. Ford Motor announced a reduction in production of its F-150 Lightning pickup truck due to lower-than-expected demand for electric vehicles (EVs). Starting April 1, the Michigan Rouge Electric Vehicle Center will cut production to one shift. Ford aims to balance growth and profitability by adjusting manufacturing flexibility. This decision follows a trend of slowing demand for EV trucks, with General Motors postponing an electric truck plant opening. Ford sold 24,165 F-150 Lightning trucks in 2023, up 55%, but plans to produce fewer units weekly. The move impacts 1,400 workers, with some transferring or opting for retirement. [Read More](#) (Reuters)

Volkswagen and rivals plug away at solid-state battery puzzle. Volkswagen, facing delays in its collaboration with QuantumScape for a solid-state electric car battery, is exploring alternative partnerships. Talks with France's Blue Solutions, known for producing solid-state batteries for Daimler electric buses, are underway. Both companies aim to finalize a joint development agreement in the coming months. This move reflects the challenges hindering solid-state battery development, considered the "holy grail" of EV batteries for improved range and faster charging. Volkswagen affirmed its commitment to QuantumScape and refrained from commenting on discussions with Blue Solutions. [Read More](#) (Battery Industry)

The much talked about EV slowdown is in Europe, not the US or China. In late 2023, reports surfaced about a slowdown in the US electric vehicle (EV) market, citing stockpiles at dealerships and cutbacks by major automakers. Contrary to this, global EV sales hit a record 1.89 million units in November 2023, up 8% from the previous month and 30% from November 2022. The Americas and Asia Pacific saw substantial growth, while Europe lagged behind. Additionally, the combined battery capacity of EVs reached 69.8 GWh, reflecting continued expansion, challenging claims of waning interest in electric vehicles globally. [Read More](#) (Adamas Intelligence)

Chart 7: Battery Capacity Deployed (January-November 2023)

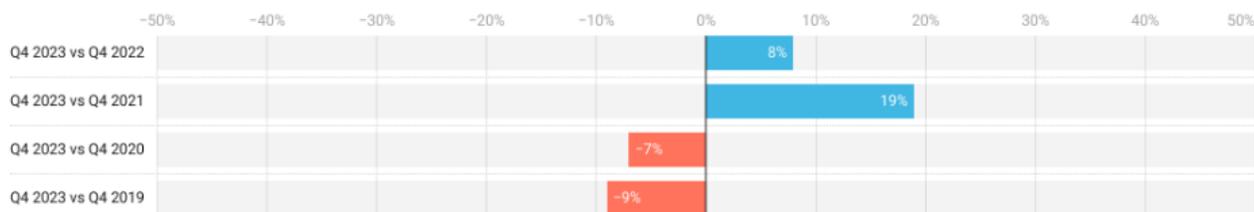


Source: Intro-act, Adamas Intelligence EV Battery Capacity and Battery Metals Tracker

Report: Lithium lull makes nickel top priority for US battery OEMs despite difficult sourcing environment. Rethink Energy's latest report scrutinizes battery raw material supply chains until 2030, assessing the impact of current raw material prices on future supply and demand. The analysis delves into battery cell prices, predicting continued declines. Notably, lithium-ion battery pack prices fell from \$151/kWh to \$139/kWh in 2023 due to oversupply and Chinese converters' overstocking. [Read More](#) (Green Car Congress)

US auto industry rose 8% in 4th quarter, while EV industry grew 29%. In Q4 2023, the US auto industry exhibited an 8% growth in overall sales, with a notable 29% rise in pure electric vehicle (BEV) sales, challenging the perception of low EV demand. Traditional brands like Toyota, Ford, Chevrolet, and Honda maintained top positions, while Tesla secured the 8th spot, closely trailing competitors. Rivian aims for substantial sales growth, possibly breaking into the top 20, while Lucid faces challenges. Tesla dominates sales growth over the past 5 years, outpacing other brands. Overall, the US auto market shows resilience, with EVs gaining traction. [Read More](#) (CleanTechnica)

Chart 8: US Auto Sales 4Q23 vs 4Q22, 4Q21, 4Q20, 4Q19

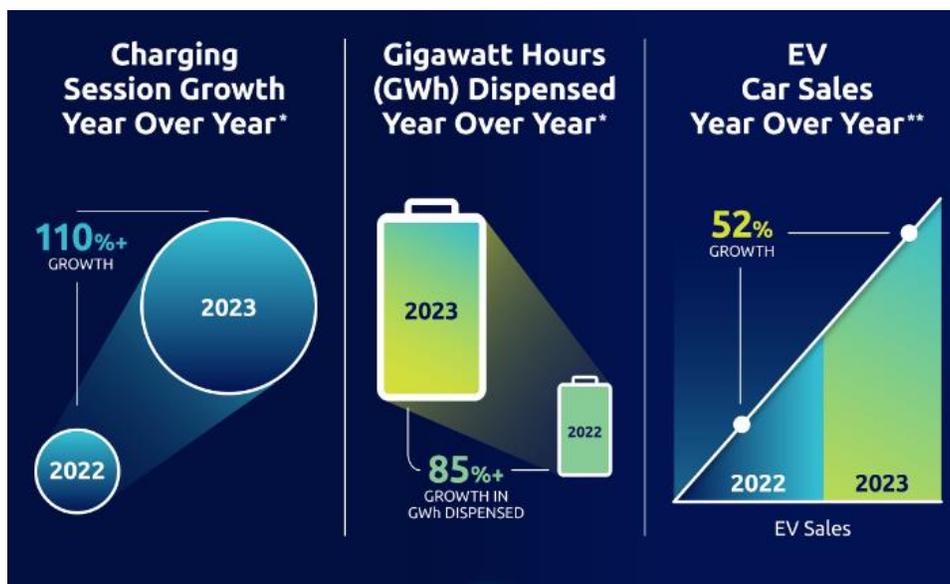


Source: Intro-act, Automakers, CleanTechnica

LFP remains the top driver of EV battery lithium demand. In November 2023, global lithium-ion battery deployment in newly sold passenger electric vehicles (BEVs, PHEVs, and HEVs) reached a record 41,240 tonnes of lithium carbonate equivalent (LCE), marking a 31% increase from the previous year. The growth was attributed to rising EV unit sales and an average 2% increase in battery capacity. LFP cathode chemistry dominated with a 34% rise, capturing a 31% share of the market. Overall, high-nickel cell chemistries maintained a 43% market share. [Read More](#) (Adamas Intelligence)

Infographic shows what Electrify America did in 2023. The company currently operates over 900 charging stations with 4,000 DCFC stalls across 47 U.S. states, Washington, DC, and five Canadian provinces. However, only about 680 chargers have been upgraded to address previous reliability issues. Despite initial challenges, recent improvements show increased sessions by over 110%, electricity dispensed by 85%, and a reduction in service dispatches by 80%. Workforce expansion, enhanced technician training, and ongoing charger upgrades indicate a commitment to improving reliability for electric vehicle users. [Read More](#) (CleanTechnica)

Chart 9: More Drivers, More Chargers, More Energy



**This Graph is Based on Internal Data and is Intended for Informational Purpose Only*

***Disclaimer: S&P IHS Markit Data as of 1/12/2024*

**** as of % of Sessions*

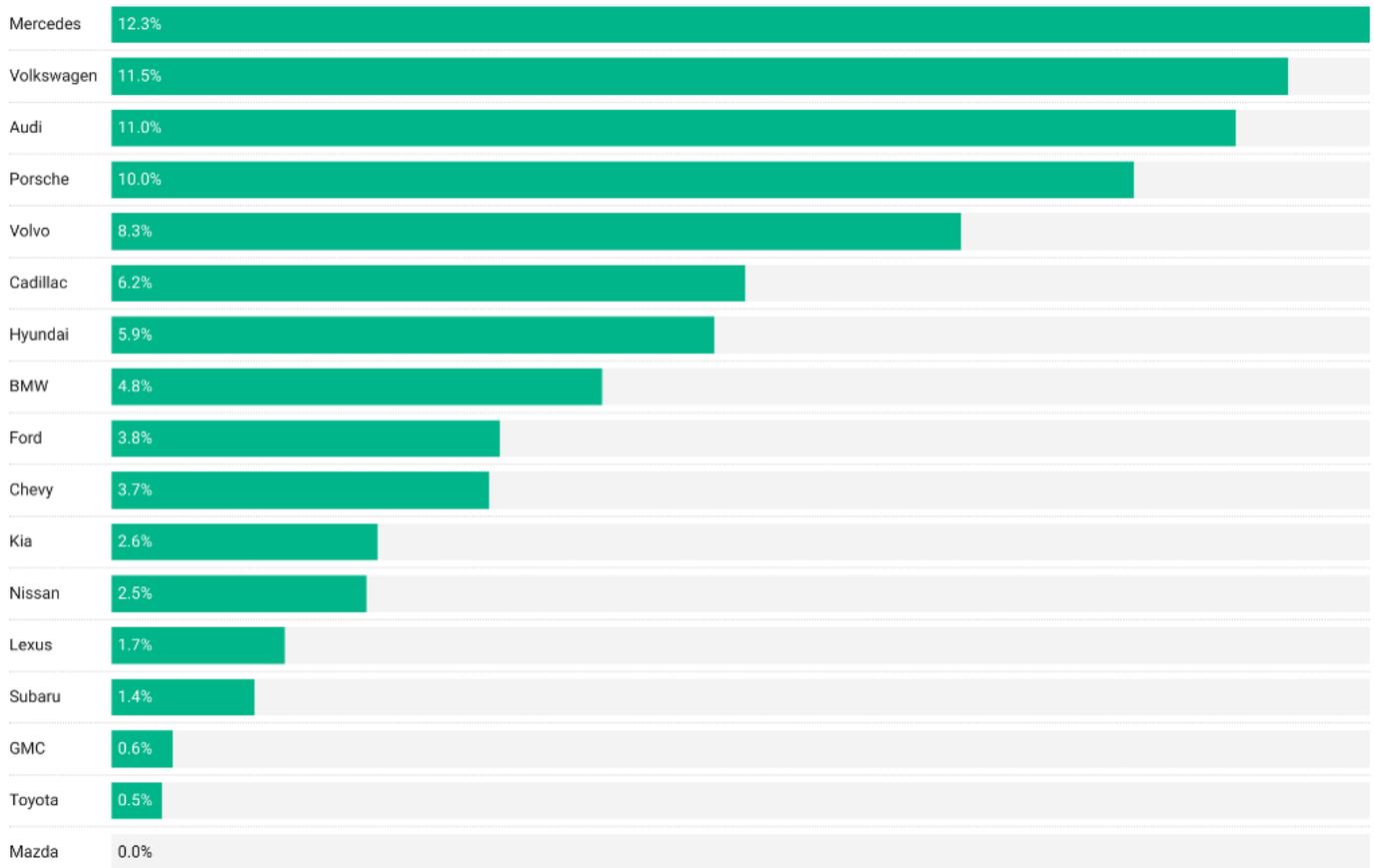
Source: Intro-act, CleanTechnica

New light-duty plugin vehicle sales topped 1 million for first time in 2023. The U.S. Department of Energy reports a significant surge in annual electric vehicle (EV) sales, surpassing one million in 2023, marking a quadruple increase from 2020. This growth, especially notable since 2021, includes plug-in hybrid vehicles (PHEVs), constituting 20% of total plug-in sales in 2023. With over 250,000 PHEVs sold, the cumulative figure for new light-duty plug-in EVs since 2010 reaches 4.7 million in 2023. A future report will delve into the proportion of battery electric vehicles (BEVs) in different automakers' sales. [Read More](#) (CleanTechnica)

Tesla's California factory now largest auto production factory in USA. Tesla's 2023 financials reveal its California factory in Fremont has become the top automobile production facility in the US. The news, not emphasized in Tesla's shareholder letter, highlights the company's remarkable growth. In 2019, Tesla held 1.1% of the US auto sales market, reaching 4.3% in 2023. The share of pure electric vehicles (BEVs) also surged, with Tesla dominating. The Fremont factory produced nearly 560,000 vehicles in 2023. [Read More](#) (CleanTechnica)

Top automakers in EV market share in USA — charts. The article explores the electric vehicle (EV) market share in the USA for 2024, focusing on auto brands, automotive groups, and alliances. Mercedes leads with 12.3% of sales being electric, followed by Volkswagen. Three of the four brands with over 10% EV share are from Volkswagen Group. In the 4th quarter, Mercedes and Ford show increases, while Geely declines sharply. Tesla dominates the BEV market with 56.2% in Q4 and 59.1% for the year, emphasizing the need for growth beyond Tesla in the US EV market. [Read More](#) (CleanTechnica)

Chart 10: BEV Share of Auto Brands U.S. Sales (2023)



Source: Intro-act, Automakers, CleanTechnica

China's solid-state battery planned capacity to exceed 128 GWh by 2025, analysts say. China currently possesses 10 GWh of solid-state battery capacity, with plans to reach over 128 GWh by 2025, according to CITIC Securities. Solid-state batteries, considered the next-gen technology, aim to overcome challenges faced by liquid lithium-ion batteries. Initially applied in 2023-2024 for aerospace, medical, and high-end new energy vehicles, the team predicts widespread adoption post-2027 as costs decrease. Semi-solid-state batteries are expected to industrialize by 2024, acting as a transitional solution. [Read More](#) (CNEVPost)

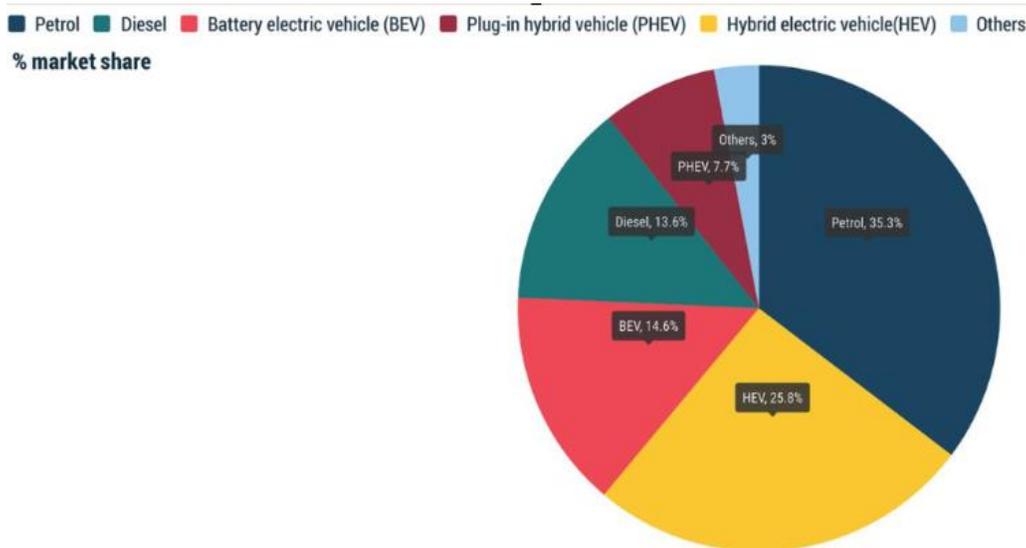
University of Michigan's Automotive Research Center receives \$100m US Army investment for autonomous vehicle development. The US Army and the University of Michigan's Automotive Research Center (ARC) have extended their partnership with a new five-year agreement, potentially worth \$100 million, to advance autonomous vehicle technologies. ARC, led by U-M, focuses on modeling and simulation methods, such as synthetic environments and virtual prototypes, crucial for developing modern mobility systems. [Read More](#) (ADAS & Autonomous Vehicle)

New data from ChargePoint shows pressure for more charging infrastructure continues to build. ChargePoint, a leading EV charging solutions provider, revealed a 53% increase in annual charging sessions globally in 2023, delivering over 1 TWh of energy, a 70% YoY surge. The rise reflects the growing demand for EV charging, spurred by record-high EV sales in the U.S. last year. Increased utilization across commercial sectors indicates a shift from EV charging being a perk to a necessity for businesses. [Read More](#) (Business Wire)

Toyota chairman issues apology for subsidiary safety scandal, brand remains world's top-seller. Toyota Chairman Akio Toyoda apologized for safety scandals affecting subsidiaries Daihatsu, Hino Motors, and Toyota Industries. Following an independent panel's discovery of wrongdoing in diesel engine tests by Toyota Industries, the company suspended shipments of certain models. Despite potential brand damage, Toyota remained the top global car manufacturer in 2023 with 11.2 million vehicles sold. However, Daihatsu's production shutdown due to fraudulent safety tests and a subsequent investigation may impact Toyota's sales. Irregularities included safety test tampering dating back to 1989. [Read More](#) (Fox Business)

More EVs than diesels sold in the EU over 2023. The EU electric car market is thriving, with over 1.5 million new electric car registrations projected for 2023, a 37% increase from the previous year. The Tesla Model Y emerged as the top-selling model, contributing to the 37% growth in battery electric car registrations. Overall, the EU automotive market experienced a 13.9% growth, totaling 10.5 million units in registrations. Electric cars held a 14.6% market share, surpassing diesel cars. Germany, France, the Netherlands, and Sweden were key contributors to the growing electric vehicle sales. In December 2023, battery electric cars claimed an 18.5% share of the market mix, further highlighting their significance. [Read More](#) (Electrive)

Chart 11: New EU Cars by Power Source (2023)

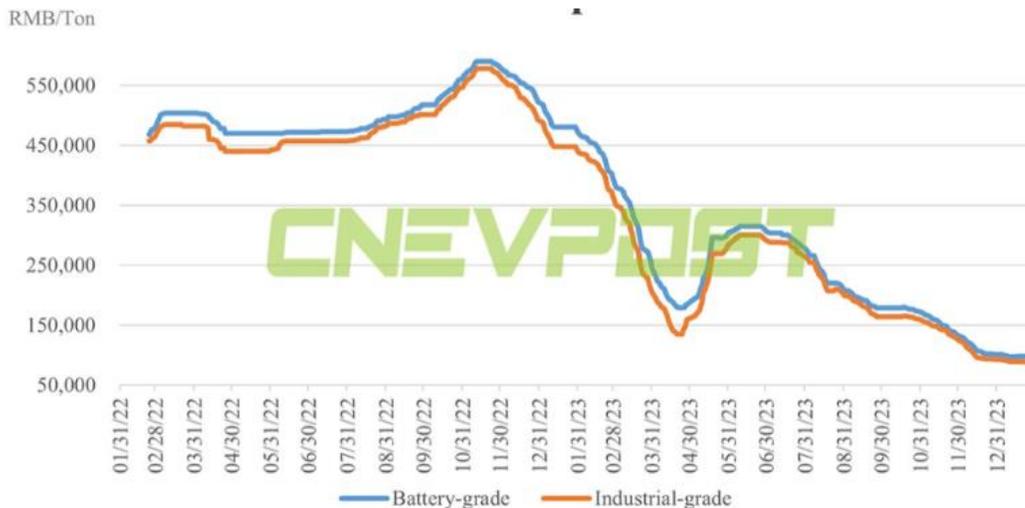


Source: Intro-act, ACEA

CATL and Didi ramp up battery swapping plans in China. In China, battery swapping is thriving, with Nio operating over 2,300 stations and CATL introducing EVOGO battery swap stations. CATL collaborates with Didi Chuxing for a battery-swapping partnership, aiming to enhance service and technology standards. Monthly rentals for CATL's battery blocks are set at 399 yuan. This approach addresses range anxiety and battery degradation concerns for electric vehicle drivers. Despite skepticism in North America, China's support for battery swapping aligns with national policies, making it a viable and efficient solution for EV users. [Read More](#) (CleanTechnica)

Chinese lithium producers expect net profit to plunge in 2023 on falling lithium prices. Major Chinese lithium producers, Ganfeng Lithium, Tianqi Lithium, and Chengxin Lithium, anticipate significant declines in their 2023 net profits due to a drastic drop in lithium prices. Ganfeng, the world's largest lithium producer, predicts a 69.76% to 79.52% decrease in net profit, attributing it to slowed demand growth and sharply falling lithium product prices. Tianqi and Chengxin also expect substantial year-on-year profit declines, pointing to lower lithium product sales prices. The industry-wide challenge arises from an 80% decline in battery-grade lithium carbonate prices throughout 2023. [Read More](#) (CNEVPost)

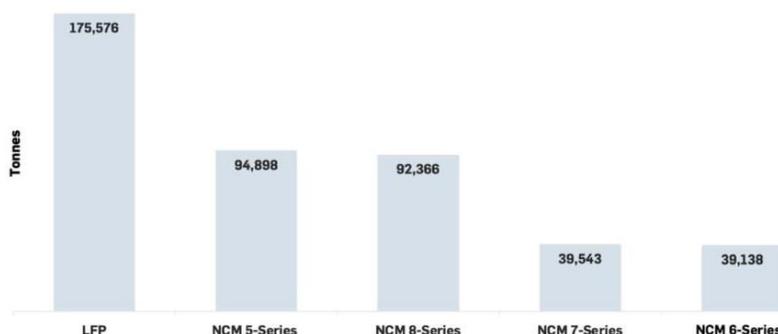
Chart 12: Lithium Carbonate Prices in China



Source: Intro-act, Mysteel, CNEVPost

LFP now responsible for 36% of global EV graphite demand. From January to October 2023, global deployment of graphite in electric vehicle (EV) batteries increased by 45%, reaching 493,472 tonnes. This growth was attributed to a 33% rise in EV unit sales and a 9% increase in sales-weighted average battery capacity. LFP dominated, capturing 36% of the market, while NCM 5-Series and NCM 8-Series followed. Notably, NCM 6-Series outpaced NCA batteries for fifth place. Plug-in hybrid sales outpaced battery electric vehicles, with PHEV battery capacities and graphite usage rising in 2023. The EV market is tracked via a subscription-based report. [Read More](#) (Adamas Intelligence)

Chart 13: Graphite Deployed by Cell Chemistry (January to October 2023)



Source: Intro-act, Adamas Intelligence EV Battery Capacity and Battery Metals Tracker

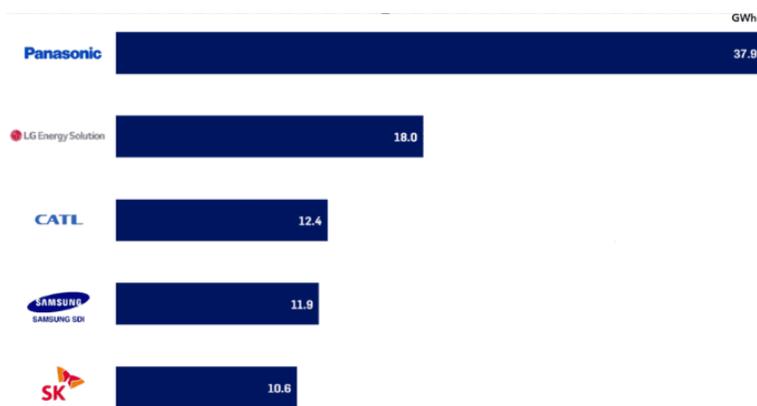
The US added 1.2 million EVs to the grid last year, & electricity use went down. In 2023, the United States witnessed a record-breaking 1.2 million electric vehicle (EV) sales, comprising 7.6% of total vehicle sales. Despite the surge in EVs, electricity generation only declined by 1.1%, challenging the assumption of increased demand. The remarkable stability in electricity consumption over the past two decades is attributed to technological advancements and efficiency gains in electric appliances. This efficiency magic, marked by a 50% improvement in energy intensity from 1980 to 2014, allows for the incorporation of new loads, like EVs, without a corresponding rise in overall electricity use. This positive trend underscores the potential for continued efficiency improvements in various sectors, ensuring a sustainable balance between technological advancements and electricity consumption. [Read More](#) (CleanTechnica)

INDUSTRY RANKINGS

Top 10 battery producers in the world — 2023. In 2023, the demand for lithium-ion batteries in light electric vehicles (EVs) surged by 40%, reaching 712 GWh, outpacing the 35% growth of EVs. CATL led with a 34% market share, fueled by the success of the Made-in-China Tesla Model Y. BYD secured the second spot with a 16% share, propelled by its namesake brand and third-party supply deals. LG faced a decline, dropping to 15%. Top three players, including Panasonic, comprised 66% of total battery deployment, emphasizing the significance of scale in this booming industry. Other notable risers included Farasis Energy, Envision AESC, and Sunwoda. The overall battery market is poised for significant growth, aligning with the expanding EV market and increasing average battery size, with an anticipated growth rate of approximately 50% in the coming years. [Read More](#) (CleanTechnica)

Top 5 EV cell suppliers in the Americas. In the Americas, the first 11 months of the previous year witnessed a 51% surge in newly sold passenger EVs, totaling 104.4 GWh of battery capacity. Panasonic led as the top cell supplier with 37.9 GWh, predominantly fitted to Tesla's EVs, notably the Model Y. LG Energy Solution, CATL, Samsung SDI, and SK On followed suit. Despite concerns about a slowdown, November marked a record 10.7 GWh deployed, surpassing growth in other regions. December data is expected to challenge speculations of a decline in vehicle electrification. [Read More](#) (Adamas Intelligence)

Chart 14: Top 5 Cell Suppliers in the Americas (Jan-Nov 2023)



Source: Intro-act, Adamas Intelligence EV Battery Capacity and Battery Metals Tracker

EARNINGS

Tesla delivers underwhelming earnings despite Cybertruck launch and high vehicle deliveries. Despite unveiling a new vehicle, exceeding delivery expectations, and forecasting a lower growth rate in 2024, Tesla's Q4 2023 results fell short of analyst predictions. With \$25.1bn in revenue and \$0.71 earnings per share, missing the expected \$25.76bn and \$0.74, Tesla faced a disappointing quarter. Although vehicle deliveries grew 38% in 2023, concerns about lower growth in 2024 led to a decline in stock value. Tesla's recent market struggles, including a significant January valuation drop, price cuts, and production challenges, indicate ongoing challenges for the electric vehicle manufacturer. [Read More](#) (The Guardian)

China's BYD forecasts 2023 net profit to rise as much as 86.5% y/y. Chinese EV giant BYD anticipates an 86.5% increase in net profit for 2023, reaching 29-31 billion yuan (\$4.04-4.32 billion). This growth, although slower than 2022's 446% surge, is attributed to strong sales, cost-cutting measures, and overseas sales expansion. BYD surpassed Tesla as the top EV maker in Q4 2023, delivering 526,409 vehicles. In 2023, BYD sold 3.02 million vehicles, a 61.9% increase. The company's diversified business includes electronic components for smartphones. Tesla reported a 19.4% net profit growth to \$15 billion in 2023. [Read More](#) (Reuters)

Samsung SDI logs record sales in 2023 on strong EV demand. Samsung SDI reported a record-high revenue of 22.7 trillion won in 2023, up 12.8%, driven by a robust increase in electric vehicle (EV) battery sales. However, operating profit declined 9.7% to 1.6 trillion won, attributed to slow sales of small batteries and electronics materials. Despite missing profit targets, the EV battery business experienced a 38% and 93% surge in sales and profit, respectively, in 2023, fueled by production expansion in Hungary and strong demand for premium prismatic batteries. [Read More](#) (The Star)

REGULATORY UPDATES

Over 20 EVs will lose tax credit eligibility in 2024. In 2024, the number of electric vehicles qualifying for the \$7,500 clean vehicle tax credit will decrease from 35 to 14, as per the U.S. Department of Energy and Treasury's Internal Revenue Service. Notable models, including Nissan Leaf and some Tesla Model 3 versions, will lose eligibility. The Biden administration's proposed rule seeks to support U.S. manufacturing and reduce reliance on foreign entities for EV components and minerals. Changes may hinder EV sales, affecting eligibility based on battery components and critical minerals from certain foreign entities. Some automakers plan adjustments to regain eligibility in 2024. [Read More](#) (Automotive Dive)

E-scooter crash injuries significantly under-reported – study. Government advisers emphasize the underreporting of injuries from e-scooter crashes, urging more rigorous data collection for a comprehensive understanding of the vehicles' dangers. The Parliamentary Advisory Council for Transport Safety (Pacts) analyzed data from October and November 2021, revealing that less than 10% of e-scooter crash casualties treated at hospitals were reflected in police statistics. Pacts calls on the Department for Transport to provide clear information to the public and issue guidance for improved data alignment with police recording systems. E-scooter trials continue in the UK. In 2022, 11 riders and one pedestrian died in e-scooter crashes, with 1,446 recorded injuries. The Department for Transport emphasizes ongoing collaboration with police to enhance e-scooter incident data. [Read More](#) (Shropshire Star)

EV automakers under pressure to demonstrate material circularity. The automotive industry, particularly electric vehicle (EV) manufacturers, faces mounting pressure to embrace material circularity, recycling, and minimizing waste in the production and use of EV batteries. A circular economy approach aims to extend product life, reduce resource input, and limit emissions. As the EV sector grows, addressing material circularity becomes crucial to mitigate environmental impacts. The EU emphasizes circularity in transportation, viewing it as integral to a sustainable future. Challenges in the battery market, such as high costs and lack of standardization, necessitate circular solutions to enhance viability and sustainability. [Read More](#) (CleanTechnica)

EU reaches deal on near phaseout of diesel trucks. European lawmakers have set ambitious CO2 targets for heavy-duty vehicles, aiming to phase out most new diesel truck sales by 2040. Manufacturers must reduce emissions by 45% in 2030, 65% in 2035, and 90% in 2040. The law extends targets to vocational vehicles from 2035, resisting pressure for loopholes from the fossil fuel industry. Trailer emissions and bus targets were also established. Transport & Environment believes this provides certainty for European truck producers to transition to zero-emission vehicles and compete globally. Around 30% of trucks in 2030 and at least 75% in 2040 are expected to be zero-emission. [Read More](#) (Transport Environment)

U.S. Department of Energy announces \$131 million to boost America's battery supply chain & supercharge electric vehicle innovation. The U.S. Department of Energy (DOE) is allocating over \$131 million for projects aimed at advancing research and development in electric vehicle (EV) batteries and charging systems. A consortium, backed by \$60 million, will focus on pre-competitive, vehicle-related advanced battery R&D to support widespread EV commercialization. The funding, aligned with President Biden's agenda, seeks to secure the domestic battery supply chain, develop innovative solutions for transportation electrification, and promote economic opportunities while ensuring equitable access and community benefits in the clean energy transition. [Read More](#) (DOE)

New policy boosts access to EV charging. The U.S. Department of the Treasury has introduced a policy facilitating access to federal tax credits for installing electric vehicle (EV) charging stations, aiming to address climate and air pollution. The Inflation Reduction Act extended the Section 30C tax credit but limited eligibility to specific areas, prompting the Treasury to adopt a commonsense approach. Tracts with over 10% not-urban blocks are now considered non-urban, preventing 32 million individuals, including rural residents and minorities, from being denied tax credits. This inclusive policy gained support from various stakeholders, promoting widespread EV charging in America. [Read More](#) (NRDC)

\$960 million in funding to boost transportation electrification, EV charging, & battery innovation. In January 2024, the Department of Energy (DOE) unveiled a total of \$960 million in funding for various projects aimed at promoting equitable clean transportation, expanding EV charging infrastructure, advancing EV battery research, and enhancing the battery supply chain crucial for widespread EV commercialization. Notably, the DOE allocated \$131 million for R&D in EV batteries and charging systems, \$46.5 million for EV charging reliability and workforce development, nearly \$150 million in grants to improve existing EV infrastructure, and \$623 million for 47 EV charging and alternative-fueling projects nationwide. Additionally, \$32.5 million was designated to advance transportation electrification. [Read More](#) (CleanTechnica)

Tesla sued by California counties over hazardous waste. Tesla is facing a lawsuit from 25 California counties, including Los Angeles and San Francisco, alleging mishandling of hazardous waste at its facilities. The lawsuit, filed on Tuesday, accuses Tesla of violating state laws by improperly labeling and disposing of waste materials in landfills not authorized for hazardous materials. The waste includes paint materials, brake fluids, batteries, antifreeze, and diesel fuel. The legal action seeks civil penalties and an injunction for proper waste management. This is not the first time Tesla has faced such allegations, having settled with the EPA in 2019 over hazardous waste violations. [Read More](#) (The Print)

U.S. safety agency deepens probe of Tesla power steering loss. U.S. safety regulators have elevated their investigation into Tesla vehicles' power steering loss to an engineering analysis, a necessary step before potential recalls. Covering about 334,000 2023 Model 3 and Model Y vehicles, the probe follows reports of premature suspension and steering failures since 2016. NHTSA identified 2,388 complaints, with some drivers experiencing steering wheel difficulties. Tesla, facing its tenth recall, may incur significant costs if physical parts need replacement. The move coincides with Tesla recalling 2.2 million U.S. electric vehicles due to small warning light fonts, while NHTSA reviews a recent Autopilot-related recall. [Read More](#) (Reuters)

M&A

Scooter startups Tier and Dott agree to merge. E-scooter rental companies Tier Mobility and Dott are merging, creating Europe's largest operator. Investors are injecting an additional €60 million (\$66 million) into the combined business. The merged entity, operating initially under both brands, will provide e-scooter rentals in 20 countries, generating €250 million in annual revenue. Tier CEO Lawrence Leuschner will be chairman, and Dott CEO Henri Moissinac will serve as CEO. The deal is backed by existing shareholders, including Abu Dhabi's Mubadala Capital and Belgian Sofina. E-scooter firms are facing regulatory challenges, leading to industry consolidation for improved profitability. [Read More](#) (Reuters)

Siemens strengthens market position with Heliox acquisition. Siemens AG has completed the acquisition of Heliox, a Dutch company specializing in DC fast charging for e-bus and e-truck fleets, marine, port, and mining vehicles. The undisclosed purchase adds to Siemens' eMobility charging portfolio, providing solutions ranging from 40 kW to megawatt charging for depots and en-route. Heliox's mobile, scalable, and parallel charging solutions expand Siemens' market reach, particularly in Europe and North America. The acquisition enhances Siemens' capabilities in power electronics and complements its digitalization and software offering in IoT-enabled hardware and services. [Read More](#) (Tech.eu)

CAPITAL MARKETS

Finn raises \$109m on a \$658m valuation, taking its car subscription platform up another gear. Munich-based startup Finn, a platform offering new car subscriptions, has secured €100 million (\$109-110 million) in a Series C funding round led by Planet First Partners. The company, valued at €600 million post-money, plans to use the funds to expand its tech, focusing on more electric vehicles and cloud-based tools. With 25,000 subscriptions in Germany and the U.S., Finn aims to make 80% of its car inventory electric by 2028. CEO Maximilian Wühr credits the company's late entry into the market, strategic sourcing, and bulk deals with OEMs for its success, reaching annualized recurring revenues of €160 million. [Read More](#) (Tech Crunch)

EV-charging startup Electra raises €304m series B to expand European network. Paris-based EV-charging startup Electra has secured €304m in a Series B funding round, led by Dutch pension fund PGGM and joined by Bpifrance and existing investors. With total funding now at €600m, Electra is close to unicorn status. The company builds both physical and software components for fast-charging stations across eight European countries. The funds will aid the deployment of 2,200 stations (15k charging points) by 2030, targeting consolidation in existing markets. [Read More](#) (Sifted)

INERATEC raises \$129 million led by Piva Capital to usher in the next era of sustainable mobility. INERATEC, an e-Fuel company, secured over \$129 million in its Series B funding led by Piva Capital, with participation from HG Ventures, TDK Ventures, and others, along with increased support from existing investors like ENGIE New Ventures and Honda. The funds mark a crucial step in transitioning from fossil fuels to sustainable e-Fuels. CEO Tim Boeltken aims to transform 1GW of renewable energy into 125 million gallons of e-Fuel by 2030, addressing hard-to-abate sectors such as aviation and shipping. [Read More](#) (PR Newswire)

Lightship raises \$34m in series B funding. San Francisco-based electric RV company Lightship secured \$34 million in a Series B financing round, co-led by Obvious Ventures and Prelude Ventures, with participation from Allegis Capital, THOR Industries, and TechNexus Venture Collaborative. Lightship, founded in 2020 by CEO Toby Kraus, plans to use the funds to accelerate production of its Lightship L1 model. The company focuses on designing aerodynamic, battery-powered trailers with a substantial energy storage system, electric propulsion, and solar capabilities, aiming to meet high demand and create engineering and manufacturing jobs at its new Colorado facility. [Read More](#) (Fin SMEs)

COMPANY NEWS

Nio Inc. announces 1,000km EV battery breakthrough. Chinese electric vehicle manufacturer Nio Inc. has revealed a groundbreaking EV battery, set for mass production in April, capable of offering an impressive 1,000 kilometers (621 miles) of range—outperforming current market options. During a live-streamed test, Nio CEO William Li drove the electric ET7 model for 1,044 kilometers on a single charge. The 150-kWh ultralong life battery demonstrated outstanding energy density and safety performance. [Read More](#) (Green Car Stocks)

Honda weighs \$14b plan for EV production in Canada. Honda is considering building a \$14 billion electric vehicle (EV) plant in Canada, possibly involving in-house battery production, aiming to compete with U.S. and European rivals in the growing EV market. Potential sites, including one in Ontario, are being evaluated, with a decision expected by the end of 2024. This marks Honda's second North American EV facility, following its Ohio plans. [Read More](#) (NIKKEI ASIA)

Tesla recalls more than 1.5 million EVs in China. China's State Administration for Market Regulation (SAMR) has ordered the recall of over 1.5 million Tesla Model 3, S, Y, and X vehicles due to door-latch control and automatic assisted steering issues. Some vehicles had a bug allowing misuse of level 2 assisted driving, increasing collision risk. Additionally, 7,538 imported Teslas had door unlock logic control problems. [Read More](#) (Green Car Stocks)

Tesla to halt production in Germany as Red Sea conflict hits supply chains. Tesla is suspending production at its Berlin factory for two weeks due to Red Sea conflicts disrupting transport ships, potentially causing a supply-chain crisis for European manufacturers reliant on parts from Asia. Houthi fighters targeting shipping in the Red Sea are causing global transport disruptions, prompting delays in parts deliveries to European factories. [Read More](#) (Mint)

Superpedestrian to auction 20,000 E-scooters after shutting down. Superpedestrian, a shared electric scooter startup, is auctioning over 20,000 scooters and equipment from its U.S. operations after closing on December 31. Silicon Valley Disposition is hosting two global online auctions for surplus assets, featuring items from cities like Seattle, Los Angeles, and New York. The first auction runs from January 23-25, and the second from January 29-31. [Read More](#) (Tech Crunch)

Charging solutions provider StarCharge mulling HK IPO, report says. Chinese electric vehicle (EV) charging infrastructure firm StarCharge is contemplating an initial public offering (IPO) in Hong Kong, potentially securing \$500 million and seeking a \$5 billion valuation, sources say. The company, also known as Wanbang Digital Energy Co, plans to collaborate with China International Capital Corp and China Merchants Bank International for the IPO, with details subject to change. [Read More](#) (CNEVPost)

Renault cancels Ampere IPO. Renault Group has canceled the initial public offering (IPO) of its Ampere electric vehicle unit due to unfavorable market conditions. The decision will not impact Renault's EV and software strategy. Ampere, expected to generate 2.8 billion euros in 2023, aimed for 300,000 EV sales in 2025 and 1 million in 2031. The IPO, initially planned for H1 2024, was dropped if valuation proved too low. Despite the cancellation, Renault asserts Ampere's profitability and plans for seven EV models by 2031. [Read More](#) (Automotive News Europe)

Chinese firm Xiaomi unveils first EV, vows to dominate industry. Xiaomi has unveiled its debut electric car, the Xiaomi SU7, with plans to invest over \$1.4 billion in its development, aiming to compete with Tesla and Porsche. The electric SUV, set to launch in a few months, promises superior performance metrics, challenging established brands. [Read More](#) (Green Car Stocks)

Hyundai, Kia join Gore for breakthrough in H2 fuel cell technology. Hyundai Motor Company, Kia Corporation, and W. L. Gore & Associates have joined forces to advance hydrogen fuel cell technology at the Mabuk Eco-Friendly R&D Center in Korea. The collaboration focuses on developing an advanced polymer electrolyte membrane (PEM) crucial for hydrogen fuel cell systems. The joint effort aims to enhance PEM development for the next generation of fuel cell electric commercial vehicles, emphasizing improved performance and durability. [Read More](#) (Mobility Outlook)

Continental and Aurora finalize design of world's first scalable autonomous trucking system. Continental and Aurora Innovation have achieved a crucial milestone in their partnership to commercialize autonomous trucks at scale. The blueprint and design of the future Aurora Driver hardware and fallback system, an SAE Level 4 autonomous driving system, have been completed. The companies aim to start production in 2027, with Continental providing lineside integration and working closely with Aurora's truck manufacturing partners. [Read More](#) (Press Release)

Pebble powers the Pebble Flow electric travel trailer with NVIDIA DRIVE Orin, bringing semi-autonomous features to the RV market. California-based startup Pebble has chosen NVIDIA DRIVE Orin system-on-a-chip to power its flagship product, the Pebble Flow electric travel trailer, aiming to revolutionize the RV industry. With production beginning by the end of 2024, Pebble intends to enhance RV user experience by integrating semi-autonomous features, such as the Magic Hitch, which automatically connects the trailer to the tow vehicle. [Read More](#) (Yahoo Finance)

Daimler Truck and TORC Robotics select Aeva to supply advanced 4D LiDAR technology for series-production autonomous trucks. Aeva, a leader in sensing systems, will supply its advanced Atlas 4D LiDAR tech to Daimler Truck for autonomous-ready Freightliner Cascadia trucks, achieving SAE Level 4 capabilities. The collaboration, beginning in Q1 2024, involves Torc Robotics and aims for Aeva's production by 2026 and Daimler Truck's ramp-up by 2027. [Read More](#) (Press Release)

Hyundai says its electric air taxi business will take flight in 2028. Hyundai's air mobility subsidiary, Supernal, revealed its latest electric vertical takeoff and landing aircraft, the S-A2, aiming to transport passengers by 2028. This marks a refined version of Hyundai's commitment to the emerging electric air taxi industry, initially outlined with Uber Elevate. While the timeline has shifted from its initial vision, Supernal plans extensive testing in California this year for FAA certification. [Read More](#) (Tech Crunch)

Honda previews its EV ambitions with two new concepts at the 2024 CES. Honda unveiled the Saloon and Space-Hub concept cars at CES 2024, revolutionizing the electric vehicle (EV) experience. The Saloon blends sleek design with technology like steer-by-wire and posture control, redefining EV joy. The Space-Hub, adaptable for various needs, suits family adventures or mobile offices. Both challenge EV norms, providing a tangible glimpse into a future where modern design reshapes the narrative. [Read More](#) (Top Speed)

Chart 15: Honda Unveils Saloon and Space Hub Concept Cars at CES 2024



Source: Intro-act, TopSpeed

Supernal debuts eVTOL product concept at CES 2024. Hyundai Motor Group's Advanced Air Mobility (AAM) company, Supernal, has unveiled the S-A2, an electric vertical takeoff and landing (eVTOL) vehicle, at CES 2024. The pilot-plus-four-passenger vehicle is part of Supernal's plan for safe, efficient, and affordable everyday air travel, aiming to enter the market in 2028. The S-A2, building on the S-A1 concept from CES 2020, features innovative aerospace engineering, distributed electric propulsion, and a focus on safety and sustainability. [Read More](#) (Press Release)

Sainsbury's launches new EV charging brand. Sainsbury's introduces Smart Charge, its EV charging service, available at over 200 ultra-rapid charging bays across 20 stores, aiming to expand to 750 bays in 100 stores by 2024. The supermarket plans to be a top-five provider of ultra-rapid charging in the UK, distinguishing itself as the first and only EV charging business fully owned by a UK supermarket. [Read More](#) (Grocery Gazette)

Swiss start-up Sirius unveils hydrogen-powered VTOL 'business jet'. Sirius Aviation has unveiled the design for its Sirius Jet, a hydrogen-electric VTOL business aircraft set for certification and service by 2028. Offering private and commercial variants, the Sirius Business Jet accommodates one pilot and three passengers, boasting a 1,150-mile range, while the larger Sirius Millennium Jet seats five with a 650-mile range. [Read More](#) (Future Flight)

US logistics firm opts to decarbonise with hydrogen trucks after operating battery electric fleet for two years. US logistics firm IMC has placed a \$22m order with Nikola for 50 fuel-cell trucks to meet California's zero-emission regulations for new drayage trucks. IMC had faced productivity challenges with battery-electric vehicles, prompting the switch to hydrogen fuel-cell trucks. However, executives express caution about first-generation technology and note challenges around refueling infrastructure. [Read More](#) (Hydrogen Insight)

Extremely fast EV charging delivers 100 miles in 5 minutes. Israeli startup StoreDot aims to revolutionize electric vehicle (EV) charging with its I-BEAM XFC™ concept. Using the proprietary 100in5 cell technology, it plans to offer a 100-mile range in just 5 minutes, streamlining the cell-to-pack process. The unique cooling system prevents hot spots, enabling ultra-fast charging. StoreDot targets mass production by 2024, with Polestar set to demonstrate its technology this year. [Read More](#) (CleanTechnica)

Bolt secures license to bring micro-mobility back to Oslo. Bolt has secured a license for 2,500 micro-mobility vehicles in Oslo until March 2025, emphasizing safety, distance-based pricing, and introducing the Bolt 6 scooter. Safety measures include ParkAssist+, an AI-based parking solution, and a reckless rider score system. The company shifts to distance-based pricing to discourage unsafe riding behavior. [Read More](#) (Intelligent Transport)

Canoo delivered electric vehicles to Kingbee. Canoo Technologies has successfully delivered vehicles to Kingbee, a national van rental provider, as part of a 9,300-vehicle binding order. The phased ramp-up manufacturing approach in Oklahoma City aligns with Canoo's schedule, with additional customer deliveries planned throughout 2024. The partnership aims to facilitate the transition to electric vehicles for fleets, offering work-ready fleet solutions. [Read More](#) (Press Release)

Chart 16: Canoo Electric Van



Source: Intro-act, Canoo

Volkswagen-backed Chinese OEM rolls out first sodium-ion battery electric car. Chinese EV brand Yiwei, a part of the JAC Group, unveiled its first sodium-ion battery electric car in December 2023, with Volkswagen now holding a 75% stake in the JAC Group EV joint venture. The sodium-ion battery technology for Yiwei's EV is supplied by HiNa Battery. The car integrates JAC's UE module technology, showcasing advancements similar to CATL's CTP and BYD's Blade battery. [Read More](#) (Electrify News)

Skyfly and AeroVolt to perform UK's first airfield-to-airfield eVTOL flight with recharging. Skyfly and AeroVolt will collaborate on the first-ever eVTOL flight between two UK airfields in 2024. AeroVolt's smart chargers at UK airports and aerodromes, part of a growing network, will support the Axe eVTOL's impressive range of 100 miles (fully electric) or 300 miles (hybrid). The partnership aims to demonstrate the viability of electric aviation, highlighting AeroVolt's advanced charging network. [Read More](#) (Press Release)

Archer Aviation and NASA sign space act agreement to collaborate on mission-critical EVTOL aircraft technologies. Archer Aviation has signed a Space Act Agreement with NASA to collaborate on battery cell safety and systems for Advanced Air Mobility (AAM). The partnership aims to ensure the U.S. leads in the next generation of air transportation. The initial project focuses on studying high-performance battery cells and safety testing for AAM and space applications. NASA will test Archer's battery system design for its Midnight aircraft, with results aimed at advancing the entire AAM industry. [Read More](#) (Press Release)

U.S. postal service unveils first postal electric vehicle charging stations and electric delivery vehicles. The United States Postal Service (USPS) revealed plans to equip hundreds of new Sorting and Delivery Centers (S&DCs) with electric vehicle (EV) charging stations, forming the nation's largest EV fleet. These initiatives are part of the USPS's 10-year Delivering for America® plan, involving a \$40 billion investment strategy for modernizing processing, transportation, and delivery networks. [Read More](#) (PR Newswire)

MOBILITY CHART OF THE MONTH

Chart 17: Top Battery Producers in 2023 by Battery Capacity (MWh)



Source: Intro-act, EV-volumes.com, CleanTechnica

EV SALES UPDATES

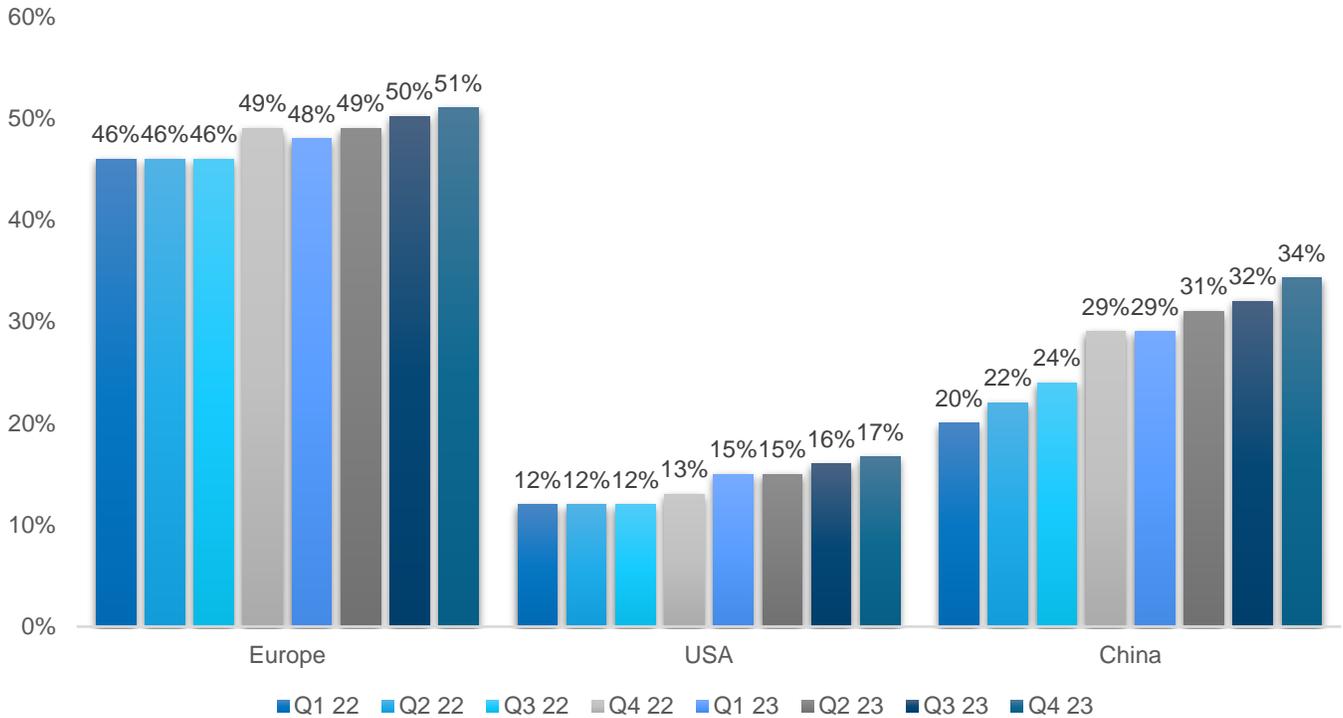
Chart 18: News Related to EV Sales from January 2024

Date	Update
2-Jan-24	Tesla Extends Lead in Norway Sales, EVs Take 82% Market Share
9-Jan-24	Global EV Battery Market Share in Jan-Nov: CATL 37.4%, BYD 15.7%
14-Jan-24	US EV Market Grows 29% in 4th Quarter, Tesla Holds 56% Market Share
15-Jan-24	In 2023, Indian EV Market Faced A Bumpy Road But Forged Ahead
15-Jan-24	U.S. EV Market Grows, Still Just 11% of Global EV Market
16-Jan-24	U.S. Plug-in EV Sales Rose to 9.8% of Auto Sales in December
18-Jan-24	The Much Talked About EV Slowdown is in Europe, Not the US or China
18-Jan-24	25% Of New Vehicle Sales Plugin Sales in Germany In 2023
25-Jan-24	Cumulative Sales of Plug-in Electric Vehicles Nearly 5 Million in USA — Chart
29-Jan-24	EV Sales Rise to 7.2% of US Auto Sales, Tesla 4.3% of Auto Sales
29-Jan-24	US Auto Industry Rose 8% in 4th Quarter, While EV Industry Grew 29%
30-Jan-24	New Light-Duty Plugin Vehicle Sales Topped 1 Million for First Time in 2023
30-Jan-24	Top Automakers in EV Market Share in USA — Charts
31-Jan-24	30% Plugin Vehicle Share in France
1-Feb-24	25% of New Car Sales in China Were 100% Electric in 2023
2-Feb-24	EVs Take 52.5% Share In Sweden
2-Feb-24	Electric Vehicles & Hybrids Surpass 16% of Total 2023 U.S. Light-Duty Vehicle Sales
3-Feb-24	24% Plugin Vehicle Share in Europe

Source: Intro-act, Clean Technica, Adamas Intelligence, CNEV, Reuters, Evannex

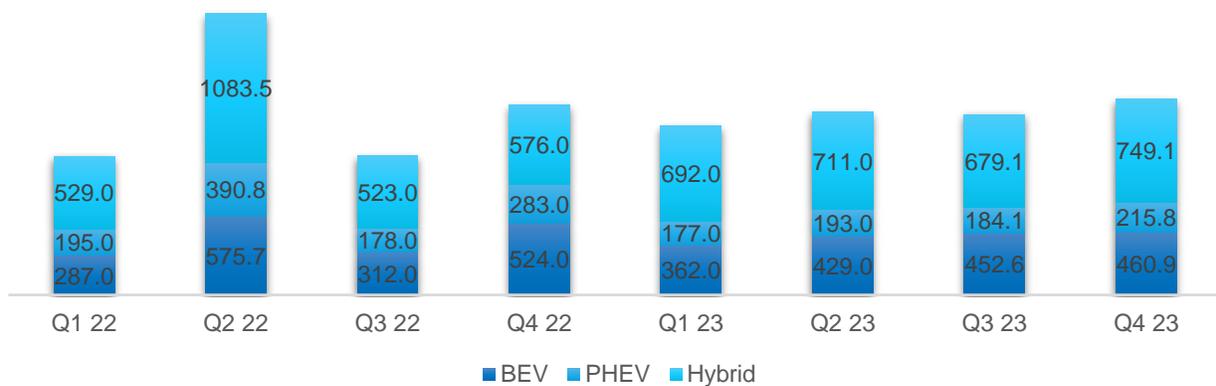
EV SALES METRICS

Chart 19: Share of EV Registrations to Total Registrations in Key Geographies



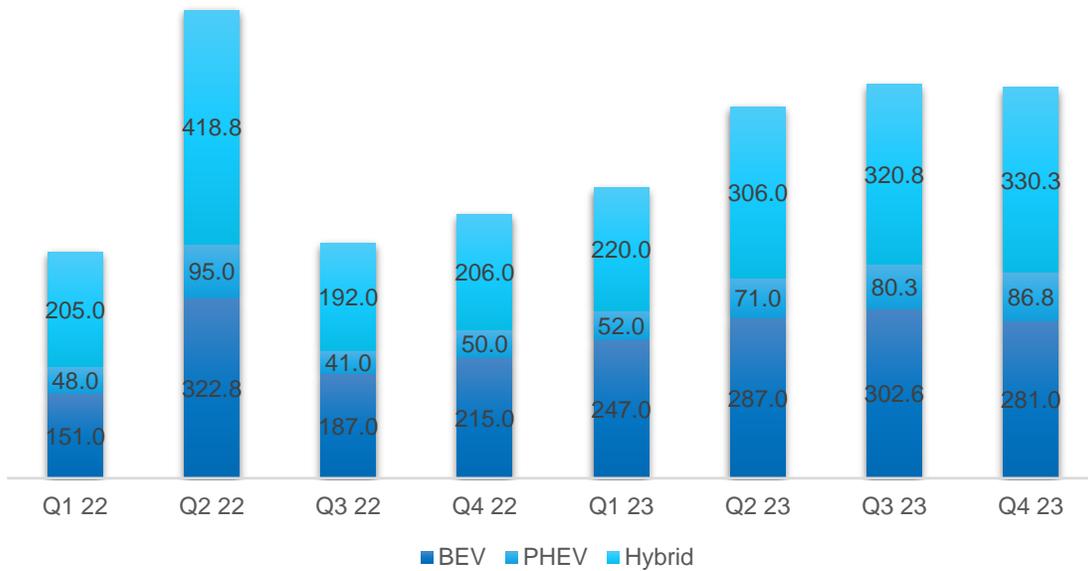
Source: Intro-act, PWC

Chart 20: Sales of BEV, PHEV and Hybrid Vehicles in Europe (Sales in '000s)



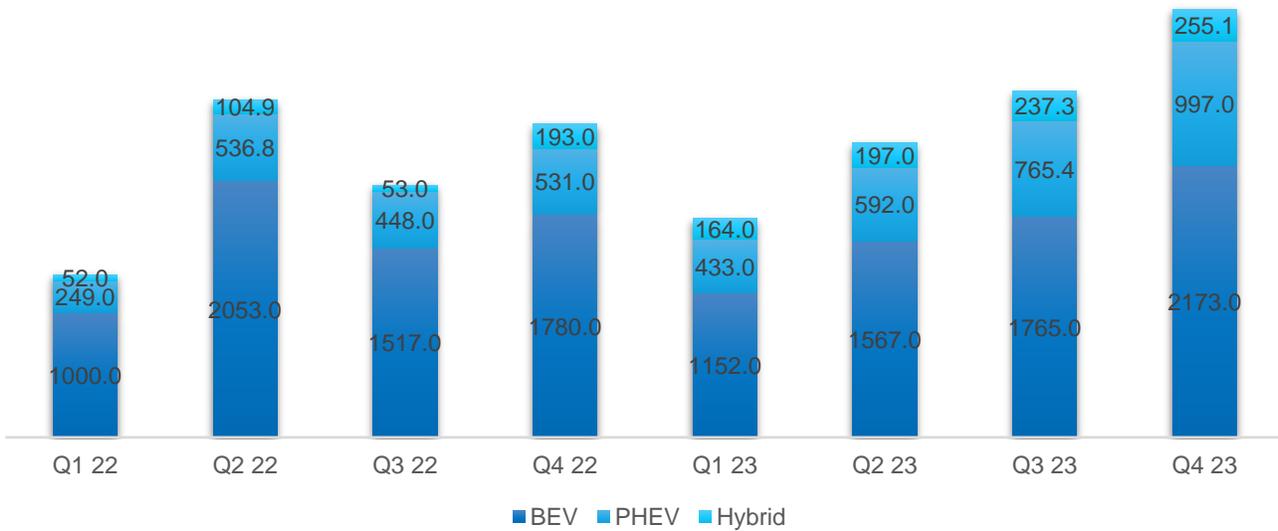
Source: Intro-act, PWC

Chart 21: Sales of BEV, PHEV and Hybrid Vehicles in the U.S. (Sales in '000s)



Source: Intro-act, PWC

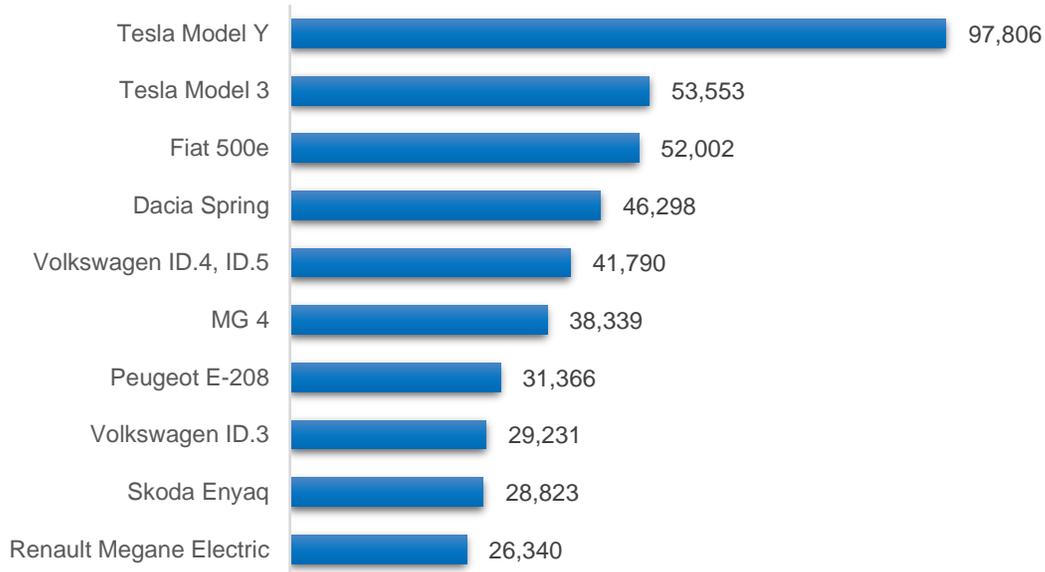
Chart 22: Sales of BEV, PHEV and Hybrid Vehicles in China (Sales in '000s)



Source: Intro-act, PWC

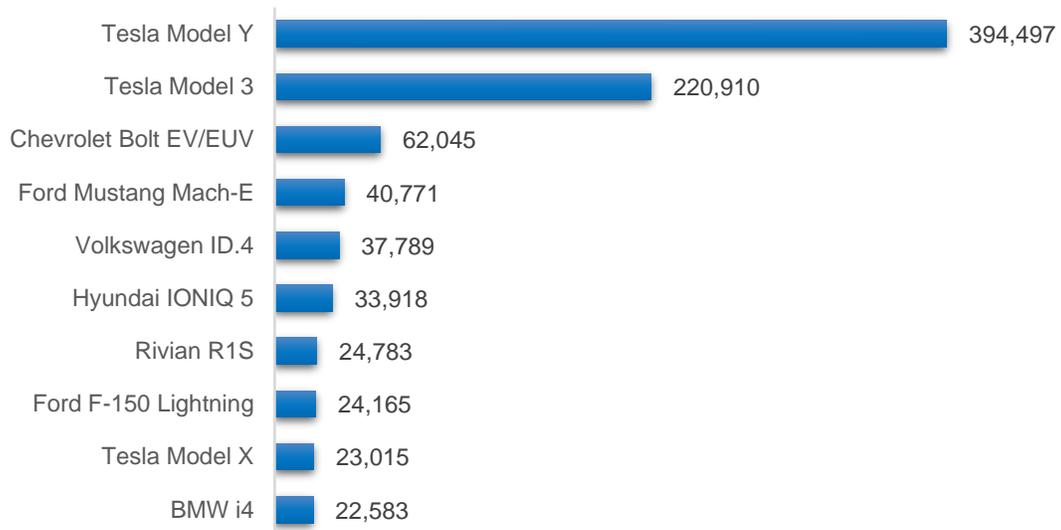
TOP SELLING ELECTRIC VEHICLES

Chart 23: Top 10 BEVs by Sales in Europe (Sales Volume 2023)



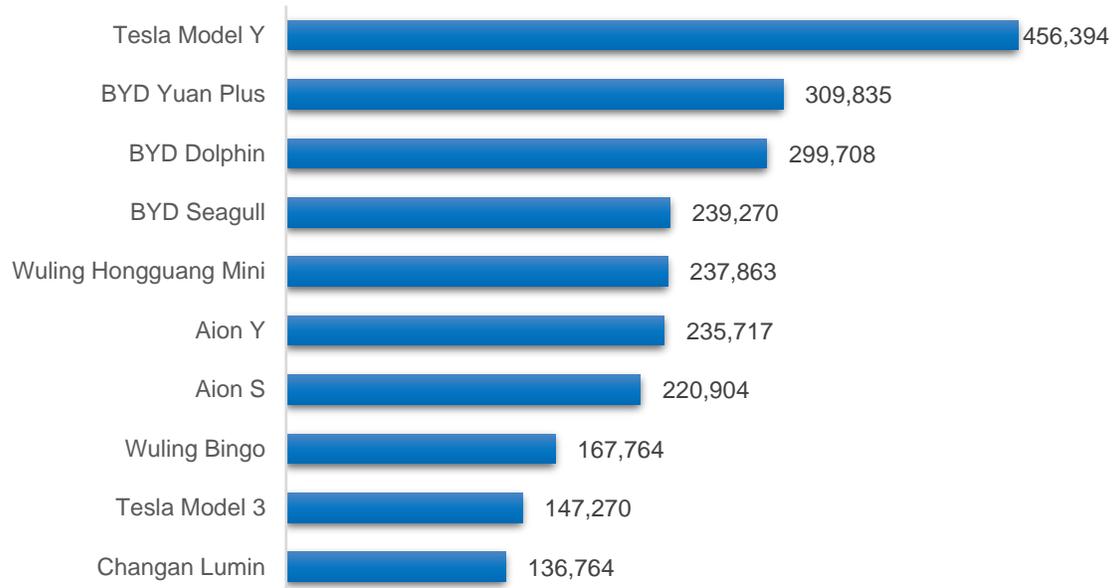
Source: Intro-act, PWC

Chart 24: Top 10 BEVs by Sales in US (Sales Volume 2023)



Source: Intro-act, PWC

Chart 25: Top 10 BEVs by Sales in China (Sales Volume 2023)



Source: Intro-act, PWC

NEW AND UPCOMING EV LAUNCHES

Chart 26: BEV Model Launches 2024 (not exhaustive)

S.No	Brand	Model	Launch	Quarter
1	BYD	Sealion 07	2024	Q4
2	Cadillac	Symboliq	2024	Q3
3	Dodge	Daytona	2024	Q4
4	IM	L5	2024	Q3
5	Jeep	Recon	2024	Q4
6	Kia	EV3	2024	Q3
7	Lancia	Ypsilon	2024	Q4
8	Lingxi	Lingxi L	2024	Q4
9	Maruti-Suzuki	eVX	2024	Q4
10	Mercedes-Benz	EQG	2024	Q4
11	MI	SU7	2024	Q3
12	Mini	Aceman	2024	Q4
13	Renault	5	2024	Q3
14	Venucia	Star EV	2024	Q3
15	VinFast	VF 3	2024	Q3

Source: Intro-act, PWC

Chart 27: Expected BEV Model Launches 2025–2028 (not exhaustive)

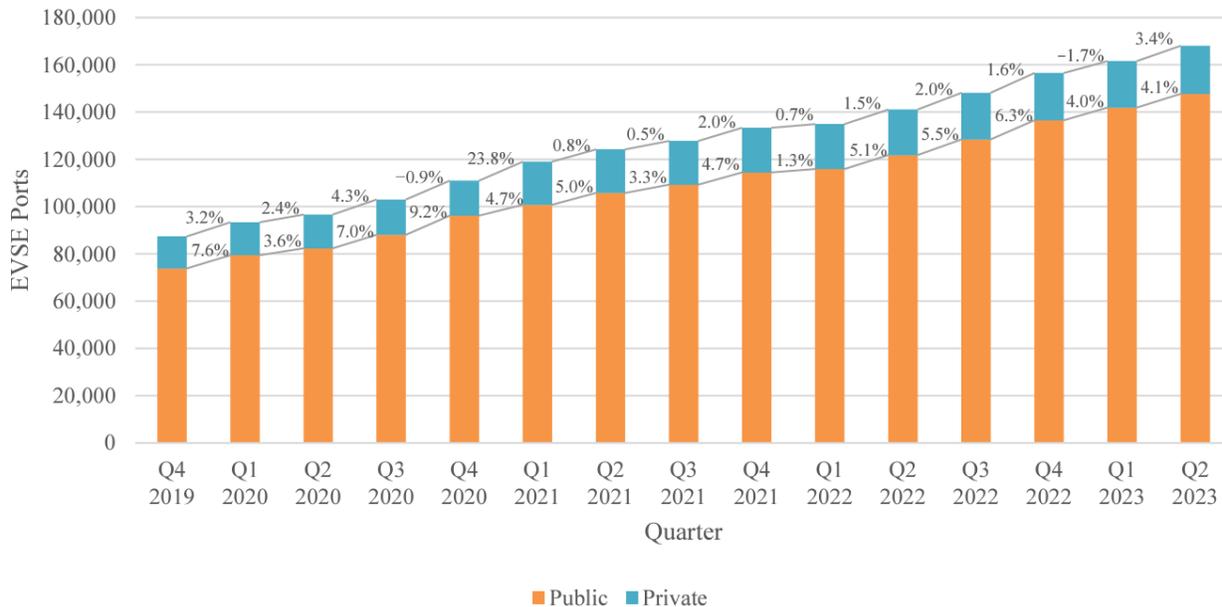
S.No	Brand	Model	Launch
1	Acura	RDX EV	2025
2	Audi	A4 e-tron	2028
3	Audi	A8 e-tron	2027
4	Audi	Urbansphere	2025
5	BMW	iX5	2026
6	Buick	Regal EV	2025
7	Buick	Verano Pro	2027
8	Chery	Omoda 3	2025
9	Chevrolet	Monza	2026
10	Chrysler	Pacifica EV	2028
11	Fisker	PEAR	2025
12	Ford	Maverick EV	2028
13	Foxtron	Model B	2026
14	Foxtron	Project X	2026
15	Honda	Passport EV	2027
16	Honda	Pilot EV	2027
17	Hyundai	Ioniq 4	2026
18	Hyundai	Ioniq 8	2026
19	Kia	EV8	2027

20	Lotus	Elise	2027
21	Mahindra	BE.05	2025
22	Maruti-Suzuki	Ertiga	2025
23	Polestar	Polestar 5	2025
24	Polestar	Polestar 6	2026
25	Polestar	Polestar 7	2027
26	Skyworth	Skyhome	2025
27	Toyota	bZ2	2028
28	Toyota	Granvia EV	2028
29	Volkswagen	ID.2	2026
30	Volkswagen	ID.3 X	2026

Source: Intro-act, PWC

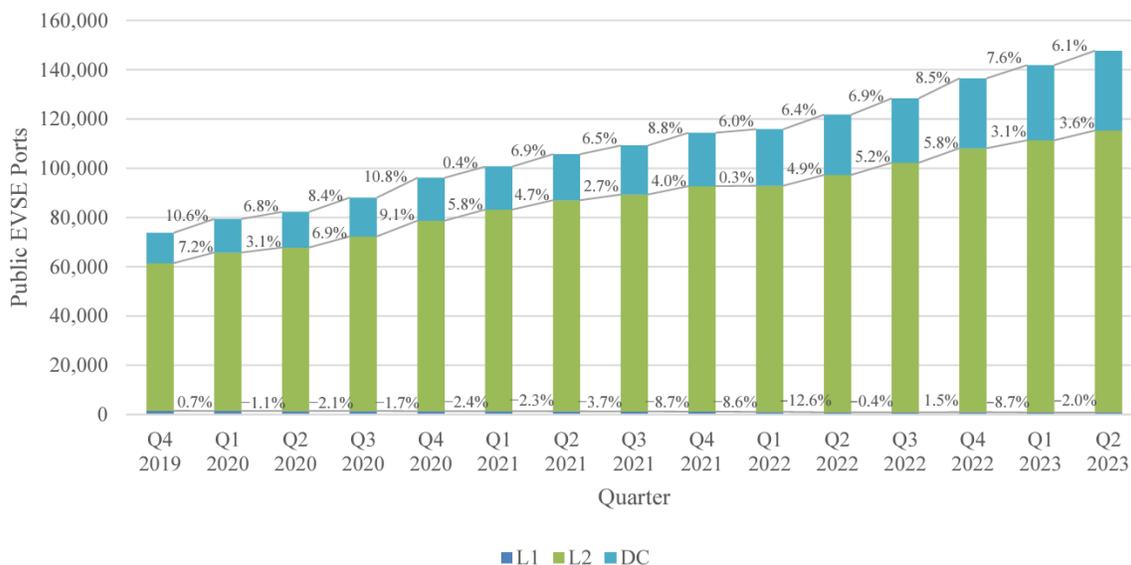
EV CHARGING INFRASTRUCTURE – U.S.

Chart 28: Quarterly Growth of Public and Private Electric Vehicle Supply Equipment (EVSE) Ports



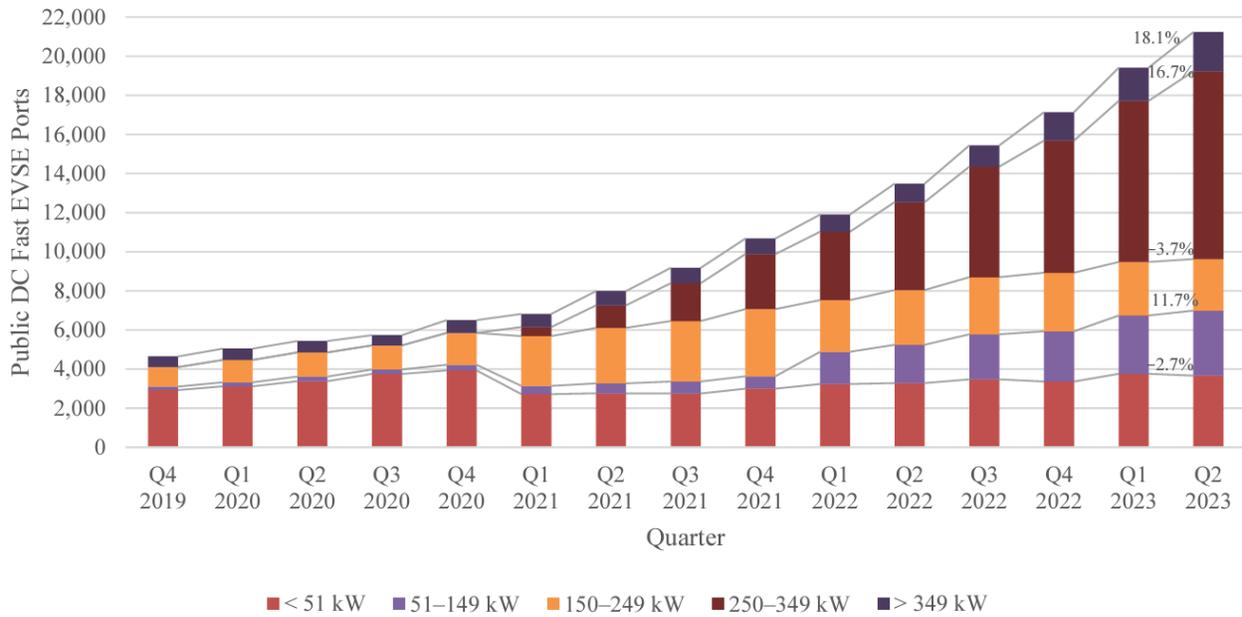
Source: Intro-act, [U.S. Department of Energy](#). Note: The chart tracks the growth of EVSE ports in the U.S. by type of access (Public vs. Private) and the percentages in this figure indicate the percent growth between each quarter. Data as of Q2, 2023.

Chart 29: Quarterly Growth of Electric Vehicle Supply Equipment (EVSE) Ports by Type of Charging Level



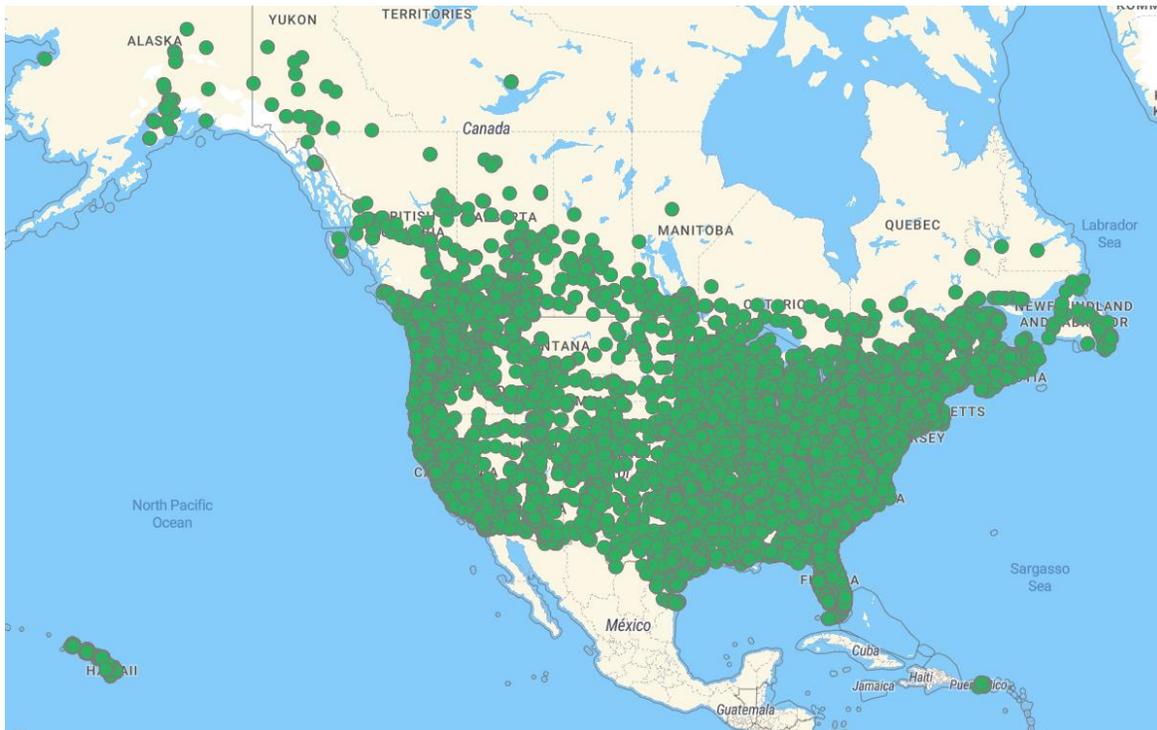
Source: Intro-act, [U.S. Department of Energy](#). Note: The L1 charging ports have a charging level of 120V, whereas L2 ports have a charging level of 240V. The DC or Direct-Current ports are fast charging ports with charging level of 480+ V. The Figure excludes legacy EVSE ports that are not classified by charging level and are no longer manufactured. As of Q1, there were 30 public legacy EVSE ports in the Station Locator. Additionally, the percentages in this figure indicate the percent growth between each quarter. Data as of Q2, 2023.

Chart 30: Quarterly Growth of Public DC Fast EVSE Ports by Power Output.



Source: Intro-act, [U.S. Department of Energy](#). Note: The figure tracks the growth of fast charging Public DC ports, classified by their power output, and the percentages in this figure indicate the percent growth between each quarter. Data as of Q2, 2023.

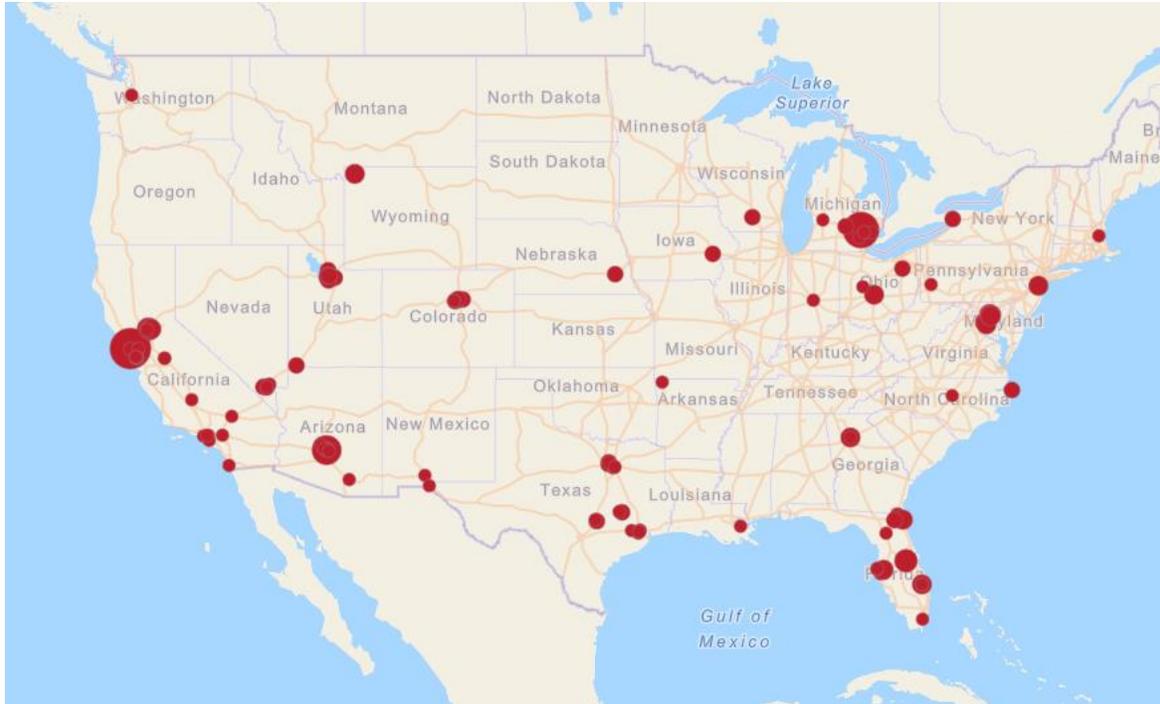
Chart 31: EV Charging Station Map – U.S. and Canada



Source: Intro-act, [U.S. Department of Energy](#). As of February 1, 2024.

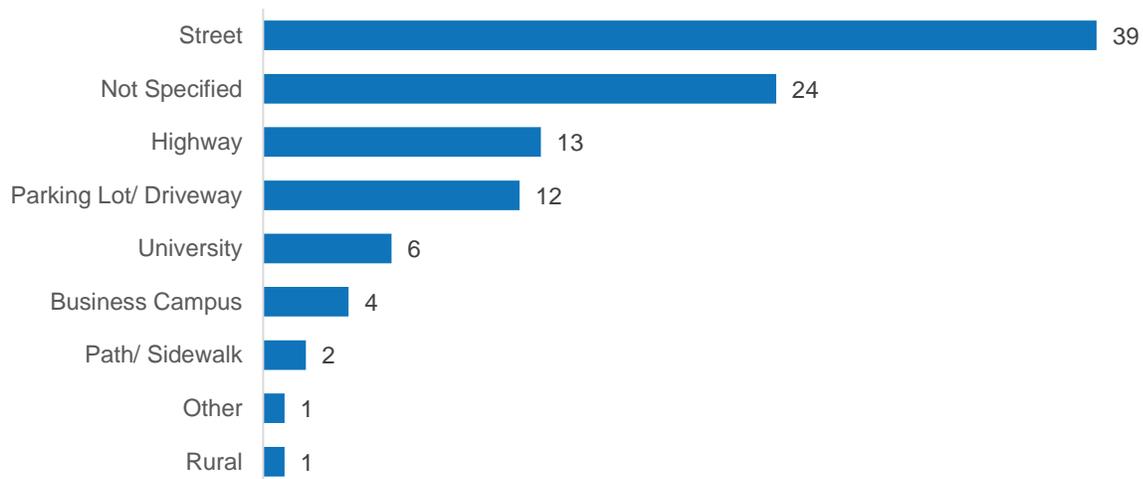
AUTONOMOUS VEHICLES (AV) TESTING LOCATIONS – U.S.

Chart 32: Distribution of AV Testing Locations in the U.S. (as of February 1, 2024)



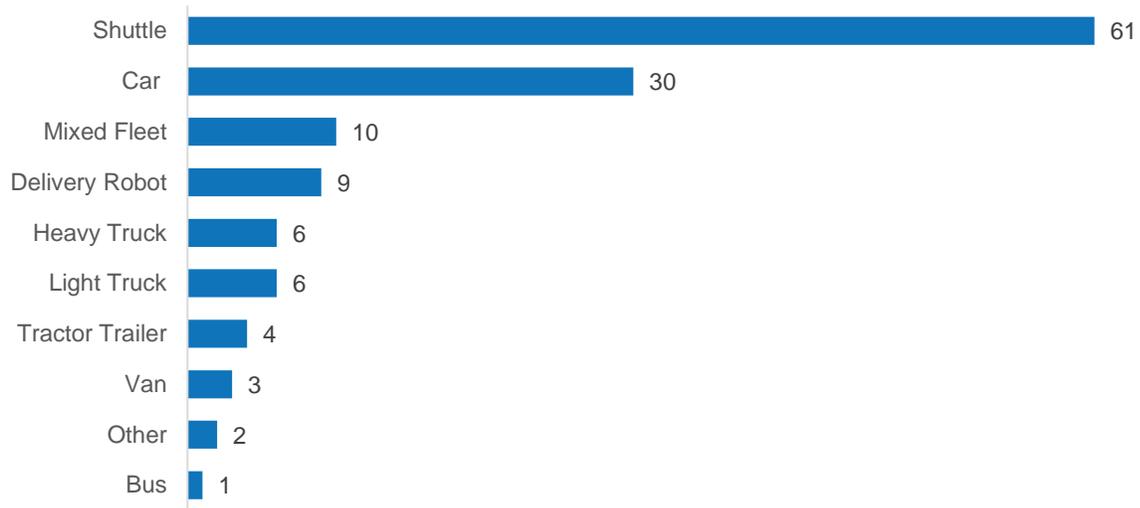
Source: Intro-act, ESRI, TomTom, U.S. Department of Commerce, U.S. Census Bureau, [NHTSA](#). The above map presents a snapshot of regions where AV Testing infrastructure is being built in the United States. Snapshot as of February 1, 2024.

Chart 33: Distribution of AV Testing Sites by Road Type



Source: Intro-act, [NHTSA](#). Data as of February 1, 2024. This chart compares the relative distribution of different types of AV testing infrastructure.

Chart 34: Distribution of AV Testing Sites by Vehicle Type



Source: Intro-act, [NHTSA](#), Data as of February 1, 2024. This chart compares the relative distribution of AV testing infrastructure that can be used to test different types of vehicles.

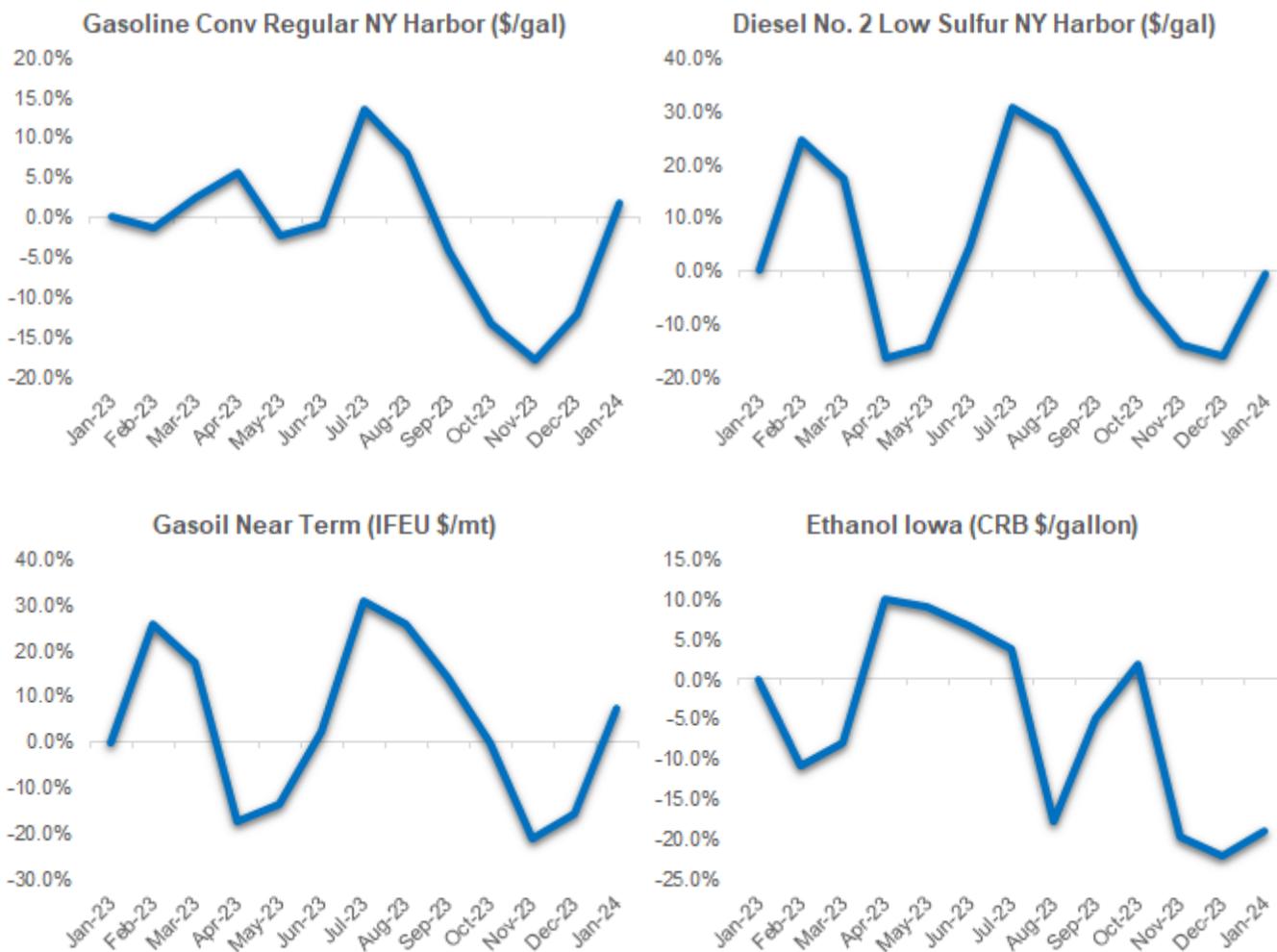
AUTOMOTIVE COMMODITIES

Chart 35: Automotive Commodities Price Returns

Energy Commodities	Price as of 31st Jan 2024	1M	3M	6M	1Y	YTD
Refined Products						
Gasoline Conv Regular NY Harbor (\$/gal)	2.32	▲ 7.64%	▼ -5.07%	▼ -19.56%	▼ -8.36%	▼ -7.04%
Diesel No. 2 Low Sulfur NY Harbor (\$/gal)	2.83	▲ 11.93%	▼ -5.38%	▼ -5.41%	▲ 25.41%	▲ 0.53%
Gasoil Near Term (IFEU \$/mt)	855.00	▲ 13.89%	▼ -3.12%	▼ -2.54%	▲ 29.01%	▲ 2.61%
Ethanol Iowa (CRB \$/gallon)	1.52	▼ -6.25%	▼ -25.92%	▼ -37.91%	▼ -35.53%	▼ -27.68%
Metal Commodities						
Metal Commodities	Price as of 31st Jan 2024	1M	3M	6M	1Y	YTD
Base Metals and Bulks						
Aluminum Cash Official LME (\$/mt)	2232.00	▼ -4.43%	▼ -0.13%	▲ 1.66%	▼ -1.02%	▼ -2.96%
Iron Ore 62% Fe CFR China Cash (TSI) CRB (\$/mt)	135.13	▼ -0.91%	▲ 13.64%	▲ 20.16%	▲ 28.61%	▲ 7.46%
US Midwest Domestic HRC Steel (CRU) Near Term (NYM \$/st)	963.00	▼ -15.15%	▲ 10.56%	▲ 16.73%	▲ 3.10%	▼ -8.63%
Battery Materials						
Lithium Carbonate 99%Min China (CNY/tonne)	86500.00	▲ 0.00%	▼ -44.01%	▼ -66.41%	▼ -80.67%	▼ -74.67%
Nickel Cash Official LME (\$/mt)	16070.00	▼ -1.41%	▼ -9.85%	▼ -25.69%	▼ -21.42%	▼ -35.25%
Cobalt Cash Official LME (\$/mt)	28680.00	▼ -0.10%	▼ -13.06%	▼ -13.03%	▼ -1.39%	▼ -15.01%
Precious Metals						
Palladium New York (\$/ozt)	982.00	▼ -12.71%	▼ -14.61%	▼ -23.88%	▼ -29.86%	▼ -31.09%
Platinum Indust (Engelhard) (\$/ozt)	930.00	▼ -8.82%	▼ -1.59%	▼ -2.62%	▼ -7.92%	▼ -2.92%
Rhodium Johnson Matthey Base Price London (\$/oz)	4450.00	▲ 0.56%	▲ 0.00%	▲ 8.54%	▼ -35.51%	▼ -56.37%

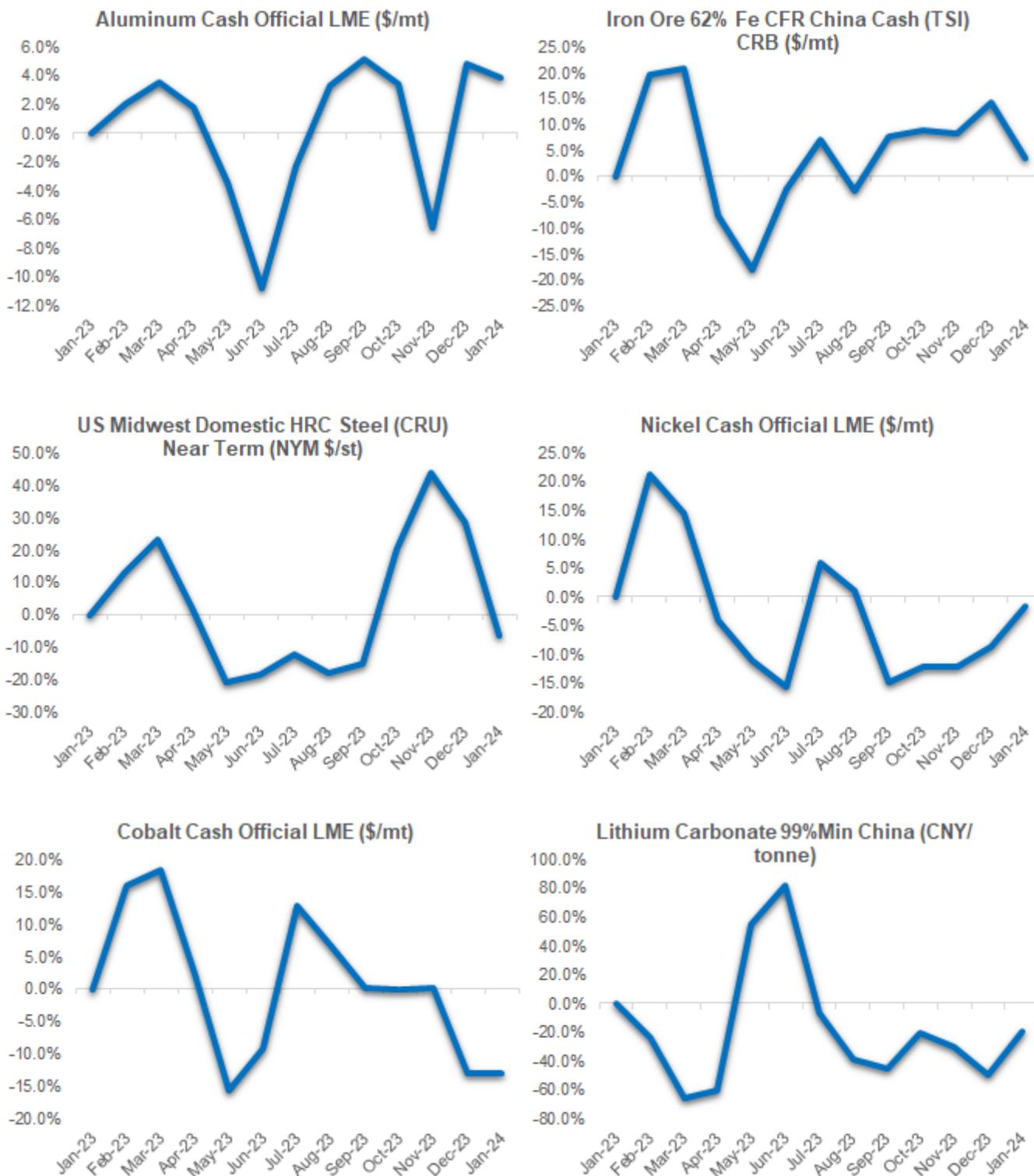
Source: Intro-act, FactSet, Investing.com. Data as of 01/31/2024.

Chart 36: Indexed Change in Refined Products Prices in Last 12 Months



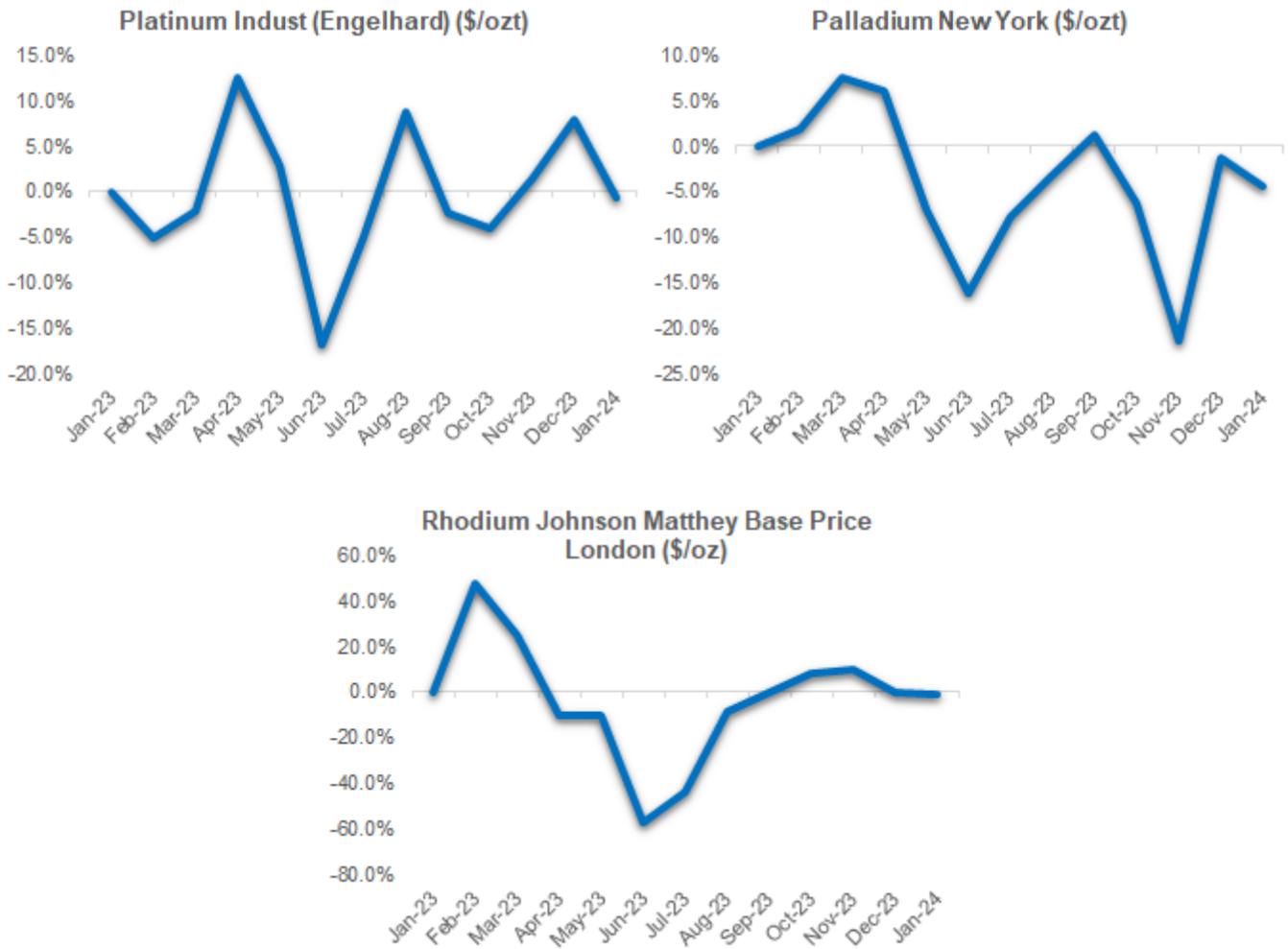
Source: Intro-act, FactSet. Data as of 01/31/2024.

Chart 37: Indexed Change in Base Metals, Bulks, and Battery Materials in Prices Last 12 Months



Source: Intro-act, FactSet. Data as of 01/31/2024.

Chart 38: Indexed Change in Precious Metals Prices Last 12 Months



Source: Intro-act, FactSet. Data as of 01/31/2024.

MOBILITY CAPITAL MARKET ACTION (JANUARY 2024)

M&A Activity

Target	Target Industry	Target Country	Acquirer	Deal Size (\$m)	Announcement Date
Cohda Wireless	Packaged Software	Australia	Danlaw, Inc.	-	8-Jan-24
LINICO Corp.	Other Metals/Minerals	United States	Comstock, Inc.	0.6	8-Jan-24
Silicon Mobility SAS	Packaged Software	France	Intel Corp.	-	9-Jan-24
emTransit BV	Motor Vehicles	Netherlands	Tier Mobility SE	-	10-Jan-24
Transphorm, Inc.	Semiconductors	United States	Renesas Electronics Corp.	319.2	11-Jan-24
Heliox	Appliances, Electrical, and Electronics Manufacturing	Netherlands	Siemens AG	-	12-Jan-24
ElectraMeccanica	Motor Vehicle Manufacturing	United States	Xos Inc	12.2	14-Jan-24
FlyBlade (India) Pvt Ltd.	Airlines	India	Direct Selling Acquisition Corp.	163.2	18-Jan-24
Lightning eMotors, Inc.	Motor Vehicles	United States	Gerco LLC	73.6	25-Jan-24
Lithium Energy Japan KK	Electrical Products	Japan	GS Yuasa International Ltd.	-	29-Jan-24
Present Power Systems	Appliances, Electrical, and Electronics Manufacturing	United States	Unico	-	31-Jan-24

Source: Intro-act, FactSet

PE/ VC Funding Activity

Company	Funding Round	Fund raised (\$m)	Investors	Date
GIN E-Bikes	-	0.39	Toloka VC	02-Jan-2024
Rincell	Seed	1.2	NextGen Battery Chem Ventures	08-Jan-2024
Recurrent	-	16	ArcTern Ventures, Automotive Ventures, Goodyear Ventures, Wireframe Ventures, Pioneer Square Labs	08-Jan-2024
FLEXeCHARGE	Seed	-	Greencode Ventures, Link Capital, Vireo Ventures	09-Jan-2024
Burro	Series B	24	Catalyst Investors, Translink Capital, S2G Ventures, Toyota Ventures, F-Prime Capital, Cibus Capital, Brian Rich, Catalyst Investors, Translink Capital	09-Jan-2024
Evify	Pre-series A	1.3	GVFL, Piper Serica Angel Fund, We Founder Circle, IVY Growth	10-Jan-2024
Finn	Series C	109	Planet First Partners	11-Jan-2024
Tiamat	-	20.1	Stellantis Ventures, Arkema France, MBDA Group	13-Jan-2024
Yulu	Series B	82	-	13-Jan-2024
On-street EV	-	23.8	Scottish National Investment Bank, growth capital investor BGF	16-Jan-2024
INERATEC	Series B	129	Piva Capital, HG Ventures, TDK Ventures, Copec WIND Ventures, RockCreek, Emerald, Samsung Ventures, ENGIE New Ventures, Safran Corporate Ventures, Honda	16-Jan-2024
International Battery Company	pre-Series A	35	RTP Global, Beenext, Veda VC	18-Jan-2024
Land Moto	-	3	Nunc Coepi Ventures	18-Jan-2024
Alt Mobility	-	6	Shell Ventures, Eurazeo, EV2 Ventures, Twynam, Piper Serica, Pitchright, LetsVenture	18-Jan-2024
Northvolt	Loan	5,000	Northvolt's Green Finance Framework	18-Jan-2024
Monta	Series B	73.2	Energize Capital, GreenPoint Partners, Quantum Light.	23-Jan-2024
Bluewhite	Series C	39	Insight Partners, Alumni Ventures, LIP Ventures	24-Jan-2024
Sion Power	Series A	75	LG Energy Solution, Euclidean Capital, Eric Schmidt's Hillspire LLC	25-Jan-2024
BluSmart	-	25	responsAbility	29-Jan-2024
MoveInSync	Series C	15	Bessemer Venture Partners	30-Jan-2024
Electrifi Mobility	Seed	3	Asian Development Bank (ADB) Ventures, AdvantEdge	30-Jan-2024
Zum	Series E	140	GIC, Climate Investment, Sequoia Capital, SoftBank Vision Fund 2	31-Jan-2024

Source: Intro-act, FactSet

MOBILITY INSTITUTIONAL INVESTOR LEAGUE

Chart 39: Mobility Institutional Owners League (Current)

Rank	Institution Name	Invested in Mobility (\$)	Q/Q Change (\$)	# Mobility Positions	% of Instit Ownership
1	The Vanguard Group, Inc.	865,066,803,346	(26,388,651,630)	351	11.6%
2	BlackRock Fund Advisors	491,711,706,116	(15,428,652,121)	337	6.6%
3	SSgA Funds Management, Inc.	386,010,453,806	(21,145,794,126)	367	5.2%
4	Fidelity Management & Research Co. LLC	259,356,155,146	(3,849,099,620)	255	3.5%
5	Geode Capital Management LLC	200,654,212,339	(1,968,776,614)	351	2.7%
6	T. Rowe Price Associates, Inc. (Investment Management)	155,773,947,384	(12,086,855,350)	138	2.1%
7	Capital Research & Management Co. (World Investors)	116,822,393,973	(3,236,204,012)	63	1.6%
8	JPMorgan Investment Management, Inc.	103,200,003,316	3,369,056,182	261	1.4%
9	Northern Trust Investments, Inc. (Investment Management)	90,399,871,830	(500,455,474)	321	1.2%
10	Capital Research & Management Co. (Global Investors)	88,085,223,395	(3,510,378,827)	45	1.2%
11	Wellington Management Co. LLP	86,037,280,197	(1,762,787,904)	173	1.2%
12	BlackRock Advisors (UK) Ltd.	78,943,995,345	(2,746,016,411)	300	1.1%
13	Capital Research & Management Co. (International Investors)	75,656,479,617	(2,276,710,124)	48	1.0%
14	BlackRock Investment Management (UK) Ltd.	74,100,319,376	(8,959,443,454)	282	1.0%
15	Charles Schwab Investment Management, Inc.	72,004,942,335	(2,286,667,658)	321	1.0%
16	Massachusetts Financial Services Co.	53,674,358,765	(3,357,619,828)	75	0.7%
17	Morgan Stanley Smith Barney LLC (Investment Management)	53,547,722,353	(578,290,130)	208	0.7%
18	Goldman Sachs Asset Management LP	49,010,397,012	(427,981,544)	294	0.7%
19	AllianceBernstein LP	48,801,271,523	(1,460,314,244)	290	0.7%
20	Legal & General Investment Management Ltd.	47,617,652,533	(1,515,706,847)	318	0.6%
21	Dimensional Fund Advisors LP	47,388,849,863	(1,993,551,760)	310	0.6%
22	Columbia Management Investment Advisers LLC	47,215,567,526	(2,781,314,848)	220	0.6%
23	Managed Account Advisers LLC	44,592,279,010	(1,646,029,647)	124	0.6%
24	Parametric Portfolio Associates LLC	42,991,564,968	(1,374,774,241)	243	0.6%
25	Jennison Associates LLC	40,538,999,108	(117,245,372)	53	0.5%
	Others	3,846,557,947,627	(166,092,831,237)	156,810	51.5%
	TOTAL	7,465,760,397,809	(284,123,096,841)	162,558	100%

Source: Intro-act, 13F Filings

Chart 40: Top 25 Mobility Buyers (Q/Q)

Rank	Institution Name	Invested in Mobility (\$)	Q/Q Change (\$)	# Mobility Positions	% of Instit Ownership
1	First Republic Investment Management, Inc.	6,047,289,372	5,082,111,398	88	0.1%
2	State Street Global Advisors Ltd.	10,511,617,302	4,622,874,937	304	0.1%
3	Nomura Asset Management Co., Ltd.	26,338,821,958	3,386,830,868	178	0.4%
4	JPMorgan Investment Management, Inc.	103,200,003,316	3,369,056,182	261	1.4%
5	Comerica Bank (Investment Management Texas)	2,573,390,698	2,573,390,698	129	0.0%
6	Wealth Enhancement Advisory Services LLC	2,656,582,116	2,411,234,344	98	0.0%
7	UBS Asset Management (UK) Ltd.	21,722,794,333	2,240,519,001	291	0.3%
8	Two Sigma Advisers LP	7,467,911,267	2,143,537,686	117	0.1%
9	National Bank Financial, Inc.	6,270,371,077	1,950,191,423	144	0.1%
10	Barclays Capital Securities Ltd.	6,943,014,405	1,752,314,947	96	0.1%
11	NBC Global Finance Ltd.	3,840,765,251	1,655,406,345	42	0.1%
12	Envestnet Asset Management, Inc.	12,443,052,571	1,541,752,133	133	0.2%
13	QRG Capital Management, Inc.	1,403,528,956	1,403,528,956	74	0.0%
14	The California Public Employees Retirement System	25,923,356,429	1,207,862,385	98	0.3%
15	PineStone Asset Management, Inc.	1,676,534,708	1,177,932,320	4	0.0%
16	Millennium Management LLC	13,788,979,665	1,149,661,208	184	0.2%
17	Osaic Wealth, Inc. (Investment Management)	1,607,756,551	1,146,465,187	181	0.0%
18	Assenagon Asset Management SA (Germany)	7,991,418,650	1,125,728,499	205	0.1%
19	Two Sigma Investments LP	4,408,615,112	1,008,626,065	129	0.1%
20	Qube Research & Technologies Ltd.	4,129,660,992	995,439,878	117	0.1%
21	Amundi Asset Management SA (Investment Management)	7,986,688,263	993,435,457	143	0.1%
22	DZ PRIVATBANK SA	19,527,768,527	967,199,770	74	0.3%
23	Mizuho Markets Americas LLC	957,681,452	933,028,204	19	0.0%
24	Citadel Securities LLC	2,934,991,556	925,085,354	164	0.0%
25	Wolverine Trading LLC	2,313,921,149	893,652,938	85	0.0%

Source: Intro-act, 13F Filings

Chart 41: Top 25 Mobility Sellers (Q/Q)

Rank	Institution Name	Invested in Mobility (\$)	Q/Q Change (\$)	# Mobility Positions	% of Instit Ownership
1	The Vanguard Group, Inc.	865,066,803,346	(26,388,651,630)	351	11.6%
2	SSgA Funds Management, Inc.	386,010,453,806	(21,145,794,126)	367	5.2%
3	BlackRock Fund Advisors	491,711,706,116	(15,428,652,121)	337	6.6%
4	T. Rowe Price Associates, Inc. (Investment Management)	155,773,947,384	(12,086,855,350)	138	2.1%
5	BlackRock Investment Management (UK) Ltd.	74,100,319,376	(8,959,443,454)	282	1.0%
6	State of Georgia (Investment Management)	2,185,766	(8,524,406,255)	1	0.0%
7	Bank of America, NA (Private Banking)	20,379,576,244	(4,966,604,616)	196	0.3%
8	Kuwait Investment Authority (Investment Management)	79,270,056	(4,813,390,596)	2	0.0%
9	Schweizerische Nationalbank (Investment Portfolio)	30,173,650,914	(4,707,725,493)	155	0.4%
10	Jane Street Capital LLC	6,777,865,353	(3,898,538,074)	175	0.1%
11	Fidelity Management & Research Co. LLC	259,356,155,146	(3,849,099,620)	255	3.5%
12	Legal & General Investment Management America, Inc.	16,588,265,641	(3,670,529,421)	205	0.2%
13	Capital Research & Management Co. (Global Investors)	88,085,223,395	(3,510,378,827)	45	1.2%
14	Massachusetts Financial Services Co.	53,674,358,765	(3,357,619,828)	75	0.7%
15	Mellon Investments Corp.	37,778,085,179	(3,267,401,931)	309	0.5%
16	Capital Research & Management Co. (World Investors)	116,822,393,973	(3,236,204,012)	63	1.6%
17	DWS Investment GmbH	14,498,161,263	(3,201,154,053)	202	0.2%
18	DWS Investments (UK) Ltd.	16,299,990,300	(3,191,964,058)	286	0.2%
19	Columbia Management Investment Advisers LLC	47,215,567,526	(2,781,314,848)	220	0.6%
20	BlackRock Advisors (UK) Ltd.	78,943,995,345	(2,746,016,411)	300	1.1%
21	Goldman Sachs Asset Management BV	675,600	(2,706,462,642)	1	0.0%
22	Janus Henderson Investors US LLC	25,522,843,776	(2,632,527,574)	160	0.3%
23	Baillie Gifford & Co.	28,018,854,084	(2,449,242,841)	53	0.4%
24	TD Asset Management, Inc.	19,986,531,971	(2,428,528,412)	162	0.3%
25	Charles Schwab Investment Management, Inc.	72,004,942,335	(2,286,667,658)	321	1.0%

Source: Intro-act, 13F Filings

ARK Autonomous Tech. & Robotics ETF (ARKQ)

Closing Price (\$)	CUSIP	Expense Ratio	Inception
52.45	00214Q203	0.75	30/09/2014

AUM (\$ million)	Shares Outstanding (#)	Fund Flows (1M, \$)	Fund Flows (YTD, \$)
99.1	1,77,00,000	(2,96,37,450.00)	(2,96,37,450.00)

Fund Description

ARKQ is an actively managed Exchange Traded Fund (ETF) dedicated to achieving long-term capital growth. The fund strategically allocates its assets primarily (at least 80%) to both domestic and foreign equity securities of autonomous technology and robotics companies. These companies are positioned to benefit from disruptive innovation across various sectors like energy, automation, manufacturing, materials, artificial intelligence, and transportation. By focusing on businesses at the forefront of technological advancements, ARKQ aims to capitalize on their potential to drive transformative changes and deliver substantial returns.

ETF Returns Annualized (As of 12/31/2023)

1 Year	3 Year	5 Year	Since Inception
40.70%	-8.65%	14.75%	12.99%

ETF Returns Cumulative (As of 12/31/2023)

1 Month	3 Month	YTD	Since Inception
9.26%	9.91%	40.70%	209.54%

Top 10 Holdings (updated as of 2/2/2024)

Holdings	% Allocation	Market Value
TESLA INC	10.26%	\$ 95,319,185.31
UIPATH INC - CLASS A	9.44%	\$ 87,717,624.42
KRATOS DEFENSE & SECURITY	8.13%	\$ 75,576,959.05
TRIMBLE INC	7.26%	\$ 67,516,141.40
IRIDIUM COMMUNICATIONS INC	7.13%	\$ 66,307,755.50
TERADYNE INC	6.85%	\$ 63,669,230.30
AEROVIRONMENT INC	4.13%	\$ 38,376,790.40
KOMATSU LTD -SPONS ADR	3.88%	\$ 36,072,255.52
ARCHER AVIATION INC-A	3.86%	\$ 35,839,131.30
DEERE & CO	3.69%	\$ 34,264,287.64

Source: Intro-act, FactSet

For more information on ARKQ visit <https://ark-funds.com/funds/arkq/>

Autonomous & Electric Vehicles ETF (DRIV)

Closing Price (\$)	CUSIP	Expense Ratio	Inception
24.74	37954Y624	0.68	13/04/2018
AUM (\$ million)	Shares Outstanding (#)	Fund Flows (1M, \$)	Fund Flows (YTD, \$)
66.8	2,73,39,257	(3,52,83,854.32)	(3,52,83,854.32)

Fund Description

The Global X Autonomous & Electric Vehicles ETF (DRIV) is strategically designed to invest in enterprises actively engaged in the advancement of autonomous vehicle technology, electric vehicles (EVs), and the production of EV components and essential materials. This encompasses companies at the forefront of autonomous vehicle software and hardware development, as well as those contributing to the manufacture of EVs, critical components like lithium batteries, and essential materials such as lithium and cobalt. With a resolute aim, DRIV seeks to mirror the price and yield performance of the Solactive Autonomous & Electric Vehicles Index, offering investors an opportunity to align with the dynamic growth potential of the autonomous and electric vehicles sector, while aiming for optimal investment outcomes.

ETF Returns Annualized (As of 1/31/2024)

1 Year	3 Year	5 Year	Since Inception
-1.92%	-2.93%	13.23%	8.98%

ETF Returns Cumulative (As of 1/31/2024)

YTD	1 Month	3 Months	Since Inception
-7.40%	-7.40%	11.03%	64.78%

Top 10 Holdings (updated as of 2/2/2024)

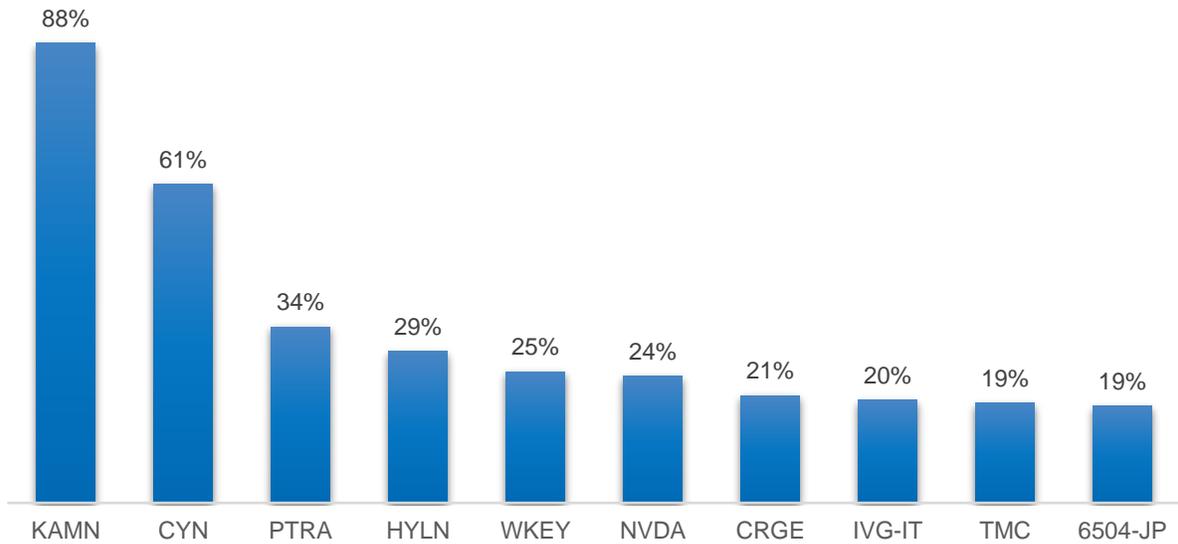
Holdings	% Allocation	Market Value
NVIDIA CORP	3.45%	\$ 2,15,97,822.81
MICROSOFT CORP	3.14%	\$ 1,96,53,969.72
TOYOTA MOTOR CORP	3.12%	\$ 1,95,62,996.41
APPLE INC	3.04%	\$ 1,90,45,754.00
ALPHABET INC-CL A	3.01%	\$ 1,88,60,402.10
INTEL CORP	2.8%	\$ 1,75,54,798.44
QUALCOMM INC	2.79%	\$ 1,74,75,320.21
TESLA INC	2.62%	\$ 1,64,28,516.93
HONEYWELL INTL	2.4%	\$ 1,50,28,929.30
HITACHI LTD	1.8%	\$ 1,12,72,135.63

Source: Intro-act, FactSet

For more information on DRIV visit: <https://www.globalxetfs.com/funds/driv/>

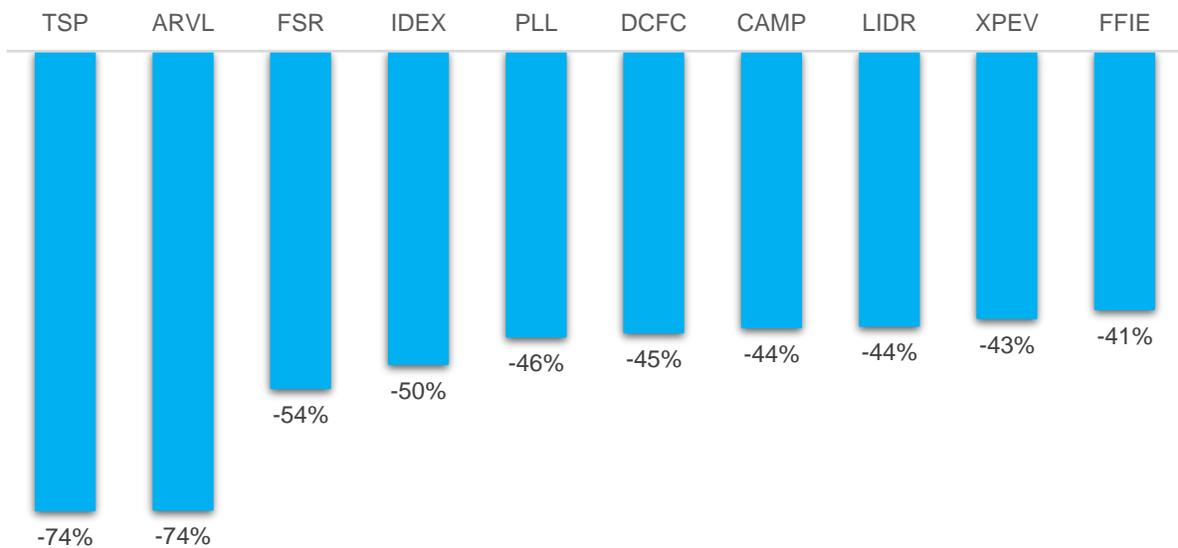
GAINERS AND LOSERS – MOBILITY STOCKS

Chart 42: Top 10 M/M Mobility Gainers (January 2024)



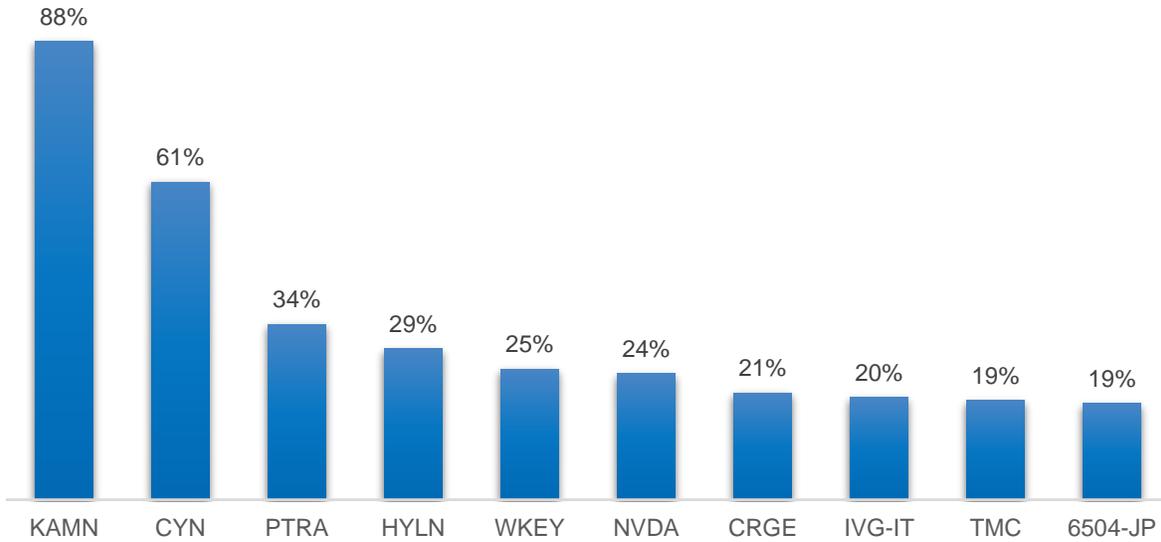
Source: Intro-act, FactSet

Chart 43: Top 10 M/M Mobility Losers (January 2024)



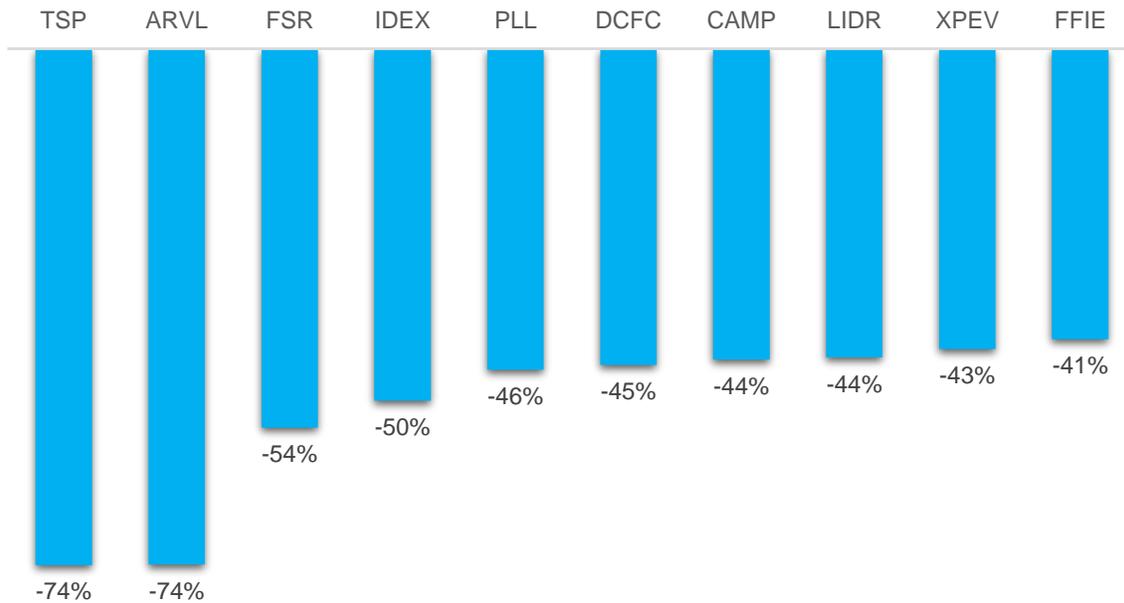
Source: Intro-act, FactSet

Chart 44: Top 10 YTD Mobility Gainers



Source: Intro-act, FactSet. YTD Data Through end of January 2024.

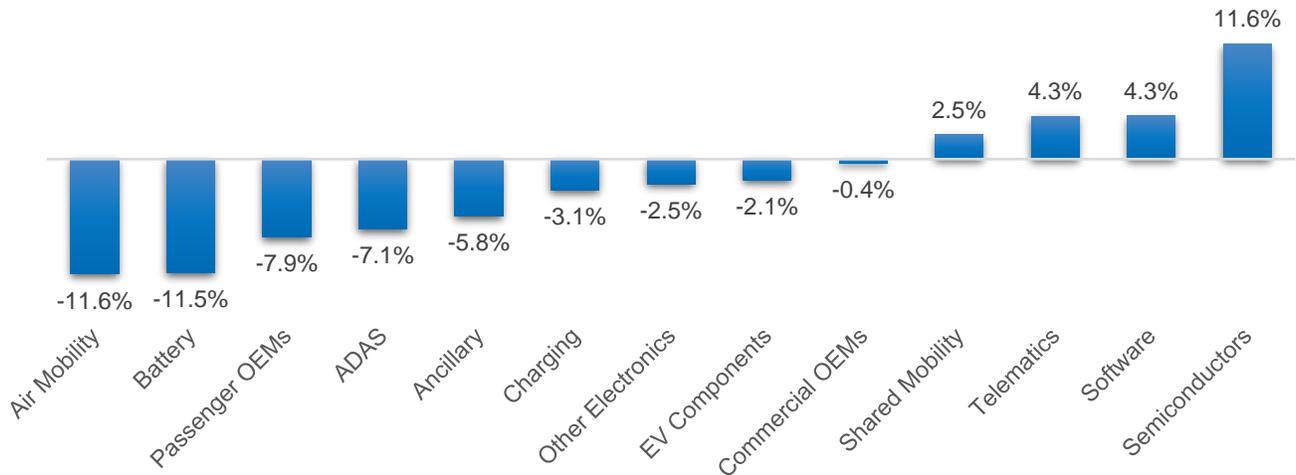
Chart 45: Top 10 YTD Mobility Losers



Source: Intro-act, FactSet. YTD Data Through end of January 2024.

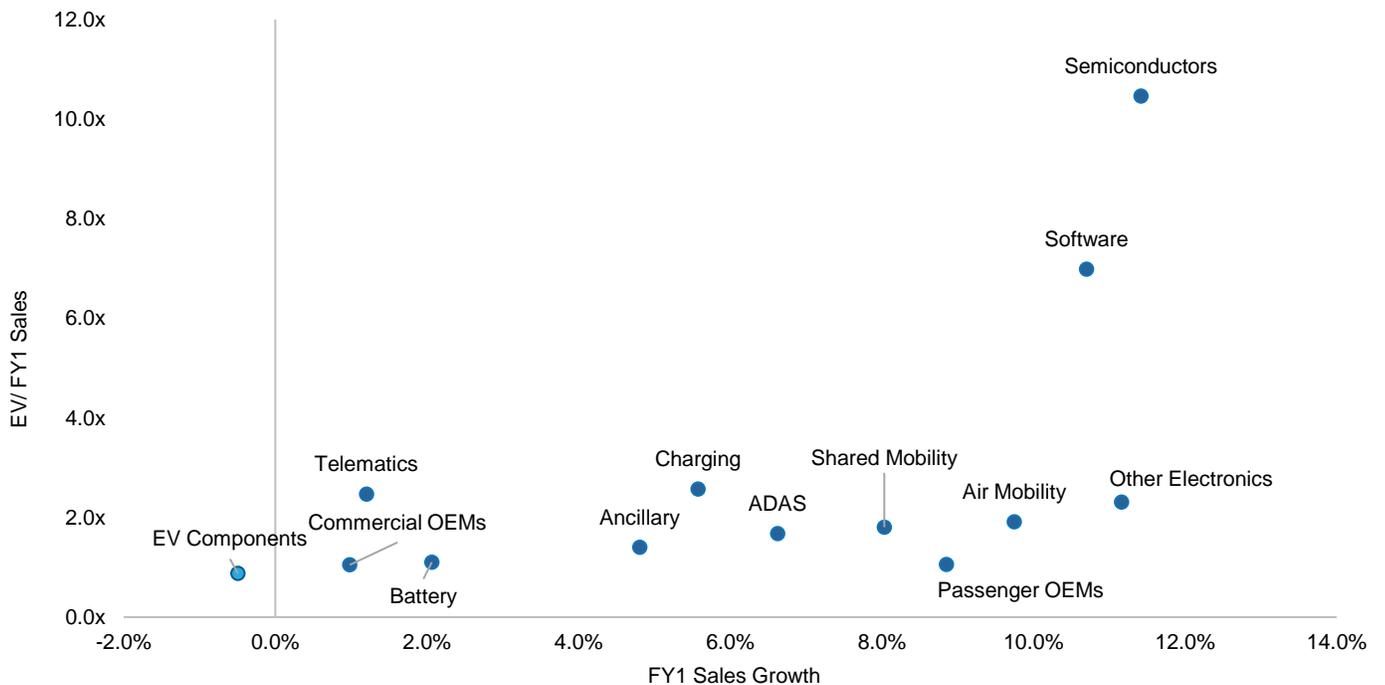
SEGMENT RETURN AND VALUATION

Chart 46: YTD Stock Price Returns by Segment



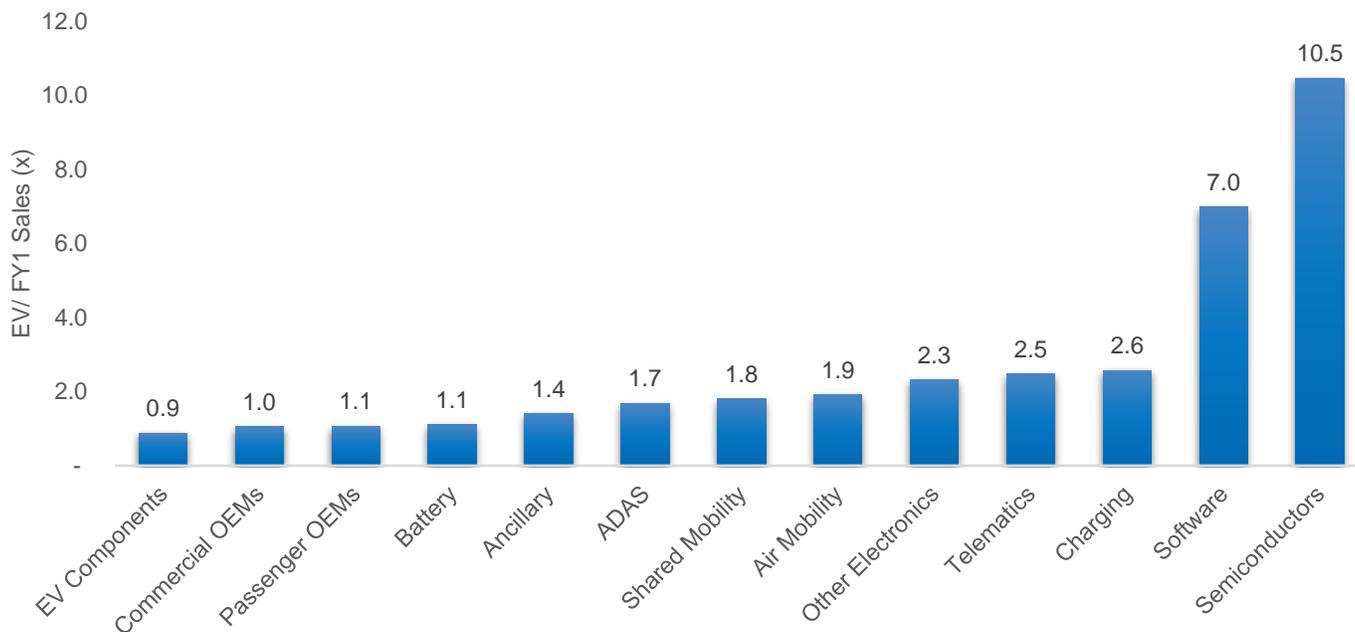
Source: Intro-act, FactSet. YTD Data Through end of January 2024.

Chart 47: Mobility Industry Growth and Valuation by Segment



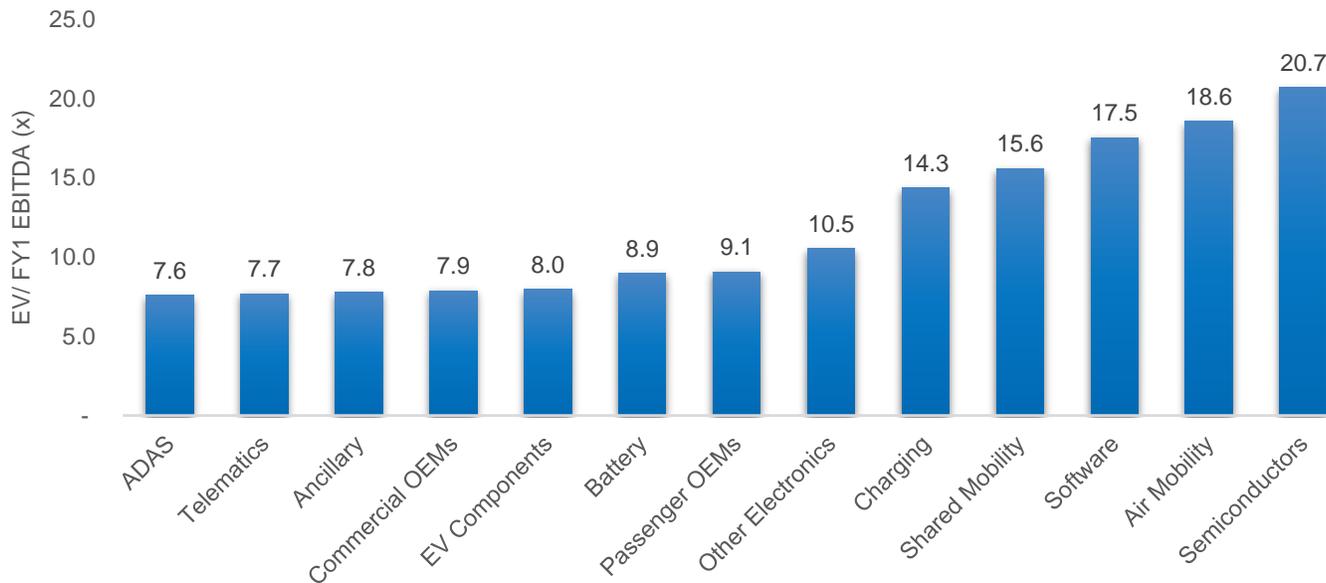
Source: Intro-act, FactSet. Data Through end of January 2024. FY0 = last reported year. FY1 = first unreported year.

Chart 48: EV/ FY1 Sales Multiple by Segment



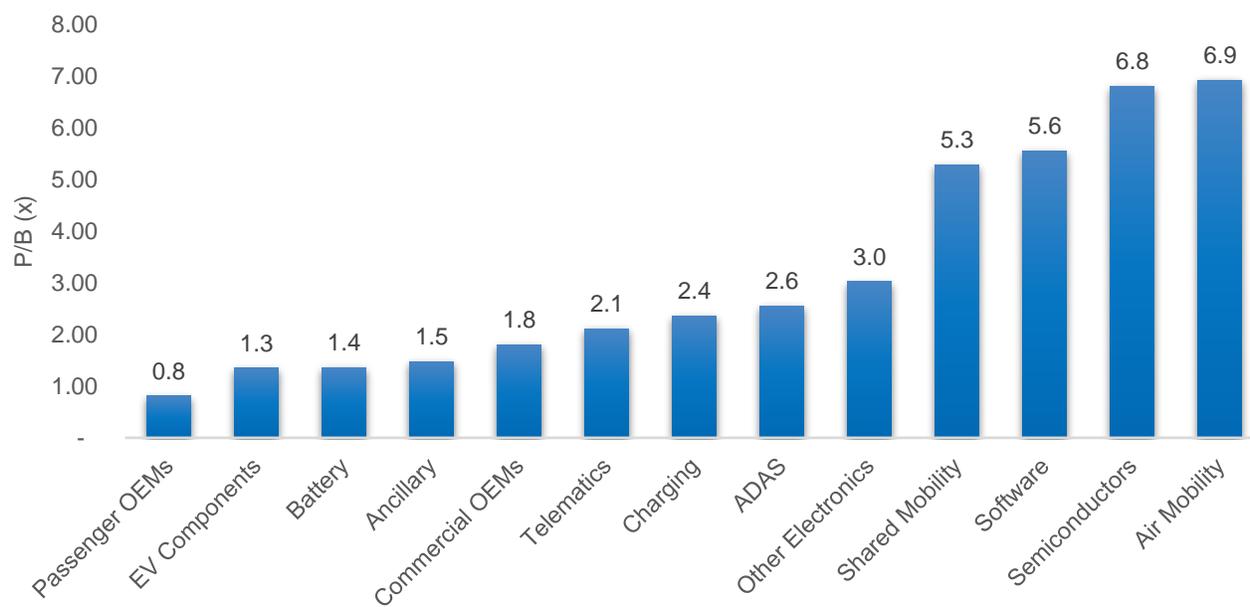
Source: Intro-act, FactSet. Data Through end of January 2024. FY0 = last reported year. FY1 = first unreported year.

Chart 49: EV/ FY1 EBITDA Multiple by Segment



Source: Intro-act, FactSet. Data Through end of January 2024. FY0 = last reported year. FY1 = first unreported year.

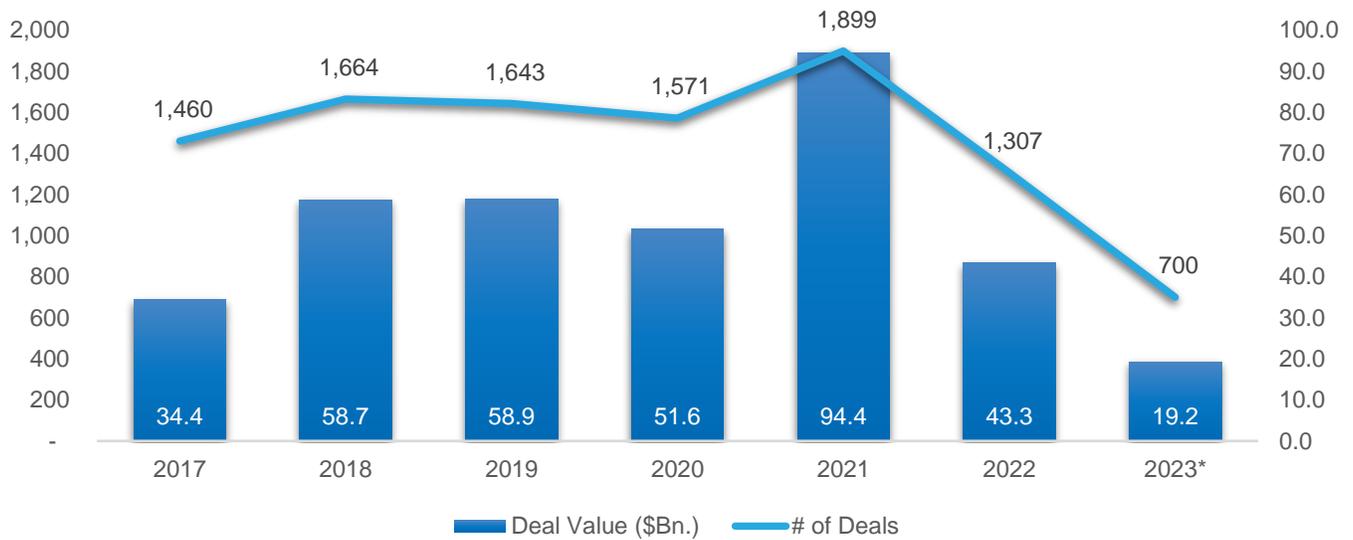
Chart 50: Price-to-Book Multiple by Segment



Source: Intro-act, FactSet. Data Through end of January 2024. FY0 = last reported year. FY1 = first unreported year.

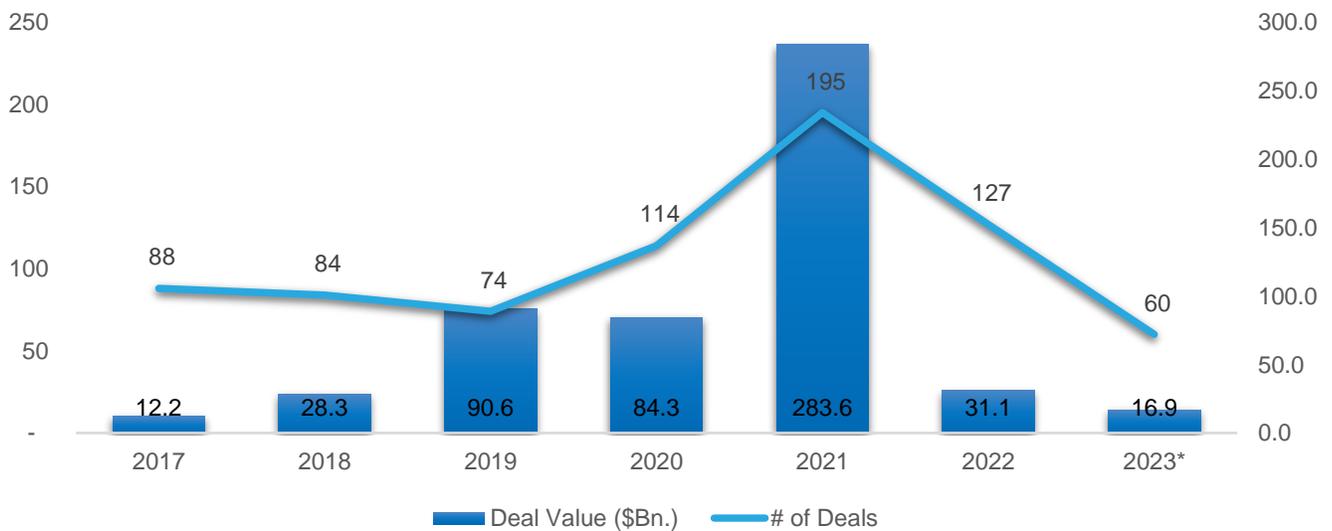
CAPITAL MARKETS TRENDS

Chart 51: Mobility VC Funding Activity



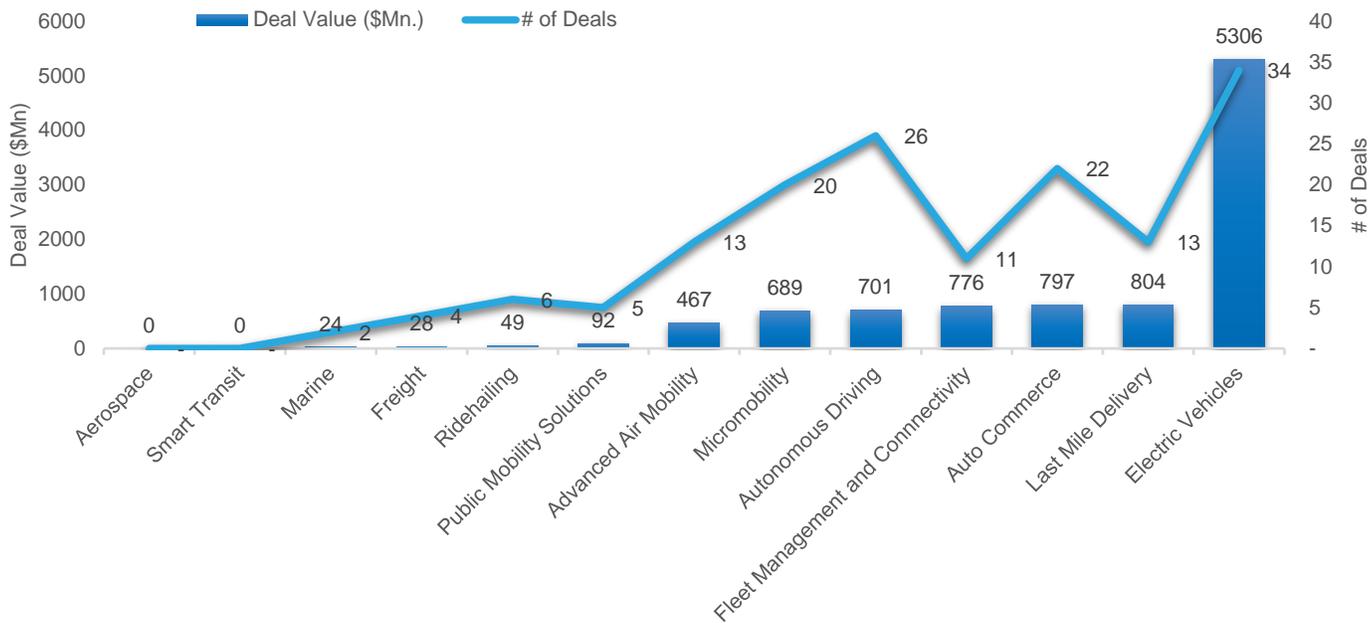
Source: Intro-act, Pitchbook, *As of September 30, 2023.

Chart 52: Mobility VC Exit Activity



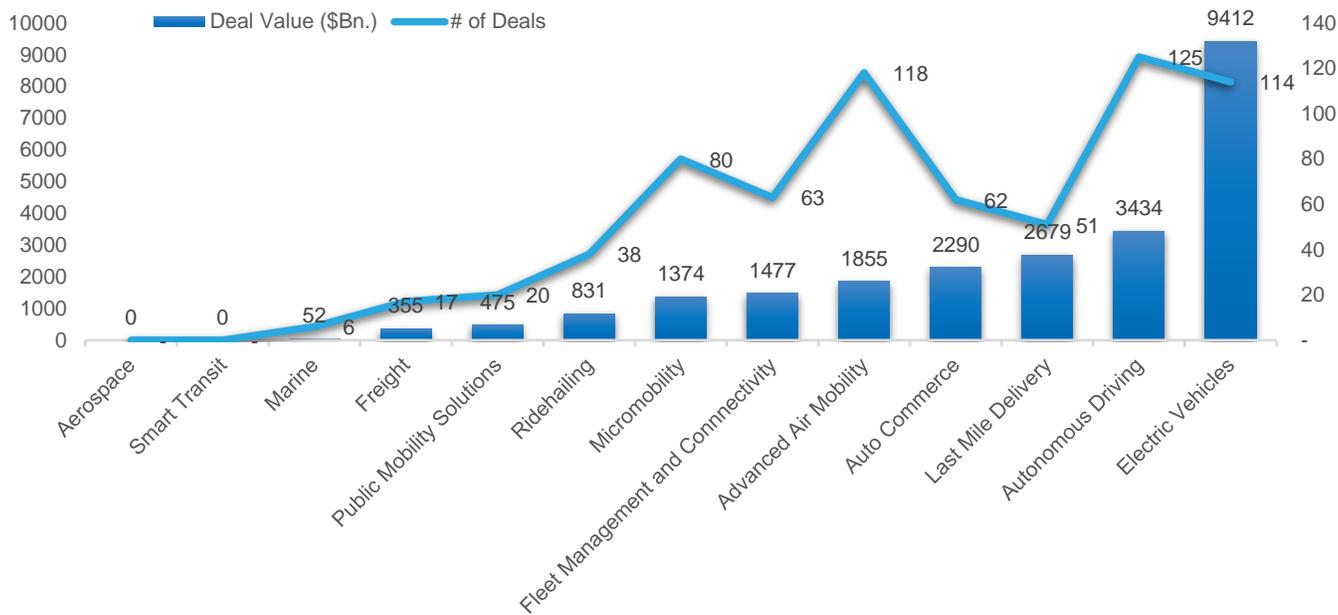
Source: Intro-act, Pitchbook, *As of September 30, 2023.

Chart 53: Q1 2023 Mobility Tech VC Deal Activity by Segment*



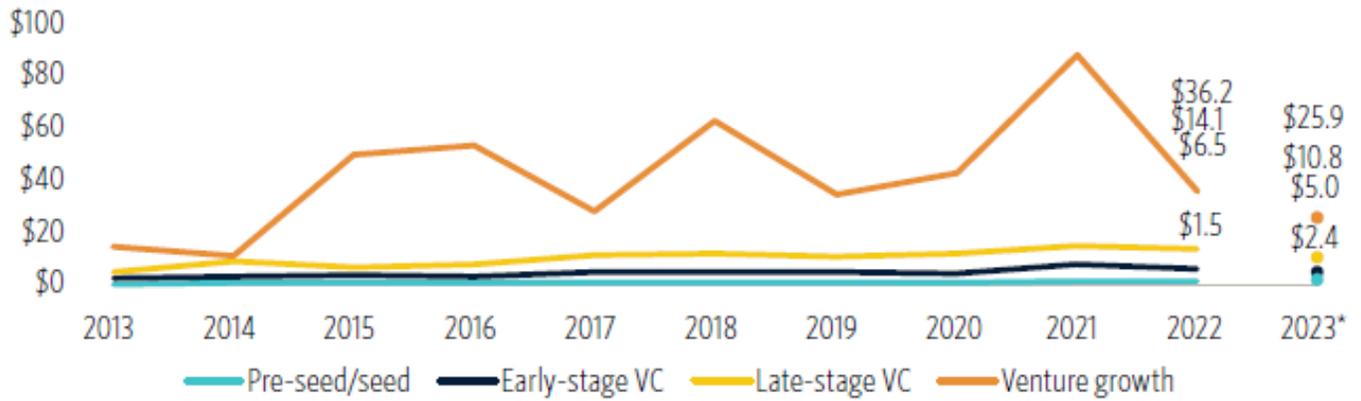
Source: Intro-act, Pitchbook, *As of September 30, 2023.

Chart 54: Trailing 12-Month Mobility Tech VC Deal Activity by Segment*



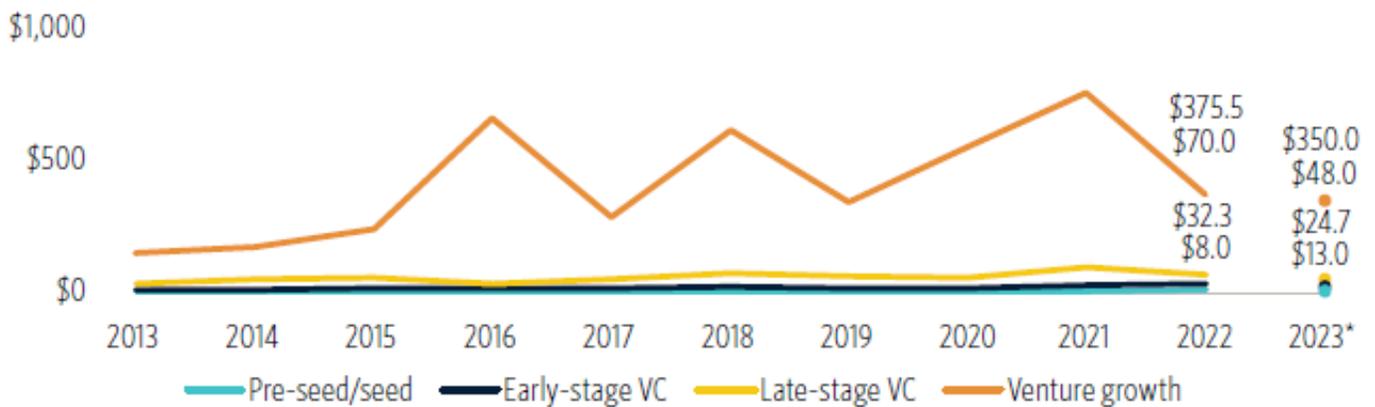
Source: Intro-act, Pitchbook, *As of September 30, 2023.

Chart 55: Median Mobility Tech VC Deal Value (\$ Million) by Stage



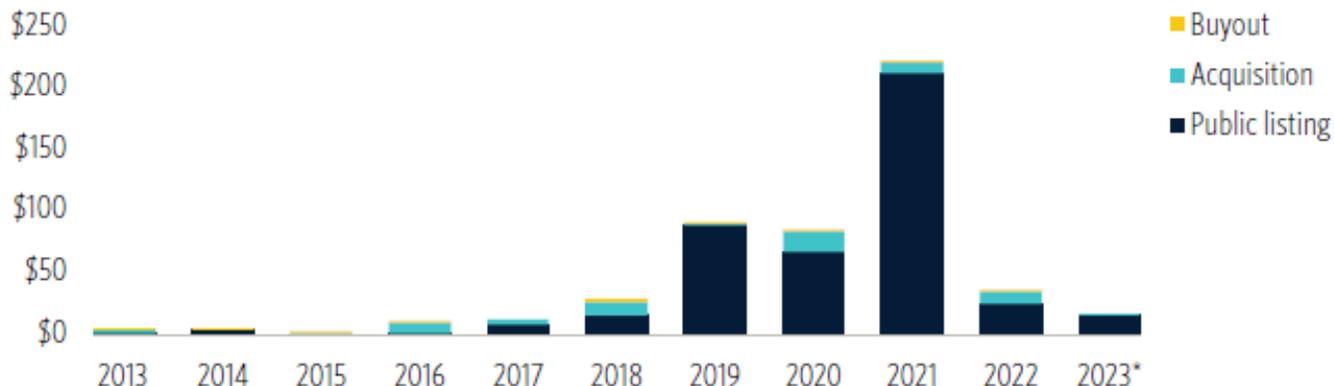
Source: Intro-act, Pitchbook, *As of September 30, 2023.

Chart 56: Median Mobility Tech VC Pre-money Valuation (\$ Million) by Stage



Source: Intro-act, Pitchbook, *As of September 30, 2023.

Chart 57: Mobility Tech VC Exit Value (\$ Million) by Type



Source: Intro-act, Pitchbook, *As of September 30, 2023.

Chart 58: Mobility Tech VC Exit Count by Type



Source: Intro-act, Pitchbook, *As of September 30, 2023.

Chart 59: Top VC Funding Deals – Q3 2023

Company	Close date (2023)	Segment	Subsegment	Deal value (\$M)	Post-money valuation (\$M)	Deal type	Stage	Lead investor(s)
Verkor	September 14	EVs	Batteries, battery tech & materials	\$1,567.1	N/A	Late-stage VC	Series C	Macquarie Group
Redwood Materials	August 29	EVs	Battery recycling & reuse	\$997.2	\$5,250.0	Late-stage VC	Series D	Capricorn Investment Group, Goldman Sachs Asset Management
Neta Auto	August 29	EVs	Consumer BEVs	\$969.4	N/A	Late-stage VC	N/A	N/A
Conigital	September 11	Fleet management & connectivity	Connectivity & data management	\$631.6	N/A	Late-stage VC	Series A	N/A
Getir	September 8	Last-mile delivery	Delivery	\$500.0	\$2,500.0	Late-stage VC	N/A	Mubadala Investment Company
Ascend Elements	September 5	EVs	Battery recycling & reuse	\$460.1	\$1,400.0	Late-stage VC	Series D	Decarbonization Partners, Qatar Investment Authority, Temasek Holdings
AVATR Technology	August 31	EVs	Consumer BEVs	\$414.8	\$2,362.4	Early-stage VC	Series B	N/A
Ola Electric	September 7	Micromobility	Vehicle suppliers	\$380.0	\$5,400.0	Late-stage VC	Series E	Temasek Holdings
Lendbuzz	July 19	Auto commerce	Financing & subscriptions	\$365.0	N/A	Late-stage VC	N/A	Delaware Life Insurance
Mapbox	September 19	Autonomous driving	Localization/mapping	\$280.0	\$1,780.0	Late-stage VC	Series E	SoftBank Group

Source: Intro-act, Pitchbook

Chart 60: Top VC Funding Exits – Q3 2023

Company	Close date (2023)	Segment	Subsegment	Exit value (\$M)	Post-money valuation (\$M)	Exit type	Stock exchange	Acquirers(s)
Maplebear	September 19	Last-mile delivery	Delivery	\$7,453.6	\$7,876.6	Public listing	Nasdaq	N/A
Tuhu	September 26	Auto commerce	Repair, maintenance & inspection	\$2,882.7	\$3,034.4	Public listing	N/A	BP Castrol, Gotion High-tech, Leapmotor, Tencent Investment, Zizhu Park Incubator
Hesai Technology	February 9	Autonomous driving	Lidar	\$2,201.8	\$2,391.8	Public listing	Nasdaq	N/A
Yaoshibang	June 28	Auto commerce	Digital marketplaces	\$1,574.4	\$1,614.8	Public listing	N/A	Zhongguancun Development Group
VIA	January 31	EVs	Commercial BEVs	\$630.0	\$630.0	Acquisition	N/A	Ideanomics
Tigerair Taiwan	August 15	N/A	N/A	\$590.6	\$608.2	Public listing	Gretai Securities Market	N/A
Surf Air	July 26	N/A	N/A	\$360.3	\$360.3	Public listing	New York Stock Exchange	N/A
U Power	April 20	EVs	Other EVs	\$300.0	\$314.5	Public listing	Nasdaq	N/A
GEO Semiconductor	March 3	Autonomous driving	Cameras	\$270.0	\$270.0	Acquisition	N/A	indie Semiconductor
Marti	July 10	Micromobility	Network operators	\$235.4	\$532.0	Public listing	N/A	Galata Acquisition

Source: Intro-act, Pitchbook

MOBILITY SPAC ACTION

Chart 61: Mobility SPACs (Searching)

S. No	SPAC Name	Ticker	Trust Value (\$ Mn)	IPO Date	Completion Date
1	Ault Disruptive Technologies Corp	ADRT	115	12/15/21	2/20/24
2	Atlantic Coastal Acquisition Corp.	ACAH	345	03/03/21	03/08/24
3	Arogo Capital Acquisition Corp.	AOGO	103.5	12/23/21	12/29/23
4	EVe Mobility Acquisition Corp	EVE	250	12-14-21	06-14-23
5	Spree Acquisition Corp. 1 Ltd	SHAP	200	12-15-21	12-20-24
6	Hennessy Capital Investment Corp. VI	HCVI	341	09-28-21	01-10-24
7	Onyx Acquisition Co. I	ONYX	265	11-02-21	02-07-24
8	Integrated Rail and Resources Acquisition Corp.	IRRX	230	11-11-21	02-15-24
9	Kensington Capital Acquisition Corp. V	KCGI	276	08-12-21	08-17-24
10	Coliseum Acquisition Corp.	MITA	150	06-22-21	06-25-24
11	New Providence Acquisition Corp. II	NPAB	250	11-04-21	05-09-24
12	Northern Star Investment Corp. III	NSTC	400	03-01-21	03-04-24
13	Northern Star Investment Corp. IV	NSTD	400	03-01-21	03-04-24
14	Papaya Growth Opportunity Corp. I	PPYA	288	01-13-22	02-19-24

15	Slam Corp	SLAM	575	02-22-21	12-25-24
16	AI Transportation Acquisition Corp	AITR	60	08-11-23	05-08-25
17	Global Lights Acquisition Corp	GLAC	69	11-14-23	05-14-23
18	Haymaker Acquisition Corp. 4	HYAC	230	07-25-23	07-25-25
19	Inflection Point Acquisition Corp. II	IPXX	250	05-24-23	11-24-24
20	Jaws Mustang Acquisition Corporation	JWSM	1,035	02-01-21	02-04-24
21	Osiris Acquisition Corp.	OSI	230	05-14-21	05-18-24
22	Qomolangma Acquisition Corp.	QOMO	53	09-29-22	06-29-24
23	Target Global Acquisition I Corp.	TGAA	215	12-08-21	05-08-24
24	Welsbach Technology Metals Acquisition Corp.	WTMA	77	12-27-21	06-30-24
25	Ares Acquisition Corp II	AACT	500	04-20-23	04-20-25
26	COLOMBIER ACQUISITION CORP. II	CLBR	170	11-20-23	02-20-26
27	Embrace Change Acquisition Corp.	EMCG	74	08-09-22	08-12-24
28	Goldenstone Acquisition Ltd.	GDST	58	03-16-22	06-21-24
29	Greencity Acquisition Corp	GRCY	40	07-24-20	10-28-23
30	Hudson Acquisition I Corp.	HUDA	68	10-14-22	04-18-24
31	Cartesian Growth Corp II	RENE	230	05-05-22	11-10-24

32	SK Growth Opportunities Corp	SKGR	210	06-24-22	09-30-24
33	Twelve Seas Investment Company II	TWLV	345	02-25-21	06-02-24

Source: *Intro-act, Boardroom Alpha*

Chart 62: Mobility SPACs (Business Combination Agreement Announced)

S.No.	SPAC Name	Ticker	Target Company	EV (\$ Mn)	Expected Closing
1	Chenghe Acquisition Co.	CHEA	Taiwan Color Optics	380	2Q24
2	AlphaVest Acquisition Corp.	ATMV	Wanshun Technology Industrial Group	300	4Q24
3	Feutune Light Acquisition Corp	FLFV	Thunder Power	400	1Q24
4	Integral Acquisition Corp 1	INTE	Flybondi Limited	-	4Q24
5	Kernel Group Holdings, Inc.	KRNL	AIRO	847	1Q24
6	L Catterton Asia Acquisition Corp	LCAA	Lotus Technology Inc.	5,400	1Q23
7	Mountain Crest Acquisition Corp. IV	MCAF	CH-AUTO	1,250	3Q23
8	Project Energy Reimagined Acquisition Corp.	PEGR	Heramba Electric	450	2Q24
9	Aquaron Acquisition Corp.	AQU	Bestpath	1,200	2Q24
10	Blue World Acquisition Corp	BWAQ	Vietnam Sunergy Cell Company	-	2Q24
11	Direct Selling Acquisition Corp.	DSAQ	FlyBlade (India) Private Limited (Hunch Mobility)	223	1Q24
12	Finnovate Acquisition Corp.	FNVT	Scage International Limited	1,000	2Q24
13	Global Partner Acquisition Corp II	GPAC	Stardust Power, Inc.	490	3Q24
14	Keyarch Acquisition Corp	KYCH	ZOOZ Power Ltd.	100	3Q24

15	Nubia Brand International Corp.	NUBI	Honeycomb Battery Co.	700	1Q24
16	OCA Acquisition Corp	OCAX	Powermers Smart Industries	2,000	1Q25
17	Pegasus Digital Mobility Acquisition Corp.	PGSS	The SCHMID Group	504	2Q24
18	Revelstone Capital Acquisition Corp.	RCAC	Set Jet, Inc.	80	1Q24
19	TMT Acquisition Corp.	TMTC	eLong Power Holding Limited	450	4Q24

Source: Intro-act, Boardroom Alpha

Chart 63: Mobility SPACs (Closed Deals Since January 2022)

S. No	SPAC Name	Ticker (Old)	DE-SPAC	Ticker	Closing Date
1	Yellowstone Acquisition Co	YSAC	Sky Harbour LLC	SKYH	25-Jan-22
2	ECP Environmental Growth Opportunities Corp.	ENNV	Fast Radius, Inc.	FSRD	4-Feb-22
3	CITIC Capital Acquisition Corp	CCAC	Quanergy Systems	QNGY	8-Feb-22
4	Growth Capital Acquisition Corp.	GCAC	Cepton Technologies, Inc	CPTN	10-Feb-22
5	Queens Gambit Growth Capital	GMBT	Swvl	SWVL	31-Mar-22
6	Archimedes Tech SPAC Partners Co	ATSPT	SoundHound	SOUN	27-Apr-22
7	Zanite Acquisition Corp.	ZNTE	Eve	EVEX	9-May-22
8	Gores Guggenheim, Inc	GGPI	Polestar Automotive Holding UK Plc	PSNY	23-Jun-22
9	Global SPAC Partners Co.	GLSPT	Gorilla Technology Group Inc.	GRRR	13-Jul-22
10	Ventoux CCM Acquisition Corp.	VTAQ	Presto	PRST	21-Sep-22
11	AEA-Bridges Impact Corp	IMPX	LiveWire	LVWR	26-Sep-22
12	ACE Convergence Acquisition Corp	ACEV	Tempo Automation	TMPO	22-Nov-22
13	InterPrivate II Acquisition Corp.	IPVA	Getaround	GETR	8-Dec-22

14	Pacifico Acquisition Corp.	PAFO	Caravelle International Group	CACO	16-Dec-22
15	Crescent Cove Acquisition Corp.	COVA	ECARX	ECX	20-Dec-22
16	Jack Creek Investment Corp.	JCIC	Bridger Aerospace Group	BAER	24-Jan-23
17	PONO Capital Corp	PONO	AERWINS Technologies Inc.	AWIN	3-Feb-23
18	HPX Corp	HPX	Ambipar Emergency Response	AMBI	3-Mar-23
19	GX Acquisition Corp. II	GXII	Niocorp Developments Ltd	NB	17-Mar-23
20	CIIG Capital Partners II, Inc.	CIIG	Zapp	ZAPP	28-Apr-23
21	Goldenbridge Acquisition Limited	GBRG	Auto Services Group Limited	SDA	17-May-23
22	Jupiter Wellness Acquisition Corp.	JWAC	Chijet Motor Company	CJET	1-Jun-23
23	GoGreen Investments Corp	GOGN	Lifefone Metals Ltd	LZM	6-Jul-23
24	PROOF Acquisition Corp I	PACI	Volato, Inc.	SOAR	1-Dec-23
25	Prospector Capital Corp.	PRSR	LeddarTech	LDTC	21-Dec-23
26	EG Acquisition Corp.	EGGF	flyExclusive	FLYX	27-Dec-23
27	Innovative International Acquisition Corp.	IOAC	Zoomcar	ZCAR	28-Dec-23
28	Pono Capital Three, Inc	PTHR	Horizon Aircraft	HOVR	12-Jan-24

Source: Intro-act, Boardroom Alpha

MOBILITY EVENTS CALENDAR

S. No.	Event	Place	Dates
1	Auto Connected Vehicle Summit 2024	New Delhi, India	15-Feb to 15-Feb-2024
2	Vehicle Electrification and Battery Advancements Summit	Berlin, Germany	15-Feb to 16-Feb-2024
3	17th Automotive Seating Technology 2024	Frankfurt, Germany	20-Feb to 22-Feb-2024
4	9th Automotive Sensors and Electronics Summit	Munich, Germany	21-Feb to 22-Feb-2024
5	Generative AI for Automotive	Frankfurt, Germany	21-Feb to 22-Feb-2024
6	Geneva International Motor Show (GIMS 2024)	Geneve, Switzerland	26-Feb to 03-Mar-2024
7	American Hydrogen Forum	Texas, US	28-Feb to 29-Feb-2024
8	Green Hydrogen Summit USA	Seattle, US	28-Feb to 29-Feb-2024
9	Battery Japan - International Rechargeable Battery Expo	Tokyo, Japan	28-Feb to 01-Mar-2024
10	Impact Mobility Forum 2024	Paris, France	5-Mar-2024
11	11th Advanced E-Motor Technology 2024	Munich, Germany	5-Mar to 08-Mar-2024
12	12th Thermal Management for EV/HEV 2024	Munich, Germany	5-Mar to 08-Mar-2024
13	AeroTech, SAE International's Premier Professional Conference	North Carolina, US	12-Mar to 14-Mar-2024
14	CAEV Expo	Bangalore, India	14-Mar to 15-Mar-2024
15	Electrify Expo Orlando	Florida, US	16-Mar to 17-Mar-2024
16	14th Automotive Cybersecurity Detroit AI in Automotive Cybersecurity 2024	Michigan, US	19-Mar to 21-Mar-2024
17	4th Connected Vehicles USA 2024	Michigan, US	19-Mar to 21-Mar-2024
18	Autonomy Mobility World Expo 2024	Paris, France	20-Mar to 21-Mar-2024
19	EV Charging Summit & Expo 2024 EVCS	Las Vegas, US	20-Mar to 22-Mar-2024
20	Vehicle and Transportation Technology Innovation Meetings	Torino, Italy	26-Mar to 27-Mar-2024
20	Tires & Rubber 2024	Moscow, Russia	15-Apr to 18-Apr-2024
21	WCX World Congress Experience 2024	Michigan, US	16-Apr to 18-Apr-2024
22	Asia Sustainable Plastics Summit 2024	Singapore	18-Apr to 19-Apr-2024
23	The 3rd International Conference on Advanced Robotics and Automation Engineering (ARAE 2024)	Shanghai, China	19-Apr to 21-Apr-2024
24	ITS America Annual Meeting 2024	Arizona, US	22-Apr to 25-Apr-2024
25	Auto China 2024 - 18th Beijing International Automotive Exhibition	Beijing, China	25-Apr to 4-May-2024
26	ICITSSM 2024: International Conference on Intelligent Transport Systems and Smart Mobility	Istanbul, Turkey	26-Apr to 27-Apr-2024

Source: Intro-act, Multiple Web Sources

MOBILITY COMP TABLE

Peer Set	Price	Mkt Cap (\$ Mns)	Ent Val (\$ Mns)	Price Performance			Sales			EBITDA			Book Value		
				% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book	
ADAS		549,977	571,784			-7%	319,868	341,061	1.7 x	69,529	75,264	7.6 x		2.6 x	
1 Intel Corporation	INTC	43.1	182,142	211,180	19%	-43%	-14%	54,228	57,747	3.7 x	13,104	16,231	13.0 x	24.97	1.7 x
2 Qualcomm Incorporated	QCOM	148.5	165,864	169,289	6%	-32%	3%	35,832	37,945	4.5 x	13,193	13,669	12.4 x	18.54	8.0 x
3 Stellantis N.V.	FCAU	22.0	69,049	42,174	8%	-31%	-4%	190,870	206,560	0.2 x	30,585	33,442	1.3 x	26.86	0.8 x
4 Infineon Technologies	IFX-DE	36.7	47,869	50,677	21%	-22%	-12%	17,721	18,113	2.8 x	6,433	6,265	8.1 x	13.42	2.7 x
5 Microchip Technology	MCHP	85.2	46,086	51,938	11%	-19%	-6%	8,439	7,979	6.5 x	4,176	3,717	14.0 x	12.88	6.6 x
6 Teledyne Technologies	TDY	418.5	19,745	22,485	7%	-13%	-6%	5,636	5,875	3.8 x	1,358	1,462	15.4 x	184.85	2.3 x
7 Allegro MicroSystems	ALGM	25.9	4,993	4,662	105%	-5%	-14%	974	1,064	4.4 x	328	368	12.7 x	5.70	4.6 x
8 Coherent Corp.	COHR	47.5	7,201	13,000	27%	-45%	9%	5,160	4,584	2.8 x	1,194	961	13.5 x	31.94	1.5 x
9 Ambarella Inc	AMBA	52.6	2,115	1,899	90%	-17%	-14%	338	226	8.4 x	59	(25)	-	14.71	3.6 x
10 Luminar Technologies	LAZR	2.7	829	1,406	288%	-23%	-19%	41	75	18.7 x	(266)	(285)	-	(0.41)	-6.6 x
11 Navitas Semiconductor	NVTS	5.7	1,023	852	95%	-17%	-29%	38	79	10.8 x	(43)	(30)	-	2.26	2.5 x
12 Indie Semiconductor	INDI	6.1	979	1,108	83%	-23%	-25%	111	226	4.9 x	(61)	(25)	-	2.40	2.5 x
13 Hesai Group	HSAI	5.8	557	167	421%	-1%	-35%	174	259	0.6 x	(43)	(55)	-	4.65	1.3 x

Monthly Newsletter – The Mobility Industry

14	nLIGHT Inc	LASR	13.0	606	509	23%	-37%	-4%	242	206	2.5 x	(9)	(4)	-	5.56	2.3 x
15	Innoviz Technologies	INVZ	1.7	282	194	259%	-24%	-32%	6	17	11.3 x	(119)	(115)	-	1.41	1.2 x
16	Aeva Technologies	AEVA	0.9	223	(3)	146%	-45%	12%	4	4	-0.6 x	(130)	(134)	-	1.10	0.8 x
17	Ouster Inc	OUST	5.2	212	79	268%	-39%	-32%	41	83	1.0 x	(140)	(100)	-	4.78	1.1 x
18	Arbe Robotics	ARBE	1.9	150	101	292%	-12%	-11%	4	5	20.0 x	(38)	(32)	-	0.61	3.2 x
19	Cepton Inc	CPTN	2.6	42	90	450%	-9%	-17%	7	11	8.5 x	(53)	(45)	-	(2.00)	-1.3 x
20	AEye Inc	LIDR	1.3	8	(22)	2127%	-9%	-44%	4	2	-14.9 x	-	-	-	8.57	0.1 x

			Price	Mkt Cap (\$ Mns)	Ent Val (\$ Mns)	Price Performance			Sales			EBITDA			Book Value	
						% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/ EBITDA	Book/ Share	P/ Book
	Ancillary			905,379	1,027,428			-6%	698,002	731,553	1.4 x	108,086	132,384	7.8 x		1.5 x
21	Samsung Electronics	005930-KR	54.5	325,181	316,025	13%	-18%	-11%	194,013	226,484	1.4 x	33,301	56,908	5.6 x	40.43	1.3 x
22	Honeywell International	HON	202.3	133,340	147,258	4%	-14%	-4%	35,466	36,919	4.0 x	8,810	9,604	15.3 x	26.14	7.7 x
23	Eaton Corp.	ETN	246.1	98,260	106,025	2%	-37%	2%	20,752	23,131	4.6 x	4,170	4,900	21.6 x	46.04	5.3 x
24	Dow Inc	DOW	53.6	37,595	50,195	14%	-12%	-2%	44,622	45,487	1.1 x	5,361	6,286	8.0 x	26.49	2.0 x
25	Cummins Inc.	CMI	239.3	33,920	39,846	11%	-15%	0%	28,074	33,616	1.2 x	3,799	5,117	7.8 x	75.22	3.2 x
26	LyondellBasell Industries	LYB	94.1	30,529	40,316	8%	-14%	-1%	50,451	41,177	1.0 x	6,517	5,295	7.6 x	40.71	2.3 x
27	Westinghouse Air Brake	WAB	131.6	23,572	27,585	1%	-30%	4%	8,362	9,597	2.9 x	1,552	1,858	14.8 x	57.65	2.3 x
28	Aptiv PLC	APTV	81.3	23,005	28,486	54%	-13%	-9%	20,051	21,547	1.3 x	2,788	3,238	8.8 x	38.11	2.1 x
29	Celanese Corporation	CE	146.3	15,924	29,146	9%	-34%	-6%	9,673	10,967	2.7 x	2,642	2,451	11.9 x	59.63	2.5 x
30	Prysmian S.p.A.	PRY-IT	44.5	12,313	14,651	3%	-21%	-1%	17,172	16,940	0.9 x	1,590	1,748	8.4 x	16.36	2.7 x
31	Sumitomo Electric	5802-JP	13.5	10,733	15,778	0%	-24%	8%	29,421	29,479	0.5 x	2,661	2,734	5.8 x	18.33	0.7 x
32	United States Steel	X	47.0	10,518	11,735	7%	-57%	-3%	21,065	17,758	0.7 x	4,140	2,025	5.8 x	49.34	1.0 x
33	ITT Inc	ITT	120.8	9,916	9,835	2%	-37%	1%	2,988	3,268	3.0 x	582	669	14.7 x	29.34	4.1 x
34	Eastman Chemical	EMN	83.6	9,906	14,755	10%	-18%	-7%	10,580	9,209	1.6 x	1,816	1,610	9.2 x	45.16	1.9 x
35	Autoliv Inc.	ALV	107.1	9,014	10,581	4%	-26%	-3%	10,475	11,023	1.0 x	1,238	1,577	6.7 x	30.96	3.5 x
36	SKF AB	SKF.B-SE	19.9	8,490	10,350	4%	-26%	0%	10,054	9,654	1.1 x	1,454	1,537	6.7 x	11.49	1.7 x

37	Gentex Corporation	GNTX	33.1	7,728	7,453	4%	-22%	1%	2,299	2,506	3.0 x	590	678	11.0 x	9.73	3.4 x
38	Zhejiang Huayou Cobalt	603799-CN	3.5	5,936	12,995	191%	0%	-24%	9,157	9,773	1.3 x	1,209	1,475	8.8 x	2.80	1.2 x
39	Allison Transmission	ALSN	60.5	5,417	7,435	2%	-31%	4%	2,769	3,005	2.5 x	961	1,077	6.9 x	13.22	4.6 x
40	Guangzhou Tinci Materials	002709-CN	2.6	5,006	5,600	188%	0%	-25%	3,241	2,349	2.4 x	1,074	514	10.9 x	0.98	2.7 x
41	Koito Manufacturing	7276-JP	15.6	4,795	3,342	31%	-7%	0%	6,447	6,573	0.5 x	659	747	4.5 x	14.75	1.1 x
42	Nexans SA	NEX-FR	92.1	4,028	4,285	21%	-28%	5%	8,935	8,087	0.5 x	639	672	6.4 x	39.55	2.3 x
43	Sk le Technologies	361610-KR	55.6	3,964	4,596	69%	-22%	-9%	468	505	9.1 x	83	134	34.4 x	24.69	2.3 x
44	Johnson Matthey	JMAT-GB	20.7	3,801	4,993	40%	-16%	-4%	5,182	5,249	1.0 x	786	763	6.5 x	16.96	1.2 x
45	Modine Manufacturing	MOD	69.1	3,607	3,874	1%	-72%	16%	2,298	2,464	1.6 x	212	301	12.9 x	12.80	5.4 x
46	Stanley Electric	6923-JP	19.4	3,325	2,353	18%	-22%	9%	3,215	3,232	0.7 x	562	497	4.7 x	21.58	0.9 x
47	Hongfa Technology	600885-CN	3.1	3,259	3,803	82%	-2%	-20%	1,707	1,827	2.1 x	375	426	8.9 x	1.06	2.9 x
48	CIE Automotive	CIE-ES	26.6	3,188	4,960	21%	-6%	-6%	4,120	4,313	1.2 x	677	768	6.5 x	11.31	2.4 x
49	GEM Co.	002340-CN	0.6	3,183	5,994	93%	0%	-18%	4,234	3,855	1.6 x	456	406	14.7 x	0.52	1.2 x
50	Adient plc	ADNT	34.7	3,167	5,207	37%	-13%	-5%	15,395	15,641	0.3 x	911	986	5.3 x	23.78	1.5 x
51	Toyota Boshoku	3116-JP	16.8	3,149	2,661	20%	-15%	6%	11,959	13,450	0.2 x	698	983	2.7 x	16.73	1.0 x
52	Ningbo Shanshan	600884-CN	1.4	3,139	5,001	112%	0%	-27%	3,156	3,121	1.6 x	665	531	9.4 x	1.47	0.9 x
53	Carpenter Technology	CRS	61.6	3,043	3,744	20%	-38%	-13%	2,550	2,772	1.4 x	274	457	8.2 x	29.83	2.1 x
54	Xiamen Tungsten	600549-CN	2.1	3,013	5,598	74%	0%	-12%	6,999	5,184	1.1 x	626	527	10.6 x	1.07	2.0 x
55	Xiamen Faratronic	600563-CN	12.0	2,696	2,541	126%	-7%	-8%	558	571	4.5 x	180	181	14.0 x	2.75	4.4 x

56	Chengxin Lithium	002240-CN	2.8	2,604	2,846	126%	-2%	-12%	1,749	910	3.1 x	1,004	171	16.6 x	2.05	1.4 x
57	Toyoda Gosei	7282-JP	19.7	2,510	2,913	23%	-21%	5%	7,097	7,187	0.4 x	606	746	3.9 x	27.17	0.7 x
58	Hanon Systems	018880-KR	4.7	2,488	5,108	71%	-6%	-18%	6,839	7,104	0.7 x	657	652	7.8 x	3.65	1.3 x
59	Fujikura Ltd	5803-JP	8.4	2,476	2,981	7%	-23%	17%	5,923	5,237	0.6 x	716	563	5.3 x	8.05	1.0 x
60	Garrett Motion	GTX	8.6	2,082	3,590	14%	-25%	-11%	3,603	3,890	0.9 x	570	638	5.6 x	(2.85)	-3.0 x
61	Dana Incorporated	DAN	13.6	1,957	4,752	46%	-18%	-7%	10,156	10,646	0.4 x	700	841	5.6 x	11.01	1.2 x
62	TS Tech	7313-JP	12.9	1,750	844	10%	-17%	13%	3,006	2,991	0.3 x	190	-	-	17.63	0.7 x
63	Nantong Jianghai Capacitor	002484-CN	2.0	1,651	1,614	101%	-1%	-14%	657	729	2.2 x	130	150	10.7 x	0.89	2.2 x
64	KCC Corporation	002380-KR	184.7	1,641	4,510	11%	-23%	26%	5,273	4,684	1.0 x	701	549	8.2 x	546.86	0.3 x
65	Gentherm Incorporated	THRM	48.2	1,579	1,657	58%	-21%	-8%	1,205	1,461	1.1 x	140	175	9.5 x	20.13	2.4 x
66	Tokai Rika	6995-JP	16.1	1,517	1,112	5%	-32%	8%	4,148	4,240	0.3 x	271	390	2.9 x	23.88	0.7 x
67	Shenzhen Envicool	002837-CN	2.7	1,511	1,566	90%	0%	-31%	425	542	2.9 x	53	69	22.9 x	0.58	4.6 x
68	Hyundai Wia	011210-KR	43.7	1,188	1,616	25%	-13%	-12%	6,260	6,509	0.2 x	407	406	4.0 x	98.81	0.4 x
69	Nexteer Automotive	1316-HK	0.5	1,133	993	82%	-3%	-28%	3,840	4,229	0.2 x	356	360	2.8 x	0.78	0.6 x
70	SL Corporation	005850-KR	24.1	1,117	1,082	39%	-22%	-12%	3,155	3,692	0.3 x	255	408	2.7 x	31.88	0.8 x
71	Lotte Energy Materials	020150-KR	23.6	1,090	1,109	145%	-1%	-28%	556	606	1.8 x	105	69	16.2 x	24.42	1.0 x
72	American Axle Mfg.	AXL	8.1	947	3,305	25%	-22%	-8%	6,244	6,053	0.5 x	747	667	5.0 x	5.24	1.5 x
73	Exedy Corporation	7278-JP	19.5	946	781	0%	-34%	10%	2,080	2,110	0.4 x	209	229	3.4 x	35.23	0.6 x
74	Standard Motor	SMP	40.4	877	1,116	5%	-25%	1%	1,372	1,383	0.8 x	144	131	8.5 x	28.96	1.4 x

75	Aspen Aerogels	ASPN	11.2	857	898	54%	-53%	-29%	180	235	3.8 x	(61)	(32)	-	5.84	1.9 x
76	Martinrea International	MRE-CA	10.3	814	1,670	10%	-22%	-5%	3,492	3,919	0.4 x	376	462	3.6 x	14.44	0.7 x
77	Musashi Seimitsu	7220-JP	11.6	756	1,301	25%	-19%	8%	2,215	2,340	0.6 x	195	232	5.6 x	12.86	0.9 x
78	Tianqi Lithium	9696-HK	4.4	723	7,539	121%	-1%	-20%	5,881	5,325	1.4 x	4,950	4,426	1.7 x	4.41	1.0 x
79	F.C.C.Co. Ltd.	7296-JP	13.2	695	263	3%	-19%	13%	1,618	1,622	0.2 x	184	-	-	25.31	0.5 x
80	IRISO Electronics	6908-JP	23.8	585	461	65%	-4%	-5%	394	390	1.2 x	98	96	4.8 x	21.96	1.1 x
81	Holley Inc	HLLY	4.8	567	1,171	69%	-60%	-2%	688	660	1.8 x	115	128	9.2 x	3.73	1.3 x
82	Nippon Ceramic	6929-JP	18.4	500	244	15%	-9%	7%	175	169	1.4 x	41	42	5.8 x	15.09	1.2 x
83	SNT Motiv	064960-KR	33.3	486	147	29%	-12%	10%	794	882	0.2 x	109	111	1.3 x	55.69	0.6 x
84	W-SCOPE Corporation.	6619-JP	5.3	291	825	125%	-2%	-17%	340	343	2.4 x	119	91	9.0 x	6.96	0.8 x
85	Luxfer Holdings	LXFR	8.2	221	320	117%	-4%	-8%	423	399	0.8 x	63	37	8.6 x	7.10	1.2 x
86	Westport Fuel Systems	WPRT	6.3	108	129	112%	-22%	-5%	306	330	0.4 x	(27)	(17)	-	9.97	0.6 x
87	REE Automotive	REE	5.8	49	(36)	189%	-60%	12%	0	2	-16.0 x	(96)	(84)	-	15.71	0.4 x

			Price	Mkt Cap (\$ Mns)	Ent Val (\$ Mns)	Price Performance			Sales			EBITDA			Book Value	
						% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/ EBITDA	Book/ Share	P/ Book
Passenger OEMs				1,530,133	2,447,354											
88	Tesla Inc	TSLA	187.3	596,479	577,390	60%	-19%	-25%	96,773	111,524	5.2 x	15,249	16,935	34.1 x	19.67	9.5 x
89	Toyota Motor	7203-JP	20.5	334,838	454,482	0%	-35%	35%	276,394	301,462	1.5 x	32,122	43,345	10.5 x	16.74	1.2 x
90	Mercedes-Benz Group	MBG-DE	68.3	73,039	165,896	22%	-15%	0%	159,971	165,271	1.0 x	27,835	28,184	5.9 x	95.43	0.7 x
91	Honda Motor	7267-JP	11.5	62,289	88,805	8%	-30%	22%	124,960	138,716	0.6 x	10,150	12,975	6.8 x	17.93	0.6 x
92	Bayerische Motoren Werke	BMW-DE	105.1	60,952	150,428	17%	-13%	-5%	150,233	165,768	0.9 x	23,726	28,770	5.2 x	153.62	0.7 x
93	Ford Motor	F	11.7	46,084	150,355	32%	-18%	-4%	158,057	171,954	0.9 x	15,435	15,339	9.8 x	11.06	1.1 x
94	General Motors	GM	38.8	44,792	150,999	12%	-32%	-9%	171,842	171,545	0.9 x	16,905	17,004	8.9 x	53.57	0.7 x
95	Volkswagen AG	VOW-DE	143.0	42,183	269,525	38%	-22%	9%	299,434	340,624	0.8 x	49,017	50,076	5.4 x	352.18	0.4 x
96	Kia Corp.	000270-KR	77.1	30,997	17,418	2%	-30%	1%	74,859	77,009	0.2 x	10,502	10,366	1.7 x	89.11	0.9 x
97	Hyundai Motor	005380-KR	145.8	30,843	113,941	13%	-14%	-4%	121,732	124,822	0.9 x	15,072	14,574	7.8 x	272.43	0.5 x
98	LI AUTO	LI	27.7	24,444	12,368	71%	-25%	-21%	6,502	17,133	0.7 x	(414)	1,219	10.1 x	6.93	4.0 x
99	Suzuki Motor	7269-JP	45.8	22,472	23,913	0%	-30%	9%	34,003	36,250	0.7 x	3,894	4,517	5.3 x	34.68	1.3 x
100	SAIC Motor	600104-CN	1.9	22,040	42,464	19%	-6%	1%	107,174	102,837	0.4 x	4,342	4,330	9.8 x	3.51	0.5 x
101	Great Wall Motor	601633-CN	2.8	17,584	28,022	83%	-1%	-20%	24,185	29,450	1.0 x	1,870	2,292	12.2 x	1.09	2.6 x
102	Nissan Motor	7201-JP	4.0	16,140	56,421	20%	-16%	11%	78,317	88,949	0.6 x	6,112	7,706	7.3 x	10.53	0.4 x
103	Subaru Corp.	7270-JP	20.5	15,426	11,180	3%	-27%	14%	28,079	31,885	0.4 x	3,254	3,882	2.9 x	21.72	0.9 x

104	Rivian Automotive	RIVN	15.3	14,543	8,542	83%	-24%	-35%	1,658	4,412	1.9 x	(5,217)	(4,038)	-	11.04	1.4 x
105	Renault SA	RNO-FR	38.1	11,265	61,041	23%	-13%	-4%	49,513	57,550	1.1 x	6,020	7,602	8.0 x	113.28	0.3 x
106	Isuzu Motors	7202-JP	13.9	10,810	12,970	2%	-22%	8%	23,472	23,517	0.6 x	2,482	2,593	5.0 x	13.02	1.1 x
107	Geely Automobile	GELYF	1.0	9,560	6,916	79%	-1%	-15%	21,524	25,101	0.3 x	1,626	1,509	4.6 x	1.00	0.9 x
108	Nio Inc	NIO	5.6	8,827	7,883	188%	-3%	-38%	7,155	7,890	1.0 x	(1,886)	(2,225)	-	1.25	4.5 x
109	Mazda Motor	7261-JP	12.5	7,873	6,520	1%	-38%	16%	28,108	33,274	0.2 x	1,821	2,645	2.5 x	17.90	0.7 x
110	Lucid Group	LCID	3.4	7,738	5,720	286%	-25%	-20%	608	623	9.2 x	(1,969)	(2,622)	-	2.36	1.4 x
111	XPENG Inc	XPEV	8.3	6,406	4,056	184%	-10%	-43%	3,906	4,404	0.9 x	(1,143)	(1,443)	-	4.57	1.8 x
112	Polaris Inc.	PII	90.0	5,080	7,129	54%	-9%	-5%	8,934	8,445	0.8 x	1,013	987	7.2 x	23.59	3.8 x
113	Zhejiang Leapmotor	9863-HK	2.7	3,021	2,357	130%	-7%	-28%	1,797	2,760	0.9 x	(697)	(521)	-	0.76	3.5 x
114	Guangzhou Automobile	2238-HK	0.4	1,225	1,289	93%	-2%	-15%	15,994	18,887	0.1 x	176	262	4.9 x	1.52	0.3 x
115	Polestar Automotive	PSNY	2.2	1,015	3,034	200%	-27%	-4%	2,462	2,554	1.2 x	(753)	(834)	-	(0.29)	-7.4 x
116	Dongfeng Motor	489-HK	0.4	973	2,229	61%	-6%	-22%	13,472	13,186	0.2 x	(226)	244	9.1 x	2.54	0.2 x
117	BAIC Motor	1958-HK	0.3	671	2,774	25%	-12%	-9%	27,672	28,183	0.1 x	5,265	4,834	0.6 x	0.97	0.3 x
118	Fisker Inc	FSR	0.8	309	832	971%	-10%	-19%	0	353	2.4 x	(511)	(320)	-	0.99	0.8 x
119	Canoo Inc	GOEV	0.2	196	327	542%	-24%	-21%	0	1	262.9 x	(433)	(243)	-	0.25	0.8 x
120	Faraday Future	FFIE	0.1	17	129	78064%	-3%	28%	0	3	49.7 x	(532)	(241)	-	8.04	0.0 x

			Price	Mkt Cap (\$ Mns)	Ent Val (\$ Mns)	Price Performance			Sales			EBITDA			Book Value	
						% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book
Battery				446,175	639,456			-11%	567,940	579,664	1.1 x	76,097	71,452	8.9 x		1.4 x
121	CATL	300750-CN	21.1	92,882	91,303	88%	-7%	-8%	47,108	57,771	1.6 x	6,642	9,376	9.7 x	5.79	3.6 x
122	LG Energy	373220-KR	285.5	66,800	74,125	70%	-5%	-14%	25,254	26,703	2.8 x	3,328	4,617	16.1 x	68.07	4.2 x
123	BYD Company	002594-CN	23.8	27,698	65,999	92%	0%	-14%	61,591	86,640	0.8 x	5,968	9,158	7.2 x	6.30	3.8 x
124	Panasonic Holdings	6752-JP	9.6	23,649	27,188	30%	-11%	2%	62,332	57,357	0.5 x	4,997	5,471	5.0 x	13.08	0.7 x
125	LG Chem	051910-KR	325.6	22,982	41,615	99%	-12%	-16%	42,080	42,207	1.0 x	5,198	4,914	8.5 x	323.57	1.0 x
126	Samsung SDI	006400-KR	279.1	19,192	21,592	121%	-8%	-20%	17,093	18,042	1.2 x	2,505	2,986	7.2 x	212.14	1.3 x
127	Ecopro BM	247540-KR	160.0	15,645	16,963	186%	-50%	-28%	4,353	5,449	3.1 x	356	291	58.3 x	11.87	13.5 x
128	Albemarle Corporation	ALB	114.7	13,465	15,936	155%	-2%	-21%	7,320	9,454	1.7 x	3,476	3,312	4.8 x	84.34	1.4 x
129	AES Corporation	AESC	16.7	11,169	40,630	64%	-31%	-13%	12,617	12,510	3.2 x	3,435	3,265	12.4 x	2.90	5.8 x
130	Asahi Kasei	3407-JP	7.7	10,704	15,516	0%	-22%	5%	20,283	19,042	0.8 x	2,019	2,026	7.7 x	9.27	0.8 x
131	JFE Holdings	5411-JP	16.0	10,252	21,593	4%	-28%	4%	39,012	36,903	0.6 x	3,687	3,753	5.8 x	26.78	0.6 x
132	Mitsubishi Chemical	4188-JP	6.1	9,222	25,137	10%	-15%	6%	34,041	30,264	0.8 x	3,345	3,772	6.7 x	8.59	0.7 x
133	EVE Energy	300014-CN	4.8	8,955	12,572	182%	0%	-18%	5,280	7,186	1.7 x	553	852	14.8 x	2.32	2.1 x
134	SK Innovation	096770-KR	87.7	8,831	25,862	102%	-8%	-15%	62,232	57,399	0.5 x	4,582	3,178	8.1 x	186.24	0.5 x
135	AGC Inc	5201-JP	38.1	8,279	12,925	1%	-15%	10%	15,549	13,713	0.9 x	2,829	2,156	6.0 x	48.97	0.8 x
136	Sumitomo Metal Mining	5713-JP	28.1	8,159	11,155	48%	-5%	-1%	10,586	9,677	1.2 x	1,781	904	12.3 x	45.73	0.6 x

137	Ganfeng Lithium	002460-CN	4.7	7,648	12,759	160%	0%	-21%	6,015	4,751	2.7 x	2,961	856	14.9 x	3.40	1.4 x
138	Pilbara Minerals	PLS-AU	2.3	7,062	5,154	55%	-13%	-13%	2,616	874	5.9 x	2,124	462	11.2 x	0.77	3.0 x
139	Lundin Mining	LUN-CA	8.2	6,356	8,990	10%	-35%	0%	3,041	3,379	2.7 x	1,252	1,244	7.2 x	6.53	1.3 x
140	Quimica Y-SP	SQM	42.1	6,008	6,968	135%	0%	-30%	10,711	7,733	0.9 x	5,840	3,494	2.0 x	18.38	2.3 x
141	Shanghai Putailai New Energy	603659-CN	2.3	4,902	5,584	155%	-1%	-22%	2,246	2,377	2.3 x	624	568	9.8 x	1.03	2.2 x
142	Allkem Limited	AKE-AU	6.5	4,154		79%	-18%	-3%	1,200	1,198	-	906	648	-	5.47	1.2 x
143	Sumitomo Chemical	4005-JP	2.4	3,959	15,216	62%	-6%	-1%	21,210	17,814	0.9 x	1,185	229	66.5 x	5.31	0.5 x
144	EnerSys	ENS	95.6	3,861	4,517	19%	-18%	-5%	3,709	3,647	1.2 x	389	535	8.4 x	40.76	2.3 x
145	IGO Limited	IGO-AU	5.0	3,784	3,509	127%	-11%	-19%	663	533	6.6 x	1,298	474	7.4 x	3.42	1.5 x
146	Exide Industries	500086-IN	4.0	3,427	3,409	2%	-49%	6%	1,771	1,931	1.8 x	191	223	15.3 x	1.77	2.3 x
147	Cadiz Inc	002074-CN	2.6	3,371	8,041	92%	-2%	-14%	3,326	4,162	1.9 x	190	343	23.5 x	1.92	1.4 x
148	Livent Corporation	LTHM	16.5	2,969		77%	-23%	-8%	813	907	-	367	515	-	9.68	1.7 x
149	QuantumScape Corporation	QS	6.8	2,926	2,311	104%	-27%	-2%	0	0	-	(308)	(314)	-	2.88	2.4 x
150	Plug Power	PLUG	4.5	2,694	3,100	324%	-49%	-1%	701	931	3.3 x	(446)	(666)	-	5.80	0.8 x
151	Shenzhen Kedali	002850-CN	9.4	2,540	2,746	143%	-1%	-21%	1,263	1,522	1.8 x	237	278	9.9 x	5.27	1.8 x
152	Beijing Easpring Material	300073-CN	4.4	2,153	1,619	130%	0%	-18%	3,093	2,555	0.6 x	365	367	4.4 x	3.52	1.3 x
153	Amara Raja Batteries	500008-IN	10.7	1,826	1,807	1%	-38%	9%	1,256	1,361	1.3 x	165	182	9.9 x	3.98	2.7 x
154	Mitsui Mining and Smelting	5706-JP	31.4	1,800	3,028	4%	-31%	2%	4,850	4,333	0.7 x	335	404	7.5 x	32.36	1.0 x
155	UBE Corporation	4208-JP	16.9	1,790	2,984	9%	-15%	14%	3,634	3,282	0.9 x	306	283	10.5 x	27.89	0.6 x

156	Enovix Corporation	ENVX	9.3	1,562	1,365	157%	-19%	-26%	6	3	393.9 x	(85)	(110)	-	1.56	6.0 x
157	GS Yuasa	6674-JP	14.7	1,473	2,286	41%	-9%	4%	3,826	3,890	0.6 x	384	405	5.6 x	21.50	0.7 x
158	Guangzhou Great Power	300438-CN	2.8	1,411	1,630	309%	-1%	-29%	1,310	1,048	1.6 x	173	137	11.9 x	1.58	1.8 x
159	UACJ Corp.	5741-JP	28.1	1,359	3,781	1%	-37%	3%	7,116	5,997	0.6 x	405	460	8.2 x	39.07	0.7 x
160	Furukawa Electric	5801-JP	18.5	1,305	3,411	7%	-22%	18%	7,881	7,164	0.5 x	401	303	11.3 x	30.97	0.6 x
161	Ganfeng Lithiu-H	1772-HK	2.7	1,079	7,887	256%	-2%	-29%	6,015	4,727	1.7 x	2,923	837	9.4 x	3.32	0.8 x
162	Ballard Power	BLDP-CA	3.3	984	219	116%	-12%	-12%	84	91	2.4 x	(144)	(153)	-	3.56	0.9 x
163	Varta AG	VAR1-DE	19.1	816	1,410	70%	-22%	-17%	891	887	1.6 x	77	44	32.1 x	4.54	4.2 x
164	Lithium Americas	LAC-CA	4.4	704	554	182%	-3%	-32%	-	0	-	-	(23)	-	1.88	2.3 x
165	FuelCell Energy	FCEL	1.2	542	390	263%	-18%	-25%	123	138	2.8 x	(103)	(76)	-	1.52	0.8 x
166	SES AI	SES	1.3	403	130	173%	-8%	-28%	0	0	-	(51)	(70)	-	1.03	1.3 x
167	The Metals Company	TMC	1.3	401	379	144%	-50%	19%	0	0	-	(166)	(69)	-	0.18	7.2 x
168	ADS-Tec Energy	ADSE	7.5	367	368	7%	-75%	5%	29	109	3.4 x	(32)	(23)	-	1.17	6.4 x
169	Amprion Technologies	AMPX	4.1	362	313	160%	-36%	-22%	4	8	40.4 x	(13)	(32)	-	0.75	5.5 x
170	Kanto Denka Kogyo	4047-JP	6.1	350	442	30%	-19%	0%	576	437	1.0 x	-	-	-	8.40	0.7 x
171	Microvast Holdings	MVST	0.9	297	342	210%	-12%	-33%	204	297	1.2 x	(57)	(25)	-	1.80	0.5 x
172	Piedmont Lithium	PLL	15.3	294	208	402%	0%	-46%	0	100	2.1 x	(31)	27	7.6 x	18.12	0.8 x
173	Stella Chemifa	4109-JP	22.1	292	192	6%	-16%	6%	263	211	0.9 x	-	-	-	26.09	0.8 x
174	Solid Power	SLDP	1.6	289	105	138%	-32%	12%	12	19	5.6 x	(50)	(76)	-	2.90	0.6 x

175	Freyr Battery	FREY	1.4	189	(116)	648%	-7%	-28%	0	0	-231.1 x	(125)	(125)	-	4.53	0.3 x
176	Tanaka Chemical	4080-JP	5.8	188	242	118%	-3%	-11%	426	373	0.6 x	-	-	-	3.51	1.6 x
177	OPAL Fuels	OPAL	4.8	135	1,579	78%	-1%	-12%	236	263	6.0 x	61	60	26.3 x	(30.80)	-0.2 x
178	CBAK Energy	CBAT	1.1	94	88	38%	-30%	0%	-	207	0.4 x	-	-	-	1.29	0.8 x
179	Li-Cycle Holdings	LICY	0.4	77	295	1430%	-19%	-26%	13	10	29.5 x	(101)	(140)	-	1.70	0.3 x
180	Flux Power	FLUX	4.6	76	89	64%	-35%	11%	66	74	1.2 x	(4)	(0)	-	0.47	9.8 x
181	Advent Technologies	ADN	0.2	12	11	1198%	-5%	-28%	8	4	2.8 x	(47)	(55)	-	0.52	0.3 x

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						% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book
Charging				404,938	510,147			-3%	188,006	198,487	2.6 x	33,024	35,557	14.3 x		2.4 x
182	Siemens Aktiengesellschaft	SIE-DE	181.1	144,845	185,535	4%	-30%	-2%	84,593	88,209	2.1 x	14,919	16,329	11.4 x	66.83	2.7 x
183	Schneider Electric	SU-FR	198.7	113,808	125,987	2%	-29%	1%	36,476	39,127	3.2 x	7,136	7,937	15.9 x	50.26	4.0 x
184	ABB Ltd.	ABBN-CH	42.8	80,493	83,467	4%	-27%	-2%	29,446	32,078	2.6 x	4,695	5,913	14.1 x	7.76	5.5 x
185	Legrand SA	LR-FR	98.0	25,881	28,107	8%	-16%	-6%	8,975	9,186	3.1 x	2,030	2,221	12.7 x	28.41	3.5 x
186	Eversource Energy	ES	54.2	18,940	45,117	55%	-4%	-12%	12,289	12,723	3.5 x	3,852	3,768	12.0 x	44.91	1.2 x
187	SolarEdge Technologies	SEDG	66.5	3,778	3,483	420%	-5%	-29%	3,110	2,998	1.2 x	487	344	10.1 x	43.84	1.5 x
188	Sunrun Inc	RUN	14.5	3,155	14,308	100%	-42%	-26%	2,321	2,269	6.3 x	(210)	(1,376)	-	25.77	0.6 x
189	Bloom Energy	BE	11.3	2,536	3,398	135%	-16%	-24%	1,199	1,452	2.3 x	27	102	33.2 x	2.17	5.2 x
190	Shoals Technologies	SHLS	13.2	2,238	2,419	119%	-8%	-15%	327	491	4.9 x	93	171	14.2 x	3.09	4.3 x
191	Shenzhen Kstar	002518-CN	2.8	1,572	1,511	217%	0%	-28%	639	779	1.9 x	129	160	9.5 x	0.98	2.8 x
192	Alfen NV	ALFEN-NL	61.4	1,334	1,418	63%	-53%	-8%	470	542	2.6 x	84	58	24.3 x	8.07	7.6 x
193	Daihen Corporation	6622-JP	48.2	1,305	1,446	0%	-37%	16%	1,378	1,267	1.1 x	161	149	9.7 x	34.36	1.4 x
194	Sunnova Energy	NOVA	10.5	1,288	8,634	133%	-28%	-31%	558	757	11.4 x	119	229	37.7 x	12.73	0.8 x
195	ChargePoint Holdings	CHPT	1.9	794	698	618%	-18%	-19%	468	510	1.4 x	(226)	(273)	-	0.94	2.0 x
196	Nichicon Corporation	6996-JP	8.9	693	657	22%	-9%	10%	1,374	1,274	0.5 x	138	125	5.2 x	11.28	0.8 x
197	SunPower Corporation	SPWR	3.0	531	789	514%	-10%	-37%	1,741	1,699	0.5 x	95	(23)	-	2.41	1.3 x

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198	Stem Inc	STEM	3.0	461	943	284%	-21%	-24%	363	550	1.7 x	(46)	(19)	-	2.91	1.0 x
199	Wallbox N.V.	WBX	1.5	274	391	347%	-15%	-17%	157	163	2.4 x	(97)	(80)	-	1.05	1.4 x
200	Maxeon Solar	MAXN	4.5	239	403	759%	-14%	-37%	1,060	1,130	0.4 x	(109)	10	39.2 x	3.22	1.4 x
201	EVgo Inc	EVGO	2.3	237	726	256%	-18%	-36%	55	154	4.7 x	(80)	(62)	-	(0.91)	-2.5 x
202	Blink Charging	BLNK	2.4	162	111	542%	-9%	-29%	61	131	0.9 x	(61)	(71)	-	3.27	0.7 x
203	NaaS Technology	NAAS	1.6	128	205	714%	-32%	45%	13	79	2.6 x	-	-	-	0.10	15.5 x
204	Beam Global	BEEM	6.8	97	84	170%	-27%	-4%	22	66	1.3 x	(16)	(12)	-	3.60	1.9 x
205	Pioneer Power	PPSI	5.0	50	44	97%	-50%	-26%	27	44	1.0 x	(4)	2	20.0 x	1.86	2.7 x
206	Ideal Power	IPWR	7.3	43	33	86%	-6%	-7%	0	0	325.6 x	-	-	-	2.06	3.5 x
207	Charge Enterprises	CRGE	0.1	30	22	1064%	-42%	21%	698	607	0.0 x	(18)	-	-	0.11	1.2 x
208	Tritium DCFC	DCFC	0.1	24	212	1708%	-9%	-45%	185	201	1.1 x	(74)	(45)	-	(1.01)	-0.1 x

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						% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book
Commercial OEMs				116,957	182,287			0%	172,024	173,713	1.0 x	21,740	23,190	7.9 x		1.8 x
209	Paccar Inc	PCAR	100.4	52,512	57,788	3%	-33%	3%	33,316	31,857	1.8 x	6,068	5,091	11.4 x	30.34	3.3 x
210	Volvo AB	VOLV.B-SE	24.2	38,419	65,448	10%	-25%	-7%	53,006	48,314	1.4 x	8,690	7,600	8.6 x	8.68	2.8 x
211	Traton SE	8TRA-DE	24.7	12,340	33,323	1%	-35%	5%	42,698	50,084	0.7 x	4,108	6,576	5.1 x	35.55	0.7 x
212	Ryder System	R	113.6	5,034	12,494	5%	-33%	-1%	12,011	11,737	1.1 x	2,722	2,796	4.5 x	69.87	1.6 x
213	Iveco Group	IVG-IT	10.8	2,920	6,427	2%	-32%	20%	15,328	17,159	0.4 x	1,099	1,615	4.0 x	10.30	1.0 x
214	Hino Motors Ltd.	7205-JP	3.5	1,991	3,940	34%	-19%	6%	11,238	10,323	0.4 x	557	402	9.8 x	4.67	0.7 x
215	REV Group	REVG	19.5	1,166	1,332	6%	-50%	7%	2,638	2,636	0.5 x	157	177	7.5 x	8.37	2.3 x
216	Blue Bird	BLBD	29.1	938	996	2%	-54%	8%	1,133	1,227	0.8 x	88	119	8.3 x	1.24	23.4 x
217	Nikola Corporation	NKLA	0.7	865	780	396%	-30%	-15%	51	38	20.4 x	(434)	(556)	-	0.61	1.2 x
218	Lion Electric	LEV	1.8	396	627	63%	-14%	-1%	140	283	2.2 x	(55)	(36)	-	1.81	1.0 x
219	Hyzon Motors	HYZN	0.8	189	58	205%	-42%	-14%	4	0	-	(124)	(140)	-	0.73	1.1 x
220	Workhorse Group	WKHS	0.3	69	39	881%	0%	-26%	5	12	3.4 x	(112)	(85)	-	0.44	0.6 x
221	Xos Inc	XOS	8.2	49	65	285%	-33%	3%	36	43	1.5 x	(93)	(64)	-	9.72	0.8 x
222	TuSimple Holdings	TSP	0.2	47	(676)	1154%	-7%	-74%	9	1	-1,035.1 x	(380)	(306)	-	3.36	0.1 x
223	Ideanomics Inc	IDEX	1.0	12	49	2660%	-3%	-50%	101	-	-	-	-	-	1.38	0.7 x
224	Proterra Inc	PTRA	0.0	6	30	23180%	-70%	34%	309	-	-	(173)	-	-	1.21	0.0 x

225 Arrival SA

ARVL

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						Price Performance			Sales			EBITDA			Book Value		
			Price	Mkt Cap (\$ Mns)	Ent Val (\$ Mns)	% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book	
EV Components				329,820	372,841					428,503	426,393	0.9 x	43,002	46,876	8.0 x		1.3 x
226	Hitachi Ltd.	6501-JP	79.9	74,053	86,608	0%	-39%	11%	79,912	63,749	1.4 x	8,797	8,060	10.7 x	40.41	2.0 x	
227	Denso Corp	6902-JP	16.0	50,476	49,101	11%	-20%	12%	47,727	49,068	1.0 x	5,835	6,622	7.4 x	12.09	1.3 x	
228	Delta Electronics	2308-TW	8.9	23,237	24,258	40%	-2%	-12%	12,446	13,033	1.9 x	1,978	2,018	12.0 x	2.48	3.6 x	
229	Nidec Corporation	6594-JP	37.9	22,607	25,056	63%	-6%	-3%	16,683	15,938	1.6 x	1,648	2,178	11.5 x	19.17	2.0 x	
230	Shenzhen Inovance	300124-CN	7.8	18,164	21,030	44%	-7%	-12%	3,326	4,046	5.2 x	620	702	30.0 x	1.19	6.5 x	
231	Magna International	MG-CA	57.2	16,377	22,935	21%	-18%	-4%	37,840	43,307	0.5 x	3,083	3,757	6.1 x	40.75	1.4 x	
232	Jabil Inc.	JBL	125.3	15,980	17,647	13%	-41%	-2%	34,702	31,045	0.6 x	2,580	2,492	7.1 x	19.71	6.4 x	
233	Hyundai Mobis	012330-KR	157.3	14,736	9,238	25%	-6%	-11%	44,344	46,115	0.2 x	2,448	2,831	3.3 x	346.60	0.5 x	
234	Aisin Corporation	7259-JP	38.0	11,198	14,839	7%	-32%	19%	32,826	33,686	0.4 x	2,422	3,269	4.5 x	51.89	0.7 x	
235	Zhejiang Sanhua Intelligent	002050-CN	2.9	10,918	11,083	57%	-2%	-29%	3,081	3,700	3.0 x	497	599	18.5 x	0.65	4.5 x	
236	Hella GmbH	HLE-DE	89.2	9,909	10,335	4%	-23%	-2%	8,506	8,921	1.2 x	877	1,175	8.8 x	29.01	3.1 x	
237	LG Corp	003550-KR	61.4	9,664	8,769	21%	-13%	-5%	5,682	5,775	1.5 x	1,691	1,552	5.7 x	131.48	0.5 x	
238	Bosch Limited	500530-IN	283.8	8,371	8,011	2%	-29%	6%	1,821	2,049	3.9 x	209	252	31.8 x	47.20	6.0 x	
239	BorgWarner Inc	BWA	33.9	7,968	11,118	51%	-7%	-5%	15,801	14,307	0.8 x	2,279	1,930	5.8 x	24.54	1.4 x	
240	Ningbo Tuopu	601689-CN	6.8	7,894	8,795	74%	-1%	-34%	2,326	2,830	3.1 x	421	505	17.4 x	1.69	4.0 x	
241	Lear Corporation	LEA	132.9	7,743	10,423	19%	-11%	-6%	20,892	23,305	0.4 x	1,438	1,719	6.1 x	83.40	1.6 x	

242	Vitesco Technologies	VTSC-DE	88.0	3,523	3,238	18%	-31%	2%	9,877	10,199	0.3 x	777	890	3.6 x	84.11	1.0 x
243	LG Innotek	011070-KR	143.1	3,387	4,913	76%	0%	-23%	15,428	15,898	0.3 x	1,390	1,611	3.0 x	145.78	1.0 x
244	Valeo SE	FR-FR	13.2	3,233	8,861	84%	-8%	-14%	21,122	24,003	0.4 x	2,531	2,865	3.1 x	16.25	0.8 x
245	Visteon Corporation	VC	115.3	3,206	3,256	49%	-6%	-8%	3,756	4,012	0.8 x	348	432	7.5 x	25.95	4.4 x
246	Zhejiang Shuanghuan Driveline	002472-CN	2.8	2,141	2,853	83%	-1%	-22%	994	1,163	2.5 x	190	215	13.2 x	1.28	2.2 x
247	Mitsui High-Tec	6966-JP	47.1	1,859	1,795	52%	-13%	-3%	1,315	1,350	1.3 x	245	201	8.9 x	18.20	2.6 x
248	Zhuzhou CRRC Times	688187-CN	4.6	1,212	5,826	85%	-4%	-2%	2,622	3,105	1.9 x	467	518	11.2 x	3.57	1.3 x
249	TI Fluid Systems	TIFS-GB	1.8	941	1,808	13%	-40%	-5%	3,471	3,804	0.5 x	227	440	4.1 x	1.38	1.3 x
250	Meidensha Corporation	6508-JP	18.2	830	1,026	2%	-28%	6%	2,002	1,982	0.5 x	144	159	6.5 x	17.56	1.0 x
251	Hyllion Holdings	HYLN	1.1	192	18	270%	-51%	29%	2	1	12.8 x	(141)	(117)	-	1.83	0.6 x

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Air Mobility				280,245	356,539			-12%	169,812	186,363	1.9 x	13,203	19,208	18.6 x		6.9 x
252	Boeing Company	BA	211.0	127,674	165,835	27%	-16%	-19%	77,794	89,737	1.8 x	1,081	6,960	23.8 x	(27.67)	-7.6 x
253	Lockheed Martin	LMT	429.4	103,764	120,958	18%	-8%	-5%	67,571	69,339	1.7 x	10,002	9,772	12.4 x	28.48	15.1 x
254	Textron Inc.	TXT	84.7	16,604	18,791	2%	-28%	5%	13,683	14,670	1.3 x	1,552	1,713	11.0 x	36.02	2.4 x
255	Heico Corp	HEI	179.6	9,827	27,673	6%	-14%	0%	2,968	3,832	7.2 x	757	972	28.5 x	22.76	7.9 x
256	Elbit Systems	ESLT	206.8	9,193	10,676	9%	-22%	-3%	5,512	5,944	1.8 x	529	578	18.5 x	63.97	3.2 x
257	Joby Aviation	JOBY	5.5	3,802	2,719	119%	-33%	-18%	0	1	2,266.1 x	(299)	(355)	-	1.60	3.4 x
258	AeroVironment Inc	AVAV	120.6	3,394	3,405	19%	-31%	-4%	541	701	4.9 x	90	129	26.4 x	28.21	4.3 x
259	Kratos Defense	KTOS	16.9	2,183	2,500	27%	-35%	-17%	898	1,017	2.5 x	71	89	28.1 x	7.44	2.3 x
260	Kaman Corp	KAMN	45.1	1,275	1,833	0%	-60%	88%	688	770	2.4 x	80	108	16.9 x	24.05	1.9 x
261	Archer Aviation	ACHR	4.8	1,228	1,003	55%	-63%	-21%	0	0	3,856.8 x	(240)	(299)	-	1.28	3.8 x
262	EHang Holdings	EH	10.2	415	399	154%	-15%	-40%	6	16	24.5 x	(44)	(36)	-	0.22	46.1 x
263	Lilium N.V.	LILM	0.8	415	233	130%	-55%	-30%	0	0	-	(261)	(264)	-	0.55	1.5 x
264	Blade Air Mobility	BLDE	3.0	222	72	71%	-31%	-16%	146	226	0.3 x	(28)	(18)	-	3.54	0.8 x
265	Vertical Aerospace	EVTL	0.7	154	170	226%	-29%	5%	0	0	-	(87)	(91)	-	(0.02)	-34.6 x
266	Surf Air Mobility	SRFM	1.2	88	147	320%	-45%	-23%	-	111	1.3 x	-	(49)	-	0.39	3.1 x
267	Aerwins Technologies	AWIN	0.1	6	126	19255%	-18%	-38%	5	-	-	-	-	-	(0.09)	-1.0 x

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						% to High	% to Low	% YTD	FY0	FY1	EV/Sales	FY0	FY1	EV/EBITDA	Book/Share	P/Book
Shared Mobility				2,327,408	2,551,482			2%	1,307,095	1,412,092	1.8 x	125,313	163,795	15.6 x		5.3 x
268	Amazon Inc	AMZN	155.2	1,603,841	1,692,653	4%	-43%	2%	513,983	570,903	3.0 x	73,978	105,865	16.0 x	17.71	8.8 x
269	Walmart Inc	WMT	165.3	444,892	508,831	3%	-18%	5%	611,289	644,776	0.8 x	35,478	38,291	13.3 x	29.50	5.6 x
270	Uber Technologies	UBER	65.3	134,316	140,616	4%	-55%	6%	31,877	37,101	3.8 x	1,713	3,975	35.4 x	4.56	14.3 x
271	FedEx Corporation	FDX	241.3	60,297	91,750	18%	-24%	-5%	90,200	88,205	1.0 x	9,534	10,400	8.8 x	84.17	2.9 x
272	DoorDash Inc	DASH	104.2	38,631	38,174	6%	-51%	5%	6,583	8,582	4.4 x	361	1,181	32.3 x	16.46	6.3 x
273	DiDi Global	DIDIY	3.5	15,366	12,972	35%	-92%	-12%	21,283	28,435	0.5 x	(1,344)	166	78.3 x	2.79	1.3 x
274	Grab Holdings	GRAB	3.1	11,504	7,874	28%	-14%	-9%	1,433	2,348	3.4 x	(793)	(26)	-	1.63	1.9 x
275	Avis Budget	CAR	163.7	5,930	31,478	53%	-4%	-8%	11,994	12,058	2.6 x	4,127	2,507	12.6 x	(0.89)	-183.6 x
276	Lyft Inc	LYFT	12.5	4,801	4,361	47%	-37%	-17%	4,095	4,397	1.0 x	(417)	210	20.8 x	1.19	10.5 x
277	Yadea Group	1585-HK	1.4	4,186	3,200	93%	-2%	-20%	4,513	4,986	0.6 x	408	458	7.0 x	0.32	4.2 x
278	Hertz Global	HTZ	8.4	2,570	18,238	145%	-3%	74%	8,685	9,341	2.0 x	2,317	718	25.4 x	10.98	0.8 x
279	Gogoro Inc	GGR	2.1	518	759	140%	-3%	-18%	383	285	2.7 x	(34)	25	30.2 x	1.07	2.0 x
280	Socar Inc	403550-KR	12.3	404	597	42%	-32%	3%	310	303	2.0 x	69	60	9.9 x	5.35	2.3 x
281	Niu Technologies	NIU	1.8	121	4	227%	-3%	-20%	460	371	0.0 x	22	(1)	-	2.43	0.7 x
282	ElectraMeccanica Vehicles	SOLO	0.3	32	(25)	331%	-21%	-20%	7	0	-54.9 x	(104)	(33)	-	0.72	0.4 x

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Other Electronics				519,028	562,627			-2%	219,315	243,799	2.3 x	33,832	53,450	10.5 x		3.0 x
283	Applied Materials	AMAT	164.3	136,708	135,838	9%	-34%	1%	26,517	26,157	5.2 x	8,209	7,820	17.4 x	19.63	8.4 x
284	Micron Technology	MU	85.8	94,660	99,780	5%	-38%	0%	15,540	22,572	4.4 x	2,663	7,376	13.5 x	38.85	2.2 x
285	SK hynix	000660-KR	100.9	73,474	88,776	9%	-42%	-3%	24,529	42,288	2.1 x	4,595	18,771	4.7 x	62.29	1.6 x
286	Amphenol Corporation	APH	101.1	60,489	63,129	2%	-29%	2%	12,555	13,425	4.7 x	2,992	3,251	19.4 x	13.13	7.7 x
287	Mitsubishi Electric	6503-JP	15.1	32,360	30,800	0%	-28%	9%	36,442	35,493	0.9 x	3,564	3,694	8.3 x	11.52	1.3 x
288	Rockwell Automation	ROK	253.3	29,021	32,504	38%	0%	-18%	9,058	9,288	3.5 x	1,978	2,042	15.9 x	29.10	8.7 x
289	Teradyne Inc	TER	96.6	14,767	14,161	23%	-16%	-11%	2,676	2,825	5.0 x	665	700	20.2 x	15.93	6.1 x
290	Enphase Energy	ENPH	104.1	14,219	13,752	137%	-29%	-21%	2,331	2,323	5.9 x	730	765	18.0 x	7.43	14.0 x
291	Samvardhana Motherson	517334-IN	1.4	9,237	11,384	4%	-45%	11%	9,531	11,756	1.0 x	752	1,026	11.1 x	0.40	3.4 x
292	AVIC Jonhon Optronic	002179-CN	4.3	8,780	8,907	56%	0%	-22%	2,295	2,813	3.2 x	477	559	15.9 x	1.32	3.3 x
293	Yageo Corporation	2327-TW	17.6	7,463	8,541	15%	-22%	-8%	3,955	3,426	2.5 x	1,195	921	9.3 x	10.63	1.7 x
294	Littelfuse Inc	LFUS	241.9	6,024	6,508	28%	-12%	-10%	2,363	2,226	2.9 x	529	445	14.6 x	96.56	2.5 x
295	Innolux Corp.	3481-TW	0.5	4,742	4,103	11%	-33%	13%	7,421	6,807	0.6 x	89	419	9.8 x	0.84	0.6 x
296	Synaptics Incorporated	SYNA	106.8	4,187	4,388	33%	-37%	-6%	1,355	990	4.4 x	403	169	25.9 x	30.73	3.5 x
297	LG Display	034220-KR	8.7	4,116	15,271	45%	-10%	-6%	15,954	18,009	0.8 x	1,253	2,904	5.3 x	14.83	0.6 x
298	Avnet Inc	AVT	45.3	4,099	7,231	14%	-12%	-10%	26,537	24,146	0.3 x	1,315	1,033	7.0 x	53.00	0.9 x

299	Sitime Corp	SITM	106.6	2,418	1,859	34%	-24%	-13%	284	143	13.0 x	82	(14)	-	31.63	3.4 x
300	Qingdao TGOOD Electric	300001-CN	2.3	2,414	3,328	51%	-3%	-16%	1,698	2,063	1.6 x	177	167	19.9 x	0.88	2.7 x
301	ams-OSRAM AG	AMS-CH	2.4	2,386	4,761	146%	-34%	-4%	5,153	3,914	1.2 x	987	348	13.7 x	2.99	0.8 x
302	Alps Alpine	6770-JP	7.5	1,652	1,796	48%	-2%	-8%	6,796	6,515	0.3 x	586	427	4.2 x	13.17	0.6 x
303	CTS Corporation	CTS	41.1	1,279	1,226	21%	-14%	-6%	587	550	2.2 x	134	118	10.4 x	16.75	2.5 x
304	Shenzhen Yinghe	300457-CN	2.1	1,078	1,328	120%	-2%	-20%	1,310	1,432	0.9 x	103	180	7.4 x	1.35	1.5 x
305	Solum Co.	248070-KR	20.7	1,034	1,155	19%	-24%	0%	1,294	1,525	0.8 x	86	147	7.9 x	6.44	3.2 x
306	Methode Electronics	MEI	20.8	739	976	147%	-3%	-9%	1,180	1,151	0.8 x	147	97	10.1 x	23.68	0.9 x
307	BOE Varitronix	710-HK	0.6	510	318	305%	-4%	-29%	1,367	1,440	0.2 x	101	99	3.2 x	0.65	1.0 x
308	MicroVision Inc	MVIS	2.4	452	386	245%	-24%	-11%	1	7	51.7 x	-	-	-	0.52	4.6 x
309	Gilat Satellite	GILT	6.3	358	262	13%	-29%	4%	240	266	1.0 x	25	36	7.3 x	4.69	1.3 x
310	Magnachip Semiconductor	MX	6.5	253	91	79%	-1%	-13%	338	232	0.4 x	23	(26)	-	8.92	0.7 x
311	Vuzix Corporation	VUZI	1.7	106	68	263%	-6%	-20%	12	13	5.2 x	(25)	(24)	-	1.51	1.1 x

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Semiconductors				3,400,827	3,431,893				12%	294,334	327,939	10.5 x	129,378	165,689	20.7 x	6.8 x
312	NVIDIA Corporation	NVDA	615.3	1,519,717	1,512,463	3%	-69%	24%	26,974	59,057	25.6 x	10,107	35,011	43.2 x	13.49	45.6 x
313	Taiwan Semiconductor-SP	TSM	113.0	585,857	568,825	5%	-28%	9%	68,430	84,237	6.8 x	46,133	56,974	10.0 x	20.00	5.6 x
314	Broadcom	AVGO	1,180.0	552,406	577,865	9%	-52%	6%	35,819	49,791	11.6 x	23,213	29,586	19.5 x	57.94	20.4 x
315	Advanced Micro Devices	AMD	167.7	270,903	267,980	10%	-57%	14%	22,680	26,023	10.3 x	5,958	8,016	33.4 x	34.04	4.9 x
316	Texas Instruments	TXN	160.1	145,549	147,823	17%	-13%	-6%	17,519	15,806	9.4 x	8,572	7,321	20.2 x	18.59	8.6 x
317	Analog Devices	ADI	192.4	95,380	101,796	5%	-19%	-3%	12,306	10,007	10.2 x	6,278	4,557	22.3 x	71.67	2.7 x
318	NXP Semiconductors	NXPI	210.6	54,277	61,717	13%	-26%	-8%	13,205	13,244	4.7 x	5,461	5,327	11.6 x	33.03	6.4 x
319	STMicroelectronics NV	STMMI-IT	44.4	40,459	37,690	25%	-17%	-10%	17,286	16,527	2.3 x	6,146	5,123	7.4 x	18.53	2.4 x
320	Renesas Electronics	6723-JP	16.9	33,120	31,995	20%	-40%	3%	11,430	10,063	3.2 x	4,900	3,994	8.0 x	8.22	2.1 x
321	ON Semiconductor	ON	71.1	30,636	31,705	57%	-14%	-15%	8,326	8,239	3.8 x	3,372	3,223	9.8 x	17.38	4.1 x
322	Skyworks Solutions	SWKS	104.5	16,737	16,903	18%	-19%	-7%	4,772	4,464	3.8 x	1,960	1,616	10.5 x	38.87	2.7 x
323	Sanan Optoelectronics	600703-CN	1.5	7,651	8,621	124%	0%	-21%	1,908	1,966	4.4 x	607	542	15.9 x	1.09	1.4 x
324	Fuji Electric	6504-JP	51.0	7,618	7,886	0%	-28%	24%	7,413	7,331	1.1 x	972	1,040	7.6 x	27.24	1.9 x
325	Rohm Co.	6963-JP	17.6	7,270	7,099	43%	-12%	-2%	3,778	3,392	2.1 x	1,104	893	7.9 x	17.55	1.0 x
326	Wingtech Technology	600745-CN	4.7	5,790	7,606	114%	0%	-22%	8,383	8,826	0.9 x	919	969	7.9 x	4.30	1.1 x
327	Shinko Electric	6967-JP	37.8	5,114	4,648	16%	-30%	-3%	2,103	1,600	2.9 x	821	475	9.8 x	13.57	2.8 x

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328	Hangzhou Silan Microelectronics	600460-CN	2.5	4,211	5,040	140%	0%	-21%	1,205	1,306	3.9 x	288	184	27.4 x	0.71	3.6 x
329	Wolfspeed Inc	WOLF	32.6	4,079	6,021	170%	-16%	-25%	922	858	7.0 x	(11)	(119)	-	9.94	3.3 x
330	SG Micro	300661-CN	8.7	3,876	3,786	152%	-3%	-31%	463	367	10.3 x	146	49	76.9 x	1.11	7.8 x
331	StarPower Semiconductor	603290-CN	17.7	3,034	2,815	180%	0%	-30%	393	521	5.4 x	124	150	18.8 x	5.09	3.5 x
332	SICC Co.	688234-CN	6.8	2,929	2,775	109%	-2%	-27%	60	181	15.3 x	(20)	14	196.1 x	1.70	4.0 x
333	Vishay Intertechnology	VSH	21.7	2,743	2,783	39%	-6%	-9%	3,497	3,404	0.8 x	774	662	4.2 x	15.46	1.4 x
334	Sino Wealth Electronic	300327-CN	2.3	792	749	182%	0%	-27%	233	182	4.1 x	51	23	32.0 x	0.65	3.5 x
335	Bomin Electronics	603936-CN	1.0	620	722	140%	0%	-33%	423	430	1.7 x	54	49	14.7 x	1.16	0.8 x
336	Amtech Systems	ASYS	4.1	58	67	194%	-12%	-3%	113	117	0.6 x	(2)	9	7.9 x	6.23	0.7 x
337	Toshiba Corporation	6502-JP	31.4	0	14,512	15%	-5%	-100%	24,692	-	-	1,451	-	-	20.24	1.6 x

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Software			4,328,798	5,295,927				4%	684,735	758,006	7.0 x	259,824	301,815	17.5 x		5.6 x
338	Microsoft Corporation	MSFT	397.6	2,954,193	2,984,535	4%	-39%	6%	211,915	243,342	12.3 x	103,406	124,689	23.9 x	32.06	12.4 x
339	Alphabet Inc	GOOGL	140.1	829,112	1,672,022	10%	-37%	0%	307,394	340,529	4.9 x	122,226	140,412	11.9 x	22.74	6.2 x
340	IBM Corporation	IBM	183.7	167,703	215,306	7%	-34%	12%	61,860	63,719	3.4 x	14,637	15,523	13.9 x	25.28	7.3 x
341	Synopsys Inc	SNPS	533.4	81,347	80,480	8%	-35%	4%	5,843	6,618	12.2 x	2,187	2,619	30.7 x	40.43	13.2 x
342	Marvell	MRVL	67.7	58,527	62,515	9%	-46%	12%	5,920	5,502	11.4 x	2,099	1,715	36.4 x	17.63	3.8 x
343	Roper Technologies	ROP	537.0	57,363	63,942	5%	-22%	-1%	6,178	6,804	9.4 x	2,529	2,772	23.1 x	159.51	3.4 x
344	Ansys Inc	ANSS	327.8	28,480	28,716	11%	-21%	-10%	2,073	2,263	12.7 x	876	968	29.7 x	57.66	5.7 x
345	Keysight Technologies	KEYS	153.3	28,010	27,564	24%	-23%	-4%	5,464	5,215	5.3 x	1,780	1,578	17.5 x	26.66	5.7 x
346	Splunk Inc.	SPLK	153.4	25,843	27,415	0%	-46%	1%	3,654	4,008	6.8 x	744	1,053	26.0 x	1.18	130.0 x
347	Jacobs Solutions	J	134.8	17,024	20,351	5%	-19%	4%	16,352	17,251	1.2 x	1,436	1,567	13.0 x	51.96	2.6 x
348	Continental AG	CTTAY	8.3	16,554	23,168	3%	-25%	-3%	41,435	45,348	0.5 x	4,147	4,998	4.6 x	7.48	1.1 x
349	Gen Digital	SYMC	23.5	15,044	23,973	4%	-34%	3%	3,338	3,823	6.3 x	1,842	2,125	11.3 x	3.77	6.2 x
350	UIPath Inc	PATH	23.0	11,114	11,255	15%	-46%	-7%	1,059	1,287	8.7 x	72	223	50.5 x	3.46	6.6 x
351	Rambus Inc	RMBS	68.5	7,368	7,022	11%	-42%	0%	572	557	12.6 x	290	281	25.0 x	8.89	7.7 x
352	Full Truck Alliance	YMM	6.3	5,995	3,311	36%	-14%	-10%	966	1,158	2.9 x	-	-	-	4.56	1.4 x
353	KPIT Tech	542651-IN	18.7	5,120	5,055	5%	-54%	3%	407	583	8.7 x	77	118	42.8 x	0.91	20.6 x

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354	Verra Mobility	VRRM	23.9	3,977	4,935	2%	-37%	4%	742	809	6.1 x	339	370	13.3 x	2.43	9.8 x
355	Aurora Innovation	AUR	3.0	3,421	3,198	61%	-62%	-32%	68	0	-	(624)	(711)	-	1.41	2.1 x
356	Chroma Ate	2360-TW	6.4	2,725	2,713	50%	-17%	-7%	727	631	4.3 x	188	192	14.2 x	1.65	3.9 x
357	Centre Testing International	300012-CN	1.6	2,497	2,675	116%	-10%	-18%	742	793	3.4 x	204	203	13.2 x	0.51	3.2 x
358	Mobileye Global	MBLY	25.9	2,448	19,641	86%	0%	-40%	2,079	1,944	10.1 x	732	419	46.9 x	18.46	1.4 x
359	Secunet Security Networks	YSN-DE	180.1	1,171	1,190	55%	-26%	12%	374	422	2.8 x	69	66	18.0 x	19.03	9.5 x
360	Cerence Inc	CRNC	20.0	826	1,005	84%	-28%	2%	295	362	2.8 x	42	102	9.8 x	17.19	1.2 x
361	Conduent Inc	CNDT	3.6	782	2,001	37%	-33%	-1%	3,851	3,699	0.5 x	394	364	5.5 x	2.85	1.3 x
362	Karooooo Ltd.	KARO	24.6	760	734	22%	-24%	1%	192	224	3.3 x	78	90	8.1 x	4.65	5.3 x
363	Pony Testing	300887-CN	1.2	651	545	194%	-1%	-28%	547	368	1.5 x	73	65	8.3 x	0.90	1.3 x
364	Xperi Inc	XPER	10.7	464	415	28%	-26%	-3%	502	524	0.8 x	15	36	11.7 x	9.29	1.1 x
365	Iteris Inc	ITI	4.8	206	195	14%	-27%	-7%	156	173	1.1 x	(7)	14	14.3 x	1.58	3.1 x
366	Red Cat	RCAT	0.7	50	47	130%	-22%	-24%	10	18	2.7 x	-	-	-	0.82	0.8 x
367	WISeKey International	WKEY	2.2	13	(4)	377%	-38%	365%	24	31	-0.1 x	(7)	(11)	-	10.43	0.2 x
368	Cyngn Inc	CYN	0.2	12	1	493%	-49%	121%	0	2	0.9 x	(19)	(23)	-	0.26	0.9 x

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Telematics				308,512	473,054			4%	188,986	191,259	2.5 x	59,272	61,526	7.7 x		2.1 x
369	Verizon Communications	VZ	42.4	178,044	345,953	2%	-29%	12%	134,000	135,693	2.5 x	47,789	48,664	7.1 x	21.99	1.9 x
370	TE Connectivity	TEL	142.2	43,908	47,049	3%	-19%	1%	16,034	16,139	2.9 x	3,438	3,763	12.5 x	42.45	3.3 x
371	Baidu Inc	BIDU	105.3	29,868	15,849	53%	-7%	-9%	17,938	18,804	0.8 x	3,905	4,667	3.4 x	94.46	1.1 x
372	Garmin Ltd.	GRMN	119.5	22,862	21,277	8%	-22%	-7%	4,860	5,159	4.1 x	1,193	1,205	17.7 x	33.18	3.6 x
373	Trimble Inc	TRMB	50.9	12,652	15,593	22%	-22%	-4%	3,676	3,780	4.1 x	893	1,001	15.6 x	17.46	2.9 x
374	Sensata Technologies	ST	36.2	5,475	8,382	50%	-16%	-4%	4,029	4,040	2.1 x	913	909	9.2 x	21.28	1.7 x
375	Vontier Corp	VNT	34.6	5,338	7,475	4%	-35%	0%	3,184	3,087	2.4 x	776	718	10.4 x	4.92	7.0 x
376	Iridium Communications	IRDM	36.3	4,491	5,905	88%	-6%	-12%	721	790	7.5 x	424	463	12.8 x	7.47	4.9 x
377	Rogers Corporation	ROG	115.3	2,146	2,114	50%	-4%	-13%	971	924	2.3 x	160	160	13.2 x	65.03	1.8 x
378	Navinfo	002405-CN	0.9	2,079	1,651	148%	0%	-25%	486	510	3.2 x	(51)	(62)	-	0.70	1.3 x
379	Stoneridge, Inc.	SRI	17.8	490	647	40%	-20%	-9%	842	966	0.7 x	30	48	13.5 x	9.92	1.8 x
380	CEVA Inc	CEVA	19.2	452	328	89%	-15%	-15%	135	107	3.1 x	(0)	-	-	10.90	1.8 x
381	Zenrin Co.	9474-JP	6.1	349	269	15%	-5%	5%	433	425	0.6 x	52	60	4.5 x	6.23	1.0 x
382	Voxx International	VOXX	8.4	170	192	77%	-13%	-22%	534	-	-	9	-	-	14.00	0.6 x
383	Ondas Holdings	ONDS	1.4	80	103	80%	-77%	-10%	2	15	6.9 x	(40)	(29)	-	0.82	1.7 x
384	Root Inc	ROOT	8.1	78	(116)	83%	-59%	-23%	600	389	-0.3 x	(228)	(67)	-	12.21	0.7 x

385	Inseego Corp.	INSG	2.2	26	173	494%	-26%	0%	245	193	0.9 x	(10)	14	12.0 x	(7.76)	-0.3 x
386	CalAmp Corp.	CAMP	0.1	5	209	3435%	-3%	-44%	295	237	0.9 x	18	13	15.9 x	(1.96)	-0.1 x

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