



MOBILITY TECH

Q4 2021 INDUSTRY UPDATE

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We are entering what promises to be a pivotal year in electric and autonomous mobility. In this report, you will find an overview of Q4 2021 transactions. But first, some thoughts on how we see autonomy developing in 2022.

**VITALY M. GOLOMB, PARTNER
MOBILITY & SUSTAINABILITY**

Autonomy Gains Traction and Pulls In Other Industries In 2022

Autonomous vehicles continue to pull forward across the globe — with more torque than speed, it is true. But with pilot projects multiplying, regulatory and tech barriers falling, and industrial applications proving themselves out, 2022 will be a breakthrough year in many markets.

Consumer-focused autonomy in the form of so-called robotaxis is the most visible aspect of this large and diverse market, and arguably the one driving the most change. China, Europe, and the U.S. are building and expanding their official frameworks for accommodating and encouraging robotaxis.

More AVs on more roads

China's AutoX, backed by Alibaba Group, will expand its Shenzhen-centered driverless vehicle zone to 168 square kilometers (65 square miles), making it the world's largest — no

idle boast when large areas produce valuable datasets and test data that can't be simulated or bought.

In Beijing, Baidu and Pony.ai will test a fleet of approximately 100 vehicles in the city's challenging urban terrain, and Shanghai is the site of smaller-scale tests from SAIC Mobility and Momenta. The outcomes of these pilots will determine the scale and location of another location launching next year.

Munich and Paris will see robotaxi services from Intel and Sixt, though as is frequently the case there are significant regulatory barriers to operating at a large scale in these closely watched and (despite the pandemic) tourist-crowded metropolises.

Germany may pull ahead of its neighbors, however: like others, it is weighing allowing Level 3 vehicles on public roads, but also getting ahead of the game with preparations for Level 4 services. The vehicles and infrastructure to allow the latter are still some years off, but existing tests hint at how it might be best facilitated— for instance, building out the charging network that will certainly be needed for these fleets to operate at scale.

Building the buildout

According to a Bloomberg analysis, autonomous vehicles will account for 10 percent of EV electricity demand by 2040, and 20 percent by 2050 — and some may call those predictions conservative. But what is certain is that countries and companies that have invested in the pertinent infrastructure will find their foresight rewarded.

One company with an eye towards the future is Faurecia, which over the summer acquired industrial giant Hella for \$8.4 billion.



This promoted the resulting company into the top 10 global automotive suppliers, and its broadened expertise (Hella has significant positions in power and batteries, radar, and sensing, and ADAS) will serve as a powerful foundation for a next-generation mobility supplier.

Comparatively unsettled is the sensing and hardware suite for Level 3 and 4 autonomy. Lidar prices continue to fall (Bosch says it will have units below \$500 soon), while capabilities rise — but the poster child for machine perception is increasingly being displaced by other modalities.

Continental and ZF will both include 4D lidars (i.e. that offer an object's position in three dimensions, plus velocity) on 2022 production vehicles. Tesla has dropped lidar and radar, relying on more traditional cameras empowered by improved AI.

Meanwhile, Honda has at last implemented Level 3 capabilities in its currently Japan-only Legend, which uses all three types of sensors. The company's experience in safety and reliability is not to be discounted, so while more experimental automakers may specialize, larger players may well hedge their bets for the time being.

There is also room for new entrants and approaches, and next-generation systems based on unsupervised learning, like Helm.ai's, may yet become the Android of autonomy.

Doing the “dirty, dull, and dangerous” work

So much for consumer autonomy, but though exciting it is far from the only area being transformed by this technology. Another such industry is mining, where the sleeping giants at the base of the supply chain are increasingly adopting autonomous trucking. It's enough to support dedicated heavy equipment autonomy companies like Pronto AI, which specializes in this exclusively.

BHP has operated a fully autonomous fleet of trucks in Western Australia at its Jumblebar mine since 2017. Far from a mere experiment, the site has become one of the safest operations in the company's portfolio, with major incidents involving trucks dropping by more than 90 percent since the project started.

The company plans to bring on over a hundred more to be split between a Western Australian site and another in Queensland. And Brazil's Vale has begun operating a handful of trucks at the enormous Carajás iron mine there, with more on the way.

Logistics are one way in, but autonomy also has a role in finer operations like mapping and inspecting mines and caves, and monitoring work sites for security and safety purposes. No doubt as major operations like BHPs succeed, others like Vale will jump on board.

As usual there are high-profile cases that excite public interest, but opportunity extends far beyond the consumer market. Just how far will be increasingly clear in 2022 as the true reach of autonomous vehicles and support services continues to be explored.

MOBILITY INDUSTRY MARKET MAP

Q4 - 2021

ELECTRIC PASSENGER CARS



ELECTRIC COMMERCIAL VEHICLES



CAR SHARING



HYPERLOOP



ELECTRONIC MOTORCYCLES



PASSENGER ELECTRIC AIRCRAFT



MASS TRANSIT: ELECTRIC BUSES & SHUTTLES



MAPPING & SAFETY



EV POWERTRAINS



AUTONOMY



MOBILITY INDUSTRY MARKET MAP

Q4 - 2021

BATTERY- LITHIUM ION



CHARGING MANAGEMENT



CHARGING INFRASTRUCTURE



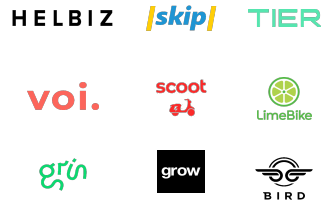
BATTERY - SOLID STATE



TECH-ENABLED LOGISTICS



E-BIKE & E-SCOOTER SHARING



BATTERY- SUPER CAPACITORS



VEHICLE TO GRID



LIDAR



MOBILITY TECH KEY HEADLINES

Q4 - 2021



SPACs

SPAC deal volume decreased but those announced were at premium valuations with over \$4B in enterprise value in autonomous technologies, electric vehicle charging, and micro-mobility

1. Embraer's eVTOL Eve is going public via SPAC Merger
2. Self-driving startup Aurora is now a publicly traded company
3. Self-driving truck tech firm Embark finally starts trading via \$5.2B SPAC deal
4. Solid Power SPAC deal, that was announced in June, completes merger at \$1.2B



Fundraising

Fundraising activity continues to soar through Q4 with over 10 rounds and more than \$15 billion in disclosed funding

1. SVOLT Energy closes \$940M B1 Round Financing
2. Chinese Ride-Hailing platform Nanjing LingHang Technology (T3) secures \$1.2B funding round
3. Hozon Auto closes \$622M in D1 funding round



Mobility Tech Industry News

Groundbreaking Q4 announcements confirm a growing, innovative, and diverse market

1. Mercedes becomes worlds first to get Level 3 Autonomous Driving Approval
2. Swedish battery manufacturer, Northvolt, produces fully recycled battery cell
3. Walmart drone delivery has started tests, dropping orders from the sky in 30 minutes
4. TuSimple will begin fully driverless freight routes in Arizona



MOBILITY TECH KEY HEADLINES

Q4 - 2021

IPO/SPAC

Embraer's eVTOL Eve is going public via SPAC Merger

[Forbes, Dec 21, 2021](#)

Rivian had the biggest IPO for a U.S. company since Facebook

[Car and Driver, Nov 11, 2021](#)

AVIATION

ABL Space Systems adds \$200M to Series B raise

[LA Business Journal, Nov 1, 2021](#)

MERGERS & ACQUISITIONS

Lemonade to acquire auto insurer Metromile

[Insurance Journal, Nov 9, 2021](#)

Ambarella closes acquisition of Oculii

[GreenStock News, Nov 8, 2021](#)

AUTONOMOUS VEHICLES

Self-driving startup Aurora is now a publicly traded company

[The Verge, Nov 4, 2021](#)

VENTURE CAPITAL

SVOLT Energy closes \$940M B1 Round Financing

[CNEV Post, Dec 13, 2021](#)

Hozon Auto closes \$622M in D1 funding round

[CNEV Post, Nov 18, 2021](#)

MICROMOBILITY

Lime raises over \$500M confirms plans to take its electric scooter company public

[The Verge, Nov 4, 2021](#)



M&A, SPAC, AND FUNDING

SELECTED M&A DEALS OF THE QUARTER

TOP DISCLOSED SPAC TRANSACTIONS

TOP DISCLOSED M&A TRANSACTIONS

SELECTED FUNDING DEALS OF THE QUARTER

SELECTED SPAC DEALS OF THE QUARTER

TOP DISCLOSED FUNDING ROUNDS

SELECTED M&A DEALS OF THE QUARTER

Metromile

TO

Lemonade

DEAL SIZE

\$500M

Metromile reached a definitive agreement to be acquired by Lemonade for \$500 million on November 8, 2021. The acquisition will help Lemonade to create customer-centric car insurance product

Oculii

TO

Ambarella

DEAL SIZE

\$308M

Oculii was acquired by Ambarella for \$307.5 million on November 5, 2021. The acquisition expands Ambarella's addressable market into radar perception

has.to.be
eMobility

TO

-chargepoint+



















DEAL SIZE

\$293M

has.to.be was acquired by ChargePoint for \$293 million on October 6, 2021. These key milestones further strengthen ChargePoint's commitment to the European EV charging market

TOP DISCLOSED M&A TRANSACTIONS

Q4 - 2021

COMPANY	COUNTRY	ACQUIRER	ACQUIRER COUNTRY	SUBSECTOR	DEAL SIZE	DATE
<i>SA Photonics</i>		CACI EVER VIGILANT		Lidar Technology	\$275m	Dec-21
SWIPCAR		CAZOO		Auto Rental	\$35m	Nov-21
CreditIQ™		cars.com		Auto Retail	\$30m	Nov-21
<i>Metromile</i>		<i>Lemonade</i>		Auto InsurTech	\$500m	Nov-21
		Ambarella™		Lidar Technology	\$308m	Nov-21
sense photonics 		OUSTER		Lidar Technology	\$68m	Oct-21
hugo				Micro-Mobility	\$150m	Oct-21
has-to-be eMobility 		-chargepoint+		Electric Vehicle Charging	\$293m	Oct-21

SELECTED SPAC DEALS OF THE QUARTER



SPA + PIPE

» AEA Bridges Impact Corp

DEAL SIZE

\$400M

LiveWire reached a definitive agreement to acquire AEA-Bridges Impact through a reverse merger, resulting in the combined entity trading on the New York Stock Exchange under the ticker symbol LVW on December 13, 2021.

Gett.

SPAC + PIPE

ROSECLIFF

DEAL SIZE

\$253M

Gett reached a definitive agreement to acquire Rosecliff Acquisition I through a reverse merger, resulting in the combined entity trading on the NASDAQ Stock Exchange under the ticker symbol GETT on November 10, 2021.



SPAC + PIPE

ZANITE

























DEAL SIZE

\$237M

Eve Air is in talks to be acquired by Zanite Acquisition through a reverse merger for an estimated \$237 million as of December 21, 2021, putting the company's post valuation at an estimated \$2.4 billion.

TOP SPAC TRANSACTIONS

Q4 - 2021

COMPANY	CONUTRY	SPAC	SPAC Country	Subsector	DEAL SIZE	DATE
 MOBILITY REIMAGINED		 ZANITE		Aviation/VTOL	\$237m	Dec-21
 LiveWire				Electric Vehicles	\$400m	Dec-21
 ALTUS POWER				Electric Vehicle Charging	\$636m	Dec-21
 votus				Electric Vehicle Charging	\$345m	Dec-21
 Gett.				Ridesharing/SaaS	\$254m	Nov-21
 arbe		 INDUSTRIAL TECH ACQUISITIONS, INC		Lidar Technology	\$18m	Oct-21

SELECTED FUNDING DEALS OF THE QUARTER



TOTAL VALUE

\$1.2B

The company raised \$1.2 billion of Series A venture funding in a deal led by CITIC Group on October 26, 2021. Dongfeng Motor, China FAW Group, Tencent Investment, Alibaba Capital Partners, Tongcheng Network, and others also participated in the round



TOTAL VALUE

\$939M

The company raised \$939 million of Series B1 venture funding from Han's Laser Technology Industry Group Company, Changzhou Xingyu Automotive Lighting Systems and Industrial Bank Company on December 11, 2021



TOTAL VALUE























\$639M

The company raised \$639 million of Series J venture funding in a deal led by Edelweiss Financial Services on December 9, 2021, putting the company's pre-money valuation at \$7.16 billion. The funds will be used to fuel its vision for the future of mobility across its various businesses including ride-hailing, vehicle commerce, delivery with foods, etc.

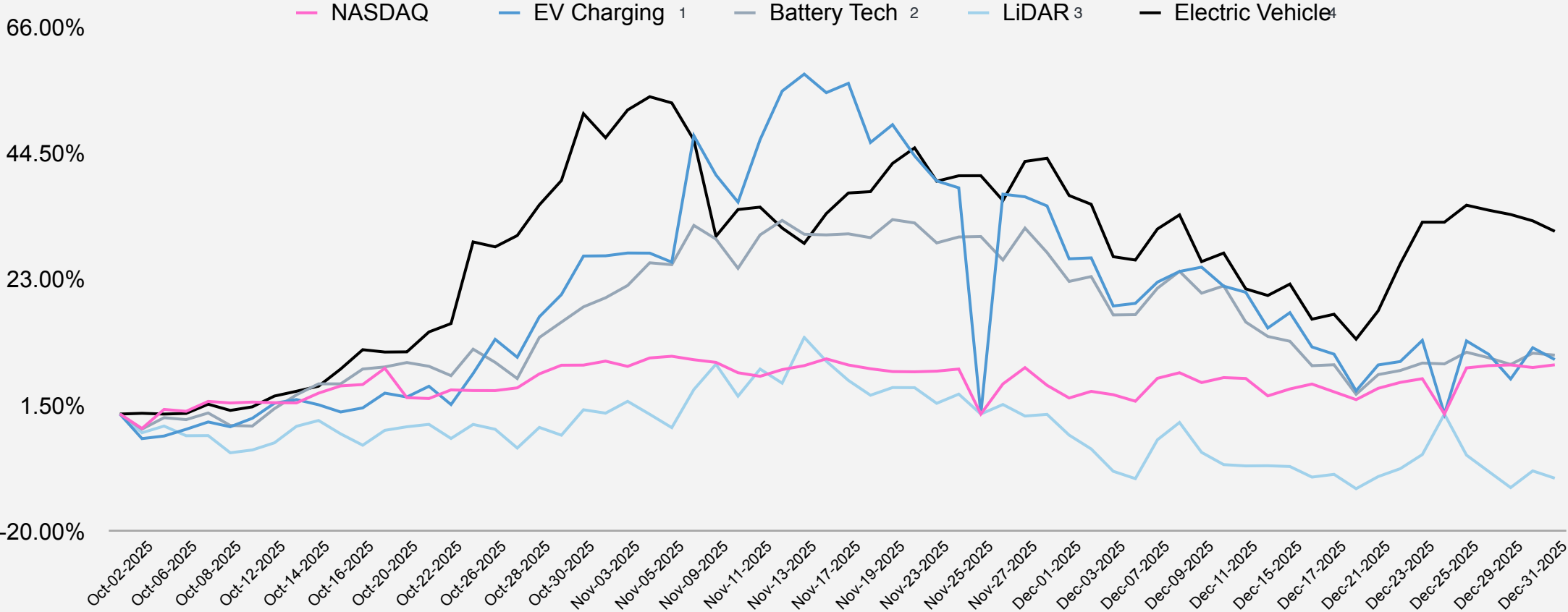
TOP DISCLOSED FUNDING ROUNDS TRANSACTIONS

Q4 - 2021

OVER \$11B DISCLOSED

COMPANY	CONUTRY	TYPE	Subsector	DEAL SIZE	DATE
 voi.		Series D	Ridesharing	\$115m	Dec-21
 CARS24		Series G	Auto Retail	\$400m	Dec-21
 SVOLT		Series B	Electric Vehicle Batteries	\$939m	Dec-21
 OLA		Series J	Ridesharing	\$639m	Dec-21
 WELTMEISTER		Series D	Electric Vehicles	\$152m	Dec-21
 NURO		Series D	Autonomous Vehicles	\$600m	Nov-21
 RAD POWER BIKES		Series D	Electric Vehicles	\$154m	Oct-21
 HOZON 合众新能源		Series D	Electric Vehicles	\$622m	Oct-21
 T3出行		Series A	Ridesharing	\$1.2b	Oct-21
 Skyryse *		Series B	Aviation	\$200m	Oct-21
 TIER		Series D	Micro-Mobility	\$200m	Oct-21

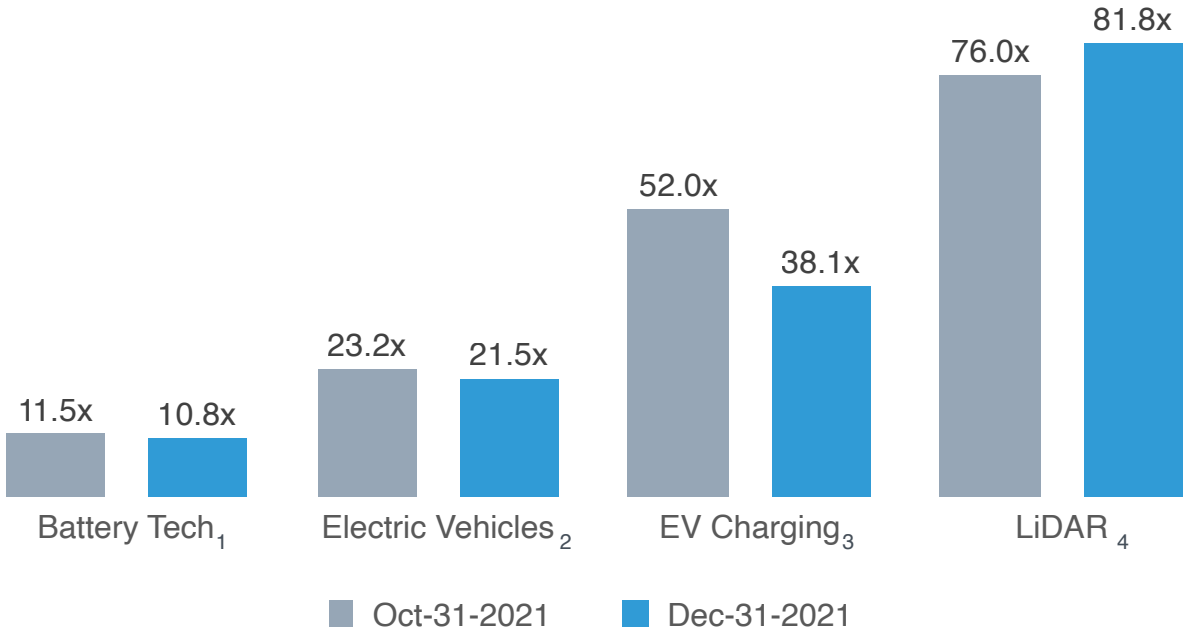
SHARE PRICES MOVEMENT IN Q4



Source: Capital IQ as of Dec 31st, 2021.
 1. Tesla, Nikola, Hylion, Fisker, Canoo, Lordstown Motors, Lucid Motors, NIO Holdings, Lion Electric
 2. Chargepoint, Nuvve, Evgo, Blink Charging, Volta, Wallbox
 3. Velodyne, Luminar, Aeva, Ouster, Innoviz, AEye
 4. MP Materials, QuantumScape, RomeoPower, Advent Tech, Lithium Americas, Livent, Albemarle, Glencore, Li-Cycle, Ennovix

SECTOR VALUATIONS BEGINNING TO END OF Q4

Median TEV / 2021E Revenue



Source: Capital IQ as of Dec 31st, 2021.

- 1. MP Materials, QuantumScape, RomeoPower, Advent Tech, Lithium Americas, Livent, Albemarle, Glencore, Li-Cycle, Ennovix
- 2. Tesla, Nikola, Hylion, Fisker, Canoo, Lordstown Motors, Lucid Motors, NIO Holdings, Lion Electric
- 3. Chargepoint, Nuvve, Evgo, Blink Charging, Volta, Wallbox
- 4. Velodyne, Luminar, Aeva, Ouster, Innoviz, AEye

A LEADING GLOBAL TECH
M&A INVESTMENT BANK

400+
TRANSACTIONS COMPLETED

70%
CROSS-BORDER DEALS

100+
BANKERS

10*
OFFICES GLOBALLY




*Including partner officers



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A SELECT SAMPLING OF OUR RECENT MOBILITY & SUSTAINABILITY DEALS

<p>MAJOR TRANSPORTATION INFRASTRUCTURE</p> <p>PENDING SPAC</p> <p>SPAC 1⁽¹⁾</p> <p>Advanced Mobility</p> 	<p>ORCHESTRATOR OF INTERNATIONAL TRADE</p> <p>PENDING SPAC</p> <p>SPAC 2⁽¹⁾</p> <p>Logistics</p> 	<p>wallbox </p> <p>COMBINATION WITH</p> <p>KENSINGTON Capital Acquisition Corp. II</p> <p>EV Charging Infrastructure</p> 	<p>TAYLOR-DUNN + GEM</p> <p>portfolio companies of</p> <p>POLARIS</p> <p>SALE TO</p> <p>WAEV</p> <p>Mobility</p> 	<p></p> <p>FREEWIRE</p> <p>PRIVATE PLACEMENT</p> <p>RIVER STONE</p> <p>Battery Integrated High Power EV Charging</p> 	<p>Last Mile Solutions</p> <p>PRIVATE PLACEMENT</p> <p>EW EUROWAG</p> <p>Electric Vehicle Solutions</p> 	<p></p> <p>ponooc</p> <p>SALE OF</p> <p>SERVICE HOUSE</p> <p>Digital Utility (Renewable Energies)</p> 
<p>EV CHARGING INFRASTRUCTURE</p> <p>CAPITAL RAISE</p> <p>INVESTOR 1⁽²⁾</p> <p>EV Charging Infrastructure</p> 	<p>ubitricity </p> <p>SALE TO</p> <p></p> <p>Electric Vehicle Charging Solutions</p> 	<p></p> <p>THE MOBILITY HOUSE</p> <p>PRIVATE PLACEMENT</p> <p>SPgroup</p> <p>AND</p> <p>EIB FINANCING FACILITY</p> <p>European Investment Bank</p> <p>Fleet Charging and Vehicle-Grid-Integration</p> 	<p></p> <p>THE MOBILITY HOUSE</p> <p>PRIVATE PLACEMENT</p> <p></p> <p>MERCURIA</p> <p>Vehicle-Grid-Integration</p> 	<p></p> <p>SOLD A MAJORITY STAKE OF ITS CHARGE POINT OPERATOR ACTIVITIES TO</p> <p>Infracapital</p> <p>PART OF</p> <p>M&G INVESTMENTS</p> 	<p></p> <p>ETERGO</p> <p>SALE TO</p> <p>OLA ELECTRIC</p> <p>E-Mobility</p> 	<p>pod POINT</p> <p>SALE TO</p> <p>EDF </p> <p>Electric Vehicle Charging Solutions</p> 

1. Includes active mandates expected to announce in 1H 2022 (2) Completed 2021, not yet announced



MOBILITY TECH

Q4 2021 Industry Update

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