Niche Li-ion applications outlook

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NAATBatt 2022

E Source

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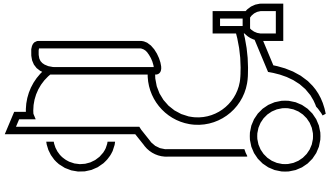
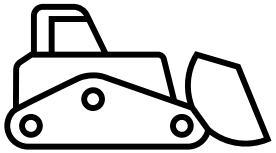
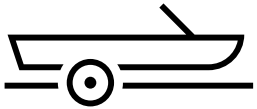
E Source supports many of the world's largest utilities, cities, and multinationals throughout the battery supply chain.

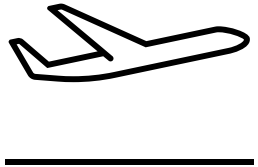
Our innovative solutions are delivered through predictive data science, market intelligence, consulting, and advisory services.

Niche transportation applications

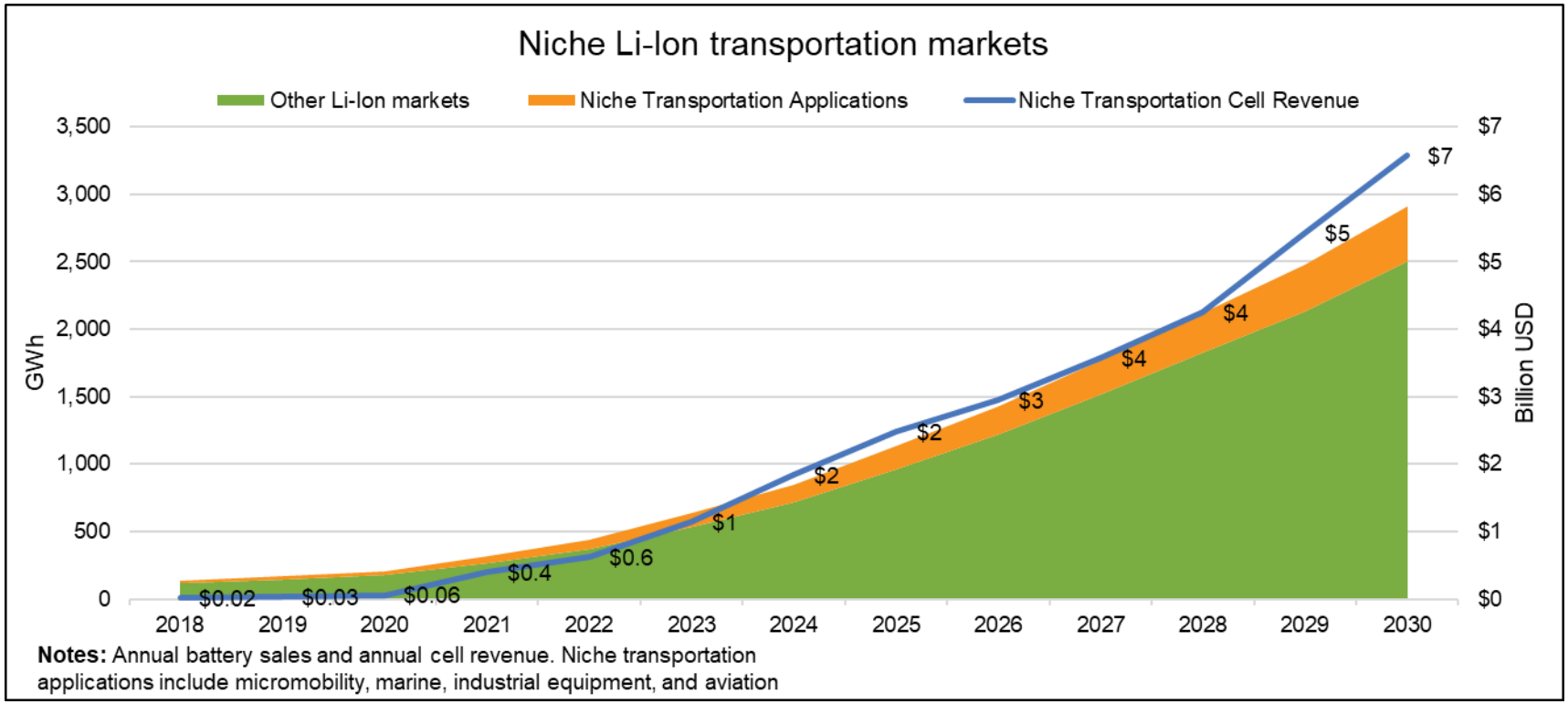








Li-ion battery demand forecast

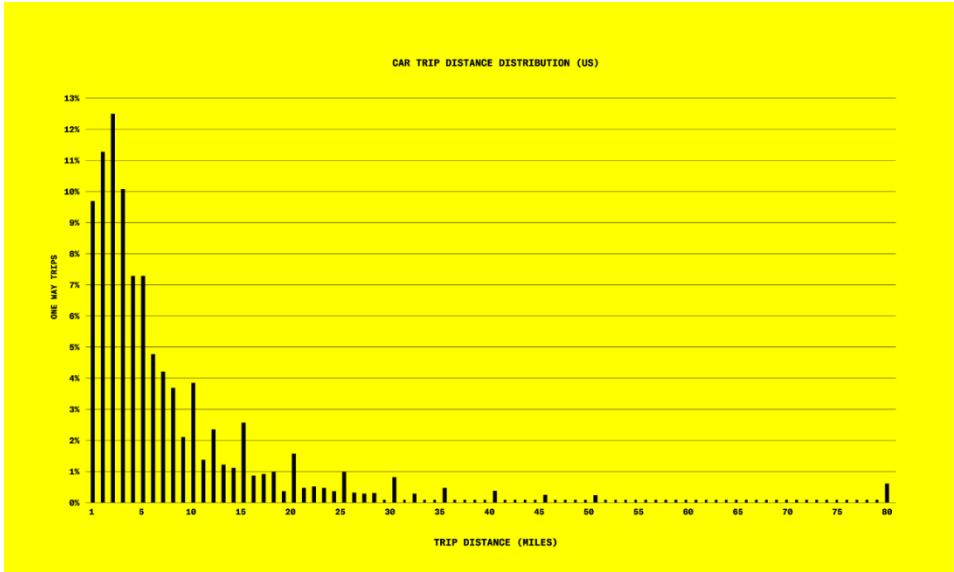


Notes: Annual battery sales and annual cell revenue. Niche transportation applications include micromobility, marine, industrial equipment, and aviation

Micromobility

Motivation for micromobility: the last ten miles

- Solving the last mile problem is a big step. Solving the last ten miles is transformational.
- That's where improvements in batteries come into the micromobility picture: A vehicle manufacturer can now buy a battery pack that will last years and will push a personal vehicle 10-20 miles for a few hundred dollars.
- The world now has a cheap, clean and enjoyable way to get where they need to be in a ten-mile radius. As the chart from Horace Dedieu to the right shows, more than 80% of automotive trips in the U.S. went ten miles or less.



Source: Horace Dedieu, Micromobility Industries

Micromobility

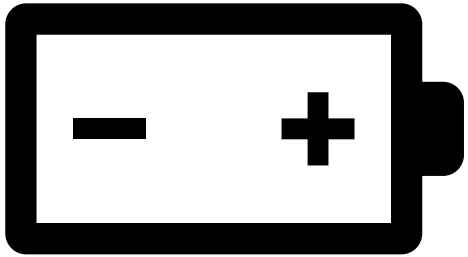
The emergence of micromobility

It’s not just about vehicle form factor.

It’s not just about the political or social climate.

It’s not just about the startup ride sharing platform.

It’s mostly about the battery.

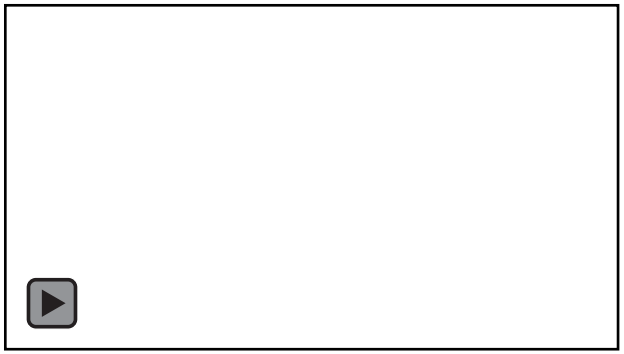


Micromobility

Shared micromobility inhibitors

Discarded shared bicycles in Hangzhou
Source: BI

- Mass adoption of shared micromobility is not a done deal. Several prominent inhibitors to micromobility still remain, including:
  - Safety
  - Liability
  - Clutter
  - Vandalism/Theft
  - Regulatory support



Spin Self-parking Scooter
Source: Spin

Micromobility

The promise of micromobility

- Electrification of micromobility in China has already been achieved. More than 300 million vehicles have been sold. They have contributed to air pollution and congestion improvements.
- The Chinese experience will be repeated globally. Micromobility will boom in developing nations due to economics and air pollution. NA, Europe and north Asia will adopt micromobility due to improved driver experience (measure in smiles, not miles).

Micromobility

Vehicle taxonomy

EKick: Standup kick scooter for one driver.

Pack Size: 0.2-0.75 kWh

Typical Range: 6-8 miles

Speed: <12 MPH

2030 Battery Forecast: 43 GWh

EBike: Sit-down two-wheeled vehicle with traditional bicycle geometry.

Pack Size: 0.4-1 kWh

Typical Range: 25 miles

Speed: <25 MPH

2030 Battery Forecast: 41 GWh

EScooter: Sit-down scooter with similar geometry to mopeds or vespas.

Pack Size: 1.2-2 kWh

Typical Range: 50 miles

Speed: <45 MPH

2030 Battery Forecast: 149 GWh

EMotorcycle: Two-wheeled single-rider highway-capable vehicle.

Pack Size: 6-15 kWh

Typical Range: 80+ miles

Speed: highway

2030 Battery Forecast: 126 GWh

ETuk: Three- or four-wheeled vehicle used for cargo-hauling or ride hailing with multiple occupants.

Pack Size: 4-8 kWh

Typical Range: 50 miles

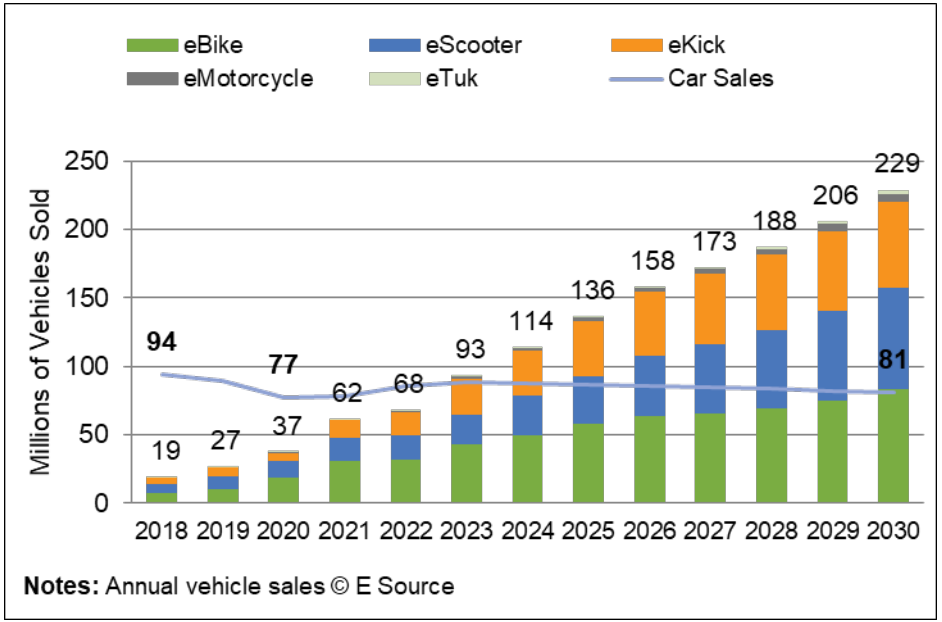
Speed: <45 MPH

2030 Battery Forecast: 19 GWh

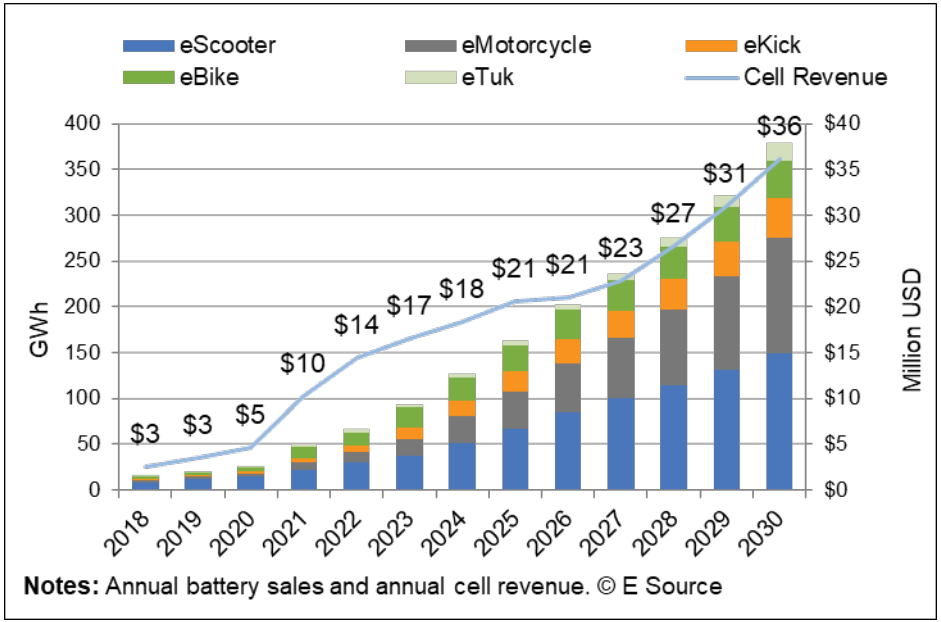
Source: Trek, Gogoro, Harley Davidson, Wikimedia Commons

Micromobility

Vehicle sales and cell revenue forecasts



Notes: Annual vehicle sales © E Source

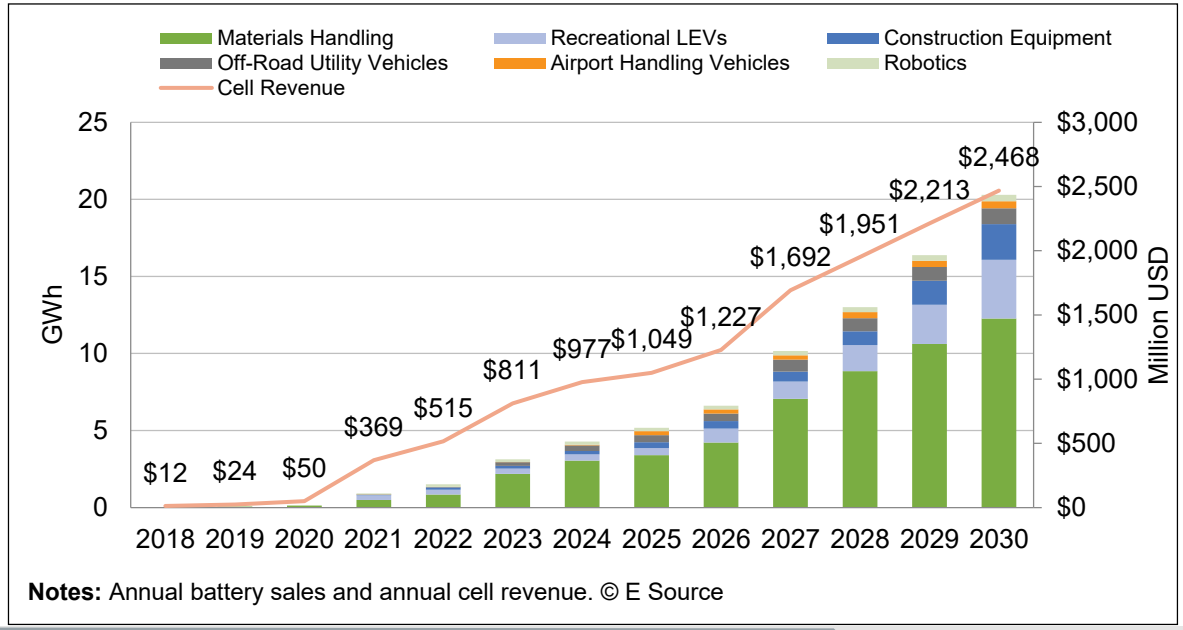


Notes: Annual battery sales and annual cell revenue. © E Source

Industrial equipment

Industrial equipment market forecast

- E Source expects the industrial equipment segment will consume 1.5 GWh of batteries in 2022, and that this will rise to 20.3 GWh in 2030.
- Materials handling will consume 60% of the cells sold into the industrial equipment segment.
- The total industrial equipment segment will represent a $2.3 billion dollar industry in 2030.
- Average cell pricing for materials handling vehicles will drop from $324/kWh in 2022 to $122/kWh in 2030.
- Robotics cell pricing will drop from $486/kWh in 2022 to $152/kWh in 2030.

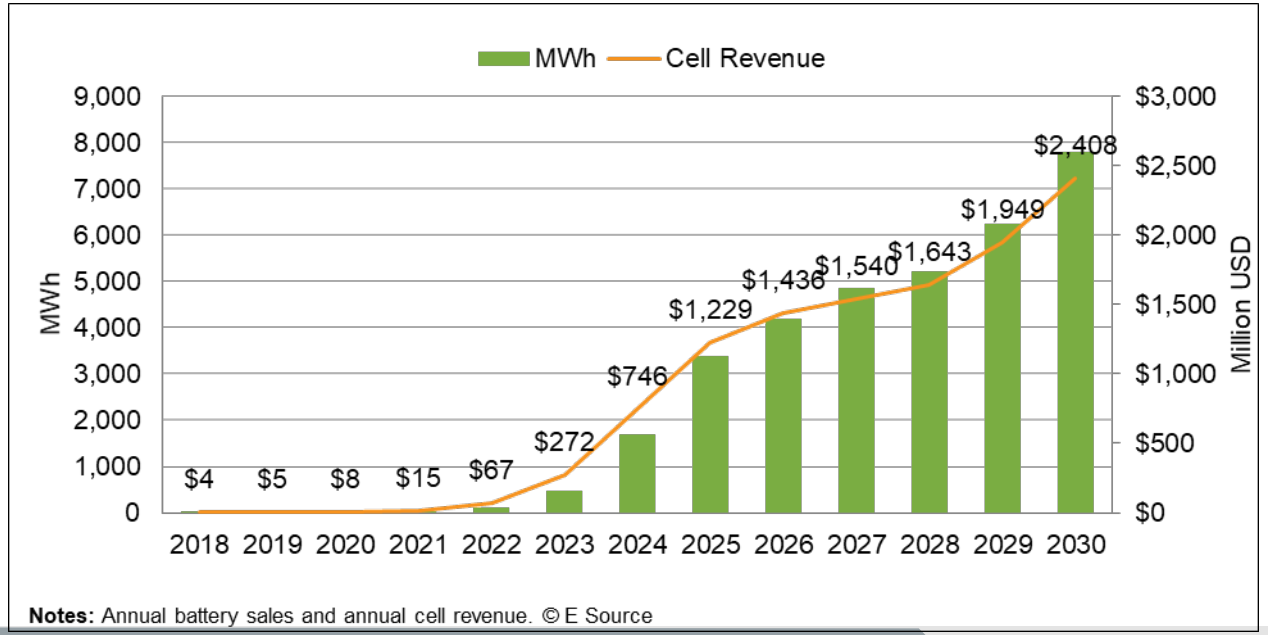


Notes: Annual battery sales and annual cell revenue. © E Source

Marine

Marine market forecast

- E Source expects the marine segment will consume 11 MWh of batteries in 2022, and that this will rise to 7.8 GWh in 2030.
- The marine segment will purchase $2.4 billion dollars of cells in 2030.
- Average cell pricing for the marine segment will drop from $559/kWh in 2022 to $301/kWh in 2030.

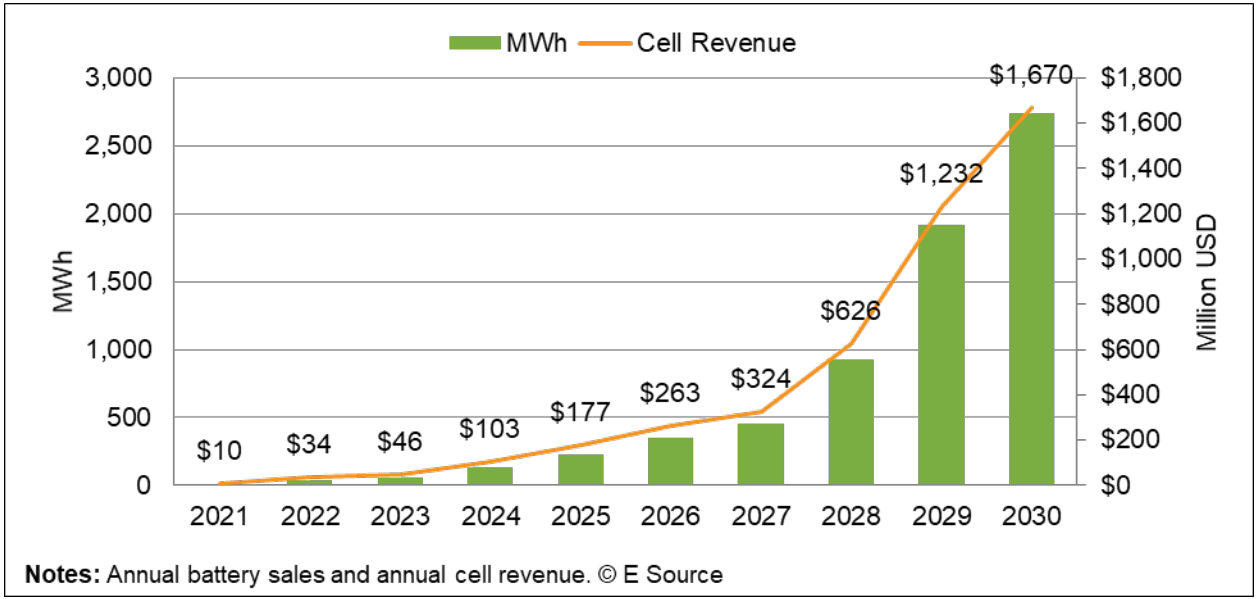


Notes: Annual battery sales and annual cell revenue. © E Source

Aviation

Aviation market forecast

- E Source expects the aviation segment will consume 36 MWh of batteries in 2022, and that this will rise to 2.7 GWh in 2030.
- The aviation segment will purchase $1.7 billion dollars of cells in 2030.
- Average cell pricing for the aviation segment will drop from $929/kWh in 2022 to $610/kWh in 2030.



Notes: Annual battery sales and annual cell revenue. © E Source

Contact us

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